Universitat Oberta de Catalunya

PhD programme on the Information and Knowledge Society

KNOWLEDGE ENTREPRENEURSHIP IN UNIVERSITIES

Practice and Strategy in the Case of Internet Based Innovation Appropriation

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Title:

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Practice and Strategy in the Case of Internet Based Innovation Appropriation

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Universitat Oberta de Catanlunya

Program

PhD programme on the Information and Knowledge Society

Thesis delivered to obtain the certification as Doctor of Philosophy

Date

September, 21. 2007

To my mother who raised me to become curi-	ous and reflective
And to my dad who taught me pragma	atism and strategy

"Believe those who are seeking the trut	th, doubt those who find it" Andre Gide
"The world is my representation"	Artur Schopenhauer

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Index of Abbreviations

CAS Complex Adaptive System
CeDiS Centrum für Digitale Systeme

CIDEM Centre for Innovation and Business Development

CIO Chief Information Officer

CLT Centre for Learning Technology
CRUE Spanish University Rector Conference.

CTT Centre for Technology Transfer
DFG German Research Foundation's
eAS electronic Administration and Services
ERP Enterprise Resource Planning

FU Freie Universität (Berlin)
GDP Gross Domestic Product

GUNI Global University Network for Innovation

HEI Higher Education Institution

ICE Institute for the Science of Education

ICT Information and Communication Technology

IN3 Internet Interdisciplinary Institute

ISI Use of Knowledge LSE London School of Economics

MIT Massachusetts Institute of Technology

OER Open Educational Resources

OCW Open CourseWare
PIC Project Internet Catalonia
RSS Real Simple Syndication
TAM technology acceptance model
UOC Universitat Oberta de Cataluñya
UPC Universitat Politecnica de Cataluñya

WTO World Trade Organisation

ZEDAT Zenraleinrichtung für Datenverarbeitung

Acknolwedgements

First of all I would like to thank Josep-Maria Duart for his assistance and supervision throughout the entire PhD research project.

Thanks also to Adam Starr, who did a great job proof-reading and editing, as well as to Daniel Krause, who - as expected – helped me visualize the concepts with some stunning diagrams and illustrations.

Also I would like to thank all the stakeholders of the universities (LSE, FU, UPC, UOC) who found the time to give me an interview and later review and comment on the case-studies.

Furthermore I would like to thank the following colleagues and friends for giving me constructive critique and comments, which made me rethink and double check many aspects described: David Casacuberta, Guenter Faltin, Josep Llados, Peter Baumgartner, Tony Bates, Pere Losantos, Henry Etzkowitz, Guenter Faltin, Barbara Hoppe, Peter Bihr, Thomas Praus, Patrik Varadinek, Tom Lombardo, Fritz Fleischmann, Hannes Gräf, Alejandro Riera, Heiner Lutzman.

Last but not least I would like to thank my friends who participated in the nights of BaDeBaTe (Barcelona Debate). This group, which met once a month to hold a debate about a theme chosen by the circulating host, was one of the most rewarding knowledge ventures I have created so far and especially the night where we were discussing the philosophy of this thesis ("La Defensa de Amigos") was a very valuable source of feedback and critique.

Research Motivation and Overview

& Knowledge Entrepreneurship as Memetic Paradigm

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0.1. MOTIVATION, AIM & OVERVIEW

In this PhD research I will attempt to (1) convince you of the usefulness and functionality of the knowledge entrepreneurship concept by (2) explaining how the concept and its phenomena have been identified (a) in the strategy and practice of universities and (b) in the reflective knowledge venture of realizing this thesis as a knowledge product. At present, there is no philosophical conceptualization of entrepreneurship, but rather lived practice and instrumental (applied) best practice collections. So far the concept of entrepreneurship is strongly connected to business, but lately political and especially social entrepreneurship have been conceptualized successfully. This research proposes an integrated meta-theory of entrepreneurship ¹ and develops the notion of knowledge entrepreneurship – which is assessed to be a beneficial contribution especially to the discourse about the entrepreneurial university². I hope the position developed helps to bridge the divide between pro and contra entrepreneurship in university by articulating and advocating for a position that focuses on entrepreneurship which isn't exclusively shackled to economic benefits, but instead allows for entrepreneurship aimed at knowledge benefits.

The strategy and practices of how internet based innovations – as entrepreneurial opportunities - are appropriated has proven to be a fruitful example. Specifically, as a source to research knowledge entrepreneurship in the form of e-learning and e-research practices; because it is in these fields wherein opportunities for creative destruction constantly arise.

As described in Methodology Chapter 2.1.1. the choice of following a grounded theory research based approach allowed for a natural development and amendment of the research question:

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¹ Allowing to embrace economic- , social- , political- , knowledge-entrepreneurship, and whatever the telos (main objective) of the actor might be.

² Because in the academic world the resistance to entrepreneurial practices is significant mostly arguing that it is a business paradigm.

Initial Question:

What relationships exist between internet based innovations, entrepreneurship and higher education?

Refined Question:

- 1. What is knowledge entrepreneurship in a university?
- 1.1 What motivates individuals to be entrepreneurial?
- 2. Can internet based innovation appropriation serve as an example?

Final Research Questions:

- 1. What enables strategic and practical knowledge entrepreneurship in universities?
- 1.1. What are the components of the mindset of a knowledge entrepreneurial entity?
- 1.2 What are the components of the gestell (infrastructure) for knowledge entrepreneurship?
- 2. How do universities apply knowledge entrepreneurship to integrate internet based innovations in their practices?

The methodological combination of empirical and theoretic investigation, namely case study and phenomenological action research, was complemented by an exploration of the existing body of knowledge within the relevant areas. This calculus of investigation is assessed to have led to more balanced propositions.

The research's contribution is first and foremost in the developed philosophical construction of the entrepreneurial paradigm. Entrepreneurship is developed as a fundamental human practice based on a mindset, and further facilitated through an infrastructure (for which the Heideggerian term *gestell* is used – see chapter 4 section 4.2.2. and 4.2.5.). Herein, the special case of knowledge is one of multiplicity; its motivating telos is stressed in the context of universities as social institutions evidencing a unique knowledge mandate.

As with all paramount concepts, entrepreneurship is by no means a scientific discovery, but rather a constructed normative social paradigm meant to contribute to the understanding of evolutionary development and human striving. Put differently, entrepreneurship is framed as a life philosophy in the 21st century zeitgeist of the knowledge society (see section 1.2. for further elaboration of this position).

The following paragraphs are meant to give a short overview of the work presented. Chapter 1 begins by introducing the complexity and Deleuzian basis of the research. This section is essential to understanding the terminology and perspective on reality presented by the research. It is followed by an introduction and contextualisation of the research's three thematic

components: knowledge entrepreneurship, higher education studies, and internet based innovation appropriation.

It begins with knowledge entrepreneurship and the historic and theoretic trajectory of the developments that lead to the necessity of the concept of knowledge entrepreneurship as a paradigm in the knowledge society. Next, the concrete understanding and definitions of the term as well as an originating theory are put forward. Thereby, the components 'entrepreneurship' and 'knowledge' are formally defined, after which the working definition is put forward: *Knowledge entrepreneurship describes the ability to recognize or create an opportunity and take action aimed at realizing the innovative knowledge practice or product.* Second, the publications that use the knowledge entrepreneurship term are reviewed, and finally, I will present the originating model of knowledge entrepreneurship, which is an amended version of the findings of McDonald's (2002) PhD research on knowledge entrepreneurship in hospitals.

Once the core theme of the research has been defined, the context of the discourse of the university in the network society is addressed. After introducing the sociological frame of the network society developed by Castells (1996; , 2000) and reviewing the discourse on the entrepreneurial university, the position of the researcher is presented as an argument for the university as a public institution. Once the normative position has been made explicit, the theme of knowledge entrepreneurship in the university will first be developed by reviewing the literature about knowledge management in universities, and then by elaborating on the university as a knowledge entrepreneur as proposed by Fuller (2006). Finally, the stage for dealing with the practice and strategy of internet based innovation appropriation will be set by elaborating on the organisational aspects of the university as a vessel of knowledge transmission.

The theoretic background of the last thematic aspect of the research - innovation appropriation, which is used as an example of a field of practice for knowledge entrepreneurship, is presented in the last section of this chapter. General insights about innovation and innovation in universities are complemented with elaborations regarding the conditions and particularities of innovation in cyberspace and the internet.

Chapter 2 presents the research design and its methodology. At first, the overall approach and the development of the research questions are recounted. Then, the two research methods applied (case study and phenomenological action research) are depicted in theory as well as in concrete application. The chapter closes with the description of how the findings were abstracted and developed into theoretic propositions.

Chapter 3 contains the four case studies that make up the heart of the empirical field work. The case studies are meant to illustrate the setting, the conditions regarding practices and strategy, as well as the position regarding academic results produced by the institution. It is important to

point out that it is not the objective at this stage to work out each institution's knowledge entrepreneurship, but rather to produce an actor validated description and analysis of the current situation in general. The cases are then subsequently used in chapter 4 to theorise and empirically ground the concept of knowledge entrepreneurship in universities.

Chapter 4 has two parts. First, the case studies are formally contrasted, especially with regards to their strategy and practice in internet based innovation appropriation. Second, the concept of knowledge entrepreneurship is developed theoretically.

In the first part, an illustrated objective is contrasting the highly diverse sample in order to explore the whole spectrum of university institutions. This general contrasting is then complemented by an analysis and classification/typologization of how the different institutions deal with the challenges of exploiting internet based innovations for their educational and research needs.

In the second part, the original theoretic contribution of the research is developed. Based on the understanding of the essential conditions at universities (gained through the case studies), as well as on the phenomenological action research conducted by the researcher as knowledge entrepreneur, an innovative conceptualisation of knowledge entrepreneurship is presented and applied to the case studies. According to the proposition, the concept is divided into an inner and an outer environment. Following Simon the research is "drawing the line between outer and inner environment, not as the firm's boundary, but at the skin of the entrepreneur, so that the factory is part of the external technology; the brain, perhaps assisted by computers, is the internal" (Simon, 1996, p. 25). In this research the terminology of an internal mindset and an external gestell (infrastructure) has been chosen.

The *entrepreneurial mindset* (Faltin, 2007) as constitutive for identity and *persona* (Erikson, 1974) is developed beginning with existentialist illumination (Enlightenment/*Aufklaerung*); resulting in an actor that takes decisions based on his free will (or *internal locus of control*). The paper subsequently develops three more strange attractors around philosophical programs – axiology/teleology, pragmatism, and ethics/sustainability - deemed essential for entrepreneurship. The presentation first follows the format of elaborating on the nature of the mindset components and then applying it to the universities investigated in the case studies.

The external component of the knowledge entrepreneurship concept exists out of the following components: the entity's governance structure, the spatial arrangement, the availability of informality and transparency, and lastly, the availability of resources.

The last part of the chapter reviews the congruence of the findings with the originating theory which was an amended version of the theory developed by McDonald (2002). It is found that the

components represent important aspects of knowledge entrepreneurship, and that the theory is correct, but that it is suggested to be amplified by an organisational context and through efforts to create an entrepreneurial mindset and gestell. In fact, the components of the originating theory are only one aspect of practices that need to be institutionalized in order to provide for an efficient *gestell*.

The last chapter, chapter 5, is divided into four parts. The first presents a set of cases of "best of breed" knowledge entrepreneurship, allowing for a better understanding of what the target practices can look like. The second deals with conclusions regarding the practical implications of the paradigm shift from Clark's suggestion of applying (essentially economic) entrepreneurship to universities-- transitioning into a knowledge entrepreneurship paradigm for universities. Next, (3) an assessment of the state of digitization in universities is compared to civil society organisations and financial markets. The chapter closes with (4) the formal answering of the research questions by summarizing and referencing the findings presented in chapter 3.

0.2. KNOWLEDGE ENTREPRENEURSHIP AS A MEMETIC PARADIGM

Different from the natural laws of the physical world, the perceived life-world (Habermas) of the individual is constructed through language (as explored by Wittgenstein). It is hence in the hands of knowledge entrepreneurs to creatively deconstruct and recombine existing ideas about social reality, or meme. A meme, as originally defined by Richard Dawkins, is "a unit of cultural transmission, or a unit of imitation³" (Dawkins, 1976). He is preliminarily interested in cultural expressions rather than abstract concepts, but the field of memetics has been expanded to include ideas and other meta-physical concepts.

Allow me to recount Sloterdijk to elaborate on the intention of the approach herein deployed. He says about the role of philosophy⁴: "Philosophy is stylizing the human being with the practice of terminological gene-technology ('begrifflicher gentechnologie'), thereby developing new taxonomies of human existence" (Sloterdijk, 1999). He further explains that philosophy creates meta-physical conceptions of human beings and their conditions, which serve as archetypical development paradigms when perceived and internalized. One example given by Sloterdijk, is Freud's creation (or meta-physically engineering) of the Oedipus complex. The complex surely existed in one or another form before he wrote about it, but he defined it and made it a condition

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³ He elaborates: "Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool by leaping from body to body via sperms or eggs, so memes propagate themselves in the meme pool by leaping from brain to brain via a process which, in the broad sense, can be called imitation" (Dawkins, 1976).

⁴ This beautifully corresponds to this researcher's perspective outlined under "*Mechanics of existence and constructed reality*" (see chapter 2.1.).

that affects us all. The proposed philosophical model of an entrepreneurial mindset is defined herein in similar terms.

Put differently, meta-physical concepts can be constructed in the same way physical engineering contributes to the potential to dominate the world; Simon's (1969) groundbreaking book "The Sciences of the Artificial" is a fruitful paradigm for the social sciences as well. The proposed philosophic model of entrepreneurship and knowledge entrepreneurship in particular, is a meta-physical innovation of this kind. Sloterdijk has held a very illuminating speech on this issue highlighting how the search for truth was traditionally an aloft divine/teleological quest which was then complemented by rational meta-physical ideals and values, and how in modernity there is a perspective shift from transcending and reaching higher understanding to an exclusivity of truth claims based on down-to-earth positivistic empiricism. Sloterdijk further elaborates upon a recently changing dominance or zeitgeist, which is focused on the development that is in front of us. In my translation the argument reads: "Today we are visually impaired, my vision is narrow, and in fact, every human lives in his tunnel. ... We are in the world, surrounded by things and entities." He goes on to describe how the objectification of the world has caused what Heidegger called the "ontological oblivion of (Seinsvergessenheit). "After Hegel the spirit descended to empirical hell. Once it reached the factual ground, it will not resurrect on the third day, but forge a plan for the breakthrough afore/ahead. ... Modern, he is not who wants to bring the world under him or behind him, but in front of himself. One brings the world in front of oneself to start an undertaking. In front of us are the fields of activity, the objectives, and the un-realized opportunities. In this direction embark the expedition squads of our times: the visionaries, the technologists, the researchers. The 'down to earth' is for the people who tackle the world, the politicians, etc. ... All practice has the movement of dragging the Being down." Then he asks: "Is this what we wanted?"

My answer is a clear no. The lofty and complex aspects of human spirit, or what has been traditionally called soul, are part of the human being. If we neglect this, we are neglecting an aspect that is crucial to understanding the human condition⁵. The meta-physical Being contains the rather important aspect of human creative energy, striving, and cognitive development, for which the traditional (philosophical) methods of investigation have recently been discredited by the dominance of the natural sciences. It is the neuroscientists and the psychiatrists who have authority and are allowed to explore human thinking, but Being is much more than thinking, just as human feeling is more than any sensor/machine can pickup. In the cognitive tunnel which constrains our vision, we have been pointing our flashlight onto the ground in front of us for so long that we have almost forgotten that it was by being curious about the stars above that we began our fruitful quest. It is my understanding that the challenge of scientific inquiry for the 21st

⁵ The modern exclusive positivist focus was very productive to develop the present understanding of the natural sciences, but at the same time it lessened believe and creativity which are responsible for important aspects of human existence.

century is to transcend the artificial disciplinary borders developed to allow for the viable piecemeal construction of human reality, and to use the insights gained in these efforts to tackle the most challenging question: how to create and maintain the best of all possible worlds/realities (not Leibniz's but the individuals aspired reality), because with all the instrumental/technological knowledge we have accumulated by researching what it means to be in the world, we have forgotten to where we want to take this world.

Like all philosophical work, the codified knowledge presented in this document is based on observation, investigation, conscious experience, analysis and rational reflection. To construct and de-construct the idea (or meme) of knowledge entrepreneurship, to understand the motivation and most essential components of the entrepreneurial mindset became the *leitmotiv* and passion of my professional and personal strive during the last two years.

It is part of my entrepreneurial nature not only to identify and analyse a knowledge opportunity, but to pursue it with the objective to reach understanding in order to suggest a solution. Therefore, I have provided not only a description and analysis of the current practices at the investigated universities, but I have had the urge to codify my understanding and to propose a model for an entrepreneurial mindset based on all of the observations, interviews, reading, and personal reflections made. Like all life philosophy, there can be no theoretic right or wrong, only the perceived usefulness for the individual reader can be judged as relevant and helpful for constructing pragmatic truth.

The result is the proposition of a philosophical paradigm⁶ of entrepreneurship that is more than just a professional practice to reach professional goals; entrepreneurship is herein set at the centre of a life philosophy, a solar attractor bringing together Aufklaerung (Enlightenment), the search for meaning, practical implementation and the need for righteousness.

Is the concept thus developed the final answer to the questions investigated? It can not be. Jaspers (1997) defined philosophy as "being searching on the way". He elaborates that philosophos is the antithesis of sophos. The latter indicates a knowing person, someone who possesses knowledge; the philosopher in contrast loves knowledge and the search for Truth. Like love, the truth is by its very nature impossible to possess.

But how is a life philosophy of an entrepreneurial mindset connected with entrepreneurial universities? This question is answered most illustratively when contrasting this research with a work like the CHEPS report on "Models of Technology and Change In Higher Education: An international comparative survey on the current and future use of ICT in Higher Education" (Collis & Wende, 2002). From the outset, the report deals with quite a similar question, but when one looks at the conceptualization and especially the description of the results, the

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⁶ In the Kuhnian sense (Kuhn, 1962).

different approaches become apparent. The CHEPS report investigates what the stakeholders do, as well as what the universities are doing, as two sets of objective practices. In comparison, in the research presented here, an original fractal perspective on knowledge entrepreneurship is advanced. The complexity and meta-physical approach thus pursued allows for the integrated, seamless description of an individual's as well as an organizational mindset deploying the concepts of wholeness (the universality of knowledge): It does this through fractality and Deleuzian emergence (continuous "becoming"), where by the holistic totality of reality and the temporal uniqueness of evolution are both given due diligence.

So why, one might ask, should one explore a question if the propositions given it cannot be verified? On the one hand, there is the concluding argument Wittgenstein (Hoerster, 2001) proposes: One can only speak about facts and what one cannot speak of, one must remain silent about. I would claim that this is the most conservative and therefore anti-entrepreneurial position possible. It is exactly the entrepreneur's function to not accept facts and to reject silence, acting instead to envision newly possible aspects of reality and then executing upon them. In fact, it is Wittgenstein himself who at another more rewarding moment writes: "The philosopher is to treat a question like a disease" (ibid). With this analogy a much more productive and creative practice is possible. And it yields another illustration of the two kinds of results presented in this research. The conditions for knowledge entrepreneurship are investigated, just like a doctor would examine a patient. Given that knowledge entrepreneurship has physical and meta-physical causes and expressions, the results of the examination stem from observations about good practices and from phenomenological reflections conducted as action research experience.

In consequence, important questions are posed and treated but not answered⁷. It is exactly for these kinds of philosophies that Socrates had to drink the hemlock. This kind of self-exploring, self-defining processes has long troubled authority, having been deemed as corruptive to the youth by distracting them from their daily business. The question for the youth remains, is their instrumental contribution to society, to operate in mindlessly prosaic constellations, or instead is it a celebration of free will and a search for telos and logos? (Frankl, 1963)

Hence the research is necessarily, as Gadamer (1992) demands, pluralistic; it combines the insights of the observation, investigation, analysis, and reflection of the factual with that of the meta-physical. This process or mental setting, results in *movements of consideration* (Bewegungen des Bedenkens) in the Heideggerian sense (Welsch, 1998). The work presented

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⁷ It is acknowledge that the results presented do not stand as scientific facts but rather as arguments and models because of the methodology deployed. However, I agree with trans-disciplinary veteran cybernetician Heylighten (1992), who agrees with Maslow "that it is preferable to carry out methodologically primitive research about fundamental problems, such as the conditions of human well-being, rather than restrict oneself to technically sophisticated observations about minor issues."

herein, can be understood as a contribution that is an instance of a process rather than a final product, because "each philosophy defines itself through its realization" (Jaspers, 1997), and thus the relevance of this work has and will continue to develop in action research and in the discourse held with the universities and knowledge entrepreneurs.

0.3. A NORMATIVE STUDY?

As Watzlawick, (2002) author of "The Situation Is Hopeless, but Not Serious (The Pursuit of Unhappiness)" pointed out absolutely correctly, we are drowning in a wave of 'how to' guides, allowing the benevolent and struggling seeker, easy to follow, but equally shallow solutions and recipes to such profound questions such as: how to become happy, how to become rich, a leader, a perfect partner etc. Even though well intended, the 'solutions' are most of the time simply dogmatic oversimplifications. Subsequently, due to the massive publication of this kind of normative prose, critical and scientific normative investigations have lost acceptance in the community, resulting in rather descriptive and analytic but less solution oriented publications. This research attempts a normative proposition of entrepreneurship as a positive attractor, or paradigm, and one that does so by engaging the seeker in a (possibly collective) midwife process meant to rouse the internal locus of control and to cause the examination of one's values, practices and interrelations. It is thus less of a manual, and more of a normative scaffolding allowing for institutional (or personal) development with a supportive memetic structure, ultimately facilitating learning in the Vygotzkian sense (Boudourides, 2003; Watson, Audio Lectures).

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1.1. INTRODUCTION

This research begun with the dedicated interest of exploring the practice and strategy of universities in regards to the integration of the entrepreneurial paradigm, and the integration of cyberspace in knowledge activities. I have opted for a grounded theory based approach because this allows me to optimize the concept and research instruments during my investigation; thus allowing for an organic growth of the emerging insights.

During the initial literature review the ambiguous discourse on the entrepreneurial university stimulated the emergence of the 'knowledge entrepreneurship' concept as leitmotiv. Opportunities resulting from Internet based innovations have subsequently been chosen as suitable research object to investigate knowledge entrepreneurship.

The presented research does not follow a Newtonian scientific approach. Instead it begins with an 'originating theory' which is rooted in traditional 20th century research paradigm and findings and then uses a combination of complexity science concepts and Deleuzian philosophy for the analysis and discussion.

However, it is important to point out that no discriminative perspective is taken. Rather, both approaches are used complementarily – Newtonian science for technical and functional understanding of specific aspects and a complexity/Deleuzian perspective for the dynamic and systemic understanding.

1.1. RESEARCH APPROACH & EPISTEMOLOGICAL POSITION

This section outlines different levels of investigation as well as the meta-theoretic framework. In Annex A I lay out my personal motivation and belief set while Annex B outlines some fundamental considerations and reflections expressing my understanding of scientific knowledge production. These two Annexes are meant to underline the transparency and therefore credibility of the research. Annex C introduces the basic terminology and concepts of complexity science and Deleuzian ontology. Readers who are not familiar with terms like complex adaptive systems, being "at the edge of chaos", and "strange attractors" are urged to read the short introduction. Likewise, readers who don't know Deleuze's work on rhizomes and 'becoming' are very much invited to review the second section of Annex C.

1.1.1. Mechanics of Existence and Rationales of Reality

There is a long discourse in social science regarding whether a piecemeal approach or a totalitarian approach is more rewarding in delivering the more accurate insights (the dispute on positivism (Adorno, 1962; Popper, 1962). A misleading argument is based on history: it claims that as positivistic natural sciences have reached quite a remarkable understanding of the physical world, social sciences should use the same technique. The argument is false,

because – following Habermas (Welsch, 1998) - natural science deals with the exploration and description of the objectively existing world, which functions based on eternal laws, wherein social sciences deal with the realities constructed by human minds, the life-world, which is constantly changing. Thus different methods have to be used because the natures of the subjects are different. However, it seems that with the advent of the complexity paradigm¹ in the natural sciences, the unity of sciences is in possible reach again, because rigid cause effect relationships are abandoned in the (currently dominant) natural sciences as systems are looked at as a whole.

Attempts to develop a general social systems theory capable of describing human action in all contexts, such as the efforts of Parsons (Parsons & Platt, 1973) or Luhman (1992), are still the exception. It is in this context that this work adopts a complexity and cybernetic understanding of the institutions investigated. This allows for the holistic treatment of the social perspective – analyzing how universities construct an entrepreneurial mindset – and the natural sciences perspective – analyzing how universities depend on the existence factors – through the deployment of the *Begriffswelt* (terminology, (Wittgenstein, 1969) of the complexity sciences (and strange attractors in particular).

Put differently, the method to establish validity is different for the philosophical aspect of creating a suitable mindset, than for the practical aspects of setting up and utilizing a suitable infrastructure. The first uses phenomenology and the reflected experience of action research to develop the philosophical model. Here validity is based on trans-occasional agreement reached through collective review and discourse which leads to an inter-subjective signing of the claims (Hoerster, 2001, pp. 292-307)². In the second aspect, which deals with the organizational architecture, the claims are based on observation and deduced from the observations made during the case studies.

In other words, this research can be classified as epistemological idealism in contrast to 'empiricist naturalism' (Mc Dowell (1998), as quoted in (Fink, 2006)) or 'naturalism of disenchanted nature'. The latter sort of naturalism takes it for granted that reality is 'exhausted by the natural world, in the sense of the world as the natural sciences are capable of revealing it to us' (*ibid* p. 173). The epistemological idealist position advanced in this research on the other hand holds that all knowledge is first a creation of the mind and then, following Dewey's pragmatist understanding, becomes a proposition with "warranted assertibility" by reaching inter-subjective agreement about the meaning and usage of the concept. To illustrate this position with an example given by Staloff (2000): We all agree that directions given in north, south, east and west are practical conceptualizations; nature however does not come preparsed in these categories, rather we have created and agreed upon these operators, and

¹ And the insights of the paradoxical insights from quantum physics

² Here the empirical verifications from the cases are only illustrative.

because they have proven useful we inter-subjectively accept them as knowledge. Applied to the conceptualization of reality and existence developed above this means that, we first create our individual reality, which we can share through communication to create inter-subjective collective realities. At the same time these realities are constantly undergoing empirical tests and the feedback from these tests serves as description of what really exists.

1.1.2. Levels of Research Interest

Conducted and written at the very beginning of the third millennium, this research attempts a truly trans-disciplinary approach resulting in three kinds of knowledge. Three levels³ of Plato's analogy of the divided line, a metaphor he used to describe and structure the different levels of existence as he grasped them, is used to visualize the different kinds of insights sought (Figure 1.1).

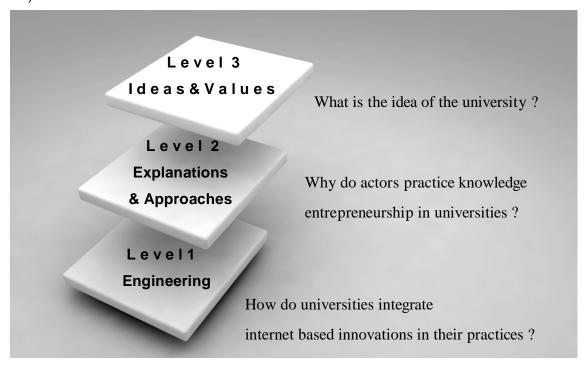


Figure 1.1 - Platonic Research Ontology

On the highest and purest level Plato positions metaphysical ideas. Why should we have universities? What is the idea of the university? And, what role ought it to play in the 21st century? These questions are of meta-physical and ethical nature and are thus dealt with through the formulation of an argumentative position ⁴. On this dimension elemental phenomena like system vs. life-world (Habermas, 1978) are discussed. The normative dimension is naturally a contested and lately discredited field because insights are deemed to be subjective, while science ought to strive for objectivity. However this dimension determines the 'ends' or objectives for the more practical questions dealt with on the other levels and thus

³ In Plato's analogy exists a fourth level which is the level of shadows. As the perception on this level is non reflexive it is to be counted as believe and thus non-scientific. Therefore the level is not interesting for this research.

⁴ See section 3.4.2. on research position.

it is important to reach and describe the works position in this regard. The second level is conceptualized by Plato as the realm of forms. Here the idea of a circle becomes a worldly representation in a drawing or a conceptualization such as theoretic math. This is the realm of scientific theory explaining why things are the way they are, or how to approach the ideas of the first level. Plato's third dimension treats the world as it is. On this level concrete and instrumental questions like: "How can the internet be used to facilitate knowledge entrepreneurship in universities?" are dealt with⁵. This research will investigate and analyze practices in universities and one result will be a collection of phenomena/aspects meant to create opportunities and stimulate innovation in other universities.

In-between the practical knowledge on how to do something and the axiological level of motivations and finality is Plato's second dimension, the world of forms. Here the world is observed and insights are gathered in order to better understand reality. What are the rules and energies that make the system behave in different ways? How do the different ideas interrelate? This is where science is at home. The aim of someone in this dimension is to understand reality. Naturally the main interest of this work is on this level. The endeavours will result in a comprehensive analysis of the knowledge entrepreneurship practices in higher education which will allow me to propose my understanding of the factors involved in the creation of a knowledge entrepreneurship mindset and infra-structure in universities.

Through this holistic approach I believe all relevant aspects of knowledge entrepreneurship can be dealt with while it allows me to weight and focus on certain aspects.

1.1.3. Universities as rhizomatic Complex Adaptive Systems

Given the multi-disciplinarity of the research subject and the subsequent trans-disciplinarity of the research design, a fusion of concepts from complexity sciences⁶ and the philosophy of Gille Deleuze and his co-author Felix Guattari is applied to allow for an analysis which does not fall into the reductionist trap of simplifying the model until a clear mechanistic 'cause-effect' relationship can be 'proven' with the obtained observations. Much rather the approach of treating knowledge entrepreneurship as a property within a 'rhizomatic' Complex Adaptive System (CAS), allows me to create a narrative which works with the notion of 'becoming' and 'emergence'. These seem much more appropriate to the dynamic process of knowing and entrepreneuring. Also, this approach seems better able to explain the existence of 'creation' and 'innovation/invention'. But allow me to introduce the concepts and their interplay as I see it in the studies setting (Figure 1.2).

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⁵ See Annex A & B

⁶ Brent Davis (Davis, 2005) has recognized education as a particularly suitable and pragmatic field for the application of complexity sciences.

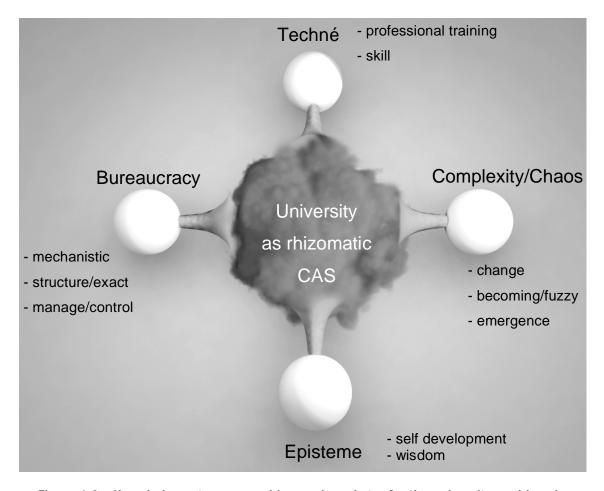


Figure 1.2 – Knowledge entrepreneurship as raison d'etre for the university as rhizomic Compelex Adaptive System

Figure 1.2 intends to provide a visualization of the theoretical interpretative framework. The framework is used to give structure and coherence to the research through a shared frame of reference for the diverse phenomena that will be described as strange attractors (variables) to create an enabling climate and infrastructure for knowledge entrepreneurship in universities.

The system is defined through its balanced position "at the edge of chaos" between two fundamental properties of universities. The thematic nature of the universities knowledge practices and the presence of freedom or its antipode bureaucratic order on the other are used as meta- or fundamental-attractors constructing the 'gravitation' of the system. The idea is that the observable phenomena (strange attractors) that will be investigated and described in this research depend on these meta-attractors. The presence of aspects of bureaucracy, what Giddens called structure (Giddens, 1979) and Heidegger *gestell* (Heidegger, 1978; , 1994) on the one side and the absence of rules and institutions that creates the chaotic and fertile environment of a jungle on the other side make up one dimension of the theoretical space. The other dimension represents the mission of the university and is bounded by two essential aims or knowledge domains. Technè, the knowledge how to do something, on the one hand and episteme, wisdom or critical thinking and common sense on the other. This dimension mirrors the lately increasing importance of practical knowledge as demanded by the private sector (the

market) leading to an education towards technological citizenship (the ability to participate in the economic system) and the education towards cultural citizenship (the ability to participate in society). Put differently, the technè attractor represents the practical education or vocational training while the episteme attractor represents the knowledge as transformation of the self- or even knowledge as an end in itself. The result of education and research on the episteme side is critical thinking (Habermas, 1978) or reflexive capacity (Giddens, (Delanty, 2001; Harvey & Knight, 1996)) preparing arguments for knowledge discourses (in the social sciences). The results of technè are trained workers (that know methods/have skills), technologies and knowledge about the physical reality.

As developed by Deleuze, real phenomena are never static/still but are always emerging always changing, always becoming something new. The still representation of the framework fails to express this 'living' aspect of the research matter. However an animated version of the diagram showing the temporal development as well as the rhizomatic vaporous connections forming and dissolving between fractalic actors can be imagined.

Allow me to quote Walsham to sum up the argument for the Deleuzian/complexity approach. "The management of organizational change is not seen as a straightforward, rational process but as a jointly analytical, educational and political process. Power chance and opportunism are influential in shaping outcomes, as are design, negotiated agreements and master plans" (Walsham, 1993, p. 53). In short, knowledge entrepreneurship depends on the unique setting (structure, culture, power relations) and external context and therefore no detailed 'specialized' theory and quantitative data will allow for the explanation of real cases (not to speak of forecasting). But the in depth analysis of the processes of emergence of knowledge-entrepreneurial properties can lead to an understanding of the influential forces that determine the properties of the aspect of the system. I also feel in tune with McLaughlin (1999, p. 23) who seeks 'insight into the messy, long-drawn-out embedding of technology into the specifics of organizations', rather then a simplistic management perspective.

1.1.3.1. Trans-disciplinarity - Best of both worlds

"No single perspective is sufficient when one is considering the development and use of an information system" (Nygaard, 2002, p. X)

Even though complexity and Deleuzian concepts are key aspects of the approach and analysis of the research, the usefulness of the methodology and perception of the traditional scientific paradigm are not neglected. After all, complex systems do follow rules and there are attractors and properties, which influence the condition and the becoming of the system effectively. Therefore it does make sense to conceptualize cause-effect constellations such as the

knowledge entrepreneurship model developed by McDonald (2002), if they are embedded in a holistic understanding of the particularities of the complex system they are immersed in⁷.

As noted above the relationship between theory and practice is not uni-linear. "Whilst the objective of critical social research is to inform conscious activity, it also derives its validity from active involvement in political struggle. From this perspective the production of knowledge is deeply embedded in the process of social transformation; both informing, and derived from, the struggle to consciously change the material world." (Wainwright, 1997)

As will become clear in the analysis and discussion of the findings, the conditions and results of knowledge entrepreneurship depend on complex system properties on all levels. Only a holistic approach can do justice to the human experience of organizational existence which creates the university.

The following section will develop the theme and the 'originating theory' which is based on the traditional scientific paradigm.

1.2. THEORETIC BACKGROUND & ORIGINATING THEORY

In this section the research is situated and the originating theory for knowledge entrepreneurship and the relevant aspects of the two other thematic fields, internet based innovation, are presented. As this research pursues a grounded theory approach (see Chapter 2) several theoretic concepts that have emerged from the fieldwork and its analysis are logically presented in Chapter 4 where the findings and reflections are moulded into a holistic proposition regarding the knowledge entrepreneurship paradigm and its enablers.

1.2.1. Network Society and the Knowledge Economy

The technological development enabled by modern science brought a development from industrialization to the post-industrial service- or knowledge-economy (Bell 1974; Touraine, 1971). Manuel Castells (1996; , 2000; , 2001; , 2004; Himanen, Castells, & Torvals, 2001) has proposed to name this society the network society, because according to his research, the economic and informational global networks are the decisive new condition. Three characteristics come to the center of societal and economic activities: information flows and informational work are at the center of productivity, location plays on a minor role as all activity has become global (within the global network of nodes), and most distinctively activities are organized in project based networks which form and dissolve according to timely needs.

In today's society, the ability of the knowledge worker⁸ (Drucker, 1967) to identify, learn and apply new knowledge relevant to the specific project at hand, as well as relevant to his

⁷ The model is best understood as a reference to explore and explain the strange attractor basin.

specialization and his organization as a whole is of central importance. Drucker proclaims: "Increasingly, command and control is being replaced by or intermixed with all kinds of relationships: alliances, joint ventures, minority participations, partnerships, know-how, and marketing agreements-all relationships in which no one controls and no one commands. These relationships have to be based on a common understanding of objectives, policies, and strategies; on teamwork; and on persuasion-or they do no work at all" (Drucker in (Gurteen, 2006)). It is in this context that the concept of knowledge entrepreneurship is explored within a balanced complexity science approach.

Given the claimed primacy of knowledge as an economic resource, it has a relatively short history as unit of analysis. In fact Hull (2002) depicts that the emergence of knowledge as a relevant scientific indicator was strongly connected to the development and rise of neo-liberalism in the 1930's. Hull's paper argues that only after knowledge became politicized as the decisive factor in economics and wealth creation, did it move to the center stage of society. It was in the fierce debate about the advantages of the market economy over a planned economy that Hayek produced his famous knowledge problem. The argument is that, in order to make the optimal decision regarding what goods to produce etc. the central planning authority needs all the knowledge about the demand, the resources, etc. because this is practically impossible, a central planning institution will always produce less optimal output than a free market.

Thereby Hayek was the first to define the key question of productivity of a system as 'the more general problem of how knowledge is acquired and communicated' (Hayek, 1949, p. 46). He also distinguishes between 'knowledge' and 'relevant knowledge' and considers, "the conditions under which people are supposed to acquire the relevant knowledge and the processes by which they are supposed to acquire it; (p. 48). It is in this context that Hayek creates and invents (Hull, 2002) the 'problem of the division of knowledge'. According to Hull, it was this move that initiated the 'sociology of knowledge – the social science of the ways groups and societies produce and distribute particular types of knowledge' (p.19).

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⁸ For him this condition leads to empowered individuals, who collaborate with others to reap synergies: 'In the knowledge society the most probable assumption and certainly the assumption on which all organizations have to conduct their affairs is that they need the knowledge worker far more than the knowledge worker needs them.' (ibid)



Figure 1.3 - The influence of Knowledge on Performance

Other famous intellectuals and scientists – e.g. Popper, Polanyi, and Mannheimer - collaborated with Hayek to defend the western societies and their capitalist markets against the Soviet ideology. And it was through that movement that knowledge in its relation to performance (see Figure 1.3) was more and more on the radar of economist and management researchers. In the next section the concepts of 'The knowledge creating company' (Nonaka & Takeuchi, 1995), organizational learning (Senge, 1990) will outline the more recent development and findings about knowledge in organizations.

1.2.2. Organizational Learning

With the growth of organizations and the increased use of information and communication technology, there have been several approaches to research and describe the optimal conditions and practices to create and exploit knowledge in organizations. Namely the two schools of organizational learning (or learning organization) on the one hand, and the field of knowledge management on the other. There is an enormous overlap between the two approaches and while there is merit in precise distinctions and definitions, for this study the understanding that all of them deal with the creation of a culture of knowledge seeking and sharing should suffice⁹.

Out of the many variations of definitions of a learning organization Gavin's is adopted for the study, because it operationalizes the knowledge handling factor in a suitable way:

the context.

⁹ Scholars have engaged in endless discussions about the differentiations between organizational learning, the learning organization and knowledge management. See e.g. Loermans (2002), or Kontoghiorghes (Kontoghiorghes, Awbre, & Feurig, 2005) for good differentiation and synthesis. The study will use the term learning organization to describe an organization which developed such a culture, however the other terms might also be used depending on

"[A learning organization is] skilled at creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights" (Garvin, 1993, p. 80).

Rather than indulging in demarcation, let's look at some of the findings and model propositions brought forward by scholars: Peter Senge (Flood, 1998; Senge, 1990) was one of the first to coin the term 'learning organization' in his seminal work "The fifth discipline". He diagnosed it to depend on five conditions: systemic thinking - the ability to explore things as wholes (as we will see this is very much in tune with complexity science); his second proposition is to always strive for personal mastery - by that he means that all constituents of an organization are meant to develop and be conscious about their personal aims as well as about the shared vision (the fourth point) for the organization; thirdly he worked out the concept of 'mental models' or routines and assumptions each of us carries around; (He proposed that these cultural dispositions are intentionally made aware and tested in order to optimize practices.) The last point is where we encounter the learning practice itself. Team learning intents to create optimal synergies for all participants through discussion and debate. The two concepts are similar and very different. 'Discussion is where different views are presented and defended in search of a view to support decisions that must be made. Dialogue involves suspending one's own views, exploring issues from many points of view, and visiting the mental models and personal visions of others' (Flood, 1998, p. 266).

Nonaka (1995), in his ground-breaking work "The knowledge creating company", has described how Japanese firms create knowledge in the form of new innovative products. He builds on Polanyi's notion of 'tacit knowledge' and develops a set of practices (the so called SECI approach - (Nonaka, 1988, 2000; Nonaka & Takeuchi, 1995)) to transform tacit to explicit knowledge and vice-versa. Besides he conceptualizes three aspects, which are relevant for this study, as vital for effective knowledge creation: firstly it is Nonaka's understanding of knowledge that will be adopted for this research - "knowledge is unlike information; it is about beliefs and commitment. Knowledge is a function of a particular stance, perspective, or intention." He continues that "knowledge unlike information is about action, it is always knowledge 'to some end'. And knowledge, like information, is about meaning. It is context specific and relational. ... While traditional epistemology emphasizes the absolute, static, and nonhuman nature of knowledge [as in science] typically expressed in propositions and formal logic, we consider knowledge as a dynamic human process of justifying personal believe toward the 'truth'" (p.58); create a knowledge vision - which "gives corporation members a mental map of the world they live in and general directions regarding what kind of knowledge the ought to seek and create" (ibid 227); thirdly, I would like to highlight Nonaka's understanding of the organization of a complex system in which all members have to become knowledge and innovation agents. He writes (p.50): "Furthermore, the organizational members must not be passive, but must rather be active agents of innovation" - 'the organization recreates itself by destroying the existing knowledge system and then innovating new ways of thinking and doing things¹⁰.

Both Senge and Nonaka were aware of the limitations of the Newtonian/Cartesian cosmology when it comes to the realm of knowledge and other complex social phenomena. Both therefore integrated aspects of complexity sciences (namely emergence and systemic thinking) in their work¹¹.

The result of organizational learning is an organization that is capable of adapting to the unstable environment (Schumpeter & Opie, 1934) through organizational transformation through innovation appropriation, or innovation (Cohen & Levinthal, 1990), as depicted in figure 1.4.

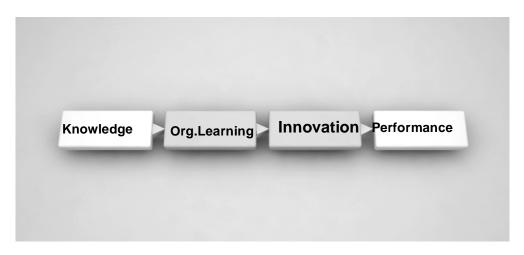


Figure 1.4 - Organisational Learning fosters Innovation

While many scholars have greatly contributed to our understanding of what conditions are favorable for knowledge work, there is almost no treatment of the question how opportunities are identified and how especially external knowledge and innovations are appropriated. Furthermore, as all these scholars were working about conditions of private companies, they subsequently used monetary performance as the main indicator for success. This research sets out to add to the understanding by looking at the conditions of how innovation

Another school of researchers have investigated how organizations can reform and transform themselves. This school, known as change management, emerged during the 1950's when more and more traditional companies realized that they had to make drastic re-arrangements in terms of technology and management practices if they were to compete in their markets. A very interesting body of knowledge, analyzing how change processes can be planned and conducted, has developed. However this schools is only of minor importance to this study, as it is mainly preoccupied with how to run a change project at one particular time – in contrast to how organizational change can become an integral part of an organizations design.

¹¹ As this work also depends on concepts from the complexity sciences these scholars have been chosen as representatives of the field.

opportunities are seized and in universities. This capability is named knowledge entrepreneurship (figure 1.5) and fills the gap between the learning organization and the appropriated innovation¹².

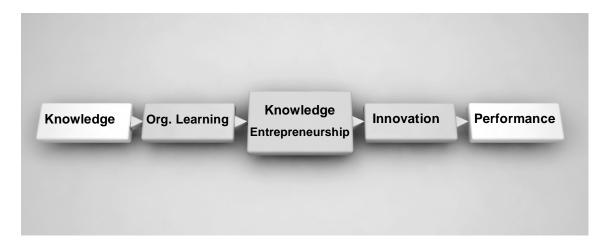


Figure 1.5 - The 'missing link' Knowledge Entrepreneurship

Steinberg (2005) rightly comments that at the heart of these economic rationalizations of human knowledge and behavior are models and theories, which reduce human action to utility equations. Economics sees itself as a 'positive, value free science' (Landreth & Colander, 1989, p. 309). Accordingly human knowledge is subsumed to relate to one superior 'objective' rational reality. In this conceptualization, all human thought is strictly logical and centered on the goal of utility maximization. This perception and its dominant application in business affairs might be one of the key factors that have led to the alienation of the individual, because all emotion and irrationality is cropped because the rationalist scientific paradigm can not account for it. Ciborra (2002) comments on this subject that these researchers 'the world gets experienced as an object' (p.16) subsequently, 'Geometry first uses ideal shapes as approximations of the vague shapes that exist in nature [...] next we grant such ideal entities essence and existence [...]eventually, ideal entities are substituted for reality, and the vague contours of the everyday reality and the human subjects who move around are dismissed or simply forgotten' (p.17). Ciborra further assesses that with the measuring methodologies employed by this scientific paradigm the key element is neglected: human existence (p.18). It is for this reason this study has chosen to implement a qualitative grounded theory approach employing a rhizomic complexity paradigm (as outlined in Annex C). With this approach I strive for a truly realistic (non-reductionist) perception of the natural conditions of knowledge entrepreneurship.

¹² Intrapreneurship – (Pinchot, 1985) introduced the term intrapreneuring in his book Forms of Entrepreneurship. "From the standpoint of a company the benefits of having intrapreneur is obvious: Intrapreneurs introduce and produce new products, processes, and services, which in turn enable the company as a whole to grow and profit" (p. XV)

The following chapter will introduce the concept of knowledge entrepreneurship in more depth.

1.2.3. Knowledge Entrepreneurship

In this section the terminological position regarding 'entrepreneurship' and 'knowledge' are developed separately, and then 'knowledge entrepreneurship' as concept is introduced.

1.2.3.1. What is "Entrepreneurship"?

One classical definition is: "Entrepreneurship is the process of creating or seizing an opportunity and pursuing it regardless of the resources currently controlled" (Timmons, 1994: 7). And the concept of knowledge entrepreneurship is not established in the academia, but even entrepreneurship, which has summed the interest of researchers from the whole spectrum of fields, has (partially because of the variety of research paradigms applied) resisted a clear definition (Davidsson, 2004; Davidsson & et.al., 2001). Davidsson (2001) assessed that the field converged around the view that entrepreneurship is about emergence.

In modern times when the concept of entrepreneurship first appeared ¹³, it has been understood to be a special characteristic, an exceptional ability of special people. And in fact it was, and still is, often used as a ex post definition that applies only when the venture is successful (Martin & Osberg, 2007, p. 30). To recall the most commonly agreed historic phases, the phenomenon of entrepreneurship is taken by most authors to be first described by French economist Jean-Baptist Say. He coined the following description: an entrepreneur is someone who: "shifts economic resources out of an area of lower and into and area of higher productivity and greater yield" (Say quoted in Dees, 2001). The first author who recognized the central role of the entrepreneur in economics was Schumpeter. For him the "creative destruction" through which the entrepreneur pushes innovation and thereby economic progress (Schumpeter, 1947; Schumpeter & Opie, 1934). A new less heroic proposition for an entrepreneurship paradigm is advanced by Drucker. For him "the entrepreneur always searches for change, responds to it, and exploits it as an opportunity" (Peter F. Drucker, 1985, p. 28). This understanding is complemented nicely by Kirzner, who identifies 'alertness' as the key ability of an entrepreneur (Kodera, 2004).

When looking at an ancient Greek precursor of entrepreneurship, three terms have been identified that have a conceptual relation with entrepreneurship: 'emporeuomai' means 'to travel to do business'; 'o en poroo' means 'mobile trader on a non established marketplace', and 'pragmateuomai' means of course 'to take something in one's hands' but also to 'engage in trade', 'being an agent of trade'.

In conclusion it can be stated that in the ancient world neither change nor trade was perceived positively – rather the conservation of traditions and stability was central to the zeitgeist before modernity. The conceptualization of the entrepreneur as positive is therefore a modern phenomenon.

¹³ Personal investigation and consultation with history expert Dr. Heiner Lutzman – email exchange on file with the author - have resulted in the following etymological development: According to the Thesaurus linguae latinae there is no verb or variation of 'interprendere'. In some medieval lexica the word 'interprisa' – somehow a derrivation of a virtual interprendere – with a negative meaning of 'attack' especially in the connection with seafaring 'to be captured', to 'break a contract' and 'unjust violence'. The connection between 'interprisa' and entrepreneur is hence not clear.

While the themes describing entrepreneurship – especially creative destruction and alertness - are agreed to, the interest of this work lies in entrepreneurship as a mindset (and subsequent practices) and it is understood to be a fundamental human feature. The potential is innate (in varying degree) in everyone (and hence in all organizations). It is an aptitude that can be developed by anyone and not a special trait of the elite, like Bill Gates or Muhammad Yunus, who nevertheless can be seen as role models. Basically success is not accepted as a measure of entrepreneurship. Hence it is defined as: *Entrepreneurship is the intrinsically motivated practice to identify, create, develop, evaluate, and realize an opportunity.*

1.2.3.2. What is Knowledge?

Like for entrepreneurship, the quest for an indisputable definition for knowledge is, with different duration and profoundness, ongoing. The question of what qualities scientific knowledge has to fulfill is discussed in Annex B, and also the section on the research approach and the epistemological position already puts forward several explanations of the approach to how to produce a and describe relevant knowledge claims. Hence in this section a simple preliminary definition¹⁴ of knowledge for the conceptualization and operationalization as subject of entrepreneurship is given.

The most accepted basic definition is: Knowledge is a justified true believe. A true believe means that the knower actually is convinced about the truth of the knowledge. Justified in this case means that a reason can be given as to why this believe is held to be true.

A knowledge product is subsequently an attempt to codify knowledge. Either through the codification of research insights (which results in new knowledge) or through the codification of existing knowledge with the aim of improving or re-contextualizing the knowledge claims. Knowledge services on the other hand describe the activity to attempt to transfer knowledge or better to help someone to construct knowledge. It is important in the context of this research that technology can be used to improve knowledge services.

The complex subject of knowledge definition is spread across several sections of this research and specific aspects are discussed in the first section on the Epistemological Position (1.2.) as well as in the Annex B of this chapter,

¹⁴ The insights regarding knowledge as telos (motivating value) of entrepreneurship are developed in chapter 4 section 2.1.2.

1.2.3.3. Literature Review Knowledge Entrepreneurship

A variety of authors have dealt with topics related to knowledge entrepreneurship, but in this section, only the few work that have been identified to have used the concrete term 'knowledge entrepreneur' (and derivates) are reviewed ¹⁵. Most of them do not have only a broadly complementary/matching understanding of the concept and are thus only contextually relevant to this research, but the Ph.D. research conducted by McDonald (2002) was found to propose and tested a useful conceptualization, which subsequently has served as basis for the model which emerged in this research (Haig, 1995; Kinach, 1995). In the following paragraphs it is reviewed what has been published in books and then the journal papers:

The Demos Think-Tank has published a report entitled: "Surfing the long wave: Knowledge entrepreneurship in Britain" (Leadbetter & Oakley, 2001), Colin Coulson-Thomas a Professor and Consultant has been promoting his version of the concept in various articles and workshops as well as in the book "The knowledge entrepreneur" (Coulson-Thomas, 2003), and lastly the librarian Stan Skrzeszewski (2006) wrote about knowledge entrepreneurship in the librarian context.

The Demos report is meant to influence policy planning in the UK. It starts with an overview section on entrepreneurship and why it is important to have an entrepreneurial society. It then goes on to present a collection of case studies from the UK creative IT services (gaming and animation). Even though there is no specific definition of the term given, they use knowledge entrepreneurship to indicate that the entrepreneur is starting an enterprise that is based on knowledge work.

With "The knowledge entrepreneur" Coulson-Thomas has written an interesting management consultant book. Having years of experience as business professor and board member, he brings reams of advice he has to give to the table. "The knowledge entrepreneur", has many general chapters (such as 'contemporary information problems', or 'requirements of different stakeholders'). In general this is not an academic but a practitioner oriented book; however some original concepts are worth noting. He describes knowledge-based opportunities as distinct from (classical) resource based opportunities; unfortunately there is no clear definition of a knowledge based opportunity which makes it difficult to demarcate, as all opportunities except for purely spontaneous action or intuition based opportunities are somehow knowledge based. He also puts forward a list of eleven things a knowledge entrepreneur needs to understand. It is a very extensive list starting with the ability to acquire, develop, share, manage and exploit information, knowledge and understanding, and related support tools, and it ends with the ability to lead and manage knowledge workers, network organizations and

¹⁵ Some more papers and the contribution to an OECD workshop on the very related topic of knowledge management in higher education are reviewed in section 3.4.3. "The University as Knowledge Entrepreneur"

virtual teams. In between you have all the whole range of skills today's great leader should have. As said, it is a book for practitioners listing proposing an ideal entrepreneurial manager who is aware of the importance of knowledge.

The third book 'The Knowledge Entrepreneur' by Stan Skrzeszewski (2006) was originally meant to be entitled "The Entrepreneurial Librarian" (ibid p. v), it describes practical hands advise for how to embrace the entrepreneurship paradigm in the librarian profession. He defines: "A knowledge entrepreneur is someone who is skilled at creating and using intellectual assets for the development of new ventures or services that will lead to personal and community wealth creation or to improved and enhanced services. The knowledge entrepreneur must have sufficient personal knowledge capital to be able to create value and/or wealth through the use of that knowledge capital' (ibid p.3). So far the definition is rather complementary with the conceptualization used in this research, only the dependence on existing intellectual capital and the result of 'wealth creation and/or improved services' actually alludes to a different objective than knowledge product or service per se. He continues: "The knowledge entrepreneur must know more about the subject at hand than his or her client of boss. It does not always have to be a great deal more, and sometimes the difference is based on the ability to communicate, present, or more importantly, apply the knowledge asset" (ibid). Now this argument is not convincing in the context of this investigation as the focus lies here on identifying and realizing an opportunity, rather than exploiting existing intellectual capital. Later, when Skrzeszewski elaborates on how information technology is a key trend to be exploited by knowledge entrepreneurs, his librarian perspective shows through again: "There is a growing need and expectation for relevant and usable digital information products and services. At the same time, there is a growing problem of information overload. Therefore, there is an attendant need to organize and package information for users, to put the information in context, to provide information intermediaries and facilitators, and to digitize all forms and formats of information - all major entrepreneurial opportunities" (ibid 31). Overall does Skrzeszewski present an interesting and valuable book with the aim to foment entrepreneurship among librarians and his general understanding of entrepreneurship is assessed to be compatible with the one developed in this research.

The forth author, McDonald (2002), has conducted his PhD research entitled "Knowledge entrepreneurship: Linking organizational learning and innovation" about a comparison of the conditions at hospitals regarding their approaches to knowledge sharing and exploration and the entry of innovations. The work is assessed as highly relevant and an amended version of his developed theory is described (see below) and applied in this research.

Another Author that has used the theme is Jennifer Rowley. In her paper "From learning organization to knowledge entrepreneur" (Rowley, 2000) she deals with how organizational learning can be meaningfully conceptualized. Thereby she stresses learning and the

usefulness of the knowledge codified. In this context she elaborates on the concept of the knowledge entrepreneur. In her understanding "an organization that is a knowledge entrepreneur recognizes the multi-faceted nature of knowledge, and the implication that this has for organization learning. Specifically, I understands how to interface organizational learning and systems evolution in such a way as to optimize and capitalize on its knowledge resources in pursuit of its vision" (ibid p.14). This understanding expresses in a different way the role of knowledge entrepreneurship as proposed in this research. She writes knowledge entrepreneurship serves to "build bridges between people and systems". She then goes on to list what is in her eyes important to achieve the co-evolution of system and organizational learning in tandem. These are: allow for diversity, allow for historicity and a knowledge culture, as well as appropriate systems for storage and dissemination.

Lastly a short paper entitled "It's difficult to innovate: The death of the tenured professor and the birth of the knowledge entrepreneur" (Bouchikhi & Kimberly, 2001) has been published in the Human Relations journal. The paper describes a near future where knowledge entrepreneurs are "working under a diversity of employment contracts and attachments" (ibid p. 82). Therefore "knowledge entrepreneurs will be hired and compensated based on their ability to imagine, execute, and use of the results of research to develop original educational products". The authors are dealing specifically with business and management education, for which they are painting a profoundly transformed scenario as they are "break[in] out of their institutional straight jackets and redefine their roles in the production of knowledge". According to their vision, there will be "an almost medieval hierarchy" amongst professors, with the superstar academics performing more the role of a "CEO of a firm than like the traditional professor, managing their work and their careers with extraordinary autonomy from customary university constraints" (ibid p. 82). As will be developed in the research position regarding the role of the university in society (section 3.4.2.) this research does not promote and envision education to become 'just another private sector service' and subsequently the scenario painted by Bouchikhi and Kimberly is not perceived as convincing, but rather as a linear continuation of the negative recent developments.

1.2.3.4. The Knowledge Entrepreneurship Model

Knowledge entrepreneurship is different from 'traditional' economic entrepreneurship ¹⁶ in that it focuses on the realization of opportunities meant to improve the production (research) and throughput of knowledge (as in personal transformation (Harvey & Knight, 1996)), rather than to maximize monetary profit. Subsequently the following working definition of knowledge entrepreneurship is deployed: *Knowledge entrepreneurship describes the ability to recognize*

¹⁶ Another example of a non-economic, non-traditional expression of entrepreneurship is social entrepreneurship (Bornstein, 2004) or political entrepreneurship (Taewook, 2004; Younkins, 2000).

or create an opportunity and take action aimed at realizing the innovative knowledge practice or product. There is however an entrepreneurial essence which I attempt to carve out in the following paragraphs.

Following Clark, (Clark, 1998, , 2004) "entrepreneurial" is used as a characteristic not only applied to individuals, but to the organization as social system, as well as to projects. However, in contrast to Clark, this study stresses the dynamic process of vision ¹⁷, and change aspects of entrepreneurship (Kuratko, 2006; Schumpeter & Opie, 1934), also known as entrepreneuring ¹⁸. Thus entrepreneurship is the act of pursuing new ways of doing thing in a real context, or more concretely "the essential act of entrepreneurship is new entry" (Lumpkin & Dess, 1996). Or as Brown put it: "Entrepreneurship is a process of exploiting opportunities that exist in the environment or that are created through innovation in an attempt to create value" (Brown & Ulijn, 2004, p. 5)

This forward looking notion is nicely depicted by Kanter (1983). According to her, entrepreneurs and entrepreneurial organizations "always operate at the edge of their competence, focusing more of the resources and attention on what they do not yet know (e.g. investment on R&D) than controlling what they already know. They measure themselves not by the standards of the past (how far they have come) but by visions of the future (how far they have yet to go). And they do not allow the past to serve as a restraint on the future; the mere fact that something has not worked in the past does not mean that it cannot be made to work in the future. And the mere fact that something has worked in the past does not mean that it should remain." (Kanter as in (Cornwall & Perlman, 1990, pp. 27-28).

Using McDonald (McDonald, 2002, pp. 12-33) as point of departure or "orienting theory" (Haig, 1995; Kinach, 1995), the following specific set of attractors are proposed to directly influence the knowledge entrepreneurship ability (figure 1.6). They are: *Environmental awareness* describes with what practices and with what intensity the organization gathers information about its external and internal environment. The importance of this practice for the establishment of an entrepreneurial organization was also recognized by Cornwall and Perlman (1990). They write: "*Scanning should be a fundamental part of every manager's job, not something that is done by top management in conjunction with the annual update of the strategic plan*"(ibid p.46). As such the concept includes activities like internal needs analysis, benchmarking and inter-organizational networking. The organizations attitude towards the risk

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¹⁷ Next to entrepreneurial vision the concept of strategic entrepreneurship is considered. Michael Hitt defined strategic entrepreneurship as "the integration of entrepreneurial (i.e. opportunity seeking actions) and strategic (i.e. advantage seeking actions) perspectives to design and implement entrepreneurial strategies that create wealth" (Hitt, 2002) page 2)

¹⁸ AMR (2006) Upcoming Special Topic Forum: Dreaming, Discovering, and Creating: The Visions and Costs of Entrepreneuring, Academy of Management Review (AMR) Journal http://www.aom.pace.edu/amr/entrepreneuring.html (visited 18.1.2006)

inherent in the pursuit of all innovation is captured under the concept of *risk tolerance*. A factor which has not been part of McDonald's model (and which replaces the variable named analytical diligence¹⁹) covers the organizations vision in the sense of *entrepreneuring* (Kuratko, 2006). This ability is strongly related to strategic thinking and planning, describes its culture of envisioning and scouting new developments. *New project support* refers to the degree to which new initiatives are institutionalized as a means of institutional development. Thereby the monetary means, as well as managerial attention given to experimental projects is looked at. *Communication* is the last variable taken into consideration as a major influence for knowledge entrepreneurship. The organizational style of communication and the richness of communication channels are evaluated here.

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¹⁹ The aspects of analytical diligence are in this study covered partially under environmental awareness and its replacement vision & strategy. The original variable has been depraved because no explicit evaluation and analysis has been found to take place in the researched universities. Rather universities follow a strategic plan which allows them to be more or less innovative.



Figure 1.6 – Amended Model from McDonald (2002)

Furthermore the organizational condition, described through its setting and its current leadership and its organizational culture are set to determine the general possibilities for knowledge entrepreneurship to occur. Thereby the organizational setting represents the basic factual being of the organization; its size, type of institution, business model, history and historic approach to innovation. Under leadership the style and values embraced by the current top decision makers, as well as the governance structure itself is evaluated. The concept of organizational culture is central to the understanding of the enabling or discouraging condition of the organization, as it adapts its attitude towards organizational learning and whether values like innovativeness, competitiveness, entrepreneurship etc. are embraced or rejected.

On the output side, knowledge entrepreneurship is set to improve innovativeness and thereby indirectly improve performance. But "the most important outcome of organisational entrepreneurship is long term: an organisation that is better able to adapt and survive." (Cornwall & Perlman, 1990, p. 29)

As we will see in the following chapter, universities are fundamentally distinct from private sector organizations and as I will argue, they are an optimal study object for knowledge

entrepreneurship because their purpose is the production and creative de-construction of knowledge as a public good.

1.2.4. The University in the Network Society

1.2.4.1. The Entrepreneurial University Discourse

Universities are a very special type of organization, because they are neither part of the state, nor are they part of the economy, while they serve both as a provider of knowledge and human capital.

Even though discussion about adopting the university to modern capitalism and management has started as early as 1966 (Rourke & Brooks, 1966), it was Burton Clark, who, with the intention to show a way for institutional autonomy, presented and coined the concept of the entrepreneurial university in the late 1990's. Since then, it has been rightly assessed that Clark's picture of the entrepreneurial university to have 'achieved iconic status among university models for the twenty-first century' (Shattock, 2003, p. 146). Also Hindle (2001, p. 5) calls Clark's book 'the bible of the [entrepreneurial university] movement'.

Clark conducted a series of case studies (Clark, 1998), which led him to propose a set of conditions which in his view allowed for institutional autonomy and well-being. The theme of the entrepreneurial university was received very controversially. Some scholars and many university management practitioners welcomed his propositions and stressed that they lead to higher efficiency, higher competitiveness both assessed essential in the surges of the globalized education market. Other scholars, mainly with a European, and/or humanities background, portray the development towards an entrepreneurial university as a sell-out of academic and scientific values, practices, and services to the capitalist economy (Bok, 2003).

The missions

With the intention of doing justice to the good intentions to both parties in this sometimes fierce discourse, allow me to recount the historical development of the university as institution. Thereby I shall carve out the appropriateness of some aspects of entrepreneurial practices (namely knowledge entrepreneurship), while rejecting others, based on the relevance to fulfill the universities mission.

Most historians take the medieval universities of Bologna, Paris as archetypes and the starting points for their account (Delanty, 2001; Kodera, 2004; Widholm, 2002). These were institutions of scholastic work and teaching. There was no, or relatively little, practical knowledge taught but rather the education obtained was meant to train general intellectual abilities as well as knowledge about the great Greek philosophers and the bible. Concurrent with the medieval understanding of a static (non-progressive) world, no new knowledge was sought but rather

was the knowledge of the idealized Greek scholars transmitted, interpreted and commented upon. From these roots comes the original mission of the university to empower and train its students to intellectually participate in society.

Over time more and more practical knowledge, such as law and medicine, was codified and offered at universities. Coinciding with the dawn of modernity more universities taught more and more students and the university became an institution to obtain vocational education. It was in this period that the state recognized the universities relevance as breeding ground for its bureaucrats, doctors and lawyers. Certification and the codification of 'nationality' (history, geography, etc.) became an important role of the university and a close bond between the state and the university was build²⁰.

The universities first mission has been captured very precisely by Delanty (2001) who describes it as education for cultural and technological citizenship. Whereby cultural citizenship includes all knowledge needed to actively participate in political, as well as social affairs (as well as to appreciate art), while technological citizenship comprises the abilities to create economic value. In short cultural citizenship is what makes the individual a valuable participant of society while technological citizenship is the specialized knowledge one exploits to make a living (Delanty, 2001; Senges, 2006)

The second mission most universities have embraced today is to do research. It has been introduced for the first time by von Humbold at the occasion of the founding of the new university of Berlin. He saw the necessity to have all the Prussian bureaucrats educated at the university, but he was also highly troubled by how the Prussians military had fallen technologically behind the French and thus proclaimed that the Berlin University was to be a place of education while at the same time pushing Prussian military development through research.

Spurred by the successes of the von Humboldian model research was added gradually to most universities. Today pure teaching universities are the exception and almost all universities have some sort of research activities.

The newest third mission is the most complex and least defined and agreed upon mission. There are several understandings of what it does or does not include, but in general it refers to the university as institution taking over a role as actor in (1) economic development, (2) politics as well as (3) knowledge deliberation with society as a whole.

²⁰ This state-university connection never developed on the same scale in the united states, which explains or better is the root of the quite obvious distinction between the European and American university systems.

One of the most influential themes that have evolved around this mission is the triple-helix concept (Etzkowitz & Leydesdorff, 1997). This school proposes that interplay between governments; industry and universities should be institutionalized and fostered. This rather econo-centric school sees mainly the role of the university to stimulate the economy. Its goal is to optimize the transfer of research results to the industry so they can transform them into innovative products and services, leading to economic growth and wealth creation. The government assists this transference thought funding and facilitating political and legal conditions.

Entzkowitz (2002) himself has portrayed this approach as a development from the linear knowledge flow model, where knowledge and human capital is transmitted through publications and certified workers, to a spiral model where industry gives feedback and interacts in the knowledge production and refinement.

A similar view had also evolved around the research of Gibbons and Nowotny (Gibbons, 1994) entitled The new production of knowledge: the dynamics of science and research in contemporary societies. In their view

The difference between the triple helix and the Mode 2 approach is that the latter are plainly assessing and promoting the production of useful knowledge, the former field is lobbying for the 'capitalization of knowledge²¹' (Etzkowitz, 2002, p. 11) For him universities are undergoing the second revolution (the first was when they took on research). Etzkowitz sees a 'new academic institution' "one that is oriented much more directly to playing a role in behalf of the state as an agency of economic development²²." (p.21)

Etzkowitz has taken over as the main proponent of the entrepreneurial university. In his book "MIT the raise of the entrepreneurial university" (2002) he describes how MIT is strongly

According to Entzkowitz (2002), the 'capitalization of knowledge in universities has occurred in three stages: securing of intellectual property; restructuring of research groups to generate a large intellectual property base; establishing of corporate vehicles – spin-off firms – within universities to maximize the return on intellectual property' (p. 11). He continues, 'the entrepreneurial university, with faculty and administration directly involved in translating knowledge into intellectual property and economic development, attempts to create an industrial penumbra around the university with varying degrees of success'(p.17). In other words he describes a knowledge industry practicing on a capitalistic knowledge market.

He paraphrases the President of the National Academy of Science "For better or worse the terms of a new social contract between the scientific community and the larger society are now being forged" and another author who suggested we are seeing "the forging of a 'new social contract' or a 'new negotiated treaty' between science and society" (p.55). At another occasion he writes: "Traditionally, the most deeply held value of scientists is the extension of knowledge. To contribute to this is the highest striving of a scientist. The incorporation of 'extension of knowledge' into a compatible relationship with 'capitalisation of knowledge' is a profound normative change in science" (Etzkowitz, 1998).

interwoven with the industry and the state and claims that MIT has became the 'role model' university for the 21st century²³.

The views of the promoters of a pro-entrepreneurial, meaning pro-business & neo-liberal market approach to higher education find a very explicit and unalloyed voice in the vice-chancellor and chief executive of the University of Surrey of the who explained: "Modern universities are businesses and, like any business, to achieve sound finances they must develop appropriate services and products for which their customers – the government, business, charities, students and the public – should be prepared to pay a fair price" (Dowling, 2004, January 12).

The suggestions of Clark and Etzkowitz have caused an imitate reaction amongst many academics who feel the need to defend the original character of the university against what they see as a business take over.

Two main arguments are brought forward against the economic entrepreneurial approach²⁴. For example Mautner (2005) assesses that it is a characteristic of the pro-entrepreneurial argumentation that independence from government funding is hailed as 'self-sufficiency' while it is in fact simply the dependence on another source.

And Ronald Barnett's brings forward that 'through the ideology of entrepreneurialism the university's particular place as a critical forum is undermined' (Barnett, 2003, p. 73). Banja makes the same argument in a more poignant way when he asserts, if the university becomes business, then it's no longer a university (Banja, 2000).

But in general, while there is ideological, moral, and human resistance to the 'entrepreneurial programme' proposed, most academics accept the new reality of higher competition, global markets etc. and even though they might not approve of the 'sell out' of academic tradition and scientific knowledge as a public good, there seems to be no alternative programme. Some authors however have worked on proposals on how to frame 'entrepreneurial' in the academic context and this work is meant to build upon and complement their work.

²³ His assessment seems to be correct at least for some circles. The European President Barosso has initiated a political initiative to found the European Institute of Technology as a European counterpart and competition to MIT (Pincock, 2006).

²⁴ More critics are listed in the OECD (OECD, 2006) special issue on entrepreneurship in higher education: 'Slaughter and Leslie's Academic Capitalism (Slaughter & Leslie, 1997) and from Marginson and Considine's The Enterprise University (Marginson & Considine, 2000) universities will lose their freedom to act in their traditional role as critics of society. Williams in The Enterprising University (2003) confirms the view "that the emergence of enterprise as a powerful and possibly dominant force in universities inevitably raise fundamental questions about their nature and purpose".

Some examples of scholars who intend to produce a synthesis of the opposing sides by transposing the entrepreneurial paradigm to higher education²⁵ are Shattock (OECD, 2006; Shattock, 2003) and Fuller ((2006) – who's view will be depicted in the next section).

They deploy the term 'entrepreneurialism' to differentiate non economic application of the entrepreneurship paradigm of creative destruction. For Shattock (2003) the essence of entrepreneurialism is self directed autonomy. He defines entrepreneurialism "a drive to identify and sustain a distinctive institutional agenda which is institutionally determined not one [which is] effectively a product of a state funding formula".

Now after elaborating on the three key missions of the university and the discourse around the entrepreneurial university, I believe it has become clear that the concept of traditional 'economic entrepreneurship' is quite controversial to describe the activities of the university. Nevertheless my personal stand in this regard is laid out in the following section.

1.2.4.2. Research Position: The Importance of Universities as Public Institutions

As described in the section above, more and more authors perceive universities as businesses and education as a market. Many of the industrialized nations and foremost the United States support this view in the current WTO negotiations education is negotiated to be included alongside other services like telecommunication and logistics. While there can be no doubt that universities comprise many aspects of economic organizations – they have budgets, they employ people who receive salaries and make careers, they have students who receive education and scientists who produce research – universities have so far always been setup as not-for-profit organizations. There are two fundamental arguments why universities and education in general should be a public good and not be treated like e.g. banking services.

- When universities become integrated in the market logic they loose their academic autonomy (read objectivity) and become subordinate to the funding sources: Industry and

 as has been described in the case of the LSE and the UOC – their clients. Two results are foreseeable:
 - a. As more and more applied research is conducted (Gibbons, 1994; Nowotny, Scott, & Gibbons, 2001) the question of intellectual property and subsequently of accessibility of the results is likely to be controversial, as funding bodies will hedge their interests. As postulated by Kant (1970) science necessarily needs to be publicly accessible and comprehensible. The public availability of knowledge is a key precondition for competition (, which fosters development and affordability) as

²⁵ Also Clark (2004) is rethinking and reacting to some of his critiques in his book Sustaining Change in Universities, which enlarges his concept by referring to "the adaptive university", the "proactive university" and the "innovative university".

- well as for the participation of small and medium sized business in the market as they can not fund research.
- b. Notably the opposite of competitive develop is also the result of privatization of research. Because scientists today operate on the basis that everybody has (more or less) access to the latest knowledge, they all compete at this knowledge frontier. In comparison, when knowledge is secured as intellectual property only the owner can push development, or, as allegedly has been the case for alternatives to the Otto-motor based automobile, the owner can freeze further development²⁶.
- c. Researchers will deal with subjects related to the funding source and will tend not to be as critical as they would be without their financial support. This issue begins with the selection of what organizations and aspects of them are selected for review and training which results in the concrete conditioning of product spread. Two concrete examples are: Funding provided by Oracle to provide database management courses naturally dealing with the administration of their solutions. Or the free provision of Microsoft Office Suites in schools and universities, which strongly favors these products in the market because users have their competence here.
- 2. The second point deals with changes related to the role of the university as social institution. Issue related with the loss of standardization, access to faculty and elitism as well as the neglect of citizen education (Delanty, 2001) have to be raised here:
 - a. Libertarians traditionally argue for the free market based allocation of goods and services as the most effective and efficient mode creating wealth and, so the argument, wealthy societies have means to secure justice and security. A chain of arguments can be brought forward to put this claim into perspective: Firstly result of free markets has been proven to be a severely increased polarization between poor and rich citizens and a subsequently less just society in the Rawlsian sense (Staloff, 2000). Given this experience with free markets, it is likely that a free educational market will result in a few (pricey) universities which will provide excellent education while the mass of people will either access universities with a lower standard then today or, perhaps more likely, will not have a tertiary education at all. The result of this scenario would be an amplification of the currently already increasing social divide with the finality of the distinction of an educated middle class, with the known consequences for the democratic system (populism and radicalization). If an inclusive knowledge society is the objective, education as a public good is one of the cornerstones.
 - b. A last trend that is already manifesting is the increasing bias towards vocational training and the concomitant neglect of citizenship education. Traditionally, the

²⁶ Even though the case is in the moment only hypothetical, it is a credible thought experiment.

university was not seen as a place for vocational skills training but rather to transform its participants into educated (*gebildet*) humans, capable of holding and constructing a healthy society (Mill unity of science encyclopedia of ideas doc). This understanding was radicalized in Habermas' conceptualization (Habermas & Blazek, 1987) of the university as institution for academically facilitated critical political discourse and the education of the critical Enlightened citizen²⁷.

This role of the university is already in decline and the commercialization of education most likely encourages this trend.

In conclusion, it is argued that the transformation of (higher) education institutions to embrace free market conditions will likely cause (a) that the public availability of knowledge will decrease, (b) that companies will exploit the opportunity to use universities as (external) training facilities and to spread the use of their products, (c) that a competition amongst educational institutions will lead to high differentiation, while a few very excellent but very costly institutions will stand against a grand mass of low performing facilities for the masses, and last but not least (d) that the role of the university to review and critique issues of interest to society and to educate and foster its students to participate in public discourse will be diminished. Hence it is not rational to end the idea of the universities as a public institution but rather increase state funding to make it flourish as the motor of the knowledge society. As one possible remedy, the concept of knowledge entrepreneurship is proposed as suitable paradigm to be applied in the university and educational sector, in the following section.

1.2.4.3. The University and Knowledge Management

"Universities have no experience of valuing their intellectual capital and entering those values on their balance sheets" assesses Jennifer Rowley (2000) in her very fertile paper discussing the question whether higher education is ready for knowledge management. The paper presents a good analysis of the challenges and benefits for knowledge management in higher education, a theme that has become the main topic of a High Level Forum of the OECD two years later. The experts general assessment is summarized: "Despite being in the learning business, teachers, schools and education authorities are notoriously bad knowledge sharers" (OECD, 2002). The individual contributions (e.g. (Oosterlinck, 2002) or (Oakley, 2002)) do all raise some interesting points, but are generally rather descriptive and theoretic in nature. Quite the opposite is true for the short but very insightful paper "Applying corporate knowledge management practices to higher education" authored by three practitioners from Price Waterhouse Cooper (Kidwell, Vander Linde, & Johnson, 2000). The authors give a short overview of their knowledge management approach and then outline the application and benefits of knowledge management for research, curriculum development, student and alumni services, administration, and strategic planning. Another very valuable contribution is the

²⁷ As attempted by the students of the FU during the student movement of the 1960ies.

organizational framework for efficient knowledge throughputs written by Piccoli, Ahmad and Ives (2000). Their report is particularly relevant to this research because there interest is to "fundamentally reengineer knowledge creation and delivery" in the university. entrepreneurial knowledge production and learning framework they have implemented at their university everybody, including the (learning) students; contribute to the knowledge product (in their case a piece of software). "Three entities, or engines, drive the proposed knowledge creation and delivery process. Faculty and researchers in the research engine provide guidance and set goals for the organization, while monitoring progress and evaluating results (knowledge acquisition and generation). Graduate students in the production engine, under supervision of those managing the research engine, produce and codify knowledge as part of their own training (knowledge generation and knowledge storage). Finally students in the learning engine, under faculty direction, absorb and apply the stored knowledge (knowledge utilization)" (ibid p. 232). This model is evaluated to be very interesting and a perfect instance of knowledge management as knowledge entrepreneurship. This case is however found to be the exception. Overall the OECD summary is correct, universities are in the prototype of a knowledge driven institution but they do not apply knowledge management, nor do they conceptualize it as intellectual capital.

1.2.4.4. The University as Knowledge Entrepreneur

The concept of the university as a knowledge entrepreneur is believed to be instrumental to dealing with a central issue present in the current discourse on university reform. What is the role of the university administration? Furthermore the university as knowledge entrepreneur paradigm can contribute one proposition for the role of the university in the 21st century and its knowledge society.

At the heart of knowledge entrepreneurship is the production of knowledge. It describes the ability to identify and appropriate knowledge and other innovations which lead to a higher performance in knowledge production²⁸.

Fuller (2006) has described the university as an intrinsically entrepreneurial institution. He laid out a how the university constantly creates and creatively destructs knowledge as a constant circulation. In his view the university creates knowledge through research. In a second step that knowledge is de-constructed through its dissemination to the students and the industry. For him this process is immanently entrepreneurial because some of the students become the researchers of tomorrow, who then develop new knowledge through the creative destruction of the known. Thereby the competitive advantage of that old knowledge is lost and new value has been created in form of the research results. In other words, he depicts a constant creation of human capital (through education) and knowledge capital (through research) which flows

²⁸ in research and teaching.

towards the third mission and is there invested for the fostering of business, governmental and societal causes. This process has been interpreted and projected onto the three missions of the modern university (Figure 1.7). It became part of the 'originating theory'.

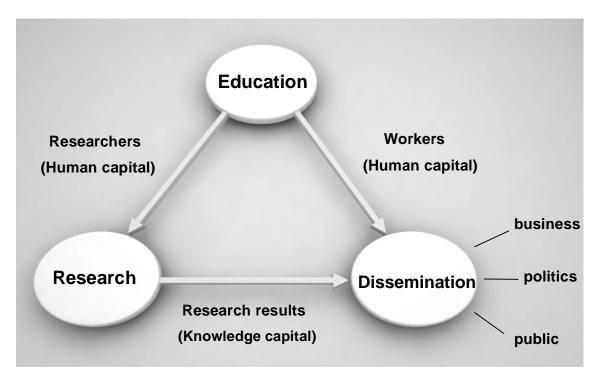


Figure 1.7 – The University as Knowledge Entrepreneur (Developed from Fuller, 2006)

1.2.4.5. The University Knowledge Entrepreneurship Model

The following model is used as a schematic frame to research the current strategic and organizational practice, in regards to the appropriation of internet based innovations, in universities. As depicted, the organizational condition determines the ability to develop and enact knowledge entrepreneurship, and this ability in turn greatly influences the appropriation of internet based innovations, which in turn influences institutional knowledge performance as a whole. The three missions of the university plus the 'business administration' task are the dimensions of knowledge entrepreneurship being examined.

When reflecting about the proposed model and its elements, one fundamental aspect to the presence and effectiveness of organizations knowledge entrepreneurship ability is not depicted. There are two elements to organizational knowledge entrepreneurship: (1) the individual's motivation and skill to embrace the concept and (2) the systemic, organizational environment fostering or whittling down the potential. This problem is dealt with through the fractals property of adaptive complex systems as will be explained in the research approach.

The described model is investigated for the special case of the appropriation of internet based innovations for two reasons: Firstly, my personal background is in knowledge systems and internet based collaboration systems- so it logically is the field with which I am most familiar. Secondly, the internet has been said (Tiffin & Rajasingham, 2003) to have the potential to fundamentally revolutionize the way we learn and subsequently how education is organized around the world. Thus, if there is this potential (and some developments e.g. Open Educational Resources and the success of UOC point to it) the ability to develop knowledge entrepreneurship abilities in this field seem especially important. So the following reviews the literature regarding innovation in universities and the integration of ICT in particular.

1.2.5. Universities as Organisations

Organisational studies are a relatively young field of study. In fact some authors claim that it was only in the beginning of the 20th, with the emergence of large organisations characteristic of industrialized societies, that organisations began to be investigated systematically (Zellweger-Moser, 2003, p. 71). It was Morgan (2006) who suggested to use metaphors to illustrate the functioning of organizations. One of the metaphors suggested is the organisation as organism, another the organisation as a brain. The latter is a classic in the cybernetics and system theories studies (Zellweger-Moser, 2003).

The university is understood to be a complex adaptive system (as described in section 1.2.2., 1.2.3., and Annex C), and all components of knowledge entrepreneurship and all independent variables are understood to have strange attractor qualities. Strategy and practice are singled out as the main focus subject of investigation, while other components (such as resources, structure and spatiality) make up the individual settings of the institutions and are explored as independent variables. So what is strategy and practice supposed to imply?

1.2.5.1. Strategy and Practice

Strategy can be conceptualized to contain the daily practices as continuously emergent strategy. Andrews has given such an definition: "Corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economics and human organization it is or intends to be, and the nature of the economic and non-economic contribution it intends to make to its stakeholders, employees, customers, and communities" (Andrews, 1971, pp. 18-19). In this research practice and strategy are two different activities. Strategy describes the process of consciously reflecting about and planning the current and future practice of the university. Put differently, the interest is on how to strategically deal with innovation, or as Drucker put it systematic innovation.

Drucker defined systematic innovation as "the purposeful and organized search fro changes, and it is the systematic analysis of the opportunities such changes might offer for economic or social innovation" (Drucker, 1985, p. 35). Practice on the other hand describes an activity that is currently routinely performed based on the implicit strategic approaches lived in the moment (by the individual organisational member and thereby producing the aggregated 'real' strategy performed by the organisation in the moment).

1.2.6. Innovation Appropriation

For the process of innovation the definition proposed by the Conference Board of Canada is assessed to be suitable. It defines innovation as "a process through which economic and social value is extracted from knowledge - through the generation, development, and implementation of ideas - to produce new or improved products, processes, and services" (Skrzeszewski, 2006, p. 53). Rogers has developed the most extensive and widely cited work in this area. He developed the V stage innovation adoption model (see figure 1.8). One has to take into consideration that the model was developed based on studying innovation diffusion practices in the agricultural sector. He conceptualizes a progressive process of innovation adaptation, starting with the necessary fact that the potential user has to become aware of the innovation (stage 1); the user has then to be persuaded of the innovations usefulness (stage 2). Here a many strange attractors are at play, however Rogers seems to have a true homo economicus at mind as there are only rational qualities present. Also the price benefit component is implicit. At this point a decision about whether or not to adopt the innovation can be made (stage 3). Obviously once the decision has been made in the affirmative, implementation follows as stage 4. Once in practice the innovation needs to prove its worth as one can not assume that one will not return to the traditional working pattern (Everett M. Rogers, 1983, p. 169).

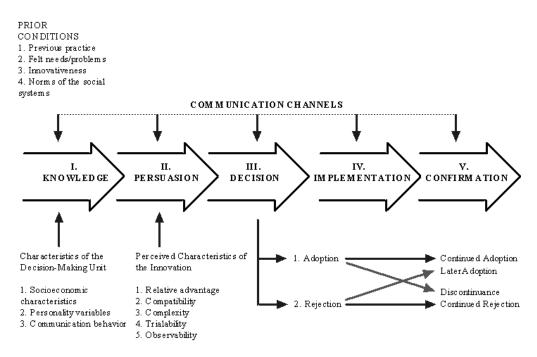


Figure 1.8 - Rogers' Model of Innovation Adaptation Behavior (Rogers, 1995, p. 170)

Perhaps the most famous result of Rogers work is the classification of the adopters of innovation into innovators, early adopters, early majority, late majority and laggards (Everett M. Rogers, 1983, p. 281). The categories are categorized to divide a classical Gaussian normal distribution of the target population (see figure 1.9). The second to groups – early adopters and early majority – are found to be decisive for the general market acceptance of an innovation.

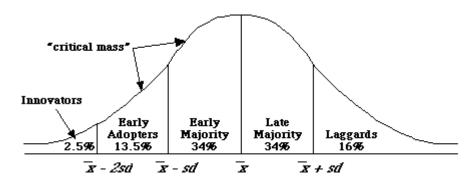


Figure 1.9 - Adopter Categorization on the Basis of Innovativeness (Rogers, 1995, p.281)

Rogers' findings illustrate that the adopters are not one homogenous group, but rather that in one professional group – such as academics – one can expect to find the whole distribution from innovators to laggards. Nevertheless, as Zellenweger writes, it is a combination of individual disposition and the organizational context that determines the overall practices of e.g. a university (Zellweger-Moser, 2003, p. 104).

Another widely cited concept in innovation studies is the technology acceptance model (TAM). It has the perceived usefulness as well as easy operation of a given innovation as its key factors (Lee, Cho, Gay, Davidson, & Ingraffea, 2003). The TAM model is however assessed

not to be very suitable to investigate and explain the rather complex internet based knowledge practice innovations like e-learning and e-research, because of its conceptualization of the decision to a simple yes or no. Rather for the innovations in question, the process of appropriation is gradual and users tend to increasingly improve their usage. This theme of classifying the innovations is elaborated by Fitchmann (1992), who categorizes a Type 1 and Type 2 technologies. Hereby Type 1 entities are characterized by a lack of user interdependencies as well as no special demands regarding knowledge or competence on part of the user. Type 2 innovations on the other hand are embedded in or cause interdependencies among stakeholders and special knowledge is needed to exploit the innovations potential. On a second axis Fitchmann addresses the theme of individual versus organizational appropriation of the new technology. Zellweger (Zellweger-Moser, 2003) is correct in assessing that classical innovation theory, like Rogers, deals first and almost exclusively with Type 1 innovations being adopted by individuals. In the case of educational technology there is almost certainly special knowledge needed and as knowledge systems deal with codification and communication there are also always interdependencies. As a consequence more complex scenarios taking organizational decision making processes, cultural characteristics, and competitive effects into consideration (Fitchmann, 1992, p. 9).

Having reviewed all the work implemented on innovation diffusion, technology acceptance, etc. it has been opted to use 'innovation appropriation' as conceptualization. Innovation appropriation has been selected as concept describing the act of integrating something innovative into the organization²⁹. The concept is based on the economic investigations about absorptive capacity as coined by Cohen & Levinthal (Cohen & Levinthal, 1990). In their conceptualization absorptive capacity is the organization's ability to recognize the value of new information or technology, assimilate it, and apply it to commercial ends. Hence the concept focuses on the realization of an opportunity for improved functionality and as such is in tune with the entrepreneurial perspective developed. But like 'traditional entrepreneurship', absorptive capacity is seen there from a pure economic perspective hence they are almost exclusively interested in econometric measures for macro- and micro-economic understanding, which is not transferable to knowledge entrepreneurship and the mission of the university. Nevertheless appropriation is chosen as it is considered more appropriate than innovation diffusion (Everett M. Rogers, 1983), which follows a particular innovation rather than the human activity. The concept of innovation integration (Darking, 2004) is assessed to describe a very similar process³⁰, as it deals with the process of incorporating an innovation into the practices of an individual or organization, but it leaves out the important part of entrepreneuring and strategically planning an overall approach to innovation as well as the identification and assessment of the opportunity before the process of integration even starts.

²⁹ Either from the inside – a self-produced innovation – or from the external envirnment.

³⁰ and hence the term integration is used from time to time

Only three studies (Luambano & Nawe, 2004; Oyelaran-Oyeyinka & Adeya, 2004; Ynalvez et al., 2005) have been identified to deal with the process of appropriating internet based innovations into the university. All three deal with the special case of practices and impact of the internet in developing countries and their special interests and results are therefore not really transferable to the European background. One other study (Nachmias, 2002) deals with the development and provision and further development of an online learning environment at an Israeli university. Unfortunately it is pursuing very technical interests and does not bear insights for this research.

1.2.6.1. Innovation at Universities

Education has long been acknowledged as one of the key sectors for the application of new innovations, especially ICT based innovations. However the visions and expectation of the observers have seldom been realized or at least not been realized to the degree and within the timeframe specified, radical optimist the eminent scientist, entrepreneur, and futurologist Ray Kurzweil has envisioned the future of education as follows: "Because of current bandwidth limitations and the lack of effective three-dimensional displays, the virtual environment provided today through routine Web access does not yet fully compete with 'being there', but that will change. In the early part of the second decade of this century visual-auditory virtualreality environments will be full immersion, very high resolution, and very convincing. Most colleges will follow MIT's lead, and students will increasingly attend classes virtually. Virtual environments will provide high-quality virtual laboratories where experiments can be conducted in chemistry, nuclear physics, or any other scientific field. Students will be able to interact with a virtual Thomas Jefferson or Thomas Edison, or even to become a virtual Thomas Jefferson. Classes will be available for all grade levels in many languages. The devises needed to enter these high-quality, high-resolution virtual classrooms will be ubiquitous and affordable even in third world countries. Students at any age, from toddlers to adults, will be able to access the best education in the world at any time and from any place" (Kurzweil, 2005, p. 337). As stated, this radial position has to seen with skepticism as most of these kinds of visions turn out wrong. For example the very Thomas Edison mentioned in the above quote proclaimed in 1913: "Books will soon be obsolete in schools ... It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in the next ten years" (as cited by Reiser, 2001). Traditional media and practices have enormous advantages when it comes to usability and the possibility of inter-generational understanding of the practices.

Probably one of the first researchers to tackle the precise question how universities innovate was Arthur Levine (1980). He has written a book entitled 'Why innovation fails', which despite its pessimistic title, is investigating how universities and colleges can successfully change. His findings are explained as example of a whole group of scholars, who, over the following years have done considerable amount of investigation into barriers of change and especially

technology adaptation. Levine developed and tested a model to describe the success or failure, the institutionalization or termination of an innovation in an organization. His theory builds upon the concept of boundary expansion. Each organization has a unique set of norms, values and goals which constitute its boundaries. He quotes Kai Erikson who described these boundaries as a "symbolic set of parentheses" controlling the organizations social space in order to retain "a limited range of activities and a given pattern of constancy and stability within the larger environment" (Erikson, 1966, p. 10). Thus these boundaries circumscribe the personality or culture appropriate to the organization. These boundaries are – similar to human development – relatively flexible in the early stage and become more and more rigid and eager to maintain the status quo the older the organization gets.

He describes the process of how the 'personality traits' of the innovation penetrates the host organization if it is received positively as boundary expansion. Two processes make up boundary expansion, on the one hand is the innovation diffusing into the organization and thereby changing its routines (he calls this process enclaving), on the other hand are the users changing and appropriating their uses and utilities to the innovation (a process which has been described as 'user driven innovation' (Hippel & Sloan School of Management., 1999)). When the innovation is perceived negatively boundary contraction happens. Boundary contraction is characterized by activities of the users to construct organizational boundaries which are meant to exclude the innovation. Thereby the innovation is labeled "deviant" and viewed as illegitimate. Two sanctions are applied to innovations that are perceived as deviant: either they are re-socialized – a process by which the innovative aspects that were in conflict with the traditional boundaries are changed making the innovation practically inexistent; or the innovation is terminated all together, meaning that it is eliminated from the organization.

Profitability and compatibility (congruence) are then proposed (in accordance with the results of many earlier studies) as the main determines for the rejection of incorporation of an innovation³¹. Compatibility³² is the degree to which the norms, values and goals of an innovation are congruent with those of the host. Profitability is more difficult, because it is rather subjective (this is true especially in knowledge work). Rogers and Havens (1961) have therefore opted to define profitability as the adopter's perceived profitability and not an objective measure. Maintenance is of great importance when it comes to compatibility. Levine

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Other factors as reported from a literature review of Rogers and Shoemaker (E M Rogers & Shoemaker, 1971) include – relative advantage ("the degree to which an innovation is perceived as being better than the idea it supersedes"); compatibility ("the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of the receiver"); complexity ("the degree to which an innovation is perceived as relatively difficult to understand and use"),; trialability, elsewhere called tryability or divisibility ("the degree to which an innovation may be experimented with on a limited basis") and observability also called communicability ("the degree to which the results of an innovation are visible to others")

³² Compatibility and profitability also include a strategic fit with externally demanded qualities – such as state or market demands (ministry policies and assessments, external ratings etc.)

distinguishes between two types of profitability – self-interest profitability and general profitability. Self-interest profitability is what motivates the sub-units and the individuals to adopt an innovation. General profitability is what makes the organization as a whole to go after an innovation. These two might be in conflict with each other. An organization might decide that an enterprise resource planning system is what is needed to get the processes and administration more efficient, thus profitable, while the sub-units are un-pleased with the idea of central control and an innovative but rigid system. On the other-hand the www can be seen as a good example which makes many jobs more diverse and is as such highly appreciated by the individual but deemed controversial for it is used for private goals as well as organizational goals. Two measurements are suggested for profitability – whether it satisfies the specific need for which it was created, and whether it positively or negatively affect the rest of the organization. Obviously the two indicators are highly interwoven ³³. When an innovation becomes incompatible it also becomes unprofitable. Therefore un-profitability is the ultimate indicator for innovation failure.

1.2.6.2. Internet-based Innovation Appropriation at Universities

'The development and implementation of information and communication technology (ICT) forces today's universities and colleges to respond to societal trends that point to a transformation of our society into a so-called 'knowledge economy' (Manuel Castells,1996). With these words describes Castells the current wave of innovation happening in education. One notices the identification of society and economy in this passage. Maybe not consciously Castells is therefore alluring to a point cut out straight by Nobel: "universities are not only the real undergoing a technological transformation. Beneath issues that change, and of camouflaged by it, lies another: the Second commercialization of higher education" (Noble, 1998). Acknowledging the efficiency gains of ICT deployment, this research is however rather interested in the benefits on knowledge production and services rather than economic optimization.

Lets remember, Rogers (1983) defined the process of innovation diffusion as "the process by which an innovation is communicated though certain channels over time among members of a social system" (p. 5). As stated in the corresponding section (1.3.6.) in this research internet

33 Interestingly he states that scientists of culture (anthropologists and sociologists) are prone to highlight compatibility,

while scientists of the individual (economists and psychologists) tend to stress profitability. Also the setting of the research is diagnosed to have an influence on the outcomes: Studies of researching innovation adoption in western industrialized countries stressed the profitability while studies looking at the conditions in developing countries found compatibility to be more important. Thirdly the research method had an influence on the outcomes: in-depth long term, participant observation case studies have more often stated compatibility as the main cause of boundary expansion or

contraction, while studies using survey research methods reported profitability to be more important. Levine reasons that this might be so because compatibility is a more flexible variable (innovations can be adopted easier to the predominant routine) but profitability is a rather stiff measurement which either produces better results or not.

appropriation, and hence the variation is investigated from the perspective of the actor as knowledge entrepreneur and with the innovations being the constant stream of new internet technologies and services and universities as social systems.

During the internet hype of the mid to late 1990's a whole industry of e-learning providers emerged and even though e-learning was not the killer application, many products have developed into an mature state (Yanosky, Harris, & Zastrocky, 2004), and in fact an advanced market consolidation has left only very few big players in the commercial field, while the open source approach gains momentum. This seems somehow natural, because many universities do have experts who are able to tweak and optimize the e-learning applications so they fit to their demands and the collegiality and humanism (sharing benefits with institutions in developing countries) among academics also is in line the open source approach. E-learning is but one example of a field of internet based innovation where actors first have unrealistic expectations and subsequently are disillusioned when the results are sobering. Zellweger Moser assesses: "It is only with solid research and development efforts that the technology matures and becomes a productive innovation adopted by many businesses" (Zellweger-Moser, 2003, p. 82).

Many authors have investigated the barriers and resistance to innovation (Ertmer, 1999; Maguire, 2005; Miller, Martineau, & Clark, 2000; Weston, 2005) rather than the motivators or institutional facilitators. Miller et. al. for example makes a distinction between individual resistance to change and organizational barriers. For them individual resistance is based on technological illiteracy and competence to assess innovations correctly but they are also the result of organizational barriers like a missing incentive structures and the fact that innovation in teaching is not valued in higher education. The missing incentive structure is directly related with their finding that universities have difficulties to redirect significant but necessary amounts of resources from the traditional and proven model of education towards technology based education. The whole process boils down to the single question of "Why change" (ibid p. 238). They also find that still many faculty believe face-to-face instruction to be the most effective form of teaching (ibid p. 233)

Maguire (2005) has conducted a literature review and essentially agrees with the classification of individual and organizational barriers for the participation in distance education. She classifies the findings of 13 empirical studies into intrinsic, extrinsic, and institutional motivators and deterrents. Her particular emphasis is on peer communication and practice as a motivator.

Another conceptualization comes from Brikner (as cited in Ertmer, 1999, p. 48) who defines a distinction between first-order barriers, which hinder the incremental evolution of a current practice, and second order barriers which are the psychological dispositions and mindsets of the teachers. According to Ertmer first-order barriers include lack of computer access,

insufficient time to plan instruction, and inadequate support services. Second-order barriers are factors like believes about teaching, believes about computers, the culture and practice that has naturally emerged over time as well as a fundamental aversion of change. Also Weston (2005) supports this external internal division in his anecdotal explanations of why faculty did or did not integrate e-learning aspects into their teaching. It remains however unclear in all these cases how these internal or external factors can be leveraged with the goal of creating more favorable conditions.

A more procedural approach, similar to Rogers (1983), is presented by Celsi & Wolfinbarger who also propose a three stage model of technology integration. They suggest a model that makes a distinction between the potential of the technology and the innovation in practice. According to them, technology is first used as a support function of the dominant traditional practice, in the second stage it is used to mirror the practice and it takes over certain teaching functions. It is only in the third stage that professors actually let go of the established practices and engage in discontinuous innovation. Their model comes very close to Bates stages of innovative technology exploitation (Bates, 2000; Bates & Poole, 2003, see Chapter 5 section 1.3.1 for description and application to the case studies).

One last study that deploys a different methodological approach and hence a new perspective on the subject has been put forward by Mergel (2005). In her doctoral study the social networking aspect towards the spread of innovation has been given central stage. Concretely, Mergel studied the e-learning adoption practices at a Swiss business school. She found four strongly overlapping network types: (1) the connection and (2) direction regarding advisory support about the software platform; (3) the social networks observing who is dealing with whom at social events; as well as (4) the professional relations network investigating who is interacting with whom for professional occasions. The findings she reports are rather clear. Colleagues interact mostly with peers in the same department while there is no gender bias amongst academics. Both top-down and bottom-up communication channels are used to spread information about the e-learning tool. Somewhat unexpectedly comes the finding that early adopters do not actively share information about their work (Mergel, 2005, p. 120).

The internet as a socio-technological space

Even though the internet is only less than 40 years old (Abbate, 1999) and has been a tool of mass media only since the mid 1990's, it is used today by more than 1,08 billion people around the planet. It has been described as cyberspace (Benschop, 2001) and as noossphere (mindsphere, (Arquilla & Ronfeldt, 1999; Senges, 2002)) both terms see a socio-

technological³⁴ environment suitable for human development similar to Vogotzky's (Mejías, 2004; Watson, Audio Lectures) zone of proximal development, and surely beyond the technology from which it is composed.

This research's perspective on the internet is affiliated with the field of social study of technology ³⁵, "a perspective which encompasses a range of sociological and historical approaches that place technology – of whatever size, shape or scale – firmly within 'the social'. Technology is not 'outside' of society but a carrier and mediator of social relations, meaning and interests" (McLaughlin, 1999, p. 6). This perspective goes against technology as bits & pieces artifacts, and it is also distinct from a managerial perspective on technology. "Instead [technology] is to be regarded as a socio-technical ensemble, whose component parts and their composition are shot through with, and held together by social relations among people, as much as by more physical ties such as screws, bolts or electrons" (ibid) It is hence the role of the internet as 'knowledge media' (Daniel, 1999) that makes the innovations a relevant subject for investigation of knowledge entrepreneurship. Eisenstadt, who according to Daniel introduced the term, states that knowledge media are about capturing, storing, imparting, sharing, accessing and creating knowledge, and it is exactly in this regard the this study is interested in the universities' practice in realizing such potentials in internet based innovations.

The role of universities

The question then is, how do universities, some of which originally participated in the creation of the cyberspace, act out their role in the development and exploitation of the internet's potentials?

Overall, universities are still on the forefront of internet use and development. There are few institutions which have embraced email especially as rapidly into their organizational repertoire,

³⁵ Another example of a similar study is McLaughlin (McLaughlin, 1999). She recounts the case study they had

Another criticized step was the installation of the students module before the finance model, as the latter was seen to be key for the smooth administration of all other parts of the system. One positive effect of the mess and problems that were encountered during the long project time was that networking and knowledge sharing (problem solving) created new inter- and intra-organizational networks.

³⁴ Within this scheme technological change and organizational change are mutual processes therefore one can speak of techno-organizational change. One can speak of a process of socio-technological deconstruction and reconstruction that is happening when new technologies are introduced.

conducted with a medium size English university, which was partaking in an effort to introduce a MAC (Management and Administrative Computing) system. The process took the enormous time of 8 years and was considered by many participants to be a failure. Partially because there was no experience in engaging in such a project on the administrative side, partially because it a collaborative development effort and all sorts of approaches were taken, and maybe most decisively the Higher Education sector was forced to undergo some major transformations during the implementation time of the project so that the needs were analyzed for a time before the development was planned.

also- universities were among the first institutions to use websites as a means of marketing and information. Thus it is true that much more could be done, and some pioneering universities are constantly pushing the limits, but given the well established and proved practices of academic conduct, it comes as no surprise that internet-based innovations are not centrally rolled out throughout the whole university, but rather experimented with by innovators, and early adopters and then gradually spread across departments (Bates, 2000; Bates & Poole, 2003).

Universities strategic reaction and outlook to the flood of technological innovations has been researched in 2002 by Collins and van der Wende, et.al. targeting all universities in Netherlands, Germany, the United Kingdom, Australia, Sweden, Finland, and the United States of America (there only a sample of 200 institutions was targeted). They report (Collis & Wende, 2002) 'continual but non revolutionary change'. From the four proposed scenarios for the future development they find that while universities are and will be experimenting with all options, no radical change is to be expected. The report is a great indicator for what academia in Europe and the US believe is happening. We can however – as is the case for all future assessments – be assured that the real impact of the net will most likely be different than these early assessments³⁶.

While several studies discuss certain aspects of internet-based innovation appropriation, such as e-learning strategies (Zellweger-Moser, 2003), no systemic approach has yet been applied. The common agreement is that the integration of new tools into university practice requires more than just cosmetic adaptations and needs to be approached strategically. Many studies report (see Zellweger for list) that the organization of education and research technology support structures and the effect on faculty behavior are not well understood. This relationship is problematic and of importance for HEI and therefore needs to be studied in more depth.

"Moreover, there is a gap between vision and reality. Or put differently, the 'Virtual University' works in theory but not in practice (Pollock & Cornford, 2002). Many institutions are still struggling to overcome the "pioneer" or the "1000 flowers blooming" phase, while trying to move into a phase of more mainstream engagement." (Collis & Wende, 2002) The concepts and results developed in this research intend to contribute to a better understanding of what conditions are favorable to the optimal exploitation of the potential of the internet.

³⁶ Allow me to remind the reader of Bill Gates' claim that a memory of 640kb will be sufficient for all home PC users. A reminder that even the thought leaders in a field can be way of with their future forecasts.

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2.0 INTRODUCTION

This chapter describes the research design¹ and elaborates on the methodology chosen by the researcher. Thereby, the argument is made that the choice inherent in research design and methodology represents a central choice regarding the trajectory and possible results of the research. A balanced approach combining theoretic and existing research with the empirical data gathered is chosen. The crucial argument for this mixed approach of deploying grounded theory elements with existing research for theory construction (rather than a pure approach grounded theory wherein a theory is developed from scratch) is deemed prudent as it connects the research with existing work. As Lessig formulated, creativity has always built upon the past, or when you consider Newton's saying about standing on the shoulder of giants, it would be careless and presumptuous not to take the existing work into consideration and simply contribute an original and, hopefully, beneficial conceptualisation to the existing body of knowledge.

First, the methodological choice is vindicated; then the actual practices and instruments are described.

2.1. RESEARCH APPROACH

The research began by a literature review, and the empirical work was conducted after the analysis and description of the cases had been completed. These findings and, particularly the problems identified, led to the development of a theory. Guided by the insights from the fieldwork, concepts that arose and were developed in other areas, including private sector organizations or philosophies, were combined to form a normative theoretic model of knowledge entrepreneurship in universities.

In its core, research uses two qualitative² methods. On one hand, data, predominantly through semi-structured interviews, is gathered and analyzed to investigate four case studies of universities. On the other hand, the researcher has acted as knowledge entrepreneur and reflected upon the research phenomenon by deploying the action research method. Both

people being studied have explanatory primacy over the theoretical knowledge of the researcher" (Wainwright,

1997)

¹ Research design is defined by Easterby-Smith, et al. (1991, p. 21) as, "the overall configuration of a piece of research: what kind of evidence is gathered from where, and how such evidence is interpreted in order to provide good answers to the basic research question[s]."

² "Generally, qualitative research can be characterised as the attempt to obtain an in-depth understanding of the meanings and 'definitions of the situation' presented by informants, rather than the production of a quantitative 'measurement' of their characteristics or behaviour. ... For many qualitative researchers the subjective beliefs of the

approaches imply an emphasis on processes and meanings rather than an examination or measurement in terms of quantity, amount, intensity or frequency³ (Van Maanen, 1983).

These two methodologies are then combined to answer the research questions using a combined empirical analytic approach, following as a guide the practices of grounded theory as developed and tested by Strauss and Corbin⁴ (1990). Primary and secondary insights have been gained by pursuing scientific knowledge opportunities in the course of the action research track. This procedure is in line with Strauss and Corbin, who stress that the methods and processes described do not need to be applied rigidly (ibid., p. 59) but rather serve as an overall frame for engaging in scientific investigation. Of course, most of the arguments presented depend on the definition of science and subsequently scientific guidelines. Kvale's definition of science is adopted: science is the methodological production of new, systematic knowledge. (Kvale, 1996, p. 60). Thereby "knowledge and practice become studied as local knowledge and practice" in contrast to other approaches that start with theory and then test them empirically (Denzin & Lincoln, 1998, p. 15).

Case studies, in particular, are often referred to as being on the same level as grounded theory (Punch, 1998, p. 149). Locke suggests that the grounded theory style of handling and interpreting data may well be incorporated with a case study approach (Locke, 2000, p. 19). Also, action research and grounded theory have successfully been used together (Teram E, Schachter C.L, & C.A., 2005). The combination of case studies, action research and grounded theory is recently gaining popularity, especially in the area of Information Systems research, and are assessed to be complementary (Baskerville & Pries-Hejeb, 1999; Myers, 1997). The combined approach has been chosen for two reasons. Firstly, the subject of the research is not well established and, thus, needs open-minded exploration and subsequent theoretic reflection and secondly because grounded theory is very suitable for practicing knowledge entrepreneurship through action research, as it allows for the realization of relevant knowledge opportunities along the way.

The findings of the research will be presented in a narrative, situated in the defined conceptual environment (using concepts, terminology and relations) prepared using the theoretic background and approach. According to Stacey (2001: 124), narratives, rather

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³ Quality of social sciences "is measured by the conception of good the research advances as well as the methods it employs. Many perfectionists approaches are communitarian, in that they attempt to advance a conception of the good shared by the subjects of the research." (Root, 1993, p. 15) One example is critical theory, which attempts to emancipate the subject. Also to be considered is participatory research, which is listed in this category by Root. Root goes on to explain that liberal universities and governments do not support perfectionist scientists. As a result, "social scientists who depend on their support have reason to maintain that the teaching and research are value-neutral even if they are not and even if neutrality is a false ideal for the social sciences" (ibid).

⁴ Dürr's (Dürr, 2000; Dürr & Aisenbrey, 1998; Prehn, 2005) method for interview coding and analysis has guided this aspect.

than facts "make experience meaningful and are the privileged mode of sense-making." This study attempts to draw on sense-making in order to better understand the phenomena.

To reach greatest credibility through reflexive methodological accounting, the theoretical orientations and preconceptions of the researcher (see Annex A) are also made evident (Seale 2000:163). The traditional role of the author is accepted and textual strategy is used to persuade the reader of the writer's authority to speak. Thereby, it is most important to prove credibility through the ability to demonstrate a holistic understanding of bodies of knowledge, as well as the development of an original and innovative contribution to the scientific discourse (as opposed to the craftsmanship of scientific conduct and writing, which is typically assumed to be minimal criteria for passing the certification (Seale 2000:181), or the entrepreneurial aptitude and management of the research initiatives, which solely represent the authenticity and embracement of the research topic.

2.1.1. Development of the Research Questions

The chosen research approach grounded theory allows for "iterative development of a research question based on emerging data" (Kennedy, 2004). The evolution and refinement of the research questions is summarized in box below.

At the outset, a preliminary research question was bound by the core terms (education, entrepreneurship and internet) and began from the question: What relationships exist between the internet based innovations, entrepreneurship and higher education? The purpose of this question was to gather the three themes and empirical descriptions into the same frame of analysis. Guided by this broad initial question, the research theme and activities became more developed and focused, and additional aspects of study that emerged during the investigation were added, to the research agenda (when deemed necessary or beneficial).

Initial Question:

What relationships exist between the internet based innovations, entrepreneurship and higher education?

Refined Question:

- 1. What is knowledge entrepreneurship in a university?
- 1.1 What motivates individuals to be entrepreneurial?
- 2. Can internet based innovation appropriation serve as an example?

Final Research Questions:

- 1. What enables strategic and practical knowledge entrepreneurship in universities?
- 1.1. What are the components of the mindset of an knowledge entrepreneurial entity?
- 1.2 What are the components of the gestell (infrastructure) for knowledge entrepreneurship?
- 2. How do universities apply knowledge entrepreneurship to integrate internet based innovations in their practices?

In early 2006, I discovered McDonald's (2002) PhD research on "Knowledge entrepreneurship: Linking organisational learning and innovation," which made me agree with Haig (1995, Kinach, 1995) in not beginning research as a tabula rasa, but with an "orienting theory" (outlined in Chapter 1 - Theoretic Background). The research questions were revised to read: What is knowledge entrepreneurship in a university, and: Can internet based innovation approbation serve as an example? Departing from McDonald's findings, the research was constantly adjusted as new phenomena and relationships emerged. Whilst using technology as the special interest theme, I intended nonetheless not to focus fieldwork activities exclusively around the technological artefact but to grasp the essential elements of knowledge entrepreneurship as a whole.

During this stage, the concept of "innovation appropriation," rather than "innovation diffusion," has been opted for because it is central to the activities and motivation of the user (human centred) rather than the innovation. Innovation diffusion is more interested in why one organisation adopts one form or another, while appropriation is framed to follow the perspective of the organisation "looking outward" (Darking, 2004). According to Darking, this allows for the concept to be used as subject of analysis "well before any definite examples of that technology have been encountered by an organisation or by intended users" (ibid p. 71). Hence, internet based innovations were chosen as a research subject without a strict or exclusive definition but, rather, as a wide field of possible opportunities. The benefits of the decision to use an open research question was perceived as positive in the context of reviewing the internet innovations literature, because in this fast evolving sector the

possibility that an aspect of the research question would be rendered redundant or irrelevant was realized to be high.

Around the same time, the dependence on the mindset of the entrepreneur, as well as the voluntary nature of entrepreneurship, was identified as a key element. Thus, the sub-research question for the phenomenological action research track was formulated as: What motivates individuals to be entrepreneurial? The adductive generation of theory was pursued by drawing inferences about "unobservables," or what Haig calls phenomena (not data⁵). However, while reliability is the basis for justifying claims about phenomena, judgments about explanatory coherence are the appropriate grounds for theory acceptance. Theory appraisal and what philosophers call "inference to the best explanation" (Haig, 1995) is used.

Throughout the entire process, the research question was amended and optimized to excavate the essential aspects of the "knowledge entrepreneurship" under the special interest of internet based opportunities, while "staying open to surprises" (Bauer & Gaskell, 2000). This natural development of the research question is also suggested by complexity theory (Kennedy, 2004). In the final step, the following two research questions were used to frame the investigation and its findings: What enables strategic and practical knowledge entrepreneurship in universities? and: How do universities integrate internet based innovations in their practices? (See Chapter 5.3 for the formal answer.)

2.1.2. Demarcation

This research exploits concepts from many disciplines in order to deal with the theme of knowledge entrepreneurship, technology and universities. During the advancement of the research several, sometimes very interesting, aspects were retained in order to be better focus on the core interest of the research. Hence, it is important to clarify what one can expect and what will be left out from the investigation and considerations presented in this research. The following aspects where purposely not considered:

The most important demarcation is needed to clarify that this research is not primarily interested in the exploration of how universities can engage in economic entrepreneurship. Hence, all questions related to commercialization, technology transfer, spin-off companies, etc., is recognized as an important, interesting and (when done wisely) very positive field of practice. However, in this research, all of these activities are only of secondary relevance. The primary interest remains discovering how to provide the perfect conditions in which a university may capitalize upon opportunities to creatively destruct knowledge service, thereby encouraging products that are continually sought though entrepreneurial projects.

^{5 &}quot;Data provide the evidence for the phenomena (theoretical categories) which social science researchers investigate [....] reliability of data forms the basis for claiming that phenomena exist." (Kinach, 1996)

Subsequently, the economic dimension of entrepreneurship in universities is not assessed. It is the aim of this research to develop and establish knowledge as a possible subject for entrepreneurship, and therefore the research only considers monetary resources as an enabler for knowledge entrepreneurship. This also results in the dedicated choice to use not economic, but rather philosophical, terminology and concepts in the description of the phenomena.

In addition, the cross-national comparative is a very interesting subject; however, given its complexity, it has been assessed to narrow the study's focus to detail only differences between national infrastructure, governance, culture, etc. Therefore, national aspects are dealt with only in passing (in the form of rival explanations).

Education and research practices are less concerned about individual concrete practice, rather emphasizing the meta-practice of how to prepare and innovate as an educator and researcher. This meta-practice again contains a large variety of knowledge based opportunities, the most obvious being innovating, concrete research as well as a teaching/learning practice. In addition, the pursuit of innovative knowledge subjects, such as the new phenomena of "knowledge entrepreneurship" itself, or even the innovation of the knowledge system through a simplified and/or more improved structure. None of these knowledge subjects are investigated in detail, rather they are all understood as one (Kantian) category of knowledge entrepreneurship opportunities. Opportunities to improve the practice of teaching and learning through internet based (e-learning) innovations is taken as focus, simply because it is a vibrant field of creative practice destruction.

The research uses the appropriation of "internet based innovations" as an example of knowledge entrepreneurship. Thereby, it is important to point out that the entity and features of these technologies is neither problematic nor considered. A non-critical stance is taken and it is assumed that the examples examined have the potential to improve knowledge services and knowledge production.

Technology is used throughout this work in its widest sense, as in technique, its applications, and the artifacts that are deployed as tools. This is what Heidegger entitled *gestell*. While specific internet based technologies are taken as examples, it is not their technological features that are of interest to this study. Rather, it is the focus of the study to the possibility of enabling knowledge entrepreneurship and the *gestell* of the organization to be an important factor. Hence, the general components of the gestell are described. An essential differentiation made is between technology as a means (*gestell*) and the organization's or individual's humanistic ends. The research is interested in technology as "technology," but also about technology as a knowledge system on an abstract level. (There is no evaluation

of technologies or exploration of how they work.) The research cannot discuss in profound depth the possible implementation of the knowledge entrepreneurship concept, as it gives a theoretic proposition. It is not a "how to," nor does it delve into why the strange attractors are this way. Rather, it presents a pragmatic study interested in what works and, as such, it identified from the indefinite (Kantian) categories of entities a number that has been found to have decisive influence on (knowledge) entrepreneurship. Both questions are surely interesting grounds for further research.

Put differently, the research is not about invention nor innovation as in creating something for the first time world-wide, but about local innovation or innovation appropriation. While in some instances (research and e-learning tool development) also the former type of innovation is described, most knowledge entrepreneurship has to do with appropriating knowledge opportunities that are already developed by someone else, elsewhere.

Lastly it describes the relations between the attractors only a limited degree as they share the characteristic of being essential elements for the composition of an knowledge entrepreneurial mindset and infrastructure (*gestell*).

2.1.3. Personal and Impersonal Narrator

There is no coherence among scholarly disciplines regarding the expression of the narrators point of view. While the natural and exact sciences by standard use the 'objectivized' third person author ("the research believes" or "the author of this work promotes"), the first person narrator is commonly found in the social sciences. Arguments can be brought forward for both versions. I believe that it has merit to decide on a case by case basis which of the practices to deploy. In general I did not opt to 'semantically disguise' my role as author. Specifically when it is a personal decision based on experience or preference in style I do not think that the recent trend to use the third person to make a decision sound more objective is helpful. Throughout this work both styles have been applied following my judgement.

2.2. PROJECT OUTLINE & RESEARCH STRATEGY

Two research tracks have been pursued to investigate the phenomenon. Four in-depth case studies about the situation in distinct European universities are carried out. Secondly the research has intended to live as knowledge entrepreneur and has engaged in various knowledge entrepreneurial ventures, allowing him to reflect and analyze his experience as basis for the development of a model of an entrepreneurial mindset. These empirical methods have been supplemented with theoretic insights based on secondary literature which were results of opportunities realized in the action research track.

These qualitative methods are deployed because "strategic planning in a college or university occurs in a complex, dynamic, real world environment, not readily amendable to controlled studies, or even to quasi-experimental designs. It is difficult to parse out measurable effects of strategic planning from the influences of such other important factors as institutional leadership, demographic chance, fluctuations in state and federal funding, politics, the actions of competing organisations, social and cultural forces, and the like" (Dooris, Kelley, & Trainer, 2004)

As outlined in the overall approach and described in more detail below, a multi-theoretical and multi-level framework (in terms of Monge and Contractor (2003)) with the goal of producing a trans-disciplinary study holding actionable, as well as theoretically sound findings, is used. The studied phenomenon is what scientists in the field of morphological analysis call a mess⁶ (also known as a "wicked problem" (Ritchey, 2003), and indisputable results are therefore difficult to reach. However as Michael Pidd in his book "Tools for thinking: modelling in management science" (1996. p 40) has rightly pointed out: "One of the greatest mistakes that can be made when dealing with a mess is to carve off part of the mess, treat it as a problem and then solve it as a puzzle -- ignoring its links with other aspects of the mess." What one ought to do is explore the subject so that entropy emerges though trans-disciplinary understanding and the act of making constellations conscious. Nevertheless as Tom Richey (2003) expressed in his text on "Modelling Complex Socio-Technical Systems Using Morphological Analysis": "reality presents us with infinite dimensionality" and we have to accept that "we are working with models of reality, which are never complete".

In the project theories from the areas of sociology, philosophy, organisations science, social psychology, economics and technology are used to describe and explain knowledge entrepreneurship in universities. Also different levels or units of analysis (individual, project, and institution) are investigated. Monge and Contractor (2003, p. 46) argue that: 'utilising multiple theories should improve our explanations [...] as well as significantly increase the amount of variance accounted for by these theoretical mechanisms'.

Rice (1999:40) presents a similar argument: 'We feel that it is important to consider multiple paradigms when studying a complex social phenomenon such as the implementation of information systems in organisations, as each paradigm emphasises and highlights different, though often overlapping, aspects of the phenomenon. Furthermore each paradigm emphasises different sources of data and different analytical approaches.'

⁶ "A mess is a complex issue, which does not yet have a well-defined form or structure. When you have a mess, you don't even know for sure what the problem is yet" (Richey 2003).

The following sections depict the specific planning and methods used in each research track. The different research tracks have the following approximate weighting: Case Studies 70%, phenomenological action research 30% and will contribute to the findings accordingly.

2.3. CASE STUDIES

The case study method has been chosen for the following concrete reasons:

- As has been described in the theoretic background (Chapter 1 section 3.3), the existing research and writings on knowledge entrepreneurship are assessed not to be suitable to describe the investigated phenomenon in the university context. Therefore, an inductive and theory-building approach is appropriate.
- In order to understand the organisation as a whole a complexity science view (Chia, 1999; Mason, 2005; McMillan, 2004; Eve Mitleton-Kelly, 2003; E Mitleton-Kelly, 2005; Stacey, 1996, 2001) the method has been chosen because it permits the description of the fractal individual and the organisation as a whole.
- Because the study is interested in specific human experience, this research is potentially relevant to non-academic audiences (Strauss & Corbin, 1990, p. 6) and, therefore, the cases are recounted as a narrative; therein, the theory aspects are developed in the cross-case analysis.

2.3.1. Case Study Method & Design

Feagin, et al, define a case study as an in-depth, multi-faceted investigation, using mainly qualitative research methods, of a single social phenomenon (Feagin, Orum, & Sjoberg, 1991). They point out that the study is conducted in great detail and relies on the use of several data sources. A case study, in their view, allows for the researcher to examine social action (such as the social action of organisational incorporation of the internet based innovations into daily use) in its most complete form (ibid p. 9). During the project planning phase, secondary literature also remarked on the potentially significant disparity between higher education institutions; therefore, multiple-cases have been conducted in wide variety of settings are meant to afford greater generality of results (Lee & Baskerville, 2003). Holistic case studies can also involve the study of complexes of social meanings. A good case study can provide a full sense of actor's motives that eventuate in specific decisions and events. The idea is to "get the reader up close" and, first, depict for them the perspective of the actors involved and, secondly, provide a systematic analysis for the reader to consider. Thereby data from ethnography (discussions, observations, etc.) as well as history complement the case narrative. Feagin goes so far as to state, "there is a type of precision [...] in case studies that is more substantial than the quantitative analysis. The precision here is more substantial than the quantitative analysis. The precision is in the recording of social life as a meaningful whole, not as the sum of lifeless quantitative units" (ibid p. 12). In this line it can be argued that the results are more robust (in the sense of Gibbons and Nowotny).

When smartly adopted to new scenarios, the results are rather actionable in other cases because they come out of a holistic assessment of real contextualised scenarios rather then from surveyed snap-shots.

Of course the question of reliability – understood as the ability to replicate the original study using the same research instrument and to get the same results - is relevant, and a particular possibly original stand on the matter is taken. It is often raised that qualitative research is, at best, descriptive and highly vulnerable to the idiosyncratic biases of the investigator. Hubert Blalock, a social science methodologist put the argument as such: "One of the fundamental difficulties with participant observation is that lack of standardisation usually involved. Each social scientist is like a journalist writing his own story; there is little guarantee that several such journalists will report the same story" (Blalock, 1970, p. 44). Several counter arguments can be made. The professionalism of journalistic work and reported facts as well as the validity and importance of diverse and heterogeneous perspectives can be stated. But on a more fundamental level two arguments can be proposed. First it can be argued that this traditionally evolutionary development of scientific paradigm has hampered the free creative innovation process necessary for scientific revolution in the Kuhnian sense. And that only the dissection of the traditional scholarly scientific methodology in private enterprises has made the so-called scientific revolution possible. If this is the case, a less methodologically regulated research environment might lead to a vastly more fertile and productive system for the social sciences. It seems more appropriate to develop a variety of theories and let the scientific discourse and practical validation of the knowledge claims decide about the potential of a theory to explain and describe a social phenomenon.

2.3.1.1. Selection of Cases

At the heart of this dissertation research are four case studies. Theoretic sampling has been chosen for the selection of the cases. The universities have been selected with the objective to reach high heterogeneity with regards to the type and location of the institution in order to improve the generalisation of results. The following types of institution has been selected: (1) an elite and international specialized research university – the London School of Economics (LSE), (2) a technical university – the Universitat Politecnica de Catalunya (UPC), (3) a traditional full range university – the Freie Universitaet Berlin (FU) and (4) a distance-education/virtual university – the Universitat Oberta de Catalunya (UOC). The case studies were conducted during extensive multiple weeks site visits, which allowed for extensive

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⁷ It could be argued in this context that fixation of social science methodology with natural scientific quantitative approaches has resulted in the vacuum of positive social theory.

observation and informal exploration of the organisational practices and institutional spirit. The following describes the setup and planning for the cases to be investigated.

2.3.1.2. Sequential Planning of Case Studies

The inductive nature of the research strategy made it logical that detail planning was sequential but an overall schedule was developed in early 2006. It was decided to begin with the LSE (May-July 2006), then go directly to Germany to investigate the FU (July-August) and then visit the UPC (September-October) and lastly the UOC in late 2006.

The following gives an overview of the sequences and tasks completed during each case study.

- 1. Preparation
 - a. Identification of key contact
 - b. Identification of interview partner and information/document sources
 - c. Scheduling of interviews
 - d. Organize temporary access to intranet (eLearning class)
- Phase I (Passive background check) (2 weeks)
 - a. Evaluate web-presence
 - b. Identify first attractors and read vision, strategy and plan
 - i. Request additional documents
- 3. Phase II (Interviews)
 - a. Conduct and transcribe interviews on operative level
 - b. Conduct and transcribe interviews on strategic/political level
- 4. Phase III (Analysis & Writing Up)
 - a. Analyze interviews
 - b. Apply interpretative framework
 - c. Write case study
 - d. Send case study to stakeholders for review

2.3.1.3. Translation and Trilingual Sources

The case studies, but also the research as a whole, were conducted in mainly three languages⁸: Spanish, German, and English. English has been chosen as main language for the study for the obvious advantages regarding comprehensibility and subsequent dissemination and impact possibilities of the research.

In general, "there is in fact very little literature looking at the implications for qualitative research of language difference and the use of third parties [e.g. dictionaries] in communication across languages" (Temple et al 2002, in Rachel 2007 forthcoming). In order to reach proximity and to develop personal rapport between the interviewees and the

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⁸ Sources in a fourth language Catalan have also been consulted and information analyzed. But the amount of documents and other sources such as meetings, e.g. of the UOC IT community of practice, are assessed to be by far of lesser quantity than the other three languages.

researcher, no interpreter was used. In the experience of the researcher there are obvious disadvantages when it comes to the understanding of details, nuances and humour which might not be accessible to non native speakers. On the other hand, the advantages of having direct contact with the interviewees has been assessed. The fact that the researcher did not master the Spanish language on the level of a native speaker equivalent had many times the effect that interviewees would make simplified but much more clear statements, thereby facilitating understanding, interpretation and theory building. There can be no doubt that the translator is involved in creating meaning because words are concepts, in many cases there is no unambiguous translation (Simon, 1999). Hence one could question the validity of the understanding and translations of the interviews made during the research, but the correctness of the interpretation is bounded through the discursive actor validation (Seale, 1999, p. 63) described in section 1.3.4.

2.3.1.4. Data Collection Methods

Over the last decades, the case study method has gained widespread interest and application because of the possibility of treating complex research problems in a realistic setting. The exploratory nature of the investigation allows for the development of understanding of unmapped knowledge territory and trans-disciplinary approaches. Because of these positive characteristics, the case study method has been chosen as a main instrument.

Because of the more flexible nature of the case study methodology, Yin (2003) points out in his classic "Case study research: design and methods" that a careful study design and scientific rigour have to be applied.

Data will be obtained by utilizing the following sources:

- Between 15-30 semi-structured interviews with selected university leaders and key administrative staff in each institution (See Annex D for list of interview partners).
 After the interview the interviewee is asked to recommend other relevant stakeholders who are then subsequently contacted.
- 2. Analysis of online presence (statistical and qualitative review of public website, intranet, and other services as possible)
- 3. Target document and records analysis
- 4. Direct participant observations ⁹ and assessment of e.g. internet utilization, collaboration practice and university setting.

⁹ Following the observer-as-participant approach (Flick, Kardorff, & Steinke, 2003), the researcher identifies him or herself as a researcher and interacts with the participants in their natural context as a participant. "Participant observation allows the researcher to immerse oneself within the social group in question, experiencing at different times and from different positions in this natural environment" (Hammersley & Atkinson, 1995).

2.3.1.5. Semi-Structured Interviews

Overall, a total of 93 interviews¹⁰ (23 at the LSE, 26 at the FU, 19 at the UPC, and 25 at the UOC) and one focus group has been conducted.

"The purpose of interviewing is to find out what is in, and on someone else's mind. We interview people to find out from them these things we cannot directly observe" (Patton, 1980, p. 196). Hence in this research, the information in question is a) about personal practice and dispositions as well as b) about the condition of the university. Each interview was planned and scheduled to take about one hour. Several times this timeframe was exceeded due to mutual interest in the exploration of phenomena. Before the interviews started it was made clear that all data would be treated confidentially and would be made anonymous before publication. All interviews were digitally recorded after the interviewee's agreement had been solicited.

It is acknowledged that, "both parties to the interview are necessarily and unavoidably active. Each is involved in meaning-making work. Meaning is not merely elicited by apt questioning nor simply transported through respondent replies; it is actively and communicatively assembled in the interview encounter. Respondents are not so much repositories of knowledge – treasuries of information awaiting excavation – as they are constructors of knowledge in collaboration with interviewers" (Holstein & Gubrium, 1995).

Within the interviews it is therefore attempted to establish rapport in a question and answer conversation and be aware of what Willis (1990) would call 'symbolic work' in order to obtain maximum meaning and information rather then intending to 'artificially objectivise' the obtained data through 'cold' or supposedly neutral behaviour.

In order to maximize the quality and amount of the yielded information the social process of establishing a convenient and liberated conversation atmosphere, a semi-structured interview format¹¹ was chosen (Ellen, 1984, p. 229). An interview guide is used to ensure that certain key areas of interest are dealt with, as well as an overall directedness of the questions. The core questions of the interviews are documented in Annex E. However, the actual questions are matched to the specific context of the interview partner's expertise and area of responsibility. The semi-structured interview method also permits one to introduce materials and questions previously unanticipated (Ellen, 1984: 230). The interviews are scheduled to be one hour in length but can be extended when appropriate. The interviews

taken not to influence the content an informant is reporting.

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¹⁰ Three interviews at the UPC and six at the UOC where not exclusively for this research but conducted by peer researchers in the PIC research.

¹¹ During the interviews widely acknowledged practices such as 'repeating the last thing an informant has said' to indicate that it has been understood what was being said, or 'making affirmative noises' (Ellen, 1984:234, Bernard, 1994:217) are used to encourage informants to continue and expand their answers. However in general care is

mostly take place within the premises of the university – either in the informant's office or a meeting room. In the case of student interviews, more flexibility is necessary, resulting in a less controlled interview setting, such as cafeterias and other public areas. Notes will be taken during the interviews and digital recordings of the interview will be produced as long as permission is granted.

2.3.1.6. Selection of Interview partners

Before the beginning of the case studies a role-based identification of interview partners has been developed in collaboration with the project supervisor. Hereby it was attempted to allow for a holistic understanding of the institutional condition, strategy and practice. The role-based description of the interview partners sought can be found in Annex D.

At the LSE, the opportunity to have a video and audio recorded focus group with students emerged. This was evaluated as quite beneficial and realized accordingly. Flexibility was also necessary to grasp the perspective of UOC's students. A document with questions had been prepared and sent out to the disciplines' student representatives, as well as to members of student associations listed from the virtual campus and randomly selected students.

2.3.2. Interpretative Framework

In the following, the specific information and data that is gathered will be specified and set in context. The interpretative framework is depicted in Figure 2.1.

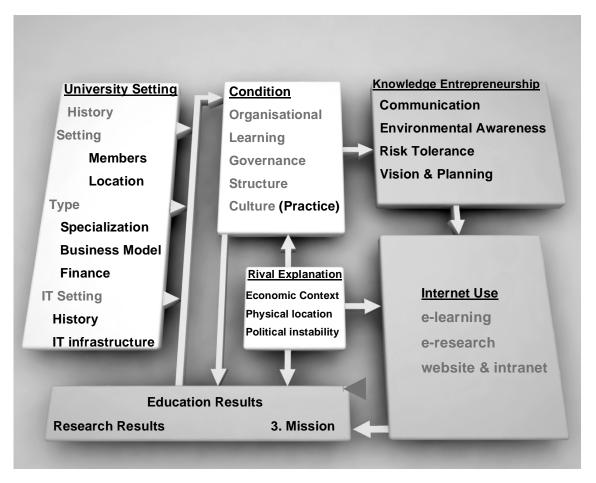


Figure 2.1 – Interpretative Framework (Based on Yin, 2003)

As a starting point data and information describing the overall setting of the university is assembled through document analysis and direct observation. This historic and general impression is then complemented by an original study of the current condition of the university's governance system (its organisational structure) and its culture (its practices). The structure and practices of the university's management directly influence in what areas and with what intensity the university uses the internet. While the variety and quality of internet uses influences (and supposedly enhances) operational practices, information availability (content) and services, it subsequently influences the university's output in research, education and the so called third mission (knowledge transfer & entrepreneurship promotion).

Next the elements of the framework are listed and described in more detail. Last but not least it is important to note that for all three elements of analysis (condition, internet use, and output) rival explanations will be considered respectively.

2.3.2.1. Framework Elements

The interpretative framework is based on the widely used approach developed by Yin (1993, 2003) and the elements are amended from van Vught (CHEPS, 2005) as well as Collis and van der Wende (2002), both studies from the Center for Higher Education Policy Studies at the University of Twente. The former is a proposal for a European university typology while the latter is a large scale quantitative comparison of European universities' ICT strategies. Naturally the framework was complemented with indicators especially relevant to this study.

A) History

In this item, an overview of the general history as well as decisive points in the university's development are put forward. Thereby special attention is paid to leadership and management as well as strategic developments.

i) Setting & Typology

To describe and analyse the university setting the following information will be used:

ii) Members

The basic quantitative data – amount of students, professors, staff are meant to give an impression of the dimensions of the university.

iii) Location

Physical location and the type of buildings offered have an important influence on the atmosphere and practices, as well as to who might be attracted to the university. Even though all universities are located within big cities, each one developed its very unique spatial arrangements.

iv) Specialisation

Under this heading, the single or multiple disciplinary specialisations of the institutions, regarding the research and teaching conducted, were reviewed.

v) Business Model

Like all organisations, universities need financial resources in order to pay their staff, maintain their daily operations and invest in innovation. In this paragraph, an attempt to describe the functionality of how the institution assures the availability of monetary resources was made.

vi) Finance

Furthermore, statements of the university regarding its finances and assets are described together with data illuminating the economic turnover of the university produces. Thus allowing for an understanding of the current financial affairs.

vii) IT Setting

This item has two sub-categories history and approach and IT infrastructure. It is meant to allow for an understanding of where the university comes from in terms of IT usage and where it stands today. A narrative of the historic development is given. Also an overview of the current dimensions of the IT infrastructure and services is given by presenting data.

B) Condition

i) Governance

In this item, the distribution of tasks and responsibilities (centralised/de-centralised, horizontal/vertical; Mintzberg 1983a, 1989) was researched and depicted in an organigram. This will allow statements about, and comparison between, the structural setup of the researched universities.

ii) Culture

Next to the governance structure, organisational culture is considered to determine the performance and strategic attitude of organisations. Through semi-structured interviews, the culture of the different universities was investigated, analysed and characterised. In the interview the collective assessment of attitude towards risk (threads & opportunities),

C) Knowledge Entrepreneurship

The exploration of the knowledge entrepreneurship phenomenon makes the next important component of the case study. As described in the section on the knowledge entrepreneurship model, McDonald (2002) serves, with slight amendments as 'originating theory'. So communication, environmental awareness, risk tolerance, vision and planning, as well as new project support were all researched, while new aspects are added as they appear. (See section knowledge entrepreneurship and the university as knowledge entrepreneur for more details)

D) Internet Use

The special focus subject of the investigation is how the researched universities use the internet. In this area the following aspects are researched:

i) Tools integration and current in e-learning

Under this heading it is first described how the university historically introduced the theme of e-learning to the institutions. In a second paragraph the current practices in general and sometimes exceptional uses are depicted.

ii) Tools integration and current in e-research

As in the token above, the universities historic approach and current practices are elaborated upon.

iii) Website & Intranet

In this paragraph the historic development of the public website and the intranet is described.

E) Results

The next element of the interpretative framework is concerning the output of the university. Here data regarding the performance in research and education is presented.

F) Rival explanations

Explanations that influence the results other than the one's discussed are raised here. Namely the conditions external to the university system, the local and national environment are reviewed here. Hereby economic and political conditions are taken into account on a relatively broad and superficial basis, while specific aspects that are assessed to have a positive or negative influence on the specific case in question are dealt with more detailed. Especially in the case of Berlin the local condition has been assessed so influential that it has been described as a unique (negative) strange attractor.

G) Unique strange attractors

Unique strange attractors are phenomena found to influence the development and condition at the investigated university in general and knowledge entrepreneurship in particular. (See Chapter 1 Appendix C for a explanation of the strange attractor concept.) What is important in this context is that the phenomena are unique to the individual institution. The inclusion of these unique aspects, that have sometimes decisive importance in creating the conditions and culture at the institution in question, is a direct result of the complexity science approach chosen. (See Annex B for a description of what a strange attractor is and how it is conceptualized in this work.)

H) Conclusion

The last section of each case study is made up of an analysis and concluding part. In this section the mostly narrative and descriptive portrayal of the findings from the framework elements is complemented by an assessment of the current situation at the university. Resuming indications regarding the causes and possible solutions are elaborated here. It is important to point out that this interpretative section is meant to deal with the specific findings

at each of the cases rather than develop the overall theme of knowledge entrepreneurship which is dealt with in the cross case study analysis and the concluding chapter.

2.3.3. Data Analysis

As suggested Glaser and Strauss (1967) the analysis and development of the case studies began before the data collection ended. Their argument that it is beneficial to have an overlap between data collection and analysis in order for the researcher to be able to address questions emerging during first review to later informants. Open and selective coding has been applied in order to find and describe the elements and facets of knowledge entrepreneurship and answer the research questions. Hereby open coding means "the process of breaking down, examining, comparing, conceptualizing and categorizing data" (Strauss & Corbin, 1990, p. 61) and selective coding is "selecting the core category" – in this case knowledge entrepreneurship – "systematically relating it to other categories, validating those relationships, and filing in categories that need further refinement and development" (ibid p. 116). The result of the analysis are concepts which are the "building blocks of theory" (Strauss & Corbin, 1998, p. 101) and hence the input for theory development as described in section 1.5.

2.3.3.1. Interview Analysis

For the analysis of the interviews the Atlas. Ti program version 5.0 was used. One so called 'hermeneutic unit' was created for each case study and all interview recordings and other case related documents were entered. Next a conceptual transcript of the content of each interview was produced using the methodology of Dürr (2000; Dürr & Aisenbrey, 1998) in (Prehn, 2005)). Hereby the interview is not understood as investigating isolated variables, instead the interview partners where understood as a "'stable whole' over which a multitude of phenomena are discovered using a qualitative data is surveyed" (Prehn, 2005, p. 42). During this process already phenomena that were identified as strange attractors and other meta-information was observed and recorded as basis for the holistic analysis. important to see whether a phenomenon is a general strange attractor of the system or unique to the case. Strange attractors that are assessed as elements of all investigated cases become part of the model developed in the cross-case analysis. Weizäcker comments on this process "Each stable result of a fulguration12 hast to have an intrinsic force for selfstabilization, a correspondence of its inner structures to he outer condition of its existence" (Dürr, 2000). The content of the interviews is then made accessible through the transcripts in which it is attempted to record and express the phenomena as differentiated and vivid as possible in natural spontaneous speech (ibid). Once all interviews had been transcribed

¹² In this context fulguration means the spontaneous merger of separately existing instances or entities, which form a new system/phenomena.

each interview was read several times, relevant and unclear parts were listened to, and data was compared across informants in order to identify and understand strange attractors and find and eliminate inconsistencies in the framework (Spiggle 1994 in (McDonald, 2002)). Additionally the notes were reviewed and relevant phenomena, facts and themes were singled out for narrative description in the case study document.

It is important to point out that Charmaz's re-conceptualization of the grounded theory approach was used. This constructivist premise "assumes the relativism of multiple social realities, recognizes the mutual creation of knowledge by the viewer and the viewed, and aims towards interpretative understandings of subjects' meanings" (Charmaz, 2000, p. 510). The most challenging aspect when analyzing the interviews was to assess the accuracy of the information obtained. Bernard (1994) points to several distorting effects, foremost deference and response effects are relevant in the context of this study, an interview situation can have on informants. Being conscious of these effects, the researcher attempted to take them into consideration during analysis.

2.3.3.2. Document Analysis

Next to the interviews document analysis was of great importance for the case study research (Wolff, 2000). For each case a wide variety of text-based sources ranging from strategy documents, to web-pages, brochures, news papers, minutes of meetings, and teaching materials have been collected, read, interpreted and set in perspective to the research question. Relevant information was singled out and included in the case narrative.

2.3.3.3. Participant Observation

The 3 month site visits made it possible to delve into the practices and conditions at the various institutions investigated. In all cases extensive use of the library, including the online services, was made. Also a variety of informal contacts with faculty and especially students of the universities were sought and information about the research theme was solicited on an informal basis. This enabled the systematic observation of the behaviour and mindsets of members of the organisation (Adler & Adler, 1994) in regards to knowledge entrepreneurship and the appropriation of internet based innovations in particular. Especially visits to meetings of IT community of practice meetings (UOC), and senate meeting (FU), but also visits to thematic lectures at all institutions investigated enriched the understanding of the conditions for knowledge entrepreneurship. Naturally the observations about the UOC are especially profound as the researcher has been involved in taking courses, developing courses and doing research within this institution for more than three years.

2.3.4. Narrative Development

The case study narratives were developed following the elements of the interpretative framework developed based on Yin (2003) and giving an account of the assessment of the researchers findings and understanding of the situation in these regards. When possible the case studies used in-direct quotes¹³ and document references to support the statements made. It is important to point out at this point that the theory development is happening in a latter step combining cross-case analysis and the insights of the phenomenological action research. The intention of the case study narratives is to give a detailed report on the conditions at the investigated institutions from the researcher's perspective. Thereby the stress is rather on portraying the general situation while naturally giving a first elaboration of the originating theory aspects of knowledge entrepreneurship.

Once the whole case study narrative is complete, the informants are made anonym using a separate coding table. In order to indicate the perspective of the informant, the stakeholder categories have been included in the final text. They are: student, faculty, administration ¹⁴ (for employees with none or few subordinates), and management for departmental directors, vice-rectors and similar. Exceptions to this practice have been made in case of particularly negative statements the informant's stakeholder group is not added, as anonymity has been granted in order to create an atmosphere of trust in the interviews.

2.3.5. Case Validation

Once the case studies have been written, validation of the correct understanding and portrayal of the facts is sought by sending the draft case studies first to a the interview partners and once the feedback and critique has been taken into account, the studies are published on the research project wiki and further feedback is solicited and discussed by spreading messages though online channels such as blogs. This technique has been described as subject discourse and member validation. Seal describes the technique as "seeking agreement from actors as to the truth of a researcher's account" (Seale, 1999, p. 63).

Concretely the following reviews have been solicited either in personal meetings, phone meetings or written form (see table 2.1):

¹³ Due to the fact that information analyzed was presented in four languages (Spanish, Catalan, German and English) the quotes are made in-direct.

¹⁴ And in some special cases also concrete functional title.

Institution	Stakeholder	Informants
LSE	Management &	Chief Librarian & IT Services Director
	Administration	Head Of Center for Learning technology
		Website Manager
	Faculty	2 Professors
	Student	4 Students
FU	Management &	Director of IT Infrastructure
	Administration	Director of e-Administration
		E-Learning department (several ¹⁵)
		Deputy Library Chief
		Head of Entrepreneurship Support Unit
	Faculty	1 Professors
	Student	2 Students
UPC	Management &	Director Technology Transfer Centre
	Administration	Leader of UPCnet Innovation Team
		Ex-Vice-Rector Academic Planning
		Director Innova31 (UPC venture capital)
	Faculty	2 Faculty
	Student	-
UOC	Management &	Vice-Rector Technology
	Administration	Vice-Rector Research
		Technology Architecture Manager
	Faculty	2 Professors
	Student	2 Students
	1	

Table 2.1 - Obtained Case Validation Feedback

This methodological aspect is central to the research's claim validation, due to the very broad distribution of interviewees and the subsequent thematic diversity, which on the one hand enabled the researcher to construct a holistic understanding and diagnosis of the institutions, but on the other hand increased the need for interpretation. Furthermore did the research feel a direct relevance of the insights to the institutions in question, because the practice of seeking actor agreement caused e.g. at the FU interesting feedback for the researcher and considerable internal discourse possibly leading to policy shifts etc.

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¹⁵ Here a team worked on the review and a joint review of the e-learning relevant parts was given.

2.4. CROSS CASE ANALYSIS

The next step after the fieldwork was completed and all case narratives were developed, was to formally contrast the different cases investigated. The contrasting began by looking at the very fundamental factual difference between the cases. Hereby essential numbers regarding size, and availability and investment of monetary resources etc. are presented in order to show the wide variety between the sampled universities.

Next the universities are compared looking at the internet specific facts and practices. Beginning with standard website traffic, the conditions at each institution regarding several internet based knowledge practices are looked at and set in contrast. Lastly the approaches toward internet based innovation appropriation are summed up for each university is elaborated and labelled with categorical title.

This part of the research is then complemented by a selection of 'best in breed' incidence of knowledge entrepreneurship, most of them exploiting opportunities based in internet innovations.

2.5. PHENOMENOLOGICAL ACTION RESEARCH

The phenomenological action research method is used to explore and model the metaphysical or mental dispositions of entrepreneurship and knowledge entrepreneurship in particular. It is applied to give a first hand reflected experience based answer to the question: What are the components of the mindset of an knowledge entrepreneurial entity? As such the method falls into the field of reflexive experience based such as (Dressel & Langreiter, 2003) who develop a good argument for why and how "When 'We Ourselves' Become Our Own Field of Research" or (Hanrahan, 2003) who writes about "Challenging the Dualistic Assumptions of Academic Writing: Representing Ph.D. Research As Embodied Practice". Hence this part of the research is following a dialog-consent-method (Groeben & Scheele, 2000) constantly engaging in the practice, pragmatic reflection and optimizing the cognitive structures and objects/attractors. The recursive character becomes nicely illustrated by the application of the pragmatist method as vital element for the research construction and as part of the results. In fact it is pragmatism, which has been described as "irenic" (Boisvert, 1988, p. 212) as a school of thought and methodology with the goal to "overcome the isolation of philosophy from the natural and social sciences" (Maxcy, 2003, p. 54), that unites the methodological analysis, the empirical investigation of the knowledge entrepreneurship concept, and the integration of external sources, by giving the cross-cutting threshold of utility for the research objective. Thereby the epistemological position defined in Chapter 1 section 2. plays an important role, because the scientific method promoted by pragmatist Charles Sanders Peirce as 'experiential method' is applied. The method is based on a process beginning with observation and sensation, codification and then communication of the knowledge claims in order to reach inter-subjectivity (Maxcy, 2003). It is in context that the pragmatist approach has been used to explore the meta-physical attractors that enable knowledge entrepreneurship. This is how Rescher (1977) can state in his classic on "Methodological Pragmatism" that "It is thus clear that, with particular regard to methodology at any rate, the pragmatists were surely right: There can be no better or more natural way of justifying a method than by establishing that "it works" with respect to the specific appointed tasks that are in view for it" (p. 3).

Both literal parts of the approach, 'phenomenological' and 'action research', are elaborated upon independently and then in combination in the following paragraphs.

Education is one of the traditional areas where the action research methodology is applied (Smith 1996, 2001). Especially the British school has a history of exploiting this approach to improve the practice of education. Carr and Kemmis provide a useful and suitable definition: "Action research is simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out" (Carr and Kemmis 1986: 162). In this spirit the action research method is conducted, while focusing on the phenomenon of knowledge entrepreneurship, in all stages of the PhD project.

Naturally this kind of research has to be considered highly subjective, but as McTaggart (1996: 248 as cited by Smith 1996, 2001) has noted: 'Action research is not a 'method' or a 'procedure' for research but a series of commitments to observe and problematize through practice a series of principles for conducting social enquiry'. In this sense it is believed that the observations made and approach documented in this effort to develop an innovative learning and teaching experience are relevant to the overall research theme addressed and as such a valuable contribution to the project.

Action research seems particularly suitable to study entrepreneurial phenomena, because "the action researcher is concerned to create organizational change and simultaneously study the process" (Baskerville and Myers 2004, p. 329-330), which is a good description of what a knowledge entrepreneur does.

But why phenomenological action research? The attribute phenomenological has been chosen for two reasons: one technical, one content related. Firstly because the constructivist epistemology and post-positive philosophy of science (as in Baskerville & Pries-Heje - cf. Schein, 1987) as further developed by Susman & Evered's understanding of action research is taken. The latter develops action research as based on phenomenology, existentialism and hermeneutics. Secondly because the subject of the action research is reflected upon taking the cognitive experience as basis for the creation of a philosophy based mental model. Hence the focus is on the meta-physical representation and causes of the phenomenon rather than its behavioural component only. And secondly the attribution 'phenomenological' is added because the researcher is investigating and describing exclusively one

phenomenon, knowledge entrepreneurship, and not reflecting upon the whole scholarly experience of the PhD. In contrast to philosophies that discuss meta-physical concepts ideas such as god or reason, 'objectively', aloft from human experience, Husserl defined the motto of phenomenology as "to the things themselves" (Zu den Sachen selbst) as perceived by the human conscious. Whereas reason or human teleology is part of the model developed, it is not the central concern and therefore not problematized. Husserl wanted to base metaconsiderations on concrete human experience. As physical such entrepreneurship is studied by examining how it appears to us in experience or consciousness (Manen, 2000). Thereby the internal relation between the phenomena and its mental representation are reflected upon and then a model is constructed delimiting component parts of the phenomenon and relating them to each other and to the whole (Marton, 1994).

The results of the phenomenological action research do not make up a separate section in the results. Instead the experiences and reflections are what led to the development of the proposed mindset model of knowledge entrepreneurship whereas the claims developed are based on the researcher's pursuance and realization of knowledge opportunities which have been assessed to be essential parts of a knowledge entrepreneurial mindset. These theoretical claim are at first a subjective selection, they have been supported by the findings of the case study and inter-subjectivity has been sought through widespread consultation and debate with scholars as well as lay people. In the following section the researchers conceptualisation of the PhD research project as knowledge entrepreneurship action research is given.

2.5.1. Development of PhD Research as Action Research

The concept of entrepreneurship was selected as a central theme of the research because of a profound personal interest and during the research extensive engagement with theory as well as practice has been taken place. In the following paragraphs a short overview of the knowledge entrepreneurial experiences that make up the body of the phenomenological action research are recounted.

Qualitative research if often criticized because of the constraint that the interpretation of qualitative data is a subjective interpretation of explanations given by informants. Hence, so the argument, it is impossible to verify the correct interpretation. On the one hand this critique is retorted through the practice of validating the described conditions at the universities through engaging in collective review and discourse with the informants and the institution in general (see section on case validation above), on the other hand the research project itself is taken as a knowledge entrepreneurial venture and the constant identification of theoretical and practical opportunities, the reflection on risks (of losing time and focus), and especially the pragmatic realization of positively assessed opportunities (by investing in

understanding and exploiting the insights to forge a solid knowledge product), was an important source for understanding the phenomenon. The researcher has followed the premises of action research to engage in an iterative evolutionary process of reflecting upon opportunity identification, evaluation or as Blum (1955) put it diagnosis, and third a therapeutic stage in which the act of integrating the concept into the research product was realized. Thereby the many thesis memos and documents are used as documentation of these reflections. Especially the organisation of the case studies was an entrepreneurial venture as both access to relevant documents, data and especially suitable interview partners was a constant emergent search, assessment, and realization of knowledge opportunities. As Checkland (1981, p. 153) states: "The problem with action research arises from the fact that it cannot be wholly planned and directed down particular paths ... [The researcher] may express his research aims as hopes, but cannot certainly design them into his 'experiments'. He has to be prepared to act to whatever happens in the research situation; he has to follow wherever the situation leads him or stop the research". One good example is the expansion of the research through the implementation of a focus group interview held with students of the LSE. This opportunity arose in an informal meeting with an LSE teaching assistant, was assessed to add substantial insight to the research and subsequently realized. But, as was understood to be entrepreneurial, I did not focus exclusively on the cases but also followed up on opportunities that emerged along the way. Two examples are, the etymological investigation conducted with a historian from my home town (see Chapter 1 - Footnote 13) or the interview conducted with the CEO of StarLab, a private sector research company, which is collaborating with universities and entrepreneurially pursuing research grants (see Chapter 4 – Axiology and Teleology).

Dressel and Langreiter found that "we try to create structures and processes 'in our own area' were we have more possibilities for action: in our working groups, in our department, in university courses, in self-organized workshops etc. – first of all with 'our equals" (Dressel & Langreiter, 2003). In the following paragraphs some selected knowledge opportunities that were realized during the research are listed.

January and May, 2007 Presentation and Debate at the Entrepreneurship Laboratory, Berlin

Presentation and discussion of research theme at the entrepreneurship community of practice gathering at Prof. Faltin's Entrepreneurship Laboratory institution (see chapter three section 1.9.6.).

- June 28 July 1st, 2006 Eudokma PhD Seminar 2006, Amsterdam Collaborative seminar on "Organizational Learning, Networks and Communities: Innovations in the Emerging Strategic Entrepreneurship Field". Organized by the Vrije Universiteit Amsterdam, Faculty of Social Sciences, Department of Public Administration & Organization Science
- Oktobre 2006, Presentation at the OECD IMHE, Paris
 Presentation and discussion of paper: "Entrepreneurial Universities in the Network

 Society A Code of Conduct for Use of the Internet" at the OECD conference "Values

and Ethics: Managing Challenges and Realities in Higher Education".

- 16. May 24. June 2005 United Nations University, Tokyo
 The course "Ecology Science and Policies" offered a unique opportunity to learn about current best practices with regards to implementing a sustainable information society.
- 18.–30. April 2005 European Doctoral Training Programme, Strasbourg
 Programme which gives young researchers a specific training in the new developments of the Economics of Technological and Institutional Change.

Through these collaborative sessions, I was able to "receive impulses from the outside and where we can meet with people who move in various academic circles but who are not involved in the project, in order to discuss and engage in informal analytic thinking with them regarding our interpretations, thought sand issues. (Dressel & Langreiter, 2003)"

2.5.2. Validation of Action Research

In the case of meta-physical reflections about subjective experiences, such as motivations and values, no objective 'right or wrong' can be pursued. Rather inter-subjective agreement or consensus is sought through proactive moderation of public as well as exclusive discourse and feedback¹⁶.

2.5.2.1. Expert Feedback

Throughout the research process, feedback and discourse with the supervisor has naturally been decisive for the development and evolution of the project. Furthermore three cosupervisors, each his own subject expert in one of the relevant essential fields of the research, have been involved in the development and review of the research's claims.

Once the analytic work had been completed, the results and propositions have been circulated among a wider group of subject experts (mostly academics).

During the last stage of the project the first complete draft has been send out to 35 experts who's work has been used for this research. Subsequently feedback has been obtained and worked in from the following:

¹⁶ As is consistent with the entrepreneurship mindset attractor of pragmatism, which deploys cybernetic methods of system optimization through feedback.

Field of Expertise	Number of Experts from whom feedback
	was obtained
Entrepreneurship	2
Philosophy	1
Complexity Science	1
Education (e-learning)	2

Table 2.2 - Obtained Expert Feedback

2.5.2.2. Wiki and Mailing List

Another source of feedback and discussion is the research project web-presence. Interested parties are able to review and comment on the work through an editable wiki space, where draft versions of the research were made available. Additionally a mailing list with the title "Entrepreneurial Practices in University" was created and served for the communication about particularly interesting findings and identified best practices.

Once the formal certification process is completed, the research findings will be published in a hyper-textual format in order to allow for user validation through feedback and collective rectification. This knowledge entrepreneurial use of the internet has been pioneered by Lawrence Lessig (2001) and his book "Code and other Laws in Cyberspace," which he originally published as wiki and recently updated in a collectively revised edition. Hence, both instruments will be continued and developed further after the formal research project is terminated, wherein the validation and optimization process will be institutionalized.

2.6. THEORY DEVELOPMENT

As already stated, grounded theory techniques have guided data analysis and the problems and good practices have been combined with findings and concepts developed (e.g., in private sector research and philosophy with the objective to develop a normative theory that answers the research questions). In the understanding of Strauss and Corbin (1998), a theory is "a set of well developed categories ... that are systematically related through statements of relationship to form a theoretical framework that explains some relevant social ... or other phenomenon". Therefore, the central concern was to generate core concepts from the data collected. Especially selective coding was useful as it "develops the theory that best fits the phenomena by identifying a story that reveals the central phenomenon (core issue or 'core category') under study" (Baskerville & Pries-Hejeb, 1999). The main conceptual attractor developed from analysis of the field work data was "knowledge entrepreneurship." Theoretical generalisation involves suggesting new interpretations and concepts or re-examining earlier concepts and interpretations in major and innovative ways (Yin, 1993). Case studies have been particularly important in the generation of new ideas and theories in social science. "Certainly one can develop significant new theoretical

innovations and generalisations from good quantitative research, but in practice this has been less likely than in the case of qualitative research".(ibid p.14). The wide variety of documents, interviews and online information used to construct the case narrative is thought to "expand the foundation upon which knowledge claims in the field are based" (Robey, 1996, p. 403). Additional improvement ensuring the proposition of realistic insights is obtained due to the embedded approach of living and thereby becoming – at least cognitively – a part of the institution. This move away from pre-formatted cognitive research scenarios has been pioneered by e.g. (Hutchins, 1995) "Cognition in the wild".

Once the individual case narratives had been developed, the insights and phenomena encountered are merged with the experiences and reflections made in the phenomenological action research track of the study. Together, they represent the chapter entitled Cross-Case Analysis & Theory Development. Thereby, it is indispensable to have the researcher serve as a subject expert filter and select the most essential phenomena because of the sheer mass of information. Zellweger Moser (2003, p. 68) states: "Writing a grounded theory requires a clear analytic story and a sense of what parts of story the writer wishes to convey". Phenomena and aspects found in the various cases are translated into a detailed outline referring to the many sources and codes developed during the analysis process (Strauss & Corbin, 1990, p. 249). Locke (2000, p. 116) states that it is especially important to provide authenticity, which is established through the validation processes described in section 1.4.2. and 1.3.4, and achieving a solid data theory coupling, which is pursued by depicting the situation in the various cases in regards to the relevant phenomena. Hereby, each theory element is illustrated with "live" excerpts from the setting, e.g. indirect quotes 17, observations or documents.

"This showing needs to be connected to the telling, when the significance of the detail is explained" (Zellweger-Moser, 2003, p. 68). Following Locke (2000) and Zellweger-Moser (2003), observations regarding the theory frame are presented first, a summary of the whole theory is then given, and lastly all elements are developed theoretically and under consideration of other sources, as well as considering the situation in the universities investigated.

During this process, it is inevitable that subjective assumptions of the researcher influence the interpretation of data and importance of phenomena. For this reason, the researcher's position has been made explicit in Annex A. It is also documented in the position developed in the theoretic background, e.g. regarding the exceptional non-market understanding of universities.

¹⁷ Due to the fact that information analyzed was presented in four languages (Spanish, Catalan, German and English) the quotes are made indirectly.

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Case – Studies

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3.0 Introduction

In this chapter the reports from the research's fieldwork are compiled. Four case studies have been conducted. Each case was chosen as to represent a type of university. There is an elite social science institution (London School of Economics), a traditional full university (Freie University of Berlin), a technical university, and a virtual university. Furthermore the different localities in England, Germany, Spain and on the internet add to the generalizability of the insights gained. The following figure illustrates the structure of the case studies as outlined in the methodology chapter (2.3):

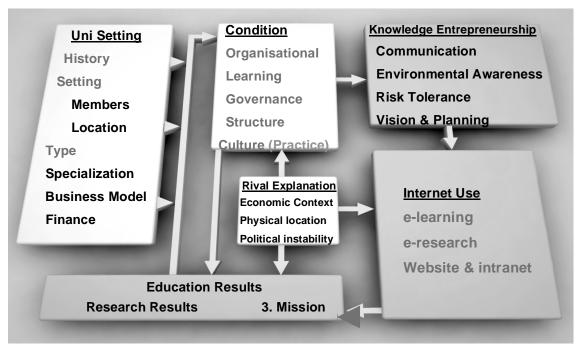


Figure 3.1 – Interpretative Framework (Based on Yin 2003)

The informants are kept anonymous using a separate coding table. In order to indicate the perspective of the informant, stakeholder categories have been included in the final text. They are: student, faculty, administration¹ (for employees with none or few subordinates), and management for departmental directors, vice-rectors and similarly ranked chairpersons. Hence the format for citing interviewee information is (institution, role, internal reference number)².

The cases vary slightly in length, and it seems important to point out that this is by no means related to quality of the institution or interest by the researcher, rather it merely due to circumstantial probability of the availability data. For example the history section is naturally longer for an older than for a younger university.

¹ And in some special cases also concrete functional title.

² The role has been omitted in cases of negative statements in order to maximize anonymity.

Case-Study 1: London School of Economics

Global Player in a British Climate

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3.1.1. Overview

The London School of Economics and Political Science (LSE) has managed to emerge as a globally leading research institution and a talent breeding ground based on inspired (knowledge) entrepreneurship. Its thematic specialization (based on the entrepreneuring of its founders) and stratified opportunistic (pro-active) application of its own research findings make it an influential political player, while the participation in the scientific discourse (e.g. Popper, Hayek, Mannheim, Sen) has allowed it to establish itself alongside the eminent Oxbridge institutions in less than a century. Surely, its physical location (in central London) at the political and cultural centre of the United Kingdom, has added to this positive development.

Foremost, it is the LSE's enabling institutional structure, which allows for a balanced practice between standardized multi-stakeholder decision-making committees and an individual opportunistic adhocracy (Toffler, 1970; Waterman, 1990) that creates the LSE's outstanding intellectual climate. The latter providing the *Spielraum* (leeway/margin) in the responsible individual's mandate, which makes him/her identify with the challenge and approach, thereby fostering entrepreneurial motivation.

The up-scaling of the administration, which took place in reaction to the increasing competition in the globalized higher education market, led to inclusive and holistic entrepreneuring (risk and opportunity identification and evaluation process) and strategy (an opportunity realization plan) practices.

Internet based innovation appropriation is institutionalized in the specialized academic support units the Centre for Learning Technology. Also some Library staff is doing research support. The activities are framed through the university's embedded IT strategy.

3.1.2. History

Founded in 1895 by the socialist Fabian Society, the London School of Economics and Political Science (LSE) was created with the aim to contribute to the betterment of society (LSE web1). The founding fathers, and particularly Mr. and Mrs. Webb, were entrepreneurs intent on fighting social injustice through the creation of an institution dedicated to research and the dissemination of knowledge focused on the improvement and management of society. The Webbs' entrepreneurial spirit played out in the various fields of entrepreneurial intention. The main interest for the Fabians was social justice, but their approach was also aimed at influencing those in (political) power through the production of scientific knowledge and the training of the coming generations. In true entrepreneurial fashion the Fabians solicited philanthropic funding as well as political support, which allowed for the rapid expansion and consolidation of the School as an adjunct entity of the University of London. The remarkable rise of the LSE as a research centre becomes evident in the fact that only ten years after its foundation it already hosted 69 (38%) of the 181 post-graduate researchers employed in the whole of England (LSE web2).

During the turbulent decades between 1910 and 1950, LSE managed to consolidate its institutional standing in British higher education. In fact, the School pioneered and established several new knowledge fields, such as geography, anthropology, and international relations, as university level disciplines. Following WWII, the political mission of the School was increasingly realised as a growing number of graduates became members of London's political elite³. With the support of these graduates, the School's director and his Beveridge Report is understood by many to be the foundational block for the creation of the British welfare state. In this period the School also became one of the key intellectual sites for the discourse (and theoretical defeat) of the communist planned-economy versus capitalistic free markets (see also chapter 1 section on knowledge entrepreneurship, (Hull, 2002)). Based on (these) intellectual accomplishments, the School continued to grow alongside its burgeoning reputation. These positive trends continued until under the political reforms of the Thatcher era, when the School

³ Despite its socialist Fabian roots the School has produced predominately social-liberal and libertarian politicians and political advisors (<u>LSE web</u>)

lost it direct policy shaping influence, as the profound and well-articulated arguments against the dismantling of the welfare state uttered by LSE's stakeholders were received as counter-productive. The School became known as a meeting-point for free-thinkers and the alternative culture that developed in London during the 1960's and 1970's. After this intellectual dynamism followed a period of organisational disorder and political neglect.

The School's more recent development can be characterized as a success of observation and interpretation in the competitive economic and intellectual business race in the higher education sector. The global competition for the most elite student body and their contingently elite pocketbooks eventually led to a streamlined bureaucracy and more effective education. During this transformation, the LSE developed a business model which guaranteed its economic stability and its promise of a high academic standard. Arguably, the School has - in harmony with, or maybe as trend-setter for, the general public - lost its idealistic roots and vision. But it has managed to develop and maintain an exceptional global reputation based on its successful training of outstanding politicians, economists and researchers.

3.1.3. Setting & Typology

3.1.3.1. Students

Born as a result of a philanthropic endeavour, the School started with only a few courses and grew both rapidly but organically (in the sense that new courses and careers were added when resources were secured). Today the LSE has about 7800 students and plans to grow to about 9000 once a new building which has recently been acquired will be ready for use. The composition of the student body has always been exceptional. For example its strong research focus traditionally results in a very high percentage of PhD students. With about 600 teaching staff, the student-teacher ratio is about 1:13. Furthermore the LSE employs ~800 administrative staff and about 200 people purely dealing with research (ConStat, 2006).

3.1.3.2. Location

The School's location in the centre of London brings two decisive advantages. First and foremost, it is literally very close to the heart of English politics and media and second – given the distinguished cultural attractions in this area - it adds enormously to the School's attractiveness for its clients and employees (LSE multiple 18). Nevertheless, its centrality also brings the disadvantage that it is extremely difficult for the School to expand, as real estate in this area is amongst the most expensive in the world (LSE management 19). It is one of the achievements of the School's current director that he managed to identify and buy a new building which will add 10200 square metres to the School (LSE web 4).

3.1.3.3. Specialisation

From its genesis, it was clear that the LSE had a very clear specialisation and would only focus on social sciences. Given the concrete aim of its founding fathers to change and better society all subjects are studied with a relatively concrete application in mind. Today the LSE consists of 18 disciplinary departments and 5 research institutions. Naturally by far the two most developed subjects are economics and political sciences, which are taken (at least partially) by the majority of LSE students.

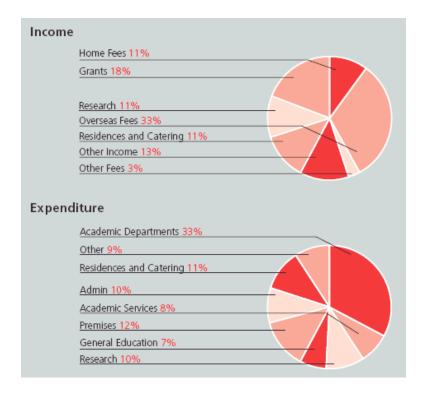
3.1.3.4. Business-Model

The LSE's business model is straight-forward: Based on its high reputation and banking on the strength of the current senior academics (LSE administration 20), the LSE attracts foreign students who pay a decisively higher tuition fee⁴ than British students (LSE Faculty 21). In 2003/04 the LSE had 62% (Howard, 2006) of its student body coming from abroad, or what is internally referred to as 'cash cow students' (LSE multiple 22). Additionally, the School is run (organisationally) like a professional private business, and all administrative staff interviewed have plausibly represented this understanding. Even though the good financial standing of the School speaks for itself, the speed and distant efficiency of the programmes taught (especially in the undergraduate and master degrees), is perceived by many students as lowering the educational experience (LSE multiple students 23).

3.1.3.5. Finance

Among the universities researched in the project, the LSE is outstanding for its financial situation. It receives less than 20% of its budget from the state, and more than 40% from tuition fees. Figure 1 nicely summarizes LSE's balance. The School's social science focus is in this ratio surely a big advantage, because when it comes to financial planning and sourcing (big) science projects (physics, etc.) naturally have exponentially higher costs and are traditionally state funded.

⁴ which is many times paid by scholarships



3.1.1 Figure - LSE Balance (LSE 2005 Annual Report)

3.1.4. IT History and Approach

Due to the non-technical alignment of the LSE, computers and the internet enter the university's practice on a pure use basis ⁵. However, even though LSE's specialisation excludes IT development, two departments (Media Lab & Information Systems) are focused on the research of how new information and communication technologies influence society and businesses. The School has realized the emergence of digitalisation as a mega-trend. The School's chief Librarian, who also serves as Director of IT Services, has characterized LSE as an early majority in terms of IT innovation appropriation (LSE management 24.) Given the School's recent efforts, this evaluation seems appropriate.

The IT services follow the School's centralized services structure, and while there are certain overlaps due to the trans-disciplinary and emergent nature of IT services, it seems that ultimately, there is a non-rival atmosphere amongst the different teams. There are six different teams: One responsible for the core IT infrastructure, one for the business information systems, one for the spread of IT as a learning technology, and one for the library services, plus two teams who promote and experiment with new technologies for research (see figure 3.1.2).

⁵ Only in the area of statistics LSE scholars make such extensive use of statistic programs that it might qualify as development.

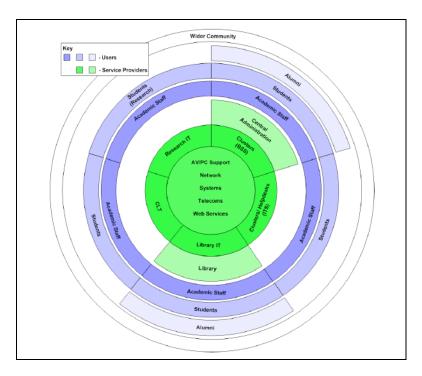


Figure 3.1.2 - LSE IT Portfolio (ITstrategy, 2004)

The LSE is the only university researched that had inclusively produced a holistic multi-year IT strategy (ITstrategy, 2004). Not only was the strategy integrated, 'upstream' with the School's overall Strategic Plan (StraPlan06, 2006) but was also integrated downstream with the working plans of units and individuals. The strategy defines technology "as an enabler of change and not a driver of change for change's sake", and goes on to describe LSE's approach to technology innovation "it therefore often takes a prudent view of emerging technologies, choosing to follow closely behind early adopters to mitigate against start-up problems and gain a better understanding of implementation complexities. Nevertheless the School understands how important it is to invest in ICT to remain competitive, attract and retain the best students and staff, and enable the highest quality teaching and research." (ITstrategy, 2004, p.5)

3.1.5. Condition

3.1.5.1. Leadership

In tune with its thematic alignment, the School has a long tradition in appointing eminent (and occasionally international) researchers and economists (mostly with experience with politics) as directors. The School's current director, Sir Howard Davies, is an experienced economist and has been said to have been chosen for his distinguished managerial abilities. In contrast to his predecessor Professor Anthony Giddens, an outstanding sociologist, who during his time as LSE director developed an innovative political direction named the 'third way' (Giddens, 1998), Davies has a clearly pragmatic profile. The distinction between Giddens and Davies is very nicely made apparent when looking at the way they think about values and idealism.

While Davies is said to believe in the 'death of idealism' (LSE management 6) thus focusing rigidly on objective market excellence through adherence to the "best practices." Giddens said: "None of us would have anything to live for, if we didn't have something worth dying for". (Giddens, 1999) which suggests that he believes that individual motivation always emerges from shared values and ideals. Thus the appointment of Howard Davies can be interpreted as the manifestation of the end of the idealistic mandate the school was once founded upon.

Under Professor Giddens, there was a strong division of labour between himself and the administrator, who dealt with the organisational and managerial matters, while Giddens dealt primarily with strategic academic decisions like the recruitment of new professors or the securing of funding (LSE management 25).

In conclusion, it is interesting to note, that the School's board has chosen two very different characters with very different professional profiles in its last two appointments. As Giddens has been described as a charismatic academic figurehead, and Davies as top notch mandarin, and a sharp communicator, who is always prepared, focused and pragmatic. Regardless of their divergent personalities, both seem to be equally effective at running the School. Given the unprecedented growth rate and varied changes impacting higher education, Howard Davies' qualities are very useful in managing the School through the un-charted waters of globalisation. This seems to suggest, that the LSE as an institution is made up of strong enough internal institutions (departmental and other organisational structures) that the university works as a collective without a strong dependence on a helmsman steering from the top.

3.1.5.2. Governance

The LSE follows a more or less classical governance structure with centralized administrative branches serving de-centrally organized academic departments.

The Council of the School's Court of Governors is the highest authority. All major decisions that affect the future development of the School, like the appointment of the director, are discussed and voted upon under its Council. Council delegates all responsibility for organization and supervision of the School to the director, who thus practically also coordinates Council's committees. Council's standing committees are the leading entities of the key administrative departments (like audit, library and information services, external relations, etc.). This levelled committee setup results in a structure in which all mid- and long-term decisions have to be taken by a group in which all relevant stakeholders are present (LSE web).

The School's director is also the chairman of the Academic Board, which is a 'democratic' (political) decision-making body for all academic matters. The Academic Board presides over several thematic strategic committees, which in turn have various subcommittees, panels, forums and user representation groups (LSE web). One of the Academic Board's committees

(the Academic Planning and Resource Committee - APRC) is responsible for the continuation of smooth academic operations as well as the planning and development of initiatives that expand the School's strengths (LSE web). One key activity of the APRC is the development of the School's (at least bi-annual) strategy. The academics are supported by a recent administrative entity, the Planning Unit. The Planning Unit is positioned directly in the director's secretariat and as such "is able to assist in the resolution of some delicate high-level planning issues that run the risk of being lost in the gaps between the various strategic bodies in the School with an interest in these matters" (LSE web). This support is a good reflection of the School's growing influence of management practices the stratifying results (as the specialised unit staffed with six planning officers and support staff obviously has a considerable influence on the outcome.)

As mentioned, the 'professionalisation' results in a holistically embedded strategy process as expressed on the Planning unit's website: "It is crucial to its success that everyone in the School is aware of these priorities. The clear connection between the strategic plan and departmental/divisional plans and then to individual staff plans (via the performance and development review process) ensure that each and every one of us can maintain our part in the planning process. Each member of staff will shortly be given a paper copy of the new Strategic Plan' (LSE web).

In general the LSE is assessed as having a high transparency (most information about structure, responsibilities and process is voluntarily published online), and most interviewees report to being satisfied with the efficiency and effectiveness of the bureaucratic system.

Students are organized in the LSE Student Union through student representatives, who participate in voting assemblies. The union has a long history and is said to be the training ground where many of the politically successful graduates have "cut their teeth in the ruthless world of LSE student politics" (Wikipedia, 2007). The Student Union is also responsible for hosting around 150 societies and 30 sports clubs, three bars, a cafe, a Media Group (consisting of a newspaper, journal, radio station and online TV network), gymnasium and photocopying shop. (Among the societies is the LSE Entrepreneurs Society which is covered separately under 3.1.10.4).

3.1.5.3. Culture

The School's culture can be described by three adjectives: cosmopolitan, professional and autonomous. The LSE tradition is being a nonconformist and these adjectives support this thematic narrative (LSE administration 26)

Cosmopolitanism

Due to the centrality of London for the commonwealth countries, the School's outreach has been global from the start. As early as 1899, the director noted that students came from sixteen different countries (LSE web 3). Today only half of the undergraduate students are British, while nearly one third come from Asia (mostly India and China – Figure 1 - (ConStat, 2006). When looking at the composition of post-graduates LSE's global reach is even more apparent. While half of the senior students come from EU countries, only 21% come from Britain itself. The same percentage as American students (21%), who appreciate the global reputation offered for less than what top American universities cost (LSE student 27). An impressive 23% of post-graduate students come from Asia. While these figures undoubtedly prove LSE's global character, they also illustrate (less then 3% of LSE's overall student population comes from developing countries) what has been described as the knowledge divide (UNESCO, 2005) or knowledge imperialism (Lyotard, 1984) through exclusive western higher education institutions.

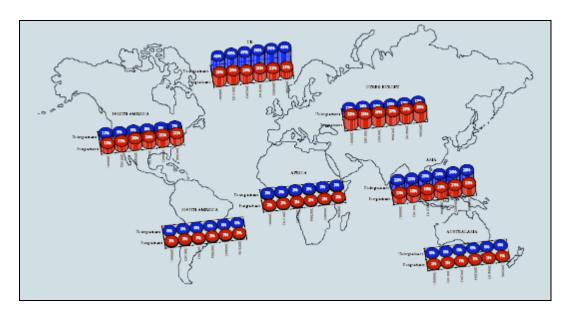


Figure 3.1.2 - LSE Student Origin (ConStat, 2006)

Professionalism

The high reputation of the LSE mirrors itself naturally in a self-understanding of the employees as well as its students as being privileged and subsequently obliged towards high performance⁶. The academics are especially aware of this prestigious intellectual legacy and seem to demand and maintain a culture of excellence. The LSE is by far the university with the

⁶ Interestingly this is not the case for both undergraduates and masters programs (cash cows), where status is lower and admittance is less difficult (LSE students 29).

least negative statements among employees. Considering the high cost and academic level of the LSE, the professional attitude can also be described as elitist.

Autonomy

The scholars report to feel a high degree of freedom when it comes to pursuing their intellectual curiosity. And the freshman's experience has been paraphrased as 'sink or swim' (LSE student 28), an alluring mix of excess, freedom and complexity which overwhelms many hapless newcomers. Even though the independence is actually embedded in a very streamlined system through which students are channelled, it is true that the individual's autonomy is challenged. Without a rigorous set of benchmarks, newcomers are forced to orient themselves in a sea of choices when weighing and prioritizing the multitude of intellectual, social and cultural opportunities. Ultimately, the LSE is quite a liberal place that limits its directorial control to the assessment of milestone results⁷.

3.1.5.4. Organizational Learning

There is no organizational learning or knowledge management programme at the LSE. The School is however fortunate in that it has a rather small personnel and that it is physically compact. This, combined with a substantial volume of contact-information, both published on paper and online, results in an environment where information is available and questions can be addressed directly.

3.1.6. Knowledge Entrepreneurship

As has been alluded to in the history section, the LSE has built and maintains a strong reputation in establishing the parameters of social science discourses. As such, it serves as a benchmark for the other case studies, especially regarding the research aspect of this investigation.

With regards to appropriating internet based innovations, one specialized central institution (the CLT) has emerged and the library continues its traditional services with the (online) tools available today. The CLT is 'the responsible' entity for the identification, evaluation and realization of technology based opportunities to improve teaching & learning. A similar function for LSE's research practices are performed by the IT team in the Library⁸.

⁷ Given the high reputation of the university, the milestones are proportionately high.

⁸ Even though with a less differentiated mandate.

3.1.6.1. Environmental Awareness

Because of the cosmopolitan composition of the faculty and student body, intellectual trends and news reach the LSE rather quickly and often first hand. Furthermore the fact that English is today's academic and technological lingua franca facilitates the vigilance of dynamic topicality.

When it comes to technology, the IT professionals in the relevant units are responsible for identifying and evaluating potential innovations. Given that the IT strategy stresses a user's need focus, and given that most of the LSE academics are not specifically interested in technology per se, technology innovations especially in research have quite a high incubation time (e.g. open access). The demand of students, who constitute a younger more IT savvy generation, and bring their IT habits from universities from around the world, is a key motor of change when it comes to teaching practices.

3.1.6.2. Entrepreneuring (Strategy & Vision)

In the academic department very little collective planning seems to be mandatory regarding research. The department's faculty mostly collaborates to deal with organizational matters and to occasionally revamp the course offering or even develop a new programme. Theses efforts are mainly led by the department's convener, who is the temporarily elected leader ('the first among equals') of the department, who also has to represent the department's interest in all relevant internal institutions. Scientific entrepreneuring is done almost exclusively by individuals.

The vision and strategy for IT services is institutionalized through the collective development of the School's IT strategy documents. Ideas (and opportunities) have to be contributed to the collaborative effort of writing the master document or have to fit into the established mandate (and priorities) for the given period. The School's positioning as early majority (ITstrategy, 2004) for technology innovations makes this strategy feasible, because most innovations can and are being watched for sometime before they are assessed to be ready for appropriation.

3.1.6.3. New Project Support

There are several established ways to initiate a new academic project. (LSE <u>web 5</u>, <u>web 6</u>). Namely the Research and Project Development Division is responsible for facilitating the attainment of research funding, as well as the creation of new academic endeavours, while the

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⁹ The convener job does not seem to be very attractive to the academics, whose interest lies in their intellectual activities and who perceive the School's organization and politics as largely uninteresting and highly nerve-wracking. (LSE faculty 30)

private business entity LSE Enterprise supports the marketing of LSE's experts for for-profit engagements. Even though much information is available online, most communications about entrepreneurial practices is exchanged interpersonally (LSE management 31).

On the IT side, a division between research and teaching & learning has to be made anew. While the team members of the CLT are specifically mandated to screen the web and go to conferences to identify and test-drive teaching and learning opportunities, the library team does this activity 'on the side' for research. As the chief Librarian has pointed out, a solid business case still needs to be made to establish innovation as a formal part of staff roles.

For both areas the same is true: they do not force any innovations on their stakeholders but completely follow a supply and demand based approach. Sincerely following the motto: "moving forward without pushing" (LSE management 32).

3.1.6.4. Risk Tolerance

Risk tolerance is no big issue for academics who do not feel a high pressure to innovate and only do so when they are thoroughly convinced of the importance of the realization of an opportunity. On an organizational level the School has engaged in several strategic activities, which have been assessed as having risk (e.g. collaborations with Columbia, or in China). Lately risk management has been institutionalized and the School has begun to develop a certain appetite for risk (LSE management 33) as an element of all institutions in a globalizing world.

For the integration of internet based innovations, the same scenario as for new project support is true. The LSE does not intend to innovate, and it is offering new services as opportunities; therefore it does not have to take significant risks.

3.1.6.5. Communication

Generally, knowledge and communication at the LSE is strongly siloed (LSE faculty 34) because of the high specialization of the academic and administrative departments. This fact is mitigated by the inter-disciplinary committees and through the extensive use of online publications, which allows for the identification of responsible colleagues when the need arises. Also, the 'weekly briefing' newsletter published internally, as well as the 'LSE in the News' service (collecting public media appearances of the LSE), both published by the Press Department, allow LSE employees to stay updated about what is happing. Nevertheless, inter-disciplinary or inter-departmental cross-fertilization happens with limited frequency on an unplanned/organic basis.

3.1.7. Internet Use

3.1.7.1. e-Learning

Tools Integration (Technology)

Next to its standard IT services, the School has identified teaching technologies (above all elearning) as an important new field to improve practices. This trend began in 1999. A temporary task-force-like project was formed jointly by the Teaching and Learning Development Office (TLDO, now the TLC), IT Services and the LSE Library. Its mission was to explore the possibilities and potential of e-learning environments (LSE administration 35, Darking, 2004). Following an operational review at the end of the first three-year funding period, the project became institutionalised as the Centre for Learning Technology in 2002. The unit's main preoccupation is the introduction and provision of the School's e-learning platform (at this point WebCT). The Centre's mission is: to identify opportunities, to improve teaching and learning, and to offer these innovations to LSE's teachers and learners.

After a classical (semi-structured, semi-objective) screening and assessment process (LSE administration 36), LSE's learning technology task force selected one of the market leaders for e-learning platforms – WebCT. The platform had been piloted with a single course and then subsequently expanded to four courses in its second phase. After technological functioning could be guaranteed and the first pedagogical experiences had been gathered, the e-learning complement was offered to all courses and has now been thoroughly embraced by practitioners (LSE administration 37). Today 50% of the courses have an e-learning environment.

Besides WebCT, CLT is engaging in a number of innovation projects dealing with the use of blogs, wikis or the use of IT in Anthropology. Furthermore, CLT is organizing presentations of innovative tools and practices where teachers can experiment and give feedback regarding the usefulness of digital whiteboard technology etc. As LSE does not have tight budget restraints, positively assessed tools are acquired in small quantities in order to allow for wider experimentation in the classroom.

Current Practices (Use Cases)

Offered as a free-to-use service to add value to courses, the e-learning platform was piloted with IT enthusiasts and then spread rather quickly, and today more than 400 courses (50% of the total) take advantage of the e-learning system. The key functionality that professors and students value is the feature to make available course reading lists (LSE students 38, Darking, 2004). As most journal articles are available through the Library's e-subscription portfolio these can be accessed directly from the virtual learning environment. Additionally, some courses also

invest in the digitisation of book chapters. This innovation not only makes it more convenient but actually ensures the availability of the course materials, which in the traditional practice were often not available simply because of the lack of sufficient multiple copies of the materials in the Library to meet student demand.

All other functionalities of the VLE are only used sporadically or not at all, even though the CLT offers training sessions to spread a more full-fledged use of the tool's possibilities (LSE administration 39). As one professor put it: "We are reaping 85% of the benefits of WebCT by using 10% of its functionality" (LSE faculty 40).

Other innovative e-learning projects, like the constitution of a pilot wiki-based research and social network community for PhD students, were not continued because the early adopters already had a blog or wiki at a public provider or they were not aware and attracted because the practice was still alien (LSE administration 55). As said one responsible remembers: "*They simply did not come back*" (LSE administration 41). In fact, many innovations the CLT experiments with do not spread to the wider community, but are either abandoned altogether or are used by a few enthusiasts, who have made the effort to learn the practice and are now exploiting the benefits¹⁰.

One PhD student with a background in knowledge systems has setup a PhD student mailing list, which is used for occasional community activities and instances of networking e.g. for housing.

3.1.7.2. e-Research

Tools Integration (Technology)

LSE is an active member of the Joint Information Systems Committee (JISC) set up by the UK's four Higher Education Funding Councils, and most e-research support projects are happening under this umbrella. An Open Access (OA) repository has been set up as part of a JISC member coalition. However the Librarian and Director of IT Services does follow the LSE's overall approach and is not explicitly promoting OA but leaves the decision to the academic community (LSE management 42).

Currently, several projects are in use, like the one to enable secure resource sharing amongst universities, (LSE web 6) or in the area of versioning of electronic articles (LSE web 7), and both are occurring within the JISC framework. What is more, the administrative support adds substantial value for the academic practices by publishing funding opportunities on a constant basis (LSE web).

¹⁰ For example the digital whiteboards are used by some, while the visualiser's capabilities (LSE <u>web 8</u>) simply took a relatively long time before their use now spreads slowly but surely.

Current Practices (Use Cases)

Because the LSE investigates strictly the Social Sciences, the number of research aspects that can be digitised are limited. Naturally, email is extensively used for communication (while also collaboration on texts happens mostly via email attachments). The Library has one of the most comprehensive (social-sciences relevant) e-print subscriptions in the world and scholars as well as students do use these sources extensively. Professors and students report to subscribe to newsletters and mailing lists, and LSE has both newsletters and mailing lists available for knowledge dissemination and discourse. In practice, there are several mailing lists- but the traffic is generally very low (LSE web 10). A considerable number of newsletters have been set up by LSE research institutions and one for alumni information. Some of these have a very high quality, as they are paid for by private sponsors facilitated through LSE Enterprise (LSE management 43). There are also specialized applications used for mathematical and statistical research, but overall the use of IT and the internet for research is limited.

3.1.7.3. Website & Intranet

Tools Integration (Technology)

The history of the LSE's website and intranet is full of change and ups and downs mirroring the fast technology changes and practices in this emerging techno-sector. The site was started out of the Library website and for years the institutional site existed as a digital business card or global yellow page entry. However, individual academics increasingly began to set up autonomous personal or departmental pages resulting in a host of designs and functionality (navigation) with the varying quality you'd expect from non-techie contractors (mostly PhD students), who developed and maintained these mini-sites.

In 1999 the School had a professional designer develop one 'corporate' website design which was then gradually and 'voluntarily' forced upon the multitude of mini-sites that had emerged. Later a multi-stakeholder website steering group (which includes student representatives) was created, which from there on was responsible for approving changes and initiatives. This mandate has been substantially facilitated since a comprehensive Web Editors Handbook (LSE web 8) has been developed. It includes a set of policies as well as a collection of best practices putting forward standard solutions and practices for most use cases.

In this moment (2006), LSE is in the process of seriously professionalizing its website technology, by investing in a state of the art content management system. This move is logically complemented by a reorganization of the organizational practices – mirroring the director's understanding of the website as a key marketing tool, planned to be reflected in a relocation of the website team's organizational position moving it from a sub-unit of IT Services

to become part of the Press and Public Relations department. Consistent with the culture at the LSE, the responsible party has to develop and present a viable business case to back up the investment in the CMS.

The intranet "LSE For You" offers a host of functionalities (mostly standard services like email and administrative matters), which are under the shared responsibility of Management Information Services, while responsibility for services and content lies with the provider (e.g. the Library). LSE's internal portal is, at its core, an in-house programmed solution, which brings together many individual services (some self-developed, some standard products). There is talk about whether a plan (strategy) for the development of the portal is needed, but for now this project does not have a clear champion (LSE administration 44).

Current Practices (Use Cases)

From a knowledge entrepreneurship point of view the website serves as a blackboard on which opportunities for students and researchers are posted¹¹. LSE's departmental practice varies greatly regarding the granularity, quality and update frequency of the website. But generally the website is present in the minds of all departments and they do make sure that substantial changes are represented. On a personal level, academics are aware of the importance of their 'virtual presence'. The LSE Experts directory, a service initiated by the LSE Press unit in order to promote external awareness of LSE staff, lists expertise and publication for each scholar, and is highly appreciated. The de-centralised responsibility for web content however still results in redundancy, or at least non-connectedness, as many departments maintain an additional space for personal presentation.

Upon its introduction "LSE For You" has triggered very positive (LSE multiple 45) as well as controversial reactions (LSE multiple 46). Some appreciate the facilitation of administrative matters, while others complain that it reduces the personal contact and thus coaching practices between student and professor.

While the Website Services Manager says he understands his role as "guardian of the medium" and to "set up channels" (LSE administration 47) for the academic community to take advantage of, internet development is still a centralized service used mostly to take care of administrative needs.

3.1.7.4. User Perception of IT Services

Students report extensive use of the internet for their learning and research activities (LSE students 48). They do however also complain about the distraction caused by the availability

¹¹ And scholars present themselves as possible collaborators for people looking for the pursuit of knowledge opportunities.

and sometimes active distraction by the internet and especially email. Asked about their perception of the VLE and the provision of internet based services by the university the participants of the focus group claimed to be satisfied, and they did not demand rapid expansion. The provision of the on campus laptop clinic was mentioned as very beneficial. This generally positive evaluation of course gives high marks to the LSE as its IT strategy defines the fulfilment of user needs as the main goal. Interestingly, some students mentioned that they will exploit the opportunity to copy the reading lists of all LSE courses they have access to in order to later have them as a highly trusted point of reference.

Scholars at the LSE also rate the IT services as satisfying (LSE multiple faculty 49) but have some chronic complaints (about e.g. limited email attachment size). Most feel that the administration is providing sufficient basic services, and if they want to experiment and expand upon that (as does the Information Systems department (LSE faculty 50)), they are happy to do that on their own.

3.1.8. LSE Position

Overall the LSE as university is constantly ranked among the top in national and global evaluations ¹² (Guardian, 2006; SundayTimes, 2006; THES, 2006). The Times Higher Education Supplement even ranked it 3rd in the world for the social sciences (THES, 2006). Especially for philosophy of sciences the LSE is evaluated as the best university in the world (Leiter, 2006). While the LSE ranked 4th among a specialized European rating for Masters in Management in 2005 it came in 8th in 2006 (FinancialTimes, 2006).

Economic Autonomy

LSE's business model works. It does cater almost exclusively to the financially well off, but we live in a capitalist system and there is nothing wrong with charging for quality. For the fiscal year ending July 2005 33% of the overall income came from overseas student fees, and only 18% came from ministerial grants (HEFCE and JISC). Another 15 million pound (11%) was brought in especially for research (35% of this from UK research councils and 37 from UK ministries, the EU as well as charities). Additionally, the LSE Enterprise (see below) already contributes about 1 million pounds in profits to the LSE's balance, and its manager is determined to see this figure raise quickly (LSE management 51).

¹² Even though the global Shanghai ranking put it only on rank 219 because of its relative recent birth and non-science specialization (which makes e.g. the number of Nobel prize winners among alumni less).

Website

In the international ranking for website quality it achieved a respectable 343 (of 3000) in the global and a 24 in the national ranking (Webometrics, 2006). This ranking does however express the historic evolution of the website amongst non-techies. In the international G(oogle)-Factor rating (Hirst, 2006) – measuring how many web-links at other university sites point to the LSE website – the 205th place reflects the School's efforts quite realistically¹³. The 4icu¹⁴ website popularity ranking shows the LSE at the 18th position.

3.1.8.1. Teaching and Learning

When it comes to student satisfaction, the LSE did not make it into the top 50 of UK universities (Guardian, 2005). This is most likely due to the fact that mostly British undergraduate students would be motivated to fill out this survey. Amongst them, voices of disappointment can be heard, as they complain that most lectures are given by PhD students (some of them foreigners who do not speak fluent English): "two thirds of the teaching there is awful and one third brilliant and nothing in between" (Guardian, 2006). Also, it is perceived that the academic super-stars are too busy to deal with freshmen questions, and that the great amount of foreign students lower the learning curve and fosters cultural ghettoization (ibid.). Professors are also aware of the problems of taking in well paying students based on credentials of which the legitimacy is hard to prove ¹⁵.

As mentioned in the history section (1.3.4) many of the LSE's graduates have become widely recognized scholars, politicians and economists. The career services at the LSE report that almost all students use their services and subsequently find work in the field they desire once they have graduated.

¹³ However, it has to be said that these rankings are highly biased towards Anglophone universities because the majority of very good universities are Anglophone.

¹⁴ As of 15.Feb.2007. 4icu explains its ranking with the following statement: The ranking is based upon an algorithm including three unbiased and independent web metrics: Google Page Rank, total number of inbound links and Alexa Traffic Rank.

¹⁵ One Professor is very outspoken in his assessment: "Virtually every Chinese applicant to LSE boasts "the highest exam scores in their province." Apparently it has not occurred to the LSE admissions office that there could not possibly be that many provinces in China. Naturally, most of these PRC students do very poorly and fail out of the program, and, when they do, many confess to having purchased or otherwise fabricated their exam scores and transcripts before they applied for LSE. He continues "at LSE, we have an enormous problem of plagiarism among our Asian students". (Kanazawa, 2006)

3.1.8.2. Research Results

The comprehensive national Research Assessment Exercise carried out in 2001 assessed the LSE's research performance with the two highest possible grades for all categories submitted (except one third highest).

In economics LSE researchers are the editors for one of the most prestigious international journals- 'Economica.' Overall, the LSE ranks 24th in the "ISI Web of Knowledge Citation Index" for the publishing of economics and business papers and 70 for all social sciences. Together the LSE has published more than 3000 papers, which have been cited more than 16000 times and on an average of 5.3 times per paper (Table 3.1.1.).

Field	Papers	Citations	Citations Per Paper
ECONOMICS & BUSINESS	1,017	6,397	6.29
SOCIAL SCIENCES, GENERAL	1,311	4,920	3.75
ALL FIELDS*	3,036	16,081	5.30

Table 3.1.1. - LSE Scientific Output in ISI (ISI, 2006)

For now the LSE's open access repository holds only about 500 papers. It is positive that the LSE has setup an OA server and as the publications mentioned in the next national research assessment (REA 2008) will be required to be put onto the server (LSE management 52), usage should become standard practice by then.

3.1.9. Rival Explanations

3.1.9.1. National Context

With a GDP growth rate of 1,9% in 2005, and 3,2 in 2004 (Worldfactbook, 2006), the United Kingdom is among the strongest and healthiest European economies. This combined with an agile higher education discourse and programme development in UK politics leads to a favourable national context.

While constituting a strong national context, it has to be taken into account that the UK (like all Anglophone countries plus Japan) is one of the most expensive countries when it comes to the costs of higher education (OECD, 2006). This, however, (according to the OECD (ibid.) does not result in low accessibility. Quite the contrary, the UK reaches the second best score for accessibility in the 2005 global ranking.

3.1.9.2. Local & Regional Context

London is one of the most cosmopolitan global centres and therefore provides a highly stimulating but also possibly distracting academic stage. However, the abundant availability of learning opportunities surely contributes to the development of knowledge and an entrepreneurial spirit. Sandwiched between the BBC World Service building and the Royal Courts of Justice, the LSE is directly in the political and communicative mix of the British government and media. This location and these prestigious neighbours have to be evaluated as a very positive asset further augmenting the School's success.

3.1.10. Unique Strange Attractors

3.1.10.1. LSE Enterprise

Back in 1992, the LSE's director asked one of its alumni to look into additional fundraising through academic outreach (read: academics working outside the university). Consequently, the alumni entrepreneur started projects, which eventually led to the creation of the university's commercial arm with the mission to exploit LSE's expertise and intellectual resources on the market. It provides tailored education for business and individual executives, conference services, as well as facilitating commercial consultancy services executed by LSE experts.

Characteristically, it was the initiative of an entrepreneurial alumnus, who wanted to tap into the university's expertise, which initiated the discourse that finally led to the commercial subsidiary's Enterprise LSE Limited (ELSE) creation (LSE management 53). The company's executive recounts that in the beginning, academics were reluctant to sell themselves, but over time, culture changed, and through the continuous efforts of ELSE to add value for the scholars, the services built up a good reputation. After a "reasonably flat" (ibid.) growth rate in the first years ELSE had a turnover of 4,5 million pounds of which 1 million profit went to the LSE and 1,5 million have been paid to the academics. Due to the improvement its acceptance climate, ELSE hopes to accelerate its growth to about 20% in 2007.

One of the key assets for ELSE is the LSE Experts service which is produced by the Press unit and has been web-enabled by the website team recently. LSE Experts is a service making LSE scholars findable on the net. Each LSE academic has a personal site listing his specialties and areas of knowledge as well as his/her publications. This service has proven to be highly successful in marketing LSE to the media and private businesses.

3.1.10.2. Corporate Relations Unit

The corporate relations unit (LSE web) is responsible for finding and managing the School's relations with big private sector 'donors'. Most of the School's research centres are financed or at least supported by a big corporation with a vested interest in good research & analysis in the

particular area. For example Deutsche Bank is financing the School's Centre for Analysis of Risk and Regulation and EDS's Innovation Research Programme.

3.1.10.3. Institutionalization of Bright Ideas

A good example of how the LSE fosters the 'bubbling up' of new initiatives and the identification of opportunities is the staff suggestion scheme known as Bright Ideas (LSE web). Coordinated by a small group of volunteers under the auspices of the Director of Central Administration, opportunities for improvement are sent in by staff and then evaluated by the volunteers. The ideas that are assessed to be worthwhile and feasible are put into practice and the author receives 100 pounds.

A similar mailbox exists for complaints (LSE <u>web</u>.) Staff who find a risky or malicious practice without envisioning a solution can post their observation/complaint.

3.1.10.4. LSE Entrepreneurs student association

In 2004 some entrepreneurial LSE students were inspired by their peers at Oxford (http://www.bouncewithit.com/) and started a students' association, which organises lectures, workshops and events meant to encourage and train fellow students to become entrepreneurs.

Two of LSE entrepreneurship society's initiatives are especially worth mentioning: the Entrepreneurs' Open Challenge (EPOCH) is a team rally where universities send a group of students, who then compete against each other in negotiation, sales, strategy and marketing 'games' (see http://www.epochuk.com/challenges/ to read about the concrete setup of the challenges). The other event is a variation of a business plan contest. The society's version takes the format of a popular TV show where real entrepreneurs and their ventures are being portrayed as they attempt to negotiate partnerships and venture capital.

The entrepreneurship society is only one example of over 160 special interest groups setup by and for students to pursue their interests. This environment provides a host of opportunities contributing to the spirit of self-realization and self-fashioning that eventually permits to define one's calling.

3.1.10.5. LSE's Alumni - Focus on Entrepreneurship Event

Another pillar of LSE's financial autonomy, donations by alumni (many of them also enthusiastically send their children to study), has been developed actively over the last years. The alumni also use the community as a resource. "Focus on entrepreneurship" (LSE web) is a networking and panel discussion showcasing events for LSE alumni. Here also, the 'Dragon's Den' TV show was used as template. They describe the flow of the event like this: "A panel of three experienced entrepreneurs and business experts comments on showcase presentations

from four budding entrepreneurs. The event will be interactive, with the audience very much involved in asking questions, and voting on their favourite showcase" (LSE web).

The Focus on Entrepreneurship event was initiated by two former LSE students who also created a non-profit Global network of entrepreneurs and professionals.

3.1.10.6. Web 2.0 - Employee commitment, Responsibility and Freedom of Speech

An interesting precedent was created when an LSE professor published a speech, which he had given to prospective LSE students in an open door session, on his personal blog (Guardian, 2006). The problem was that the scholar had raised the fact that at LSE the eminent scholars, who make up a good bit of the School's prestige and subsequent attractiveness, are not very interested in teaching students, in fact most classes are held by PhD students. And as if this critical insight, which the School's authorities of course understood to be disloyal slander, was not enough- the speech stood right next to an earlier blog post in which the professor was questioning why so few foreign academic staff at the LSE were promoted to senior positions.

This incident – the first of its kind – prompted the professor to ask for the creation of a blogging charter, which would guarantee freedom of speech. The director however replied publicly that: "The issue here is not a policy on blogging, it is whether a colleague can publicly abuse his employer and his colleagues without consequences." (Guardian, 2006). The instance has caused a vivid and controversial debate on the internet. To this researcher's knowledge, the LSE has not developed a blog or other new media charter.

3.1.11. Analysis and conclusion

Of the four universities investigated and portrayed in this research, the LSE has produced and continues to produce the most successful graduates. The list of 14 Nobel Laureates and 34 heads of state does not leave room for doubt that LSE is one of the top global players in the field of higher education. What are the forces that create this outstanding academic climate?

From the interviews and observations made, it is concluded that the following factors are particularly influential in creating the environment necessary:

There is a good balance between measuring and controlling performance, and leaving enough *Spielraum* (leeway) to think and decide for the individual to allow identification with the challenge. In fact the LSE's governance system is set up in a way that most strategic decisions are decided upon by consensus in a multi-stakeholder forum while the practical implementation of the strategy is left to the individual role. This results in a good equilibrium between planned (strategic) opportunity pursuit and ad hoc opportunistic action, because the organization and

the individual have a generally defined 'master plan.' It is expected that the individual identifies with the challenge and thus thinks and reflects about opportunities for new solutions. This might sound obvious, but it happens regularly that an organization passes responsibility without leaving room to think and decide about solutions autonomously.

Furthermore, the LSE has well developed sensors for change as well as opportunities - particularly in the national - political context because of its research is focused on the understanding of the political system. This immanent interest paired with LSE's direct impact on politics through the participation in expert committees and personal advice results in an organization that can consciously "decide to change" (LSE management 1), because it is experienced in and understands the long-term effects of political change.

Another substantial advantage of the LSE as an Anglo-Saxon university is that they have much greater liberty to decide on the salary of the professors. This makes the LSE attractive to researchers from countries where professors have to be paid according to national standards. Also because of this advantage, LSE manages to succeed in the constant search and recruitment of the best researchers in a given field. The top notch intellectuals not only attract many (paying foreign) students, but also serve as role models for the younger researchers, who can learn from them in an apprenticeship-like manner.

To summarize the points above, the LSE has an enabling organizational structure, which serves like scaffolding (*gestell*; (Ciborra & Hanseth, 1998; Heidegger, 1978, , 1994)) on which individuals can orient themselves in their personal intellectual development.

It is also clear, that once such a high level has been reached, a positive spiral effect occurs (Gates, Myhrvold, & Rinearson, 1996) – wherein the best institutions attract the best students. However, as Gates points out, nothing guarantees the continuation of the positive spiral but the constant initiation of new trends. Hence the question remains how does the LSE manage to stay at the top for over 110 years?

The IT governance structure has a reasonable division of labour amongst departments, except the existence of two separate research orientated teams.

In some cases the rapid technological development has led to historical legacies or portfolio distortions due to ad hoc opportunistic behaviour intending to expand the departments responsibilities or simply ad hoc service provision.

Regarding the integration of internet-based opportunities to improve knowledge practices, the School's Librarian and Director of IT Services correctly summarized that, given the School's focus on social science, it is not their mission to push technological innovation but to be attentive and implement beneficial solutions as soon as they are market ready. Based on this

claim, the transparent and holistic strategy formulation process as well as the user centred service provision is being evaluated as excellent.

Given the LSE's research strength and focus, one would expect to find an institution as strong and developed for e-research support as for e-learning.

While the strategy process in general is assessed as quite positive, the recent content shift towards "academic excellence" is believed to be less positive. In line with Birnbaum (1988, p.184) who states regarding the idea: "Although people agree on the goal, no one understands the full range of behaviors that would be required to implement it," hence, while it sounds like a good visionary goal, it is not deemed suitable as strategic objective, because it is too complex, and thus it is very difficult to measure adequately.

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Case-Study 2: Freie Universität Berlin

Academic Freedom, State Dependency and the Struggle for Excellence

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3.2.1. Overview

The Freie Universitat Berlin is a sizeable institution hosting 34000 students in almost all academic disciplines. It paradoxically continues to have a highly decentralized academic structure, while the administrative functions are increasingly centralized. Consequently, the entrepreneurial climate is heterogeneous, instable and very much based on individual initiatives and social-networks.

The FU was founded in 1948 under the initiative of entrepreneurial students who did not accept Russian ideological paternalism at Berlin University. They henceforth created a new university which embodied the ideals of western liberalism. The FU quickly developed due to efficient bootstrapping and international support, and became one of West-Germany's key educational institutions. By the time the '1960's Student Movements' hit West-Germany the FU already showed embryotic signs of a mass university. After the unrest of this first critical experiment, the traditional bureaucratic and committee based administrative/governance system's incapacity to deal with the complexity of the institution became readily apparent. The

institutional decline that started in the nineties was hence not only caused by the regress of state funding but also by intrinsic institutional malformation.

German re-unification and the subsequent renovation costs of the last two decades, have shrunk the FU to almost half the faculty and administrative personnel it had at its climax. In that sense one can say that the FU has been in a continuous organizational crisis, managing its diminution since 1992. As such, its agenda was dominated by controlling and executing measures in the "realm of exigency" (FU chancellor and management 35). Only very recently, as the political orders are fully implemented, has the institution witnessed new competitive inspiration through the occasion of a national excellence competition held between German universities. Building on its historically inter-disciplinary structured entities, it has succeeded at producing a mid-term vision for its development as a "lighthouse of science" in Germany.

From this perspective, it becomes clear that the FU has undergone a double 'perspective buckle' (*Perspectivenknick* (*FU faculty 38*) when looking at the development of the institutional mindset. An ironic transformation for the institution that it started as a 'lighthouse of capitalist liberalism' after the world war. The communal identity of what the university 'was' saw transformation during the 1960's student movements, which promoted a critical leftist idea of the university, stressing the institution's cathartic role of individual liberation and the platform from whence to level a critique of society. In recent years, the second renaissance of the FU's organizational self-understanding has taken place. Now the FU – lead by the strengthened steering core - strives towards excellence as defined by the external environment. Interestingly, this acceptance of an external set of objectives has mobilized entrepreneurial potential that is now being deployed in order to model the internal world of the university. To summarize, we witness an internal locus of control with an external teleology.

The long and continuing period of financial hardship has resulted in an administration that is much more efficient than before, but which has also a focus on control rather than giving access to opportunities. Organizational infrastructure has been organized to maximize structure over potential. While the preceding mindset stressed freedom and autonomy, (which caused a waste of resources because of exploitation of this freedom due to the vacuum of control), today's monetary crisis and the new institutional focus on control, has lead to an organization that does not give its stakeholders the *spielraum* to develop initiatives and truly cooperate. Furthermore, the concentration of power concentrated upon the president and the chancellor has led to cliquism and power politics.

As the university continues to struggle with the financial and political change, it begins to prepare itself to deal with the rapid change evidenced by new technologies. Internet based innovations are entering the FU through various channels but there is no institutional strategy in general nor with regards to IT fully exploit the potential. The theme of e-learning and to a

lesser degree e-research is occupied by an entrepreneurial institution (CeDiS), which has installed a very effective network of e-learning consultants within the departments. Nevertheless, the exploitation of internet based opportunities depends exclusively on the motivation of the individual faculty member.

3.2.2. History

The history of the FU can be divided in three epochs: (i) Its foundation and evolution towards one of the premier academic centres of post war Germany; (ii) the controversial years when the school became one of the centres of 68' student protests and the trajectory it took from this experience; (iii) and the recent epoch after the German reunification; an epoch of diminishing funds and continuous struggle¹. Today the end of the reduction seems to be finally in reach and a new vision is forming.

3.2.2.1. Foundation and growth

When WWII ended, there was only one sizeable university - the Berlin University - and after some internal institutional unrest, the Russians moved the university's administration into their sector. Not long after it reopened, some students opposed the explicitly communist influences and began agitating for free speech and scientific autonomy. Over the following months, the Soviets tightened their grip on their sector of the university and in 1948 three student activists were banned from re-matriculation. In the following weeks, the small interest group that had already formed around students began to intensify their lobbying for the foundation of a propaganda-free and politically-independent university in the western sectors. After weeks of fomenting, the American commander in chief officially approved such a foundation and on the 4th of December 19482 the Freie Universität (FU) was founded. In its first semester the FU accepted 2140 students (out of 5500 applicants) who were taught by 128 professors. The student body doubled in just one year (1949: 4, 946) but luckily many renowned professors returned from exile. The growth was continuously high and by 1960 a full-fledged university had emerged with 12,548 students enrolled. While Germany's post-war reconstruction (Wirtschaftswunder) enabled funding for most of the university, the FU would not have developed as it did without the generous donation of more than 100 million US dollars. The political situation in Berlin became more and more tense during the 1950's, escalating in the separation of West-Berlin from East-Berlin and the surrounding hinterland. For the FU, the

¹ Unless state differently the information in this section is drawn from (FU <u>APO archive web</u>, FU <u>Zukunft von Anfang an</u>, FU <u>Kleine Chronik</u>) as well as (Rabehl & Müller-Enbergs, 1988).

² Right in the very early days (Dez, 1948) the "Aussenkommission" (Commission for the external affairs) was founded and given the mandate to engage in close contact to foreign universities, and scientific institutions in West Germany and other nations. Mr. Hartwich – one of the founding students - develops this aspect very successfully from the FU's foundation till 1989. Today the FU has extensive international contacts and organizes an international summer university to allow students from around the world to encounter Germany and Berlin for an educational stay.

result was the increased politicization of its student body. Over the following years the atmosphere on the campus became more and more radicalized, anti-traditionalist, and vanguard.

3.2.2.2. Critical Student Protest and Massification

The generation of students that began to populate the FU in the 1960's was born during the last years of the war or just after, thus they were the first generation that was not involved with mature experience of the Nazi regime. Instead, they perceived their elders as conservative and concealing of their histories. Inspired and spurred by similar movements in France and the USA, an atmosphere of critical and existentialist philosophy developed. A significant group of left-wing students engaging in political activities and applying psychoanalysis meant to (a) bring transparency and overcome Nazi remains in the German society, and (b) to reform the traditional (in their view) 'imperialist' practices regarding the exploitation of the third world, the working class and women.

In 1966 the first German student sit-in occurred at the FU; 3000 students debated for eight hours over (university) politics. The movement pursued a holistic societal critique and the formation of a counter-culture, but education is recognized as a key aspect of this process. Defining and applying the "correct" educational practices to secure such an atmosphere was a hotly debated discussion. On the positive side, critical reviews of lectures were published by students, conversely, students boycotted lectures and lashed out against professors who allegedly nurtured nazi propensities.

For this research the most relevant outcome of the student movement was the creation of the 'Critical University' on the 1st of November of 1967. Based on the critical philosophy of the Frankfurt School³, the Critical University was a student driven initiative to create scientific working groups on such themes as "Imperialism and development problems", "sexuality and dominance", or "psychosomatic medicine". The students organized more than 70 seminars over a period of two semesters (AStA web), but the 'critical-university' was not sustainable⁴, probably (at least partially) because there was no assessment and certification process to add matriculated legitimacy.

Similarly the socio-political movement slowly ebbed away after its climax in 1967, when, after the assassination of a demonstrating FU student, the multitude of splinter parties agreed to unify their demands and coordinate their activities in the APO (Outer-Parliamentarian-

³ Named after the critical method advanced by the philosophical Frankfurt school (Foremost Horckheimer and Adorno (Welsch, 1998)). The philosophers Habermas and Marcuse (1967) (the latter not directly related to the Frankfurt School but very close) have had discourses at the FU in these years.

⁴ After the institutional changes conducted in 1969 FU president Mr. Kreibich continued as advocate for a new concept of the 'team university' (Gruppenuniversitaet), which incorporated several aspects of the critical university.

Opposition.) The rebellious students then either dropped out of university or re-assimilated into the fold. By the late 1970's the FU returned to 'practice as usual'.

The other significant development during this phase was the continuous growth of the institution. Attracted by the 'happening atmosphere' and special conditions⁵, as well as the increasingly good reputation of the FU, more and more students enrolled, leading to the massification of the educational experience. Enrolment rose from twelve thousand in 1960 to 50.298 in 1983. It continued to rise until the fall of the Berlin Wall with an enormous student body of 60 000⁶ and was for a time Germany's second biggest university.

3.2.2.3. Solidarity and Recess after the German Reunification

Caused by the costs of the reconstruction of East-Germany and the East-Berlin university – now Humboldt University – in particular, the FU was ordered to reduce its student base by 10,000 in 1992, and further cut-back orders followed incessantly. In these years a very high turnover of senators responsible for education (FU, 2001, p7) increased the university leadership's understanding that they had to fight for political autonomy for their political benchmarks. In 1993, all three Berlin universities setup a joint structural planning committee to negotiate and coordinate the reductions prescribed by the local government as a result of Berlin's state bankruptcy. These structure plans largely dictated the changes to the individual departments, partially guaranteeing a certain planning reliability for the university as a whole ⁷.

The aggravating monetary situation for the university led to several student protest movements⁸ but protests remained rather unproductive as few constructive solutions were proposed and the treasury was (and still is) factually empty.

After the scrutinizing the practices and contributions of each department and individual for over a decade, and having dealt with the rough diet prescribed by the politicians, the FU has successfully adapted to the new structural realities⁹.

In recent years the university has even regained some inspiration, especially through the Excellence Initiative of the German Research Foundation (see special section 3.2.10.5 in unique strange attractors)

⁵ Boys with residence in Berlin did not have to enter in the obligatory one year military service. This was particularly attractive to leftists and hence augmented this group.

⁶ Enrolment peaked shortly after the re-unification (1992) when many eastern Berlin students transferred to the FU. Following the re-unification, the FU had to take continuous cut backs and started to shrink, as outlined in the following section.

⁷ Before the political orders changed and worsened continuously.

⁸ Also the FU president authors several public letters criticizing and explaining the intricate situation of the FU.

⁹ In 2000 the FU creates, together with eight Berlin universities, a spin-off company for the marketing of e-learning (multimedia) products (web). In 2003 the FU receives the "entrepreneurial think tank" award of the business plan competition, because of the original and good performance of the participating students.

3.2.3. Setting & Typology

3.2.3.1. Members

The FU is a full-service university hosting 35.500 students of which 60 % are women, and 15% foreign students (FU web). As previously elaborated, the university had to reduce its faculty to 408 Professors, which resulted in a student-professor proportion of 87:1. The FU's administration is conducted by about 2,200 personnel. The Professors collaborate with about 1,150 professional scientists and scientific assistants, while the relation between social-sciences and the natural sciences is planned to become 2:1 (FU Chronik)

3.2.3.2. Location

At its foundation, the FU obtained many buildings from the old Friedrich-Wilhelms University and from the Max-Planck-Society in Dahlem, Berlin. Today, most of the FU's 74 institutes are situated in this relatively high-class residential area of Berlin. Due to the high degree of autonomy enjoyed by the individual departments, teaching and research space was added to the institutes in the form of annexing nearby buildings (many of them villas.) Therefore the FU has a legacy of a host of non-educational buildings, which is widespread across several city districts. The architectural disconnect is of certain interest. The mansions provide very comfortable and sociable spaces at very high maintenance costs. Given the university's financial stress, it is interested in selling these luxury homes and relocating the institutions into "proper" lecture and research centres. Dahlem however, was a hub for all West-German research institutions like the Max Planck Institute etc. and they still have subsidiaries next door. In consequence there are both positive and negative attributes to this legacy of non-academic spaces being used by the FU. Architecturally, a collegiate atmosphere and interconnectivity is encouraged, and proximity to nearby foundational institutes maintains an academic linearity, but high costs and budget -shortfalls may outweigh these otherwise positive trends.

3.2.3.3. Specialization

The FU offers instruction and research on all academic disciplines, while naturally, most professors and researchers work in highly specialized sub-fields. On an institutional level, the trans-disciplinary regional centres (for North-American, Eastern-Europe and Latin-America) have greatly contributed to the FU's good international standing since its foundation, and can be understood as representing a specialization. More recently, Collaborative Research Centres have emerged as foci for the different departments. However, as can be observed by reviewing the specialization of these centres or by looking at the list of Leibniz Prize winners from the FU, one hardly finds the same discipline twice.

Branches of study and the scientific output of scientific journals that are part of the ISI science indicator.

Field	% of production
Human Medicine, Dentistry, Veterinary Medicine	13,0 %
Mathematics, Natural Sciences	18,0 %
Law, Economic, Social Sciences	27,0 %
Language, Civilization Studies	37,0 %
Other	8,0 %

Table 3.2.1 - FU ISI Indicator

3.2.3.4. Business-Model

Like most Higher Education Institutions in Germany, the FU is a public university, which is not allowed to charge student fees¹⁰ and thus receives the grand majority of its budget from public funds. Fund allocation is based on statistical rules and there is very little influence the FU has on the amount it receives for teaching. The scenario is somehow different for research, where several funding agencies (especially the EU and the DFG 11) are offering grants on a competitive basis. The FU administration is successfully raising awareness, training and generally foster the practice of pro-active funds acquisition by professors and scientists. Additionally a small office for patent and intellectual property rights utilization is working to spread the word and support researchers in optimizing their research findings. In some cases the FU has also acted as investor in spin-offs created by university members 12.

The electronic Administration and Services (eAS) department deserves special mention in this section; even though it does not bring in resources, it has the mandate to ensure the efficient use of the funds received through the introduction of an internet based, process-driven architecture with embedded controlling functionality.

3.2.3.5. Finance

In 2004 the FU was allocated 291 million Euros by the state and raised an additional 55 million through third parties. Over the last 15 years the FU had to manage a budget cut back of state funding at about 50% (FU Chancellor 67). This caused complications within the institution because German Employment Laws make it almost impossible to lay off staff. Therefore the accounts are being stretched on all fronts and new investments (like the new library building) have to be organized through finance deals negotiated with donors in an entrepreneurial spirit. As a result FU departments have been under constant watch by the central administration

¹⁰ Students pay a low subscription which contributes less than 15% of the budget. This condition is in the process of being changed and some counties are beginning to raise student fees.

¹¹ German Research Foundation

¹² Being a public institution it is however only legally allowed to do so in case the university can not offer this service and even more restricting the university can not use this instrument with the objective to make profit. It is as such an instrument for social or knowledge entrepreneurship.

(which needed to supervise a fair distribution of the scarce funds.) On the other hand, researchers have learned the hard way to get a hold of third party funding (FU web). The FU has repeatedly reached top positions for third party research funding.

From the administrative side, their occurred a standardization and digitization of processes as well as the introduction of a cost-benefit based resource management that encouraged more precise central controlling functions. By giving the individual departments higher autonomy regarding the distribution of budgets (budget responsibility (FU, 2001)), these trends have been assessed as a major step forward (FU management 68) towards the overall goals of university competitiveness (FU, 2001).

This performance based resource allocation model has been introduced gradually since 1992 and has evolved to distribute 40% of the funds through either indicator ¹³ or negotiated performance based distribution keys.

It is difficult to assess the financial dimension of the spending on IT infrastructure because the IT functions do not have a single joint budgeting and reporting committee. The main IT infrastructure provider ZEDAT has a capacity of about 40 full time employees (FTE), plus 600 hours of student assistant jobs per month (FU web). CeDiS the centre specialized on elearning employs the equivalent of 35 full time people 14. Its entrepreneurial style is reflected by the fact that one third of the staff is financed through FU external funds.

3.2.4. IT Setting

3.2.4.1. History & Approach

Because of its decentralized governance structure, the Natural Sciences and the Computer Science department were the first to procure computers. Other departments followed suit, contingent upon need in the acquisition of computers. Thus, there was a long tradition in the FU to leave IT matters to their separate departments without a comprehensive university overseer.

Given the lack of top-down organization, it comes as little surprise, that two chemistry students pioneered the FU's connection to the internet, and in 1989 the domain fu-berlin.de was registered. However, it took until 1990 to connect the FU to the science web WiN; again, web development was left to individualistic ambitions, until 1997 when a central web-team was formed by the central IT department (ZEDAT) and the library. A new web-server and site were developed on behalf of the president.

¹³ Indicators are third party grants, publications, dissertations, habilitacions, student degrees, and students (FU, 2001) p.13)

¹⁴ This figure represents the employment in May 2007. This is important as most of the positions at CeDiS are temporarily limited project based posts.

Nevertheless, even today some natural science departments prefer to run their own servers and services.

Despite the idiosyncrasies of the university, today there are basically three specialized IT institutions. The first is the 1970 (FU web) founded ZEDAT (Central IT Service Department), which is in theory¹⁵ responsible for all hardware and basic services (like email). The CeDiS (Center for Digital Systems) is, as can be seen by observing its staff and budget growth rate, a very dynamic institution specialized on e-learning and multi-media production. The library runs quite a substantial part of its services on their own IT infrastructure. The eAS (electronic Administration and Services) department has been setup recently with the mandate to introduce a higher education resource planning system. And last but not least there is the university's web-team. Also a quite recent creation, the web-team is responsible for the application of the corporate design to the website and facilitate the transfer (or creation) of web content of all administrative departments to the content management system.

In order to coordinate this swarm of specialized institutions, and to conciliate between them, a Chief Information Officer (CIO) institution has been setup. The CIO Panel as it is named, consists of the chief administrator (chancellor), one vice-rector, and one IT professional. They meet every quarter to work through and decide on issues put on the agenda by a CIO secretary¹⁶.

With regards to internet based innovation appropriation, the fragmented IT functions each have their own individual practice. The ZEDAT is responsible for the basic setup of most machines and as such prepares the ground for potential opportunities to be optimized. The library provides systems for research practices and most notably the CeDiS is scouting and introducing innovative teaching & learning, as well as research practices 17.

3.2.5. Condition

3.2.5.1. Leadership

The current FU President - Prof. Dr. Lenzen - is perceived as someone who knows what he wants, as visionary and a as having a good feel for the press and politicians (FU management and administration 36). Lenzen, who taught at the FU since 1978 before becoming its vicepresident (1999-2003) and then president in 2003, is known as a performance oriented and

¹⁵ In practice there are a host of exceptions where institutions prefer to use their own solutions.

¹⁶ This position had not been staffed during the case study.

¹⁷ The web-team understands itself as responsible for content and thus follows the mandate to introduce an effective practice of creating and updating FU's organizational content. eAS is introducing administrative innovations which are not the focus of this research.

authoritarian leader, to the extent that some call it a presidential dictatorship (FU administration 19, in reference to: Kühne, 2006).

This is for example mirrored when observing the preparation for the Excellence Initiative. A "Special Squad" (Kühne, 2006) of confidants had been setup and is working extensive additional hours. The development is top-secret ("*Reichs-Geheimsache*" – FU management 28) and even the selected community that participates in the regular Monday breakfasts (FU management 27, Kühne, 2006), are restricted to a need to know basis. With Lenzen, the anti-authoritarian culture of debate has ceased to exist, and more traditional, 'effective' leadership has become the norm.

The president has a rather strategic and political focus, representing and lobbying for the university. Internally, the chief administrator (Chancellor) is the highest authority in charge of daily business. Both men are perceived as authoritarian leaders of change in their realms (FU multiple 23) and even though the institution has a bureaucratic committee architecture, they have – based on their extensive experience within the system - established effective ways to pursue their respective agendas. The relationship between the two has been described as good, pragmatic and utilitarian (FU Chancellor 24, FU management 25). The Chancellor himself described the collaboration as complementary; the president sets the vision and the chancellor implements the course and conducts the daily fire fighting (FU Chancellor 37).

While traditionally the Praesidium (the central administration close to the President) was a typical public administration institution, in recent years there is a more competitive and dynamic atmosphere. This has been attributed to the fact that the leadership of the FU has become more pro-active in lobbying and managing for greater efficiency. Even though the trickle down effects are slow in this environment, glacially- but surely, the winds of change are reaching all parts of the administration (FU administration 32).

3.2.5.2. Governance

In Germany, public universities have a 'normalized' ¹⁸ governance structure with an Academic Senate and a Council as central bodies and departmental boards with sovereignty in regards to academic matters as well as rather extensive autonomy in most practical matters.

Nevertheless, the FU has had a bustling and controversial governance history. As elaborated in the history section, the FU was created as an explicitly autonomous (free) university and because of the important role students played in its creation, they also had a decisive role in its governance structure from its very birth. For a relatively long period from 1969 till 1978, the

¹⁸ In fact legally defined through HEI law (Hochschulgesetz).

faculty even lost the absolute majority in the main committees (FU web). This change is part of the first significant institutional reform¹⁹ which took place in the 'revolutionary' phase in 1969.

In 1998 the FU opted – after debate in the academic's senate and through a decision in the council - to participate in a trial regulation program that is intended "to test new models of leadership, organization and financing, with the goal of simplifying the decision making efficiency, especially with regards to the acquisition of self-generated incomes" (BerlHG, 2003, § 7a).

The new governance structure gave clearer framed responsibilities to the vice-presidents and most notably eliminated the council, which was formerly the highest board, with its key functions being overtaken by an extended academic senate. Additionally the board of trustees witnessed a new personnel composition; now comprised of the senator for education, five independent eminent personalities, as well as four members of the FU, one from each stakeholder group²⁰. The new structure is meant to detach the board of trustees from daily business and cause it to engage in fundamental questions of strategy (FU, 2001, p. 12). Next, from this institutional change several committees have ceased to exist and responsibilities have been transferred to the presidency with the goal of enhancing the universities capacity to act (*Handlungsfaehigkeit*). The new model is still legally a trial, but has been positively assessed by an external expert group and is transferred more and more into official regulatory/law.

Accordingly, the leading political and practical role played by the students during the FU's foundation was to organise themselves even before the official foundation and pass their statutes with their own autonomous voice. The statue provides for the institutionalization of students politics in the student convent (today student parliament) and the general student committee (AStA) as executive branch. Even though political interest and participation from students has slowed in recent years, there is still a rather well functioning and fertile practice ground for student self-representation at the FU.

3.2.5.3. Culture

Polycentric

Since its formation from an initiative organized by some student activists and professors from various disciplines, the FU has always granted substantial autonomy to its academic departments. Today, the FU consists out 71 academic institutions, which deal with matters from languages to engineering. Although there is considerable institutionalized overlap in the

¹⁹ Also the administrative staff becomes more influence, and the election of the president and the administration of the departments is reorganized.

²⁰ Students, professors, scientists, and other staff.

case of the regional centres, etc. the problems which arose in veterinary education and mathematics seemed to be so different that the academics did not readily ask for the pooling of services. Nor was such collusion perceived as necessary as West-Germany was going through a phase of unprecedented economic growth (*Wirtschaftswunder*) and so resources were readily available. As described in the section about its location, the polycentricism of the FU is also visible through the dispersed housing arrangements²¹.

Open Minded

Born out of the reaction to the intolerant and legalistic practices introduced by the Unter den Linden University, the FU has from its inception been a place for free- thinking and internationally focused interests. The latter has been manifested in the regional studies institutions, which naturally gave the FU direct academic links to universities and peers in these regions. The FU-Berlin European Studies (FU-Best) program is a good example of how the FU is prepared to cater to international students.

Open mindedness became one, if not the most apparent characteristic during the alternative cultural movement, known as 68. FU was one of the centres of student protest and Habermas²² and especially Marcuse (1967) presented his conceptualization of a "Critical University" – meant to educate students for participation in politics and society – in a speech held in the FU. The open mindedness is of course also related to the wide array of disciplines that have to co-exist and collaborate in the FU.

Manic-depressive

Caused by more than fifteen years of constant budget and personnel cuts, many of the employees have entered into a manic-depressive mood (FU chancellor 33). Older faculty and administrators are especially sceptical of the many organizational changes, and are rather passively complying with what they are asked to do. Some of the interviewees have assessed this group to be as large as one third of FU staff (FU management multiple 39). This negative state is fostered by the leaderships mandated approach of "participation, but no codetermination" (FU Chancellor 42) when it comes to strategic decision- making.

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Despite the grumbling pessimists, it has to be documented that the university gives its employees relatively high levels of freedom. Within any hierarchical organization, there are always individual knowledge entrepreneurs, who are motivated to find and realize opportunities,

²¹ It is important to underline that because of the polycentric culture, all observations about the FU's cumulative condition can only be understood as snapshot descriptions of the 'singular instances' that were recorded during the field-work. Nevertheless the author believes that, given the researchers embeddedness in the practice and culture, a realistic snapshot of the overall climate is portrayed.

²² Jürgen Habermas: "Rede über die politische Rolle der Studentenschaft in der Bundesrepublik",

and produce very good results for example in the area of internet based innovations (elearning: Dr. Apostolopoulos, spin-offs: Prof. Schiller, and research: Prof. Perchelt)

3.2.5.4. Organizational Learning

There is currently no university wide management or organizational learning program with the goal of codifying knowledge and competencies as they are implemented at the FU. As in the LSE, most organizational learning happens between befriended or otherwise connected colleagues and within the personal websites of the professors (and administrative staff) that are available. Access to an in house 'yellow pages' does serve as a key resource to locating in-house knowledge. Also similar to the LSE but less developed, is a press contact service that facilitates contact between FU professors and the media.

Individual departments have naturally developed communities of peers inside and outside the FU.

3.2.6. Knowledge Entrepreneurship

3.2.6.1. Environmental Awareness

Most FU stakeholders interviewed were quoted to be using conferences and other professional gatherings as their main tool for identifying trends and engaging in 'casual benchmarking' with their colleagues and peer institutions.

While the administrative stakeholders showed a relatively high interest and awareness of their university's position (FU chancellor and management 47) - mostly motivated by the Excellence Initiative (see below) –, the faculty (FU multiple faculty 48) naturally was much less challenged by institutional comparisons and excellence. Stressing instead the pursuit of their own academic interests and awareness of scientific developments.

Regarding internet based innovations, a typical diffusion scheme, as described by Rogers (1983), can be observed. Depending on personal preferences, administrative staff and other faculty learn about innovations and appropriate them as per necessary for their personal use or sphere of responsibility.

3.2.6.2. Entrepreneuring (Strategy & Vision)

For this token an exceptionally homogeneous perception is to be reported. Both administration and faculty expressed a forward looking and stratifying view – mostly caused by the frenzy of the Excellence Initiative (see below). It was felt that after many years of cut-backs, that finally

the recession was over, and that it was acceptable to openly envision positive future developments²³.

With regards to internet based innovations, the specialized institutions within the FU each follow their individual agendas. While all of them have expert knowledge about innovations in their respective fields, it is the CeDiS who most actively identifies, assesses, and acts upon trends. The library and eAS follow the strategy of influencing the development of the software suite by participating in the client community of practice (lobbying for their interests there.) ZEDAT on the other hand, has the most structured and standardized business planning processes.

3.2.6.3. New Project Support

The FU has operated for the last 15 years in a state of constant budgetary emergency. In this condition – the realm of exigency (FU chancellor and management 62) – there was no room for experiments that entailed a financial risk. Individual faculty can experiment and set their teaching and research agenda with academic freedom, but institutional support is nothing they should expect (FU faculty 33). Instead, they are expected to find the money elsewhere and (at least overall) they are not doing badly at funding their own research (see figure 3.2.1)



Figure 3.2.1 - Third party financing by professors

Generally all initiatives with a monetary or administrative aspect have to be lobbied for (providing a business case like argument) with the decision resting ultimately upon the Chancellor.

²³ Most professors interviewed, and especially the computer science faculty, did not really connect their vision to the FU's future in general, but rather expressed a motivation and entrepreneuring based on their research.

With the (natural) exception of the Computer Science Department, the central services are rather hygienic (sealed tightly) when it comes to the experimentation of users with new IT services²⁴.

3.2.6.4. Risk Tolerance

Again, the FU did not- and does not- have resources for experimentation. Thus change happened in a very improvised and bricolaged evolution. In contrast, in the spring of 2006 – as the preparations for the Excellence Initiative were in full swing – stakeholders reported that they had to now reconstruct the ship on the open sea (FU administration 41.) Under such shaky terms, the institution was very risk aware (FU management and administration 46) as it was the widely understood that the FU would either be selected amongst the elite universities or that it would have to endure yet another painful shrinking phase (FU administration 55).

In the IT sector very little risk is assumed as there are enough basic (widely tested) services on the to-do-list (ZEDAT). The internal financial budget is still tight, as are exclusive innovations without a financial dimension (library, web-team) or third party funded projects (CeDiS).

3.2.6.5. Communication

Communication and public relations in particular have been expressed to be an open flank of the FU²⁵ (FU administration 56). Insiders praise the direct access to colleagues (FU chancellor, multiple management, and administration 61), and have expressed a preference for spoken agreements, but communication is based on personal and social networks. There is no developed culture of transparently for publishing planning or results (there is virtually no central intranet). One rational explanation is that informal practices and agreements are far more effective than to follow through with the official and laborious bureaucratic machinery (FU chancellor 65).

The individualistic (knowledge entrepreneurial) tendency of faculty was most markedly expressed by Philosophy Prof. Wolf, who stated, when asked about departmental collaboration: "Every philosopher is his world" (FU faculty 66).

protests up to the occupation of the main administrative building.

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²⁴ The firewall is set to block all unknown services and it is generally difficult for the users to install and run software that is not authenticated by the ZEDAT or other relevant in-house responsible.

²⁵ The FU has a particularly difficult stand with regards to the implementation of the Bologna process because of the traditionally well developed left wing student association structures, which oppose the 'streamlining' of programs. Another cause of offence is the discourse about the introduction of student fees, which has resulted in long student

3.2.7. Internet Use

3.2.7.1. e-learning

Tools Integration (Technology)

In line with the FU's decentralist traditions, individual departments started to experiment with elearning on their own. In 1990 the FU started to publish the central lectures catalogue online, and allowed for linking of the online course materials on individual websites. To various degrees, faculty made use of the internet and published and maintained their own websites depending on personal interest.

The scenario began to change in 1994 when an entrepreneurial employee (Dr. Apostolopoulus) began to develop the e-learning services of the economics department. He assessed e-learning to be a growth sector and one which might provide splendid opportunities. In the late nineties the e-learning team was transferred to the central administration which became the institutional predecessor of the CeDiS. In 2002 CeDiS became the official e-learning and multi-media competence centre.

After a normal procurement procedure²⁶, the FU has opted to invest in the e-learning suite of the market leader and the solution is being spread across most departments. To introduce the new opportunities, CeDiS has made the strategic choice (and has secured the funding) to embed 'e-learning consultants' directly in the departments. These consultants have the assignment to raise awareness, find appropriate applications for faculty to benefit from the platform (and CeDiS services in general) and work as facilitator of content production (FU administration 58). This approach is reported to be very successful, especially because the consultants are able to develop close relationships with their clients and are not perceived as 'change enforcers' but rather as helpers to explain and facilitate new practices.

With impulses of the e-learning consultants, who spur and support faculty ambitions, 199 elearning projects²⁷ (see Figure) emerged under the auspice of CeDiS (FU web).

In accordance with the entrepreneurial spirit spear headed by CeDiS' director, many e-learning projects have either partial or complete external funding²⁸ (FU administration 50, FU web). For the purpose of developing competence and fostering the application of e-learning the FU has setup a special steering committee which decides on and finances the individual projects.

²⁶ The official version is an objective evaluation and bidding process (FU 69), while the un-official version tells that leadership had set clear preferences and the results were accordingly (FU 70).

²⁷ The following data regarding the CeDiS is from May 2007

²⁸ Mostly as part of one considerable big grant from the German Education and Research Ministry (FUeL) to foster elearning at the FU.

From 2003 to 2006 more than 1,8 Million Euro have been invested and for the yea 2007 to 2009/2010 a yearly budget of 420'000 Euro has been allocated. The e-learning steering committee is also responsible for FU's overall strategy.

These practices are thoroughly embedded in an understanding of the CeDiS as service department (pricing all output) rather than an academic institution. The authoritative lead-entrepreneur business style of CeDiS does repel academics from the computer science department, who generally report being un-integrated in university IT decisions (FU faculty 53).

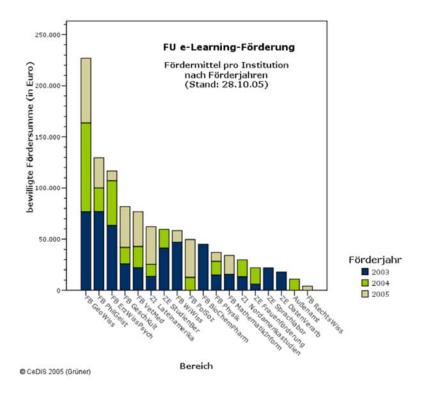


Figure 3.2.2 - FU e-learning Funding

Current Practices (Use Cases)

There is a special e-learning programme setup for FU freshmen, which consists of a selection of info-material about the administrative and communal services, about the process and procedures during the careers, as well as some tutorials for the FU's e-learning platform and its functionalities. The "Working Group Market" (WGM) deserves special mention, because it provides an internet based knowledge opportunity to FU students. The WGM is an easy to use bulletin board, where students can post and search for peers who are studying the same subjects and are interested in creating a learning community. Usage is assessed to be only medium, but has potential to increase with the growing utilization of e-learning.

In the 'normal' educational practice some courses (especially in the new master programs) have up to 35% of the learning and assessment done through the e-learning suite (FU administration 44).

Biased-expectations regarding discipline characteristic usage patterns have not been fulfilled (See Figure 2). Very interesting is the very high percentage of social science courses (especially the Regional Institutes) using the e-learning platform. This result suggests that the natural sciences (except geography) like the computer sciences are still running independent solutions.

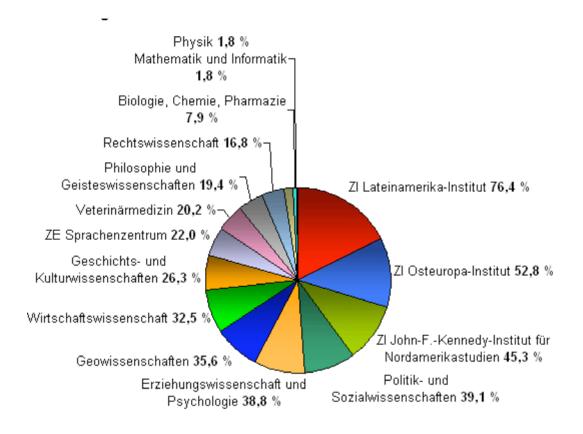


Figure 3.1.3 - % of all FU courses using the e-learning platform (web)

While all disciplines report to use the internet as an indispensable tool, philosophers in particular feel a revolution in basic email communication. They are also encouraged by the subsequent possibilities to tele-collaborate on a text and by thusly making their own works widely available (FU faculty 29.) Economics professors are making more extended use of the possibilities to structure courses, to provide reading lists and in some cases to have tests (FU faculty 30); and as described above, the computer sciences had already experimented with elearning and have decided not to use the central platform. Instead, as within IT the study of hard- and software is their principal learning and research interest, the IT department

experiment with various tailor-made solutions, many times on an individual basis (FU faculty 31).

From the many projects CeDiS implements in addition to the general e-learning platform the "Statistic Laboratory" (SL) is also mentioned, because it provides a highly successful innovative knowledge assessment practice. The SL is one of the first initiatives (1995) CeDiS got engaged in and was developed in a succession of several projects. It aims at developing a holistic e-learning software for statistics education and now a functioning suite has been provided including the provision for a computer based final exam (FU web).

3.2.7.2. e-research

Tools Integration (Technology)

There is, besides the library's online database services, an individually founded central institution to promote and develop a specialized e-research service, but the theme has generally not hit a chord within the university. As is typical in appropriation of an innovation, it starts with individual knowledge entrepreneurship. One example is the work of at an individual employee at the CeDiS, who has developed extensive expertise in the area of qualitative social science research methodology, and has developed a number of highly networked (online) discourse communities²⁹. She has also identified and realizes the institutional epublishing and Open Access initiative. Today the field of e-publishing and Open Access, which has the mandate also to 'give online support to research teams' (FU web) is worked on by four CeDiS employees. The group is promoting internal spread of digital institutional publishing solutions on the one hand but also has a well networked approach aggregating relevance and impact of the repositories by cooperating with other national and international actors. For the future institutionalized and defined support services for FU researchers in the area of virtual research community management and e-publishing are planned. Interesting is also the typical CeDiS 'support service' approach to offer to 'support all kinds of projects in this area', thereby also ensuring at least partial ownership.

The team leader who had developed these activities mostly autonomous, and by building alliances, has now been integrated in CeDiS' institutional structure. She reports to have achieved extended leverage but notes having had to struggle to find her place in CeDiS streamlined hierarchic team structure.

Another example is the Argunet project (www.argunet.org) an online platform for logical and visual reconstruction of complex philosophical debates and argumentations. A hybrid between pioneer e-learning and e-research, Argunet is a collaboration of several FU philosophers (one of them with a computer science background) and occurs, (as most initiatives of this kind) under the e-learning support program of the CeDiS.

²⁹ Mailing lists and an Open Access journal on qualitative research methodology.

Current Practices (Use Cases)

Individual academics are using online services according to their personal preference and diffusion is assumed to follow the exposure to change agents (such as the e-learning consultants).

In the computer sciences one extensive use case of wikis has been found. One professor, who had an academic curiosity for IT based collaboration systems, had introduced the wiki technology in his individual sphere. The IT professors have cultivated a very collegial atmosphere (FU multiple faculty) and the professor became known as the in-house resource on the subject, reporting on the condition and progress of the wiki usage on an informal basis. He reports that wikis have been integrated in the department's portfolio wherever their (well understood) functionality is beneficiary (FU faculty 49).

3.2.7.3. Website & Intranet

Tools Integration (Technology)

In 1998 the content and design underwent a complete overhaul managed by the then newly created web-team (FU, 2001). Recently, a content management system has been acquired and a new corporate design was produced by CeDiS' Media + Design team in close collaboration with the Praesidium. The first step was to put a replication of the existing content into the system.

One interesting feature, a chat for student consultations and counselling, has been added recently. The chat is perceived quite positively and adds to the highly functioning hotline and email counselling (Dowe, 2001).

Current Practices (Use Cases)

The new content management system is being introduced gradually with the central services being dealt with first. It is planned to then progress entity by entity from the decentralized services to the various academic departments. No written strategy or process architecture has been identified for the content side for which the press department is responsible. CeDiS is responsible for the technical as well as the procedural introduction and hosting of the system, as well as for all internal trainings. As for e-learning a high level steering committee has been formed and decides on the CMS strategy and project funding.

Overall leadership regarding the integration of services and a holistic strategy for an online portal are missing due to the mostly non-expert CIO committee, which additionally suffers under the time and attention constrains of its constituents.

Once again, all IT related institutions (eAS, CeDiS, ZEDAT, the web-team and the library) are hedging their interests, with CeDiS and eAS as the dynamic and entrepreneuring shapers and ZEDAT and the library as the historic stakeholders carrying on a complex legacy of functions and personal structure³⁰.

3.2.7.4. User Perception of IT Services

According to critical students (FU <u>student web-blog</u>) the FU is pushing many IT innovations. The administrative resource management especially is seen as a means to create processes/practices where the IT system has total control of the practices rather than the professors. Conversely, these are initiatives that are valued by the students. One comment on a user survey conducted by CeDiS before engaging in the development of a social networking platform is telling of the ambivalent if sometimes positive nature of these developments: "...within some years these web-based platforms will be compulsive for any modern university and it makes me kind of proud that mine is already starting it." (Praus, 2006)

User perception of the academic IT services is as varied as the offerings of the departments. In the German HEI rankings 2006 undertaken by CHE (2006), the FU finds itself in the middle group regarding student perception of PC provision and e-learning (authors calculations based on CHE dataset).

3.2.8. FU Position (Institutional Results)

Economic Autonomy

Compared to other HEI in the German education system the FU has managed to acquire one of the highest external funding of €55 Mio, which is 15,8 % of the overall budget. Per professorship, this sum seems to be fluctuating around 100,000 Euro per year (FU web). Such possibilities for individual entrepreneurial initiatives result in a degree of financial autonomy from the state, and are politically craved, having already been implemented in co-operations with BMW, Schering, Siemens, Deutsche Telekom and Pfizer (FU web), although ultimately, they are the exception.

Website

After the relaunch of the website in 2000, the FU began to receive many positive reviews (FU, 2001, p. 94; (Lederbogen & Trebbe, 2001)) and even reached the first place in a comparison of the websites of all 17 Berlin based higher education institutions (Dowe, 2001) In the International University Website Ranking the FU reaches the first place for German universities and the 82nd internationally, also the 4icu³¹ platform ranking of website popularity placed it third.

 $^{^{30}\!\}text{The}$ web-team's mandate is understood to be solely non-technical content management.

³¹ As of 15.Feb.2007, the

On the site, contact information is available on a relatively general level for administrative services and almost all Professors do have a personal website.

3.2.8.1. Teaching and Learning

In general a positive trend for the FU can be observed looking at the assessment conducted by CHE (2006). However, in the sampling for this research the Economics and Business education departments received rather mediocre to negative reviews as did the History and Psychology departments. Oddly, the results for the Pharmacy and Chemistry depts. were surprisingly unfavourable. In the sampling undertaken, only the Computer Sciences have managed to rise in the evaluation in three out of the five indicators. It is now part of the top bracket (of leading universities) for: the study situation (elaborate what study situation means?), the student care/consultation, and for IT infrastructure. It holds a middle position regarding reputation with professors and research funding.

The FU's endeavours in regards to e-learning have been recognized with an overall approval by students, who rate the offering with 2,4 (on a 1 to 6 scale³²).

3.2.8.2. Research Results

As would be expected the FU's researchers are publishing in as much as 14 different categories³³, and have published a sum of more than 16 000 papers. More than 97% of the publications are coming from the non social sciences, with 22% coming out of clinical medicine, 14% in chemistry, and 8% in biology. Overall FU papers have a respectable 11,62 citations per paper³⁴. In the global list of ISI listed institutions the FU reaches the 173 place. On a national level it was rated 9th best research institution (out of 46). Even though that is not as good as in the last ranking, it was able to participate in 14 of the 17 examined disciplines and was assessed to have a strong research capacity in 6 of those. In chemistry research the FU is one of the finest in Germany and it performed best in the securing of external funding among all German universities. FU's potential is also underlined through its top ranking for dissertations per professor (CHE and FU web).

The FU's relatively good standing in regards to research is also reflected in the 12th place ranking that analyzed the choice of 4,713 top-flight researchers, who spent time at German universities between 1998 and 2002 (vHumbold, 2003).

³² Authors calculations based on CHE 2006 dataset of sampled departments in the last years.

³³ Of the ISI Essential Science Indicators

³⁴ These ISI figures have to be understood to be a very "science biased" indicators for the simple differences that exist in the different disciplines. (E.g. in humanities academics are more likely to publish monographs.)

3.2.9. Rival Explanations

3.2.9.1. National Context

Germany, which is Europe's biggest economy, is experiencing a very low-growth economic development at around 1%. This, combined with the increased costs for pensions and the transfers to rebuild the East-German counties, has caused a general trend for de-constructing the once famous welfare state, including the state funding for universities. Germany's politicians have embarked on the controversial quest to introduce university student fees, and in general- politicians are quite determined to lower costs and de-bureaucratize the continuously inflating civil servant apparatus.

The German Research Foundation's (DFG) "Excellence Initiative" most definitely elicited a striking influence on the FU's self-assessment and the spirit within the university (see below). This national initiative is the first of its kind and can be seen as an act of political entrepreneurship from the ministry of education, which intends to play more decisive role in the allocation of funds³⁵.

Overall, when seen against the national context, FU is evaluated as being too bureaucratic and inflexible and thus is seen as unfavourable. The FU is a good example of an institution of the German educational system, which is assessed (by FU President Lenzen) to have undergone a process of bureaucratization and overregulation resulting in excessive governmental intervention and legal obligations (Lenzen, 2003).

3.2.9.2. Local & Regional Context

Berlin is - due to the immense costs of renovating the eastern part, coupled with scandalous mismanagement - one of the poorest German cities. On the other hand it has – due to its history – enormous space in the eastern parts of the city (and its surroundings). This keeps rents down (just 75-287 €/month³⁶) and results in the fact that living costs are among the cheapest in Germany. As in London, Berlin hosts the national government and most ministries, which does not have a strong influence on the FU because of its more generalist profile³⁷. Also German media is much less centralized when compared to London, following instead the federalist polycentric setting. Despite its problems, Berlin, having revitalized its position in the realms of power and economics, exhibits a very vibrant and magnetic atmosphere- thus attracting entrepreneurial personalities.

³⁵ Traditionally education has always been a sector, which was very much in the hands of the counties.

³⁶ Including extras - DAAD – almost 50% live in individual private flats.

³⁷ In fact Berlin's role as a western outpost did have a much greater influence on the development of the political sciences department at the FU, which became one of the biggest and most important ones in Germany.

When considering Berlin's influence on the FU's condition, its formative influence cannot be overstated, (as has been pointed out in the history as well as in the section on the Humboldt University as a unique strange attractor (below)).

3.2.10. Unique Strange Attractors

The culture of academic freedom and polycentricism makes the university a breeding ground for "unique strange attractors" (see Chapter 1 Annex A for definition). Therefore, unique instances are described within the relevant section and factors influencing the general condition/climate of the FU are listed herein.

3.2.10.1. Tutoring Communities

A unique educational practice in Germany the Tutorial Model was initiated and successfully piloted at the FU³⁸ in 1951. Following the critical stance towards system politics, the students at the FU were eager to ensure autonomy from propaganda and the authoritarian 'scientific control apparatus' (Adorno, 1964), hence they developed and proposed a community based tutoring practice in which senior students coached the younger ones. The original goal was not exclusively the transfusion of specialized knowledge but encouraged instead competencies like active learning, collaboration, as well as the "fomentation of independent, critical thinking through scientific work" (Büchner, Hansmann, Lecher, & Stumpögger, 1986). The membership to the Tutorial Groups was limited to 10 and the idea was to foster communities that stayed together throughout their studies. As such, the model was meant to supersede the traditional German fraternities, which had participated with the nationalistic agitation. The tutor model was officially formulated in 1962 by the student association and then ratified by the scientific council in 1969.

According to Büchner et. al. (ibid) the tutor model was an educational and institutional success and has subsequently been adopted by other universities in West-Germany. However, nowhere did the tutors manage to install themselves so well as in the FU, where they setup a special workers council for themselves. This report is disputed by reviews of the FU AStA (web) which cites hostile lobbying by traditionalists, who launched public media campaigns against the tutorials, so that the model could never really flower. Whatever the exact conditions, with the rapid growth of the FU³⁹ in the sixties, the innovative pedagogy of the tutorials were increasingly absorbed by the massification of university education. Since the 1970 tutorials became "the most effective and cheapest way to guarantee education for all" (ibid)

³⁸ The initiative for the interests of student workers mentions that the idea was facilitated by the American administrators involved in the foundation of the FU (Tarifini, 2006).

³⁹ And the universities in general

3.2.10.2. Heinzelmaenchen

The FU facilitates the financial independence of its students through the Heinzelmaennchen institution since 1949. Heinzelmaenchen is a student job broker, matching local enterprises and private households' demands for short term jobs to students. With fluctuation, the Heinzelmaenchen provide jobs for between 20% of the students in the early years, to up to 50% after the construction of the Berlin wall and back to 40% and less in the last years. While the job market in Berlin has become tougher after the reunification there are still 15,000 jobs for students procured (2002) and for many of the students, these jobs are their only source of income (FU web).

The success of the Heinzelmaennchen is a good illustration of the 'status' or the 'way of life' of German university students. Most students earn money in part time jobs, and most live in their own, or shared flat (especially in Berlin). This allows the students to learn to 'stand on their own two feet' and subsequently develop an internal locus of control.

3.2.10.3. Crisis as Catharsis

The FU has been in an organizational recession caused by the regression of the German state in general and the local Berlin government in particular. Next to the general trend of deconstructing the welfare state, Berlin felt particular financial hardship by the reunification of the divided city. As universities situated in the former west suffered additional financial challenges as the universities of the former east and (especially Humboldt University) needed immense funds for renovation whilst providing little beyond duplicative educational capacities. What is worse, Berlin was thrown into a full-blown budgetary crisis when misspending (speculation) and embezzlement emptied the city's treasury and caused high instability. The restless political fluctuations caused the fourfold replacement of the senator for Culture and Education in the years between 1998 - 2001 (FU, 2001). Hence it is assessed that the FU was in a constant state of crisis since the early 1990's This crisis caused a manic-depression amongst a large part of its staff, but it was also expedient and used productively by deflating the bureaucratic apparatus (through the new governance structure) and boosting efficiency e.g. through the reallocation of mansion based mini-departments in more cost-effective offices. Furthermore, the crisis made the FU attend to its institutional raison d'ètre in depth and put them ahead of other institutions in dealing with the shrinking of their funding base. FU faculty was already accustomed to a reality without much state support and the leadership is (at least recently) pushing hard to put an (neo⁴⁰-) liberal educational vision in action (Lenzen, 2003). It is the very crisis that serves the FU as a catharsis (Ciborra, 2002), clearing the organizational culture of the tendency to 'do things because they have always been that way' and give preference to entrepreneurs who come with new visions.

⁴⁰ In the view of the students (Andy, 2005)

Another good example for entrepreneurial practices born out of 'poverty' is the Society for the Promotion of the German philology library (FU FBG web). Following the announcement of heavy financial cutbacks for the library's budget, two entrepreneurial students founded FBG (in 1996), which sells second hand books received as donations (and engages in lobbying through author readings etc.), with the objective to improve the conditions at the library.

3.2.10.4. Generational Change

Because of the high growth in its early decades, the FU has a distorted age structure in its faculty. In the years between 2000 and 2005⁴¹ 50% of the professorships are to be replaced. This has and will bring new energy into the ranks of ambitious academics to the university and the expectation for positive effects are palpable.(FU chancellor and management 51.) Transition takes time ,and new professors are usually granted 3 years to settle in the new environment before they have their routine and start to generate income.

3.2.10.5. Excellence Initiative

In mid 2005 the German federal states agreed to launch an initiative to promote top level research with a special funding program distributing 1,9 billion Euros amongst a selected elite of research universities. Universities have to compete on the three lines of funding (overall university strategy, research clusters, and graduate schools) and the winners will receive extra funding over a period of 5 years.

This initiative has awakened a new hope at the FU (read: "finally there is a light at the end of the tunnel"), while on the other hand it has put the university's leadership under pressure. Stakeholders perceive the Excellence Initiative as a last chance: "when we win we finally have the chance to become an elite university, or we will slowly but surely perish" (FU administration 26). Whatever the outcome, at the time of the interviews, most representatives of the administration were quite enthusiastic about the opportunities and hence entrepreneurial and strategizing about the possibilities.

At the first round of the initiative, the FU was made a winner of extra funding for one Graduate School of North American Studies and shares one Graduate School in Mathematics with the two other Berlin universities. Nevertheless, the initiative is perceived as beneficial to the whole university by the President (FU web)

3.2.10.6. Prof. Faltin

Prof. Faltin is professor for entrepreneurship in the department of educational science and psychology for more than two decades He has developed a unique approach to venture

⁴¹ The process is actually still in full swing

creation, which focuses on the development and refinement of an innovative business model. In a truly entrepreneurial fashion, he has created two innovative and successful enterprises and one foundation, continuously pursuing his personal passion - the practical and theoretic exploration of the entrepreneurship paradigm. Prof. Faltin has developed his approach in several publications (Faltin, 1998, , 1999, , 2001) and is facilitating a business model creation in his regular lectures, the Entrepreneurship Laboratory. Since 2006 he also collaborates with the FU entrepreneurship team in the provision of an incubation office space for new ventures in the Faltin Villa.

Prof. Faltin's approach is specifically relevant for this research because, even though it focuses on economic entrepreneurship (enterprise creation), its methodology is based on the intellectual practice of refining an idea/opportunity to the point where it is the blueprint of a viable and sustainable venture. As such, it can be applied to all entrepreneurial projects no matter what the lead ambition is. In essence innovative entrepreneurship is about unlashing the potential of the individual to follow his/her personal interest, and to develop a unique idea to the point that it can realistically implemented. Hence Prof. Faltin's facilitation practices and institutions are briefly reviewed in the following paragraphs.

In his regular lectures, he first aims at enabling the students to see the creative and non-economic/business aspect of entrepreneurship, and then subsequently introduces them to the methodologies on how to design a blueprint for a venture.

The Entrepreneurship Laboratory (EL) are evening workshop-sessions comprised of two components: On the one hand, Prof. Faltin interviews thematically relevant guests, who report about their work and how it can be useful for entrepreneurship and business model design; on the other hand, the ELs are meant to give nascent entrepreneurs a platform to present, discuss and refine their business models with Prof. Faltin and his community of practice⁴². The ELs takes place in the premises of one of Prof. Faltin's companies and usually have a duration of about three to four hours with possibilities for networking during a middle break and again after the event. Since 2006 the sessions have been streamed live onto the internet and most interviews are available as edited and annotated video on demand through Prof. Faltin's web portal www.entrepreneurship.de

During the field work of this research another institution with the mandate to foster entrepreneurship at the FU has been created – the Faltin Villa. In close collaboration the FU's

who come out of curic approach in particular.

⁴² Over the years a community of people has emerged around Prof. Faltin's approach, and the participants of the EL are mostly out of this group. The attendants are comprised of many local 'regulars' (around 50%), selective semi-regulars (who come when the agenda and date suits them, around 30%), and guests, who either don't live in Berlin or who come out of curiosity. All either have a professional or personal interest in entrepreneurship and in Prof. Faltin's

entrepreneurship team⁴³ and Prof. Faltin have setup a new venture incubation space in one of Dahlem's typical residential mansions. The house provides space for about eight offices and two larger multifunctional meeting- or "living-rooms." Nascent entrepreneurs can use the offices and ICT infrastructure free of cost once their business design has been approved by Prof. Faltin.

In conclusion, Prof. Faltin has dedicated his professional life to the promotion of entrepreneurship and has influenced hundreds of FU students to live out their entrepreneurial potential.

3.2.10.7. FU Entrepreneurship Fomentation Team

The FU has chosen to institutionalize the promotion of an entrepreneurial spirit in its faculty and students in the department (IV. team A) in charge of the facilitation of the exploitation of intellectual property and business creation (from hereon the entrepreneurship team). This unit existed for many years as a one-staff institution, but has recently taken off since the end of 2005 when substantial funding was acquired from a structural EU fund. Today about 13 people are working on several initiatives meant to foster (primarily but not exclusively) economic entrepreneurship at the FU. The team has developed and implemented very practice oriented (action learning) courses, and most of them can be classified as knowledge entrepreneurship from the perspective of the FU entrepreneurship team 44. One of them is run by Prof. Faltin and has students develop an innovative business model. Another has students design and run a mini-business on campus for several weeks. Additionally the team has created a web-portal offering learning and networking opportunities related to entrepreneurship. Last but not least several experts have been hired, who function as scouts scanning the FU's research efforts for opportunities for economic exploitability. These scouts do follow an economic entrepreneurship ambition, but they generate the funds that enable the institutional knowledge creation and transfusion mandate. Agreeing with Clark's (1998) observations, the employment of these specialists makes sense as they perform a non-academic support function and allow the academics to focus on knowledge entrepreneurship.

Allow me also to recount a case of innovative political entrepreneurship facilitated by the FU entrepreneurship team. The case of the creation of the communication channel www.direktzurkanzlerin.de is another instance that verifies the practical overlap of the various entrepreneurial ambitions and its paramount theme of creative destruction. "Direkt zur Kanzlerin" (Direct to the Chancellor) is a website that was setup to allow citizens to have a direct dialogue with Germany's highest political institution, whereby individuals post their questions in a forum. Every day, the website users vote on the relevance of the questions and

⁴³ Which institutionally manages and provides the space.

 $^{^{\}rm 44}$ As they have never been implemented at the FU, barely elsewhere.

the chancellor's office issues a reply to the three questions that where voted most relevant. This innovative political communication channel has been developed by a small group of student entrepreneurs, who now make use of the publicity and reputation they have built up through their political entrepreneurship to pursue several other entrepreneurial projects. In tune with their humanistic understanding of business practices the founding team has managed to gather a cadre of co-entrepreneurs around them who collaborate (for the moment) without financial remuneration, solely motivated by their ambition to realize themselves in a creative and striving environment. Thereby the founders have managed to create a very effective and 'family-like' team (FU students 21).

The founding core team of this 'entrepreneurial clan' has been attracted and supported by the FU's entrepreneurship team ⁴⁵, proving that it is attentive to opportunities to realize opportunities.

Overall the FU provides medium conditions for economic entrepreneurial development. According to a ranking that is conducted by Schmude and Uebelacker (2005) the FU reaches the 27th place amongst German universities (2003: 20th).

3.2.11. Analysis and conclusion

The most dominant aspect of the current environment at the FU is the lack of funds⁴⁶. It is a typical example of state regress (economically caused political liberalism) from educational responsibilities. The result is more effective and more context-aware stakeholders, less then optimal facilities, a streamlined education and more business oriented research.

The FU has yet to fully exploit the possibilities from the closeness of most of the first-class German research science institutions like Max Planck or the Federal Institute for Materials Research and Testing. A program "MBA's meet Innovation" is in the planning stages, but there is still no central strategic activity⁴⁷ to foster FU's stakes.

The complementary leadership duo at the FU's top, is effective and determined, but authoritarian. While many in the administration report 'short paths' (meaning direct access to

⁴⁵ Which provides office space and political flanking.

⁴⁶ The economic condition of the FU is quite grave and student fees are presented as the only solution. However it seems to be overlooked that it is mainly the natural sciences, which need grand funding for their laboratories and experiments. Niklas Luhman – the famous German sociologist - is well known never to have solicited any funding (FU faculty 52). All he needed for his outstanding research was the library and discourse with colleagues and students. This might be an extreme case, but it is surely true that the high costs are mostly produced by the natural sciences. Thus it might be prudent to think about separate conditions for financing social- and natural-sciences.

⁴⁷ The individual institutions have more or less developed links to the specialized research centres.

decision makers) there is a practice of behind the door diplomacy and deal making that spurs power politics and cliquism; even in best-case scenarios these practices exclude the non-members from opportunities and decisions (FU 22).

The new 1998 governance structure supports the efficiency of the processes at the cost of the traditional (tedious) discourse and consensual decision making. The efficiency of informal coordination is augmented by moves to follow the official procedure in order to satisfy political guidelines only to ask external consultants to produce 'favourable reports' (FU management 45), while striving towards the intended result "un-bureaucratically". These practices led to the de facto creation of a parallel informal structure used to achieve results.

The FU has emerged out of extraordinary historical conditions, which even today makes it a unique institution in regards to the scientific and cultural experience it provides. Even though most of the 'critical' experiments initiated during the 1960's have not been sustained, there is still a high degree of self-determination necessary to reach the degree sought after⁴⁸. What is more, doing research is a matter of motivation and bootstrapping as monetary feasibility depends mostly on self-initiative, marketing and deal making.

Culturally the legacy of the leftist student movement is still recognizable but the new generation is noticeably less idealistic and political than their predecessors. Nevertheless, the FU provides a suitable atmosphere for young adults to learn to stand on their own two feet (e.g. through the Heinzelmaenchen), and generally offers a vast variety of opportunities for students to assess and realize their ambitions⁴⁹. As such, the observations of Levesque et. al. (2004), that German university students have a significantly higher level of autonomy than other European or American peers (also FU student 54), are assessed to be generally on the spot for the FU.

The Excellence Initiative has succeeded at energizing HEI leadership and at an instilling entrepreneurial spirit, but the effect might be short-term as there is an 'either we make it or we are out of business mindset that is implicitly roaming in many universities. In contrast to the British and the Catalan system, Germany has setup a "one time competition", while in the other two countries there is a constant bidding for state resource allocation.

Probably the single-most decisive deficit at the FU is an inclusive, transparent and systematic strategy process. Until now the university has only engaged in due diligence regarding its bureaucratic reporting obligations, ⁵⁰ and has only now, for the first time developed a vision for

⁴⁸ Arguably this 'uniqueness' is at danger as the Bologna process homogenizes the educational architectures across Europe.

⁴⁹ including the opportunity to learn about entrepreneurship

⁵⁰ Even though no report could be found for the period after 2001.

the future. However, this vision was developed by a selected few and communication was (due to the competitive setting) on a secret service mentality (i.e. "everybody knows only what s/her has to know"). A holistic entrepreneurial strategy would engage the stakeholders, and ideally-create a shared vision.

3.2.11.1. Internet based innovation appropriation

With regards to the appropriation of internet based innovations the FU represents a good example of the positive and negative effects of poly-centric structures. On the one hand, individual entities are free to pursue their interests and develop the technology and practices they deem most adequate. On the other hand, one observes redundancy and non-compatibility instead of synergies and economies of scale because of the entropic state of IT governance.

Especially with regards to entrepreneurship, the polycentric IT structure seems to allow for little synergies and congruence. The CIO is a committee institution with relatively little IT competence and lacks strong thematic leadership; it thus misses its mandate to coordinate interests and prohibit the territorial fights through a stringent holistic IT vision and strategy.

The CeDiS is clearly the most dynamic and entrepreneurial exploiter of the current situation. CeDiS embodies 'new public management' and positions itself as a 'service agency' (FU administration 57). Run by a leader with entrepreneurial motivation, CeDiS was founded because the opportunity had been identified and assessed positively. From its very beginning, CeDiS was market-oriented by: scanning the 'e' education and research field for relevant innovations (through general meetings, and thematic working groups), requiring business cases for new project start, and most decisively, by encouraging wide spread stakeholder ownership by providing opportunities – facilitated by the e-learning consultants and the inhouse funding- for faculty to look for needs that can be satisfied with IT. The CeDiS model is assessed to be successful in identifying, evaluating, and spreading opportunities for internet based knowledge entrepreneurship at the FU.

ZEDAT is on its way to more effective management practices but has a tough time ahead due to the continued scarcity of funds, and even the sheer size and heterogeneity of the mandate make it very complex to navigate. The web-team presents itself more as a classical public administration department and does not seem to be aware of the opportunities in its field. The library does well as a traditional knowledge depository entity but has not fully embraced the fluid multi-disciplinarity of modern information sciences.

On the other hand, the eAS initiative holds the promise of revolutionizing FU's administration processes – the same way Enterprise Resource Planning (ERP) systems have revolutionized

private enterprises - by introducing one-coherent-process architecture⁵¹. Even though eAS is not involved in knowledge entrepreneurship, their project is relevant, because they provide the standardized process structure that (theoretically) allows for 'state of the art' efficiency in administration (structure) and thereby allows more space for real academic processes (FU chancellor 60).

The clear separation of IT mandates – infrastructure, process, and knowledge - as suggested by one of the key stakeholders (FU management 59), is assessed to have potential for improving the situation at the FU.

As for the LSE, the provision of an open FU wide intranet seems to provide a very interesting opportunity to energize social networking, make practices more dynamic and transparent, allow for organisational learning through knowledge sharing regarding environmental scanning and assessment, and ultimately to cultivating a more entrepreneurial atmosphere. A step in this direction has been initiated by CeDiS planning for the social networking platform.

the eAS might bring a solid bureaucratic structure that enables intellectual freedom.

⁵¹ This is not the place to consider the pros and cons of a monolithic ERP system, but allow me to raise that on the one hand there is great potential for conflict as this centrally controlled instrument goes against the freedom of the departments to decide on their practices, on the other hand it bears great promises for efficiency and transparency, and it has no influence on the teleology/ontology and academic freedom (the knowledge mandate) of faculty. As such

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Case-Study 3: Universitat Politècnica de Catalunya

A Technocratic Knowledge Manufacturer

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3.3.1. Overview

The UPC is a modern university that has embraced the three missions: education, research and societal commitment¹. The latter is especially carried out through contributions to policy making and expert forums, as well as institutions meant to accelerate socio-economic development through entrepreneurship. After having just finished the consolidation phase following a period of constant change in the political environment, the UPC has now identified and accepted the challenge to reorganize a vast part of its structures to allow for the integration into the European Higher Education Area².

¹ http://www.upc.edu/catala/la-upc/presentacio/publicacions/pdf/7841_presentacio_UPC_angles.pdf

² "The Organic Laws on Universities (LOU) and the Catalan Universities Law (LUC), which have resulted in a thorough revision of our statutes, and, more importantly, the definition and subsequent incorporation in a European Higher Education Area, mark the beginning of a period of radical changes that will not only affect the way studies are

The UPC's management has internalized the "triple helix" paradigm, stressing the importance of effective interrelations between government, industry and universities (Etzkowitz, 2002; Etzkowitz & Leydesdorff, 1997). By pursuing this paradigm the UPC has enabled continuous institutional growth. Therefore, the UPC has a well-developed technology transfer unit and an entrepreneurship program. The UPC is a classic technical university and, as such, tends to fall into the trap of delivering exclusively vocational training rather than complementing the technical courses with cultural competence.

The UPC has the culture and structural design of a well-run ship. The crew is organized hierarchically with a very disciplined and cascading strategy process in place. The strategy has a double use; first, it serves as basis for the negotiation of the university's funding from the regional government and, second, it fulfils the function of scaffolding by implementing central directions throughout the organisation.

When it comes to internet based innovation appropriation, the UPC has adopted an interesting solution. All infrastructure management, including innovation, is outsourced to the wholly-owned spin-off, "UPCnet" The spread of learning technology is entrusted to the Institute for the Science of Education (ICE). The library, on the other hand, takes care of the development of digital knowledge repositories. Lastly, there is the School of Informatics with which all stakeholders nurture a good relationship. In fact, the School of Informatics (FIB) is actively developing the e-learning platform further. Overall, the setup is quite satisfactory, which is somewhat surprising because there is no coordinating entity.

3.3.2. History

Founded in 1971 the UPC is a conglomerate of a host of technical schools in and around Barcelona. Over the following years, it has assimilated various additional schools as well as created several new institutes. The UPC can look back on a history of successful institution building and constant expansion. Some of the schools, like the School of Industrial Engineering, go back to the 1850s. To fully explain the history of the UPC, one needs to elaborate on Catalonia's role in modern Spanish history.

Catalonia had always been a well developed and, to varying degrees, an autonomous region. After it "stood on the wrong side" in the civil war, the Spanish dictator Franco intended with

structured and taught, but also more conceptual aspects, such as the step forward from "learning for life" to "lifelong learning" (UPC, 2005c).

draconian measures to break the Catalonian society³. Catalonian culture and nationhood survived in clandestine practice; when Franco died in 1975, measures to revive traditions and regain autonomy were taken immediately.

It was during the later years of the Franco regime (1970s) that there was a general reform of the educational system. A legislative ruling resulted in a push to group the small, technical higher education schools in and around Barcelona into one bigger administrative unit. The law reform enacted during this period was a milestone in improving the Spanish university system, as it allowed universities to determine control over assessment procedures, teaching methods, and research fields and practices.

Catalonia, which was one of the first regions of Spain to be industrialized, always had a high demand for technical workers and engineers. The demand that arose with the increasing complexity of technology was satisfied by the UPC, which learned and implemented the practices of massification of higher education from its international peer institutions.

One decisive figure in the development of the UPC is also a protagonist in the UOC case. Gabriel Ferraté i Pascual became UPC's second rector in 1972, and thus was responsible for building the institution during those first years. In 1976, Ferraté took a post with the Ministry of Education in Madrid, only to return to the post of UPC rector in 1984, at which time he consolidated UPC's role as one of the top Spanish and, increasingly, European institutions for technical education and research. Ferraté held the post until 1994, just in time to engage in the foundation of UOC, which will be treated in the following chapter.

The first in a serious of efforts to improve HEI performance and capacity was started in 1983 and paved the way for the official ratification of the UPC's statues in 1985. From the very beginning, the UPC was set up to have a matrix organizational structure with a board of trustees at its top, in order to allow for maximum autonomy of the individual sub-institutions, while guaranteeing administrative coherence. In 1987, the national University Law was reformed and UPC used the opportunity to overhaul its academic model. Another major environmental change was implemented in 1997, when the increasingly confident Catalonian administration decided to distribute funds based on a sophisticated indicator system over four year period. These so called program-based contracts allowed for better planning inside the universities, as they know their income for the following years rather than only for the next. Josep Vilalta (2001) assessed the setup and the practice as a very positive a direct parallel could be drawn to the local university contracts that were negotiated among the Berlin universities.

³ By prohibiting their language and resettling thousands of workers from other parts of Spain to the region (see Castells, 2001 for an elaboration of the history).

In more recent years, the UPC is pro-actively making the changes required to continue its progress in the united European higher education space.

3.3.3. Setting

3.3.3.1. Students

Similar to the FU, the UPC is a rather big university overall, serving 31,8974 (as of 2005-2006 (web)) students. Given that there are many very specialized disciplines – like the Nautical School – each with their own realm, it 'feels' very different, depending of course on what discipline is presently being observed.

With 1.000 international students⁵ (web) and only 26.4% female students (web) the UPC is neither very international nor gender balanced as an institution. The low female enrolment is most likely due to the technicality of the subjects; this technical course load seems to repel female students in what is still a rather traditionalist Spain. Despite this in-equality in enrolment numbers, the atmosphere is perceived as welcoming, and the engagement in international cooperation is cited as exemplary⁶. The low number of international students (~2.5% most of them from graduate and PhD programs from Latin America (UPC, 2005a)) cannot be easily explained. This trend might be due to the non-English/partial-Spanish speaking environment, as about 60% of teaching is in Catalan and only 40% in Spanish⁷. The differentiated Catalonian culture and language seems to repel Spanish speaking students who make up only 5% of the population⁸ (UPC, 2005a). The picture changes significantly when the doctorial level is observed, here the UPC is highly cosmopolitan with around 40% and more foreign students⁹.

Also the introduction of double degrees ¹⁰ – issued by the UPC and a foreign partner organization - is an innovative practice to make UPC's degrees more valuable. The selected internationality has been recognized and an International Relations Plan has been devised and implemented in order to improve this endeavour. As a result, almost half of the UPC students

⁴ In this number the 4.387 students in associate schools are lumped together with the 27.510 students in core UPC schools.

⁵ It has to be noted that in practice there are much more international students at the UPC than there are thousands of students from all over Europe. These students are not counted as UPC students.

⁶ The low female students rate is most likely due to the technical fields of study. These technical courses are still a male domain in relatively traditional Spain.

⁷ www.upc.edu/ari/unitech/docs/FactsheetIncomming2006UPC.pdf

⁸ The definition of Spanish is not clear in that context. There are many students from the Balearic island and Andorra which might not accurately be part of this number.

⁹ Researchers own calculation based on (UNEIX, 2007)

¹⁰ http://www.upc.es/ari/english/2/ambit1/indicadors1.htm

have some phase of their studies abroad, however the percentage of foreign students has not increased at a coterminous rate. (UPC, 2005a).

Even though there is not extensive financial support, there is quite a vivid social life which is surely also a result of the 160 student associations (web). Furthermore, it is interesting to note that more than half the students are also working (EUA, 2005) which makes them more autonomous, but also prolongs the duration of studies by one or two years (average) measured against the time officially outlined for their course completion. As Spanish universities are not allowed to select their students, the crucible of setting an intellectually challenging first year in order to 'filter the laggards out' results in a drop out rate of one third of the total entrants (ibid).

On the staffing side, the UPC is rather neatly supplied with academics. In total, the UPC is employing 2,657 lecturers¹¹ which results in a student teacher ratio of 12:1. The daily operations are handled by 1,363 administrative and service staff which seems to be comparatively little.

3.3.3.2. Location

The UPC has three core locations in Barcelona including its 'headquarter' campus in the 'university zone' and seven locations in villages around Barcelona¹² (see Figure 1). As such, it is save to say that the university does have a headquarter-like centre, but that the different locations feel a great deal of institutional autonomy and many students and professors are hardly ever in contact with any other UPC institutions besides their own school.

¹¹ (Jofre, Amoros, & Cortadellas, 1998) write that about 70% of these professors are full time; nevertheless a professorship in Germany or the UK is more closely defined, more difficult to obtain and emminent. In Spain, assistant professors, and lecturers are counted in the total as well.

¹² Some of them are as far as one hour outside the city.

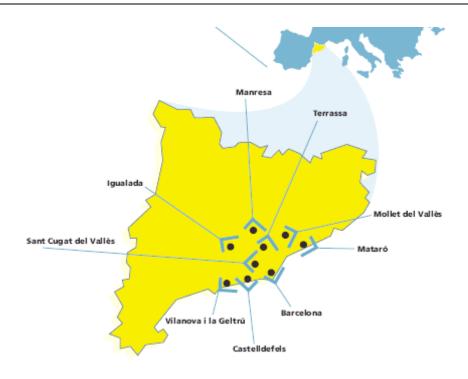


Figure 3.3.1. - UPC Locations (UPC, 2005g)

While the European University Association (EUA) evaluation team wondered "where were the cosy corners in which students would meet in small informal groups to discuss their work and progress" (UPC, 2005a) the researcher has observed and participated in various informal activities on campus. Consequently, informal spaces, and informality as a community generating stimuli, is not assessed to be a problem at the UPC.

3.3.4. Typology

3.3.4.1. Specialization

The UPC has a straight forward specialization in exact sciences: engineering, architecture and related subjects (UPC, 2006d). Starting with the engineering schools, more and more specialized schools and departments were founded. Today, the UPC describes itself as delivering "skills and knowledge oriented towards real professional practice" and it does so by fostering realistic interdisciplinarity and various work placements institutionalized through more than 7000 Educational Cooperation Agreements ¹³. On the one hand, the UPC delivers vocational training for technological citizenship (Delanty, 2001), and on the other, it is pushing innovation through research and regional development through technology transfer. While there is no explicit cultural citizenship education, the UPC is aware that social- and especially

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ecological-responsibility is an important aspect of modern technology, and has hence developed teaching and research capacities on the topic of sustainability.

3.3.4.2. Business-Model

The UPC is still largely dependent on regional government funding, but it is also leading the process of developing a funding-mix among Spanish universities. The money coming from the *Generalitat* represents half the university income, while no more than 6 or 7 % come from the Spanish Government itself (UPC, 2005a). The students finance a respectable 25% of the budget through fees, while the rest is made through technology transfer and private sector cooperations. In line with the triple helix understanding, the university aims to double the latter contribution over the next few years (ibid)

This objective seems highly possible given the good marketability of UPC's research products and services. Today, the UPC holds 54 active patents, and 409 agreements with private companies. These private sector relations are naturally developed through the integration of UPC graduates into companies. The UPC is understood to see "the task to transform the formation in directing the new graduates to be better formatted and more utile for the businesses and the society" the strategic plan continues "to generate new knowledge that permits the transformation of the production system in a more knowledge intensive one, determines us to implement changes" (UPC, 2005e, p. 3).

Another interesting venture at the UPC is its Fundacio institution which offers post-graduate and life-long learning courses at competitive market prices. Even though the Fundacio was founded more than ten years ago (in 1994), it has still not been fully verified whether it is a profitable and viable endeavour. In 2005/2006 it conducted 300 activities for about 8,000 students which is not an impressive figure for an institution working with a staff of 120 people (Fundacio, 2006). Considering that a course of about 150 hours costs about 3000€, the Fundacio needs only enrol about 15 students to reach the break-even point (UPC faculty 49). However, this is not always the case. Overall, the volume of activities realized is declining; this might be interpreted as a retreat from this form of commercial venture. Since 2005, the UPC Fundacio has setup a unit in Chile and is active in projects in many other countries. These trends illustrate the entrepreneurial character of the institution.

3.3.4.3. Finance

In 2006 the UPC had an overall budget ¹⁴ of €309,143,278 and a €52,041,985 income managed by the Technology Transfer Centre. However, these funds exist within a matrix of

More numbers for 2005/06 are available: http://www.upc.edu/memoria/upcavui_infpressupostaria.htm

¹⁴ http://www.upc.edu/pressupost/principal.htm

tight planning and installed controlling, this leaves only *one percent* of the overall budget representative of finances that are not earmarked for specific purposes (EUA, 2005). This tiny fraction of spending leeway seems inappropriate in light of the fact that the relatively paltry sum of 3% is managed on a decentralized basis, while an overhead of 14% is taken on all outside linkages that the school and its satellite interests nurture (EUA, 2005). The UPC's income sources are depicted in Figure 3.3:2.

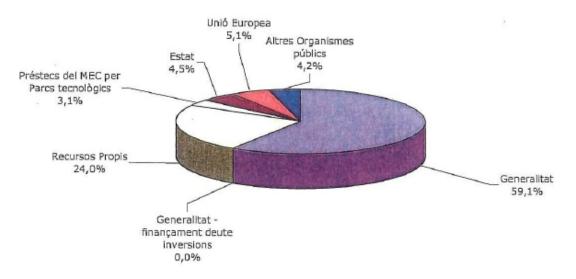


Figure 3.3.2 - Sources of UPC Income 2006

The following description contrasts the spending of 2004 (EUA, 2005) with 2006 (as depicted in figure 3.3.3.). Personnel, which traditionally capture the lion's share of university spending, has increased 5.77 %; meanwhile, research has decreased 0.56% and financial expenses have decreased drastically by 3.67%. This leaves the UPC with 29% to use for general university policies. This trend largely parallels 2004's budget allocation figures (27.69%). As previously intended, this amount is mainly allocated for construction and investment in infrastructure and only 2% is left for emergent issues and opportunities. This situation has not changed since 2004 (UPC, 2005c).

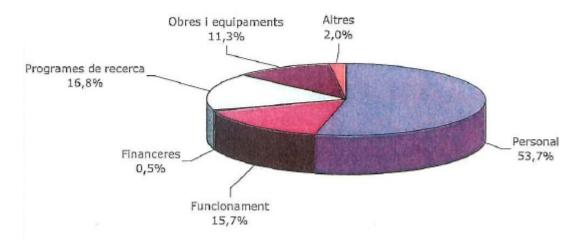


Figure 3.3.3. - UPC Spending 2006

The UPC has shown impressive growth rates since its founding and plans to expand its operations in the coming years. From a macrocosmic demographic standpoint it need be taken into consideration that growth will most likely stall as the baby boomer generation superannuates and following generations are experiencing a much lower, and later rate of childbirth. In late 2006, the rector reported to have successfully secured the funding from the Generalitat at a rate of 15.7 % for 2007 and 10.95 % for each coming year until 2010 (UPC, 2006a).

3.3.5. IT History and Approach

Responsibilities for IT services are distributed among UPCnet, the Institute for the Science of Education (ICE), the library and the School of Informatics. The evolution and role of each of those entities is described in the following paragraphs.

Since 1976 the UPC has employed a School of Informatics that steadily grew over the years and today hosts 3,039 students and 270 professors. The faculty has 75 servers and 475 workstations for research and development. As is the case for the FU, the UPC computer scientists enjoy their own separate intra-net and continuously experiment with innovative elearning solutions. It should also be noted that it was a software development professor who first became involved in the open-source community development of the Moodle e-learning platform, and who subsequently facilitated UPC's implementation of said e-learning solution (more in the e-learning section).

The library presents itself as an entrepreneurial entity, which engages in regular entrepreneuring in form of collective strategy development exercises, including a SWOT analysis (e.g. UPC, 2007a), as well as a controlled review and analysis through yearly reports (e.g. UPC, 2005b). The positive (strange attractor) effect of this strategy process has also been

recognized by the regional administration evaluation (AQU, 2006). The libraries, (because the library function is truly poly-centric in the sense that it is a collection of autonomous facilities with a coordinating centre) have embraced the challenge posed by the digitization of knowledge repositories and information services. This emergent trend is especially evident in the areas of research support while publication strategies have been developed consciously (as described in the e-research section); the e-learning content repository is maintained in cooperation with the ICE and basic media literacy trainings are imparted through this didactic vessel (see 3.3.9.2).

The Institute for the Science of Education (ICE) is the key entity for the diffusion of pedagogically sound practices regarding the use of ICT. When the ICE was founded by a general governmental decree in the 1970s it got a mandate for the "research and promotion of specialisation in education, the target groups were pre-university teachers and university lecturers" (UPC web). Through several evolutionary steps, the UPC transformed the department to its current role as a promoter and training ground for model e-teaching practices. To better understand the specific role of the ICE, it becomes necessary to put forward a few numbers: there are 17 specialists working at the ICE, who together imparted 7,248 hours of ICT training for 797 faculty members. The list of themes dealt with by the specialist's tutorial platforms spanned topics from student motivation to specific software training; furthermore, they produced 68 CD or web based training materials (which are hosted by the library). The training for academic staff and other educators continues as a standard activity. Recently, the ICE has taken over many responsibilities in preparing the UPC for the integration in the European Higher Education Area (EHUA). With 147,000 € allocated for teaching innovation, this figure makes up less than a fourth of ICE's budget for 2007 (UPC, 2007b), but it has to be noted that there is a dedicated budget for the "support of the implementation of ICT in teaching" as well as for "diffusion of the best teaching practices" (See figure 3.3.4).

2.3. Suport a la implantació de les TIC a la docència	86.000
2.3.1. Factories	10.000
2.3.2. Atenea	25.000
2.3.3. Desenvolupament i manteniment de recursos TIC per a la docència	51.000
2.4. Prospecció i difusió de bones pràctiques docents	20.000
2.4.1. Relacions amb altres institucions i participació a events	15.000
2.4.2. Presentació i aportació a la UPC de resultats i recursos	5.000

Figure 3.3.4. - UPC ICE budget allocation for Teaching Innovations

Today, the whole standard IT infrastructure maintenance is outsourced to a UPC spin-off enterprise UPCnet¹⁵. UPC founded UPCnet. in 1999 with a triple mission: to maintain the UPC's ICT services on a top European level, to maximize return on investment for the

¹⁵ Which has become a self-reliant limited company.

university, and finally to give its employees an exemplary professional possibilities in the field of ICT¹⁶. In the beginning, UPCnet consisted solely of the 50 people from UPC's computer administration services. At present, UPCnet is employing 130 people and 90% of them come from UPC (UPC administration 40), and while it is still conducting the majority of its business through UPC, 20% also come from 'neighbouring' external clients. UPCnet understands itself as an ICT laboratory where new solutions are realized through experimentation before they are marketed to the UPC (UPC administration 41). The company has a special unit tasked with the 'identification of opportunities for innovation' which is holistically integrated in the state of the art process architecture that UPCnet is currently running (see 3.3.12.2 section for more details). The Innovation Unit serves as an institutionalized rallying point for (spontaneously) emerging initiatives, and as a body which pro-actively scans and evaluates innovations and evolutions in the market. The innovation team manager understands his work to consist mainly of the creation of the right climate, "that the people feel like changing" and innovating (UPC administration 42). Two and a half years after the creation of the innovation team he concludes that 20% of his work is technological and 80% is social and political.

3.3.6. Economic Entrepreneurship Setting

As mentioned, the UPC has embraced the Etzkowitz triple helix paradigm and is henceforth developing several institutionalized initiatives to foster economic entrepreneurship amongst its constituency. The 2006 El Mundo ranking highlights the strong public vocation and consciousness of the university's formative role; the ranking also illustrates that innovation and technology transfer are two key points for awarding the UPC the respectable 6th place (el Mundo, 2006).

The good relationships with the private sector is documented through the existence of 18 company chairs, 534 contracts with companies, 52 Million Euros in research income, and a respectable 6,853 internships (UPC, 2006d). The following paragraphs describe the two main institutions for entrepreneurship as well as noting another institution which evidences still developing, but impressively high knowledge and economic entrepreneurial objectives.

3.3.6.1. UPC Innova

In 1998 UPC set up the Innova Programme with the mission to promote the culture of innovation and the entrepreneurial spirit throughout the university community. Innova has three missions: First the training for promotion of an entrepreneurial spirit, second, the monitoring and technical support for the companies thus created, and thirdly the networking tasks with national and international peers and partners. In its seven years of existence the UPC Innova, has facilitated the creation of more than 100 companies (see also Figure 3.3.5), and is the

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¹⁶ http://web.upcnet.es/usr/frames.php?idioma=CAT

holder of hundreds of entrepreneurship courses each year. Because of its impressive aforementioned accomplishments, it is generally recognized as the competence centre on this type of subject matter. This role was further underlined when Innova received the award for the Best Technology Springboard in Catalunya from the federal Centre for Innovation and Business Development (CIDEM).

Programa Innova	2002	2003	2004	2005
Nombre de projectes d'empresa	70	76	73	75
Nombre de persones emprenedores usuàries del Programa Innova	130	119	114	107
Nombre d'empreses creades(1)	18	23	16	17
Nombre d'empreses en què ha entrat a participar la Universitat	-	-	1	1
Nombre de projectes presentats al concurs UPC-EAE d'Idees de Negoci	84	69	101	90 (2)
Nombre d'estudiantat matriculat a les assignatures en què col·labora el Programa Innova	382	410	434	700
Nombre total de participants en presentacions, seminaris i cursos del Programa Innova	964	1.731	1.753	2.490
Nombre de visites al web pinnova.upc.es	12.000	18.000	17.000	17.926 (3)

⁽¹⁾ El càlcul de les empreses creades s'ha regit per criteris de prudència, tenint en compte que la data de constitució entrés en els intervals de referència. Tot i així, el nombre de projectes vius i en fase de constitució és molt més elevat.

Figure 3.3.5 - UPC Innova activities 2002-2005

Consistent with the assessment that Catalonia lacks a sufficient venture capital environment, UPC also participates in Innova31, which is a venture capital company set up in 2001.

Quite soon after its creation the Innova program was selected to be a pilot meant to gather best practices and hence the responsible parties have amended some practices "to fit the profile of other Spanish universities in less industrialised areas" (Warden, 2000). This roles has been assumed whole heartedly as it added funding and gave the UPC the possibility to organize conferences and networking events (THES, 2003), which naturally have a positive reputational influence and create awareness of collaborative opportunities.

Innova's service spectrum and practices are depicted in figure 3.3.5. The first continuous activity of Innova is the raising of awareness of UPC stakeholders through courses and media presence. Next, there is the core process architecture of identifying and developing business opportunities inherent in research conducted at the university. Once a commercial opportunity has been detected, or the researchers have contacted Innova, (a standard procedure of meetings, assessment of intellectual property rights protection and licensing, as well as commercialisation modalities is carried out). Depending on the assessed feasibility, potential and the type of product Innova creates, the entrepreneurs work towards venture creation and assists in providing contacts to industry etc. The last service line of Innova is labelled 'future technology' on this illustration; it consists of networking and screening the environment in order to be aware of trends and opportunities.

⁽²⁾ Concurs d'Idees de Negoci

^{(3) 60.000} des de la seva creació

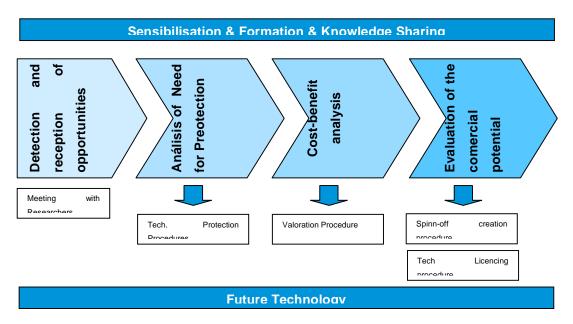


Figure 3.3.6 - UPC Innova Operations Architecture

3.3.6.2. Centre for Technology Transfer

The Centre for Technology Transfer (CTT) was created in 1987 (UPC, 2002) and has since then developed to become a decentralized service provider employing 39 specialists. It manages the UPC's various Technology Parks and is positioned to be the information and collaboration hub for researchers who are interested in linking their work with the private sector (i.e. to obtain funding), and private sector organisations that are interested in exploiting the research capacity of the UPC. The CTT has opted for decentralisation and maintains offices in virtually all UPC locations (ibid). For researchers, the CTT offers up-to-date information about national and European funding opportunities, services and information about intellectual property protection, as well as internal conventions and project management. The most important service for the researchers is the legal handling of the contracts between them and private companies. However, researchers report an overhead fee of 15% charged by the CTT, plus 6% for the researchers department, plus 16% value-added tax inflates the costs of collaborative efforts, which is perceived quite critically (UPC faculty 50).

For companies, the CTT is meant to offer (a) customized entry portal to the research centres, technology parks and concrete works implemented at the UPC, as well as (b) access to the database of patents held by the UPC. The CTT pursues a pro-active marketing approach and produces promotional brochures and papers (e.g. on UPC's in the area of logistics, ecology, textiles and local administration), which it disseminates externally (especially at trade fairs) as well as internally.

3.3.6.3. K2M (Knowledge to market)

The Knowledge to Market (K2M) project is still under construction, but as it deals with the institutionalization of university knowledge entrepreneurship with private sector business interest, it will be described here shortly.

The initiative is the brainchild of a group of UPC's knowledge entrepreneurs and leadership veterans. For many years, this group has followed the assessment of the Generalitat and the UPC itself. The group decided that there needs to be closer collaboration between the university and the private sector (UPC, 2005f). The project has the objective to bring top researchers together with top companies in order to develop new high-tech projects (like robots) to the point of market entry. The idea was pitched in Madrid and 6 Mio. Euro funding has been secured in order to spur interest and get the first round of co-operations going. Essentially, the K2M is a variation of the CTT's technology parks, but it aims to be a strategic institution, causing a spiral effect by working with top-notch companies. Thereby catapulting the UPC into the premier league of research and development (UPC management 44).

A typical collaboration project is thought to last about 3-4 years and the professors working on it will be paid in shares and futures in the company since they are not allowed to work outside the university (UPC management 45).

At the time of writing, the K2M project had still not materialized in the form of actual collaboration projects or even a building, but the project has reached a mature state.

3.3.7. Condition

3.3.7.1. Leadership

UPC is a very democratic institution and the leadership team is elected every four years on the basis of political programs. However, even once elected, the leadership team finds itself confronted with a host of assemblies (UPC management 19) in which everybody is elected because of a political stance and vision (UPC management 12). Hence there is a rather good balance of power and checks & balances, but, as one interviewee commented, there is no 'competence' other than a political requirement and it would be useful to introduce a practical preparation course for new leaders (UPC administration 16).

Once again, the political tint of each leadership team decisively influences the direction in which the university is steering. In the last power shifts it was reported that a liberal management team was replaced by a socialist team (UPC administration 15), which then lost the electorate's support after their first period, returning the power to scientific managers. A professor remembers that the leftist team was winning quite easily because they promised to

renovate the university and introduce social measure and because the incumbent team had not mobilized its electorate appropriately because they had done a good job and thought they would be easily reconfirmed (UPC faculty 51). Today, the social measures of the anterior leadership are perceived by some as stifling growth ¹⁷ by for example, turning buildings scheduled to become technology development centres into teaching facilities and generally decapitalising the technology transfer unit (UPC management 13 and administration 15).

One member of the more liberal leadership team before 2002 explained their rather instrumentalist political approach: "One has to construct the discourse on a very simple level in order to reach clarity of objectives" (UPC management 25). Thereby multi-layered and highly complex discourses are cut and framed in manageable and decidable packages on which a majority can be found. This approach facilitates decision-making and leadership at the cost of consensus and in depth understanding.

3.3.7.2. Governance

The UPC is directed by a Rector, who serves a four-year term and is elected by a weighted vote by all university members. The Rector then appoints the Vice-Rectors, the Secretary-General to assist him and the manager, who is responsible for running the university's administration. Together they make up the executive branch of the university (a.k.a. Board of Management). Then there is the advisory board, a permanent forum for eminent academics and administrators as well as at least eight UPC external consultants, meant to give direct advice and raise necessary issuess to the Rector. The board of trustees "is a dynamic force shaping the institution's future" (EUA, 2005) by developing strategic discourses and advising the management team.

Similar to the LSE, the Board of Governors - consisting of eight thematic committees - is the highest entity of the university. It approves the strategic lines and directives developed mainly by the Board of Management and politically coordinates their implementation through the committees.

Additionally, the UPC has a Senate, which has the final say on internal regulations as well as the fundamental positions and aspirations of the university. As expected, the Senate is voted for in a secret, un-weighted election that is open to all university members. An overview of the UPC organisational structure is given in figure 3.3.7..

Despite the wide authorities of the central administration, the UPC's schools have substantial autonomy, decisions are made on a consensual basis. In fact, "each basic unit is governed by its own regulations and by the UPC Statutes" (web). The schools are themselves run by multi-

¹⁷ This evaluation has to be understood as biased because of the position of the interviewees.

stakeholder boards¹⁸, which are headed by a Director who is elected by the university community of that basic unit. The Director is the final academic authority in terms of representation and management.

Another important aspect is the restructuring of the UPC's administration to transversal support- and services-units.

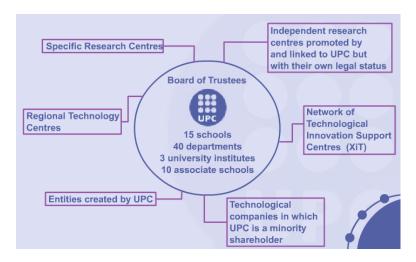


Figure 3.3.7 - UPC Governance Structure

Another central feature of the organisational structure, that should not be left out is the *matrix* arrangement of its educational structure. It is "common to Spanish universities" and it "is supposed to ensure flexibility and avoid redundancy of action (one department of chemical engineering, for example, serving all the needs for the teaching of chemistry throughout the university)" (EUA, 2005). The matrix system linking the schools' demands and departments' supply of teaching forces is not favouring change either, as professors usually giving allegiance to their research 'home' – the departments where they meet colleagues of the same mind and discipline -, rather than to the school(s) where they are serving their teaching duties. The schools, unlike the niche departments, are not necessarily such congenial environments.

3.3.7.3. Culture

The UPC culture is assessed to be rather locally bound by the schools and departments leading to a perceived collective of clans. There are however, some characteristics that are shared across the whole organisation: they all live in a pragmatic democracy which is coupled with academic managerialism. Another common element that has evolved over the years is that there is an indicator introduced and measured for everything; in general, there is a focus on vocational training; and last but surely not least there is a Catalonian culture present.

¹⁸ Or councils in the case of departments.

Collective of Clans

One interviewee expressed this point clearly: "The UPC is not a community, it is a collective" (UPC faculty 21). There are interfaces, shared obligations – like filling out the central assessments - and central practices – like negotiating the entity's budget, but each particle of the collective has its own internal logic, culture and fitness landscape. The de-centralized architecture and autonomy is defined by the university's statutes. There it reads: "The administrative management of UPC is founded on the principles of decentralisation and autonomy of its departments, in accordance with the functions assigned to them within the structure of the University, and of coordination to promote collaboration between departments and staff, thus avoiding the duplication of structures and initiatives" (Article 146 of UPC's statutes). The task to "avoid duplication" theoretically reduces the leadership's task to mere administrative and not political tasks, which runs contrary to the practices thus observed.

It is not easy to promote integration of the different vocational cultures, especially when "the professors of associated institutions tend to enjoy a better salary scheme than those from the fully integrated sectors of the university" (EUA, 2005) are not making it any easier.

In this scenario it is legitimate to wonder whether the UPC is actually more than the sum of its parts? And while this might internally be affirmed, externally the name is recognized because of its aggregated research contributions, hence-- the professors consider "the 'UPC' to be a good brand to go by" (EUA, 2005).

Pragmatic democracy & academic managerialism

As already allured to in the history, leadership and governance section, there is a Janus-faced ambiguity when it comes to political culture and leadership. The UPC is by its institutional design essentially a very democratic organisation and this is also lived out. On the other hand have most leadership teams steered the institution with a very pragmatic managerialism following the premises of efficiency rather than consensus or participation (UPC management 46). This is not meant negatively at all, rather it is understood to mirror an engineer's or cybernetician mentality of efficiency applied to politics as management.

Indicator culture

UPC's "primary goal is academic excellence in teaching and research" (UPC, 2005g)

When asked about the culture, UPC members list attributes like rational, pragmatic, scientific, formalist (UPC administration 11).

The intelligent but rather mechanical 'due diligence' when it comes to fulfilling 'reporting tasks' has also been recognized by the experts of the European University Association who write: "When asked by the EUA guidelines to think in terms of a SWOT analysis of their institution, the self-evaluation group carried through the mechanical part of the process but stopped short of a reflection on the long-term evolution of the university" (EUA, 2005)...

Vocational training

As the UPC is a technical university, the educational programs it offers are virtually all 'practices' like engineering, architecture, computer sciences, etc. and hence it is natural that there is a high vocational percentage. However, the university seems not to comprehend the cultural citizenship (Delanty, 2001) component of higher education because in the UPC interpretation of the third mission social commitment means "training highly skilled professionals" (UPC, 2005g) so they can benefit society which is precisely what Delanty defines as technological citizenship. This assessment is of course not totalitarian, and as mentioned above, the UPC is involved in a number of ecological areas and international development initiatives. Also the Catalonian youth is observed to be comparatively political and hence there are myriad student associations.

Catalan

The UPC started as a purely Barcelonian institution, until it chanced its name to UPC in 1984 with the expansion to become the technology education and research centre of all Catalonia. Transformation came swiftly. Today the UPC "wants to play as the scientific and technological powerhouse for the social and economic development of Catalonia" (EUA, 2005). But the extension of UPC's catchment area is a long-term trend. There is interest to form new units in Mataro, Sabadell and or Mollet del Vallès, thereby expanding in the Catalonian hinterland (ibid). In general Catalonians are quite aware of their accomplishments and so expressions of UPC's superiority on the Iberian peninsula (UPC administration 17) comes at no surprise. While multilingualism is supported and there are considerable amounts of professors who do not speak Catalan, there is also a minority of 'militant Catalonians', who argue that it is imperative to use Catalan in all classes and conversation because it is the most important element of Catalonian culture.

3.3.7.4. Strategy & Organizational Learning

The UPC developed its first holistic strategic plan in 1995 as result of quality assurance initiatives (Jofre, Amoros, & Cortadellas, 1998). This first plan caused the institution to give itself a mission and vision statements, which were subsequently elaborated in general strategic lines of action (Mindreau-Silva, 2000). Solas assessed that the strategy process has caused a "profound transformation in how the university tackled problems and realized activities" (Solas, 1998). These general motives were then translated into concrete policies and departmental programmes, such as the ICT Investment Plan (UPC, 2003). In fact, the same way the university as a whole negotiates and settles its funding with the local government, the individual departments establish programme contracts with the university's central governing body. Especially noteworthy is the (cybernetic) review of the activity's functioning and progress reviewed once a year. According to Jofre et. al. "the focus is primarily on mechanisms that encourage the participation of the university community in the introduction of improvements" (ibid p. 4-5). 'Participation' is ensuring an obligation to conduct all sorts of assessments. These

include an Assessment of research activity, Questionnaires on teaching and the functioning of the subjects, assessment of the administration and service personnel, student questionnaires, aggregated quantitative indicators, and UPC account audits (leading to an Internal Control Report), user satisfaction appraisals, and the 'pulse taking' is then completed by monitoring the opinion of UPC graduates. The EU University Association has commented that with these evaluation schemes the UPC today evidences an abundance of indicators, it now needs to begin to harvest and make meaningful effective strategic decisions (EUA, 2005).

For research the UPC is preparing multi year strategic plans (current for 2005-2010) in which a general direction (priorities) for the whole UPC are defined by identifying and assessing research opportunities.

A working group was setup and started its work by conducting a preliminary SWOT analysis. Next they organized a conference, where external experts and decision makers presented their views on Catalonian research politics, in order to predict (Scharmer, 2002) the future weighting policies of subjects. Hence, they improved the realistic assessment of opportunities. Thereafter, the group started drafting the actual strategic plan, which was publicly discussed, and then finalized. The final document mentions entrepreneurship and the fomentation of an entrepreneurial spirit eight times. In the research report it is recommended extending the integration of the individual researchers in strategy and management practices (UPC, 2006c).

The UPC gives the opportunity to get involved and have a say (give feedback) either by participating in conventions, for which information and background material is available through their website, and constantly through email¹⁹.

A special not deserves the UPC library, which is perceived to be pro-actively and consciously developing its mandate. The 13 libraries, which are dispersed across the schools and core campuses, are administered autonomously but come together to develop thematic activities like Open Access initiatives and they also jointly develop their strategy including e.g. the conduct of a common SWOT²⁰ analysis (UPC administration X).

Like at the LSE and the FU, no formal knowledge management activities are conducted. The ICE however does understand itself as a knowledge hub for teaching improvements and four or five voluntary communities of practice have constituted themselves around the theme of exploiting the e-learning platform and pedagogic knowledge sharing. These activities are, as said, voluntary, but the facilitator can assert the hours spent in his self-assessment exercise (UPC management 14).

¹⁹ Which is also available on the page http://www.upc.es/catala/recerca/plardi2010/index.htm

²⁰ A management practice to identify current and future Strengths, Weaknesses, Opportunities and Threats.

3.3.8. Knowledge Entrepreneurship

3.3.8.1. Environmental Awareness

Most stakeholders report to subscribing to mailing lists, to reading articles on the internet and to going to conferences. In general, stakeholders first rely on Catalonian sources, then Spanish, English and French information wells. As for their German colleagues, this obviously causes a relative delay in environmental awareness as new developments are likely to be published first in English. This weakness is however limited to general environmental awareness, news and developments in the field of specialization are followed closely. The trends are also tracked in international journals and websites written in English.

On an institutional level, the EUA assessed a need to work on a "strengthening of [UPC's] 'scanning power' (EUA, 2005), which is needed in order to engage in meaningful entrepreneuring. This contrasts with rather short-term planning documents and indicators meant to negotiate budget increases with the government.

3.3.8.2. Entrepreneuring (Strategy & Vision)

When it comes to entrepreneuring, almost no researcher reports to developing his opportunities in a conscious way, but he/she seems rather to pursue an organic interest in the subject matter, and concrete chances for creative capitalization fluctuate and emerge along the way.

The UPC as a whole is laudably engaging in a reoccurring cascading strategy process. However, this does not develop alongside a vision of UPC's long term growth (EUA, 2005) but rather looks at and develops all opportunities without setting strategic priorities. Rather, they are complying as best as they can with the law and the procedures established by the regional administration. The goal seems to be simply satisfying their expectations rather than really envisioning a future (UPC Faculty 37). One faculty member expressed what the researcher has observed in the German setting already: "They want 'planable' innovation" (UPC faculty 35).

3.3.8.3. New Project Support

With regards to new project support, no explicit support practice has been found. The experts of the EUA assessed that the university does not have sufficient leeway to take advantage of emerging opportunities and develop new projects. The EUA suggests that the "UPC needs the 'free money' – i.e., not earmarked" (EUA, 2005) with which it can create a stimulation fund with the aim to support new initiatives.

Furthermore, it was commented that there are two faces of the organisation. On the one hand, there is the official bureaucratic way of conducting business, while on the other hand, there is

the informal naturalistic way. Needless to say, the latter is significantly more efficient (UPC faculty 36). Interestingly, the interviewee commented that even though the hierarchical structures are rigid, the daily reality is almost complete liberty because there are no control mechanisms. Hence the interviewee reported a strategy of 'first do then ask for justification once you have first positive results' (UPC faculty 38)

3.3.8.4. Risk Tolerance

Like in the LSE and the FU, the first and popular response when asked about risk taking was that universities do not take risks (UPC administration 18). One understanding that is very much in line with the 'planable innovation' method mentioned before is that risks have to be calculated "in Spain we can base our decision on results from other countries before we implement - we jump with a security net" (UPC administration 28). In fact, within a certain logic, one interviewee commented that there is no risk in research as all results are relevant (UPC administration 26); The clandestine approach described above was confirmed by a management representative who confirmed that there are neither incentives nor penalties to motivate university staff (UPC management 20).

3.3.8.5. Communication

Like in many organisations, the rise of ICT has improved transparency while also creating a milieu of information overload. It is reported that the professors are 'intoxicated with information' (UPC administration 30). What makes things worse is that a culture of neglecting UPC emails has developed, because they are perceived as broadcasts with a very institutional style (UPC faculty 32).

What has been found at the LSE and FU is further confirmed at the UPC; the new ICTs are offering a wide variety of communication channels, which can potentially improve awareness, informed decision making and networking. The positive effects of ICTs are however constrained due to insufficient media literacy and subsequently inappropriate usage by individuals and institution. Also, it is possible that the ICTs increase complexity and information overload.

3.3.9. Internet Use

Overall, the UPC is exceeding the objectives regarding IT services it negotiated with the Generalitat (UPC, 2006b). This indicator measures the availability of wireless network connection, library access, and use of e-learning. For the period of 2002-2004 the UPC received satisfactory results twice and very satisfactory results twice (ibid).

3.3.9.1. e-Learning

Tools Integration (Technology)

The UPC was one of the first universities in the world to introduce a computer based enrolment system in 1984. This system allowed the university to amend the arrangement of courses so that students had more liberty in choosing thematic combinations, as well as more flexible sequences of interdependent courses. The team of programmers subsequently began to develop the Raquo software for the School of Informatics (FIB), which has offered cutting edge academic administration functionalities (course management, scheduling, personalized grades portfolio, etc.) as well as e-learning functionalities since 1994. Each course has a forum, and the possibility to up- and download files and documents, as well as a rudimentary evaluation system²¹. The FIB is presently using the Raquo in addition to other self-developed and 'experimental' e-learning solutions.

In 1996, the first UPC wide experiments with e-learning were conducted using IBM's Lotus Notes under the auspice of the ICE (UPC administration 48). When the idea to move to Moodle first entered the discourse, it was decided to setup both a working group and then a pilot project in 2005. Once the pilot with 4000 students was successfully completed, it was decided to roll the platform out for all UPC courses interested in utilizing the technology. The first task however was to migrate the content from the old to the new platform. As stated in ICE's budget for 2007, the maintenance of the Moodle server costs 25,000 € annually (see figure 4) plus about 250 days of worked man-power from the technical side through UPCnet

On the content side, ICE has setup and is facilitating the stocking process of the *Factoria* (<u>web</u>) repository. The *Factoria* holds all of the teaching materials developed inside the UPC and makes them available to the UPC faculty (and in most cases to the whole global educational community through online Open Access / Open Educational Resources).

Furthermore, a software development professor and a team of students are actively seizing the opportunity to contribute and improve upon the e-learning platform. As their practices are an exemplary case of knowledge entrepreneurship the practices are described in a separate section as unique strange attractor (section 1.12.4)

Current Practices (Use Cases)

Statistically, e-learning the local administration (DURSI) indicator counts 112.3 million users have accessed the e-learning platform (UPC, 2006b). According to estimates by UPC e-

²¹ In fact many of the programmers who have developed the Raquo have accompanied Dr. Ferraté when the UOC was founded.

learning developers, the e-learning offers are currently only being exploited by approximately 20% of the courses (UPC faculty and administration 47).

The e-learning platform is mostly used rather conservatively. Documents and articles are made available and are possibly even a forum used for communication, but overall the system's potential is not exploited. One positive exception are evidenced in the classes of Moodle developer Prof. Alier. He uses the collaborative and constructivist learning elements made possible within the platform (e.g. in his class on the history of computers). Within his class, students have to research one thematic aspect and either create a new article on the evolving wiki-knowledge-based elements being developed, optimized or updated.

The Institute for the Science of Education (ICE) is dedicated to giving training on e-learning practices to professors and it also facilitates the development of teaching material within the UPC.

3.3.9.2. e-Research

Tools Integration (Technology)

The theme of e-research support and development is, according to the information of the researcher, not yet institutionalized. The library has, quite-proactively, developed through services such as Open Access repositories and intellectual property consulting for UPC authors. Also, UPCnet is offering services such as the setup of mailing lists that can be used for scientific discourse. Furthermore, the FIB and the Unit for Free Software Development is naturally developing e-research activities as concrete outcomes of their research field.

Current Practices (Use Cases)

According to the regional administration (UPC, 2006b), the library's website was accessed 64,491,978 times in 2004, thereby 6,923,216 files have been downloaded. An almost exponential usage of the opportunity to publish research in the Dspace repository has taken place in the last year. In 2006 only 174 items were entered into the UPC's open access portal²² where as there were 1251 in mid 2007²³.

When looking at the utilisation of the mailing list service, it has been reported that in 2007 there were about 400 mailing lists and the procedure for setting each one is highly standardized (UPC web).

²² http://www.invenia.es/e-prints.upc.edu

²³http://en.scientificcommons.org/repository/universitat_polit%C3%A9cnica_de_catalunya_upc_-_dspacee-prints

3.3.9.3. Website & Intranet

Tools Integration (Technology)

The first testimonies²⁴ of UPC's website under upc.es have been dated to early 1997. Since 2001, the UPC is also using the upc.edu domain²⁵. Naturally, the UPC has also secured the upc.cat domain when it became available in early 2006. Unfortunately, it could not be clarified how the content being distributed was decided upon.

As with the other universities, the UPC institutions created and maintain their own sites. Subsequently, the design, quality and amount of information vary greatly between the entities. In fact it has been reported that there are about eight or nine intranet solution for different purposes (central HR, departmental, etc.). Even though this has created a highly fragmented information space, the central administrators were at least able to setup an LDAP server, which allows for single sign on.

For administrative software, the UPC has chosen IBM's Lotus Notes for basic intranet and communication services, which is complemented by a non-standard solution. Based on the fact that the UPC is a technical university with a business studies department, it henceforth has human capital in the area of IT and business, it was thus decided in 2001 that in-house campus management software need be developed. The project launched under the name "PRISMA" and has since produced a solution that assists academic units in the planning, development and evaluation of studies; it is also implemented in most entities. UPC stakeholders report to be rather satisfied by the system (UPC faculty 43) and adjustments and new necessities can be taken care of fluidly, as the know-how is present and no intellectual property restrictions apply.

Current Practices (Use Cases)

The institutional website's content is maintained by the Public Relations Unit, while the technology components are taken care of by the UPCnet The individual departments are responsible for their content on an individual basis.

In the Madrid authored global website rankings of universities, the UPC reaches the 8th place for Spanish universities, and the respectable 318 on a global scale (Webometrics, 2006).

²⁴ The 'whois' serviced does have corrupted data for upc.es Using the internet-archive historic website service web.archive.org

²⁵ According to http://reports.internic.net/cgi/whois?whois nic=upc.edu&type=domain (4.June.2007)

3.3.10. UPC Position (Institutional Results)

3.3.10.1. Teaching and Learning Results

The UPC is evaluated in national and international university rakings and quite a positive impression remains (see table 1). The newspaper *El Mundo* puts the UPC in the 6th place for all of Spain. The *El Mundo* ranking also assesses the UPC to have an international mentality, especially in regards to the integration into the EU HEI space, as well as a good student orientation (el Mundo, 2006). The *Gaceta Universitaria*, a specialized higher education newspaper ranks the UPC more moderately in the middle field at 20 out of 47.

El Mundo	Gaceta Universitaria	InternetLab (2005)	4icu (2006) (from 72)
(2005/2006)	(2002) (from 47)	(from 100)	
(from 41)			
6th	20th	4th	20th

Table 3.3.1 - UPC in national and international rankings

When it comes to evaluating UPC's website, the Webometrics ranking gives it the 4th place (Webometrics, 2006) and the 20th place in the 4icu web popularity ranking²⁶.

The UPC is deploying several quality assurance instruments such as student satisfaction questionnaires and has consequently reached an ISO certification in that area (Hernández et al., 2003; Jofre, Amoros, & Cortadellas, 1998). Furthermore, the UPC has conducted a 'best teaching practice' award every year since 1998. The award includes prize money of nine thousand euros and is given to initiatives that make use of new systems (many times of an elearning variety) in teaching²⁷.

3.3.10.2. Research Results

The 2006 El Mundo ranking puts the UPC "indisputably" at the first position for research leadership in its fields (el Mundo, 2006). Accordingly, the ICI Essential Science Indicator indicates that the UPC has a very respectable production of 5,450 papers in journals that have passed ISI's high quality standards (see table 3.3.2). The average citation rate of 5.2 per paper must be assessed as rather low for the field.

²⁶ www.4icu.org/

²⁷ http://www.upc.edu/castellano/la-upc/presentacio/premiQdocencia.htm

Field	Papers	Citations	Citations per paper
PHYSICS	975	7,347	7.54
CHEMISTRY	778	5,552	7.14
ENGINEERING	1,113	4,383	3.94
COMPUTER SCIENCE	856	2,311	2.70
MATERIALS SCIENCE	479	2,078	4.34
ALL FIELDS*	5,450	28,337	5.20

Table 3.3.2 - UPC ISI Essential Science Indicator (28.10.2006)

3.3.11. Rival Explanations

3.3.11.1. National Context

For the latter part of the 20th century, Spain and Spanish universities have played a catch-up role within the European community (WorldFactBook, 2007). In 2006, the economic growth has slowed down a bit to a GDP of 3.6%; still quite a high figure compared to the other two countries (UK and Germany) which were examined in the study.

One institution that has rather extensive influence on universities is the Spanish University Rector Conference (CRUE). Here, all Spanish university rectors come together to discuss and respond jointly whilst collaborating with policy makers. The CRUE works as an efficient lobbying group for higher education interests.

In general, the Spanish context is assessed to be rather positive, but less and less important as the centre of Madrid is replaced by a more federated system. Catalonia as a region is definitely one of the political powers leading this process.

3.3.11.2. Local & Regional Context

The Spanish province of Catalonia is a nation without a country that is striving for political autonomy from Madrid. The nation ²⁸ is mainly held together by its language – Catalan (Castells, 2004) and since the Spanish dictatorship, (that mercilessly crushed all energies that were against its political doctrine of one egalitarian Spanish nation,) ended in 1979, Catalonians have enthusiastically revived their distinct traditions, especially the cultivation of their language. Extending upon its strong industrialization, the Barcelonan region especially was eager to increase its influence on education, subsidizing local universities as much as it could.

²⁸ Catalonia is the mainland of a society that consists of various additional 'catalunyan enclaves' that all at one point belonged together.

One of the earliest expressions of Catalonia's dedication for independence was the reform of its university system. The concrete role of universities for the preservation and development of specifically Catalonian culture was thus enshrined in the regional higher education legislation of 2003. Regarding the mandate of the universities, there is a canonized effort: to 'enrich the intellectual, cultural and scientific patrimony of Catalonia, as well as 'incorporate the Catalan language in all areas of knowledge, thus contributing to the process of its standardisation in scientific, cultural and social contexts'. (LUC Article 3).

Catalonia has a distinct dedication to move its society into the information society; contingently, related programmes and events have been observed to be omnipresent. This fact is documented in the active and vibrant higher education politics (which led to the modern higher education coordination system described below) as well as the fact that 3% of the GDP was invested in research and development²⁹ by 2010.

3.3.11.3. Local Universities Coordination System

The program-based contract system setup by the Catalonian administration provides a new framework for management and coordination between universities and the local authorities (outlined in figure 3.3.8). The universities are required to develop a comprehensive strategic plan, including defined objectives and measurable indicators on which the funding depends. Vilalta notes that without the strategic planning process for the contract, the transformation of university culture and hence the implementation of the internal strategic planning process would not have been possible (Vilalta, 2001, p 16). He furthermore assesses that the autonomy of the university has been strengthened, and the negotiations are more transparent and objective driven, and not limited to quid pro quo costs for means (ibid). For the UPC he reports that it strives to adopt a similar system of results-linked funding.

What the observer finds today is a holistically cascading strategy initiated at the rector's office and streaming down to individual units. By now, it is a matured practice involving the whole university, interlocking all activities and making them accountable. The coordination system hence allows for more decentralization because it gives responsibilities to the implementing unit, while on the other hand there is an increase in centralization as a result of the possibility of central leadership to ensure certain priorities and directions as well as the introduction of standardized measurements (ibid p.19). "This sort of 'centralised decentralisation', as Henkel (1997) calls it, would provide the means for ensuring unversities' capacity for enterprise without sacrificing their cultural foundation." (ibid p.20). As such, Vilalta's conclusion is really quite positive: "It is not the type of contract that fixes and determines, but rather one that fosters change, creates a dynamic of constant innovation and revision and, above all, provides for the differentiation of each university and even for each unit." The last point is evaluated as

²⁹ http://www.upc.es/catala/recerca/plardi2010/plardi2010.pdf p.3

particularly important as for Clark (1998), differentiation is one of the key strategic objectives for successful HEIs.

Only one of the negative aspects raised by Vilalta has been reported to manifest itself, and that is an increased competition between the Catalonian universities (UPC management 52).

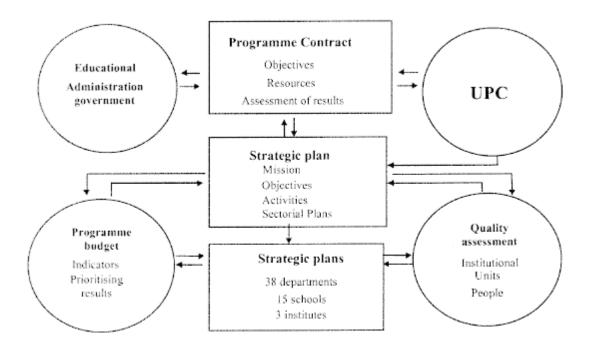


Figure 3.3.8. - Catalan university contract framework (Vilalta 2001)

3.3.12. Unique Strange Attractors

3.3.12.1. I2CAT

The I2CAT foundation was founded with the mission to promote research and innovation in advanced internet technology. Thereby, it follows Etzkowitz' and Leydesdorff's triple helix innovation model (Etzkowitz, 2002; H. Etzkowitz & L. Leydesdorff, 1997). As such, its mandate is to foster private sector-governmental-university collaboration as a knowledge entrepreneurship institution. The foundations director follows a Simonian (2000; H. A. Simon, 1969) conceptualization of a science within an engineering paradigm. Hence the I2CAT is understood to deploy scientific methods to produce (technological) artefacts and mode 2 knowledge (Gibbons, 1994).

The centre, which is directed by the UPC but was initiated officially by the regional government's network society programme, has successfully established itself as a

collaboration platform. In so doing, it has initiated and lead regional projects as well as evoked Catalonian participation in international projects. For this purpose, it has setup and is coordinating various local multi-stakeholder clusters, bringing together private sector, political and academic specialists.

I2CAT is a good example of how an institution dedicated specifically to the promotion of knowledge entrepreneurship can be beneficial for the university, the industry and, through the transparency and accessibility of the knowledge generated, to society itself. The I2CAT is also a good counter example to the EUA's assessment that the research done at the UPC is aloft and only looking for retroactive applications. The EUA's statement that it seems "as if the university had solutions looking for problems rather than solutions invented to meet the specific situation of a given firm or set of enterprises – whose basic needs required original analyses" (EUA, 2005), can not be confirmed by the findings of this study.

3.3.12.2. UPCnet Innovation Team

What can be named a centre of excellence, not only among the investigated universities, has been found at the IT service provider spin-off UPCnet The company has a fully-developed holistic process architecture; this architecture is constantly reviewed and updated. One strategic area of work is innovation, and a small team is dedicated exclusively to the identification, evaluation and realization of innovations. The team, which has the explicit finality "to manage the constant flow of [innovation] opportunities, ideas and projects from their birth to their successful completion" (UPCnet, 2006), follows a defined but continuously fine tuned practice (see Figure 3.3.9.).

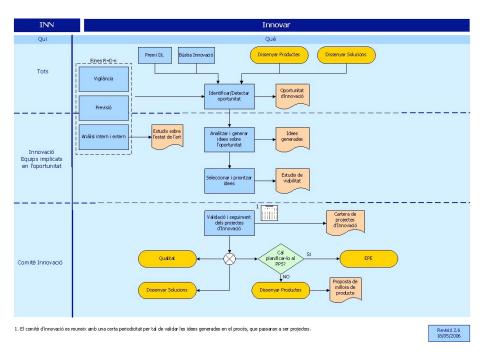


Figure 3.3.9 - UPCnet's Innovation Process

The activities are structured by responsibilities: (all, innovation team, innovation committee). The first block of activities, that of identifying opportunities is a task shared by everyone. Here we find technologic, commercial and environmental 'vigilance' (matched with the environmental awareness component), and 'prevision', a rather external locus of control-focused variation for the entrepreneuring component. Two elements to facilitate opportunity identification are defined.

An incentive for participation is created through an innovation price. This makes it attractive to contribute an opportunity because of the possibly obtained beneficial price,; even more importantly, it also communicates and create an atmosphere of innovation and optimization. This culture creation aspect was additionally spurred by another prize for the best definition of innovation, also making innovation a theme of organizational discourse. Secondly, opportunity recognition is facilitated by providing a virtual institution in the form of a webpage and mailbox, where staff is asked to contribute ideas which they develop from inspiration found in their daily work context and/or from user input.

The next step in the process is the formal development of these opportunities in brainstormed multidisciplinary meetings. This opportunity development, in which each opportunity is assigned to a work team, is followed by the evaluation of the opportunities, which eventually leads to a selection based on obligatory requirements and potential assessment. Obligatory criteria are: (1) strategic fit with strategy, (2) clear competitive advantage, (3) technical feasibility, and (4) non existence of prohibitive external attractors. The opportunities potential and risk is assessed by looking at strategic, economic and technological aspects. At this stage, the innovation project is also formally defined with a proposed duration and concrete success factors (goals).

Once a list of prioritized opportunities has been produced, the innovation team calls for a meeting of the Innovation Committee, which has the power to decide about the initiation of a project and its budget.

In conclusion, it becomes clear that UPCnet has institutionalized innovation by deploying all elements of environmental awareness, entrepreneuring, communication, risk taking, and new project support (using their variation). The components are well defined with regards to content, results and ownership. The state of the art technological environment at the UPC is directly related with this innovative setup.

3.3.12.3. Mare Nostrum Supercomputer

The high-technology race is fierce; in fact, the Supercomputer that the UPC managed to build (thanks to the sponsorship obtained by IBM and the Spanish government), never made it to

the global top-tier, and yet it remains the fastest computer in Europe. A result of UPC's work on computational architecture since 1991, the construction of Mare Nostrum was an important and groundbreaking first step for Spain and Catalunya. The Times Higher Education Supplement commented: This "will help Spain make its mark in the elite field of supercomputing" (Warden, 2004). Today, only one year after the construction was completed, the Barcelona Supercomputing Centre (which is hosted by the UPC) ranks fifth in the global competition, but the importance of Mare Nostrum is not only measured on a global scale, but in its importance for the local milieu. The presence of the supercomputer is an excellent example of a strange attractor. Originally the first team was 140 highly qualified staff members, constituted of 80% multi-disciplinary scientific staff and 20% support staff. These specialist work directly on and with the supercomputer itself, but when observed in detail there is a host of other services and initiatives in the field of computational science, life science and earth science that are springing up in its periphery (Figure 3.3.10).

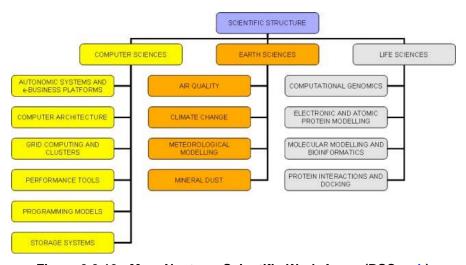


Figure 3.3.10 - Mare Nostrum Scientific Work Areas (BSC web)

In fact, the supercomputer is embedded in a multi-disciplinary research scenario, which the responsible administrators value as "our exposure to industrial and non-computer science academic practices improves our understanding of the needs and helps us focusing our basic research towards improving those practices. The result is very positive both for our research work as well as for improving the way we service our society" (BSC web)

3.3.12.4. Dynamics of Open Source e-Learning Platform

The knowledge entrepreneurial ventures (developed by software development professor Marc Alier) delineated in the context of the introduction are assessed to have the effect of a strange attractor in the context of this research. This is the case because they are (a) dealing with the creative destruction of the practice of imparting knowledge services through the appropriation of an internet based innovation and (b) because the development of this knowledge product is occurring in an innovative way of doing applied team research coached by a professor.

Needless to say, he also actively exploits and sets an example of how to benefit from internet based collaborative learning tools in his classroom.

Marc Alier, who setup and managed a commercial software venture after his studies³⁰, decided to become a university professor when he realized that he was more interested in pursuing and sharing knowledge than striving for monetary profit. He became a member of UPC's School of Informatics in 2001 and has since then developed a special practice of having students develop their assignments (especially more serious works such as their final thesis) in teams and working on a 'real life' problem that professors like him identified and assessed as an opportunity for beneficial improvements.

The process of the development of the DFwiki component, which at the time of writing is about to be integrated in the official Moodle distribution, serves as a point in case to illustrate the approach. When professor Alier came to the UPC he had identified wikis as a high potential tool for learning. He began to program a wiki software but then realized that in order for his efforts to have an impact he could tap into an existing user community. This is when he became aware of the e-learning platforms as a relevant theme of his programming work in the university. He identified Moodle as one of the more established systems and after assessing it positively, he decided to attempt to integrate himself in the developer community; this decision was important because it was a key aspect when working in an open source project. He contributed a small but effective functionality³¹ that improved an existing feature. With that move he proved to the community that he was (a) pragmatic rather then theoretic, (b) did have the competence to identify and solve a problem that actually improved the overall product.

He then programmed a bigger module for internal mail exchange together with some students. The internal mail module became a huge success because of user expectations from competitor programs and the clear separation of learning & teaching contexts to normal mail.

Next, he tackled the wiki component (which when compared to the first 'tweak' and the second hack of an existing module is a rather substantial part of the platform) by communicating to the community that he thought it to be less than optimal and suggested looking further into the matter. His interests were positively encouraged and he decided to propose the project as an opportunity for a final thesis project to his students. Two students were interested – working from then on under Alier's supervision on the task. The first idea was to integrate a wikisoftware that Alier had programmed previously. After experimenting, comparing and evaluating several existing wiki programmes, the team decided to develop a new wiki-software

³⁰ He actually conducted his studies at the FIB from 1991 to 1996. The software development company he run was finally sold in 2005 because of a long takeover procedure.

³¹ A spell checker module

specifically for this context³². The foundational programming was done within three months, and in May 2005 the module was offered as an optional replacement for the integrated wiki. After this entrepreneurial bootstrapping and rapid completion of the fundamentals, a long period of six months followed. During this time the team worked on code optimization and tweaked the interoperability and added security features in order to have the DFwiki integrated into the official distribution. As a result of the project, the two students who first developed the DFwiki are now employed by the UPC to maintain and optimize the e-learning platform and to integrate it with the universities other IT systems (especially the PRISMA management tool). Because of the popularity of this approach, a second, third, and today fourth generation of students are working on improvements of the original module³³.

Three aspects, one pedagogical, the other two dealing with individual research benefits, have been reported by Prof. Alier (UPC faculty 22) to be especially noteworthy in regards to his practice:

- The practical application of the students' developments causes them to be much more motivated. Furthermore, the real life context prepares them for real world projects. And, the collaborative organisation of the research work, combined with the constructivist methods used by Prof. Alier, ensures that learning is not restrained to the narrow task at hand but also includes team work and communication skills.
 - This approach is supported by the argument of a like minded colleague, who stated that he attempts to instil a work ethic along the lines of Himanen's *Hacker Ethics* (Himanen, Castells, & Torvals, 2001). In practice he reports to (a) listen to what the students are interested in, and (b) allows them to work in groups and have fun, thereby he sets them (c) practical challenges in a realistic context meant to (d) communicate what the knowledge or skill is useful for (UPC faculty 34).
- First, understand the practices and culture of the developer community. Secondly, develop a good relationship with the developer community. Start this process by contributing a small but useful piece of work.

Within the open source community, relationships and credentials are developed amongst individuals and not between organisations. While there is a positive side effect for the institution, the reputation and trust is primarily developed by and for the protagonists. Hence, one of the major benefits of the transparency and informality of

³² http://appserv.lsi.upc.es/palangana/moodle16/mod/glossary/view.php?g=1

³³ In fact contrary to the smaller add-ons, the wiki is in mid 2007 still not integrated into the official release because of political issues. Nevertheless, Prof. Alier and his team have continuously improved the software and have added especially innovative educational features like the possibility to evaluate peer contribution, or the exportation to Open Office or pdf.

open source development is the formation of a reputation and the act of becoming part of a social network.

- In Prof. Alier's assessment, the current research assessment practice is not holistic
 enough. It single-mindedly focuses on the traditional research practice of publishing in
 scientific journals, e.g. the production of open source software (which is a highly peer
 reviewed process), and Open Educational Resources are not taken into consideration.
- Furthermore, the valuation of academic efforts ex post is not very conducive for the fomentation and motivation of new projects initiation. Instead, un-bureaucratic procedures employed to obtain concrete support at the beginning of a new project will be needed.

3.3.12.5. Student IT Consulting JEDI

Junior Company – the business run by the Young Informatics Students (JEDI) association is an ICT consulting firm offering a broad range of services from graphic design to hardware maintenance. JEDI is a very interesting solution which allows students to gain professional experience during their studies in a flat hierarchical environment. From the institutional design perspective, this participation in JEDI should lead to personal autonomy, specialisation and role profiling.

3.3.12.6. Global University Network for Innovation

UPC is hosting the Global University Network for Innovation (GUNI) which is an association bringing together the various UNESCO chairs from around the world. The mandate of GUNI - which is internally managed by UPC's UNESCO chair on higher education management – is to research and disseminate 'best practices' in university innovation and the university's broader role in spurring innovation.

Unfortunately, no interview with one of UPC's GUNI representatives could be conducted. However, from the information presented on the website,³⁴ and the assessment of the EUA experts it appears that the competency and knowledge of the GUNI is not sufficiently taken advantage of, and that the best practices were not applied to the UPC itself (EUA, 2005). The aforementioned observation could neither be verified nor disputed. However, the neglect of internal knowledge and human capital has been observed at the FU in regards to the computer sciences departments, and to a certain degree at the LSE within the information systems department. Notably though, at the UPC the integration and partial leadership of the School of

³⁴ http://www.guni-rmies.net/

Informatics in the improvement of the e-learning platform seems to give evidence to better emergent practices at the UPC.

3.3.13. Analysis and conclusion

The strategy and practices at the UPC are assessed to embody (in a very interesting way) the current paradigm of the *entrepreneurial university* as exemplified by the MIT (Etzkowitz, 2002). On the positive side, the university is hedging its interests and is entrepreneurially negotiating its governmental funding; in fact, it has co-determined the evolution of the higher education funding contract framework. Additionally, the UPC is assessed to share the same high standards of transparency as the LSE (see e.g. the database of protocols of meetings of the council and the senate which are <u>published online</u>³⁵). Also UPC's practices and institutions for the fomentation of commercialisation of research results, be it in the form of transfer services (implemented through the CTT) or through business creation (implemented through the Innova Program), are evaluated to be state-of-the-art. Furthermore, the I2CAT and the K2M projects are understood to follow an innovative and promising approach of Mode 2 Knowledge Production (Gibbons, 1994) and the development of technological artefacts (H. A. Simon, 1969).

From a more critical perspective, the UPC seems to have only a "very general understanding" of its mission (EUA, 2005) which, coupled with the poly-centric structure, makes the university look disjointed, lacking in a concrete vision, and largely without priorities to be pursued by the institution as a whole³⁶. Rather, 'excellence' – a term that only makes sense as an attribute of a practice - is aimed at what seems to be virtually all fields of activity. The negative conclusion of this trend may be that the UPC becomes a "jack of all trades, but a master of none."

What is more, extensive cultural indicators present at the UPC favour the development of a Janus-faced organisation (UPC administration 31). This is a planned and strategically implemented duplicity ³⁷. There is the official face, which shows all the procedures and indicators, and then there is the un-official face where bureaucratic steps are informally emitted. The danger herein, is that rather than pursuing truly meaningful objectives, the numbers initially meant to serve only as ad hoc proxies for the non-measurable positive practices, are now being pursued as ends in themselves. Hence, at the UPC, knowledge -- or perhaps knowing the "right people" is power in itself – the power to expedite the bureaucratic process, and the power to make an initiative thrive. As one interviewee assessed, for this insular and self-interested culture to change, a paradigmatic shift is needed (UPC faculty 39).

³⁵ http://www.upc.es/catala/la-upc/govern/bupc/

 $^{^{\}rm 36}$ This observation is made even though the practiced strategy process is laudable.

³⁷ Duplicity here is not used pejoratively.

The celebrated contract framework within the regional government is assessed to having had the positive effect of providing mid-term planning security, but on the other hand it too strictly controls the university's development. Consequently, there is hardly any leeway to encourage innovative policies (EUA, 2005). Generally, the whole contract framework and the contingently dependent strategy development are meant to control the university, while the university management is expected to control its entities. The strategy can be used much more as a balanced endeavour between incitation and bottom up emergence of strategic initiatives. This is a coordinated project orchestrated by the management and creates a collective entrepreneuring process (development of a shared vision) which is naturally inspired by the leadership. The EUA wrote: If the hierarchy of tasks and duties becomes transparent, present bureaucracy – accumulating data rather than offering tools for the management of persona responsibilities – could be much reduced to empower staff to innovate in teaching, research and services – an innovation process that should be encouraged from the centre (even financially), thus building a culture of trust rather than of control inside the institution (ibid).

Tight planning with little leeway for pursuing ad hoc and emergent opportunities, has had negative effects on the entrepreneurial practices. Except for the laudable exception of the UPCnet, there is no fund to set aside to stimulate innovation (ibid). While there are budgets, these are prepared years in advance by the central management. Such strict budgetary control doesn't allow for experimentation, innovative research ideas or learning projects to adequately mushroom.

One critique expressed by an informant touched upon a largely external factor. Since university professors are civil servants, there is a tight regulation of their external non-university related working and consulting possibilities. The elimination of these restrictions (even while they ensure the good performance of basic functions), would elevate the entrepreneurial spirit within the faculty (UPC faculty 33).

When looking at the educational mission, a similarly positive first impression has to be complemented with some critical observations made upon a closer inspection of ultimate educational goals. The UPC is assessed to be successful in imparting state of the art vocational training for technical professions and researchers. This education is effective but not complete. This regional excellence in specialized knowledge and skill transmission leads to graduates perfectly able to contribute their technological citizenship, (Delanty, 2001) but what of their cultural citizenship? These institutions will need to adopt program curricula that teach about the 'big picture' of life (Lombardo, 2007). The necessary question being posed is: Beyond technology, are these students being adequately prepared for cultural citizenship³⁸ (Delanty, 2001)?

³⁸ Outside stakeholders like politicians and private sector employers "claiming that graduates, next to their good craftsmanship in engineering, were often lacking social competences" (EUA, 2005). Some paragraphs later, these

Any holistic and worthwhile educational platform must necessarily teach an advanced specialization in the subject of student focus, but to teach only this is to fail the student. A true university must also leave a matriculating student with the broad tools necessary to participate in the international discourse of (global) citizenship. For institutions such as those that teach technological excellence it is deemed necessary for their curricula to cumulatively embrace a foundational core of cultural citizen education and complementary subjects. Through this balanced system the "western traditions" of both art and science may be fully imparted, thus leaving the pupil with the mastery necessary of all educated cultural citizens. A computer scientist that can quote Homer is more well-informed and better served than one too heavily focused on a purely technological discourse. What is the point of science without art? What is the passion of exploration without the visceral and uniquely human recognition of happy discovery? An algorithm may more effectively locate a flower, but a poem will always more fully be able to articulate its beauty. An engineer should be encouraged to paint just as a musician should understand the calculus of both sound and mathematics. Today we now look to scholars that can navigate the virtual cyber spheres with the same mental acuity that they have engaged in the metaphysical and the philosophical ruminations of antiquity.

Last but not least, the conditions and practices regarding internet-based innovation appropriation are analysed. Each part of the technology triumvirate: ICE, UPCnet and the library, is assessed to perform rather satisfactorily in their respective field. As there seems to be a rather established (though not institutionalized) knowledge flow between UPCnet and the School of Informatics, it is assumed that certain synergy effects are exploited. Nevertheless, in general there are no observable coordination practices found to facilitate the co-management of IT matters between all stakeholders. There is no central IT leadership functionary – such as a CIO - and subsequently no holistic strategy (such as that developed for the similarly dispersed and autonomous libraries) has been developed. This omission has already been realized by the UPC library (UPC, 2005d SWOT Perez). Furthermore, some themes of e-research are addressed by the library, but more dynamic and discursive aspects are not addressed (most likely these would fall under the purview of the ICE, or possibly the library). E-research opens up splendid opportunities, especially for institutions with an ambition to enter into the prime league as it allows them to gain visibility and a larger impact by populating discourse spaces (such as PLOSone) and developing and promoting 'best practices'.

In conclusion, the UPC has been assessed to foster and maintain an "entrepreneurial spirit of a large part of the UPC staff" (EUA, 2005) but the traditional economic entrepreneurship paradigm applied is not conducive for the knowledge mandate of the university. Fundamentally

skills are spelled out as "need for communication skills and social competences – i.e., the capacity to work in a team and to take responsibilities of an entrepreneurial character" (ibid.). This research goes further in demanding cultural citizenship education even beyond competencies that are meant to improve professional versatility and productivity.

though-a university is at its core not a business and its objective is not to make money but to transform its students into mature and entrepreneurial members of society. Whenever money is made, one has to ask "what is the academic value, for instance, of some of the 'service' activities when trying to meet the requirements of external stakeholders?" (EUA, 2005) . This question perfectly matches the leitmotiv of knowledge entrepreneurship developed in this study.

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Case-Study 4: Universitat Oberta de Catalunya

A Sleeping Innovator

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3.4.1. Overview

When the Universitat Oberta de Catalunya (UOC) was created in 1995 it was the first university to offer certified university degrees exclusively through internet based distance learning. After focusing the first years on teaching only, in 2000 a research centre was opened and investigations began relating to the crosscutting theme of information and communication technology (ICT). On its foundation UOC was designed to be a lean institution, run by an experienced authoritarian leader who saw UOC's mission as one of satisfying the learning needs of as many Catalonians as possible. He hoped to achieve this service while still allowing the university to live out its semi-private semi-public institution status. Even though the university was not established with profit motives, it evolved to follow all state of the art private sector practices. Subsequently, a host of complementary and parallel business lines and companies were setup. Unfortunately, most ventures did not blossom and survive. In late 2005 the old leadership team was replaced and it was one of the new rector's first strategic decisions to transform institutional culture and practices to become more academically aligned, a closer approximation to the traditional idea of a university.

There can be no doubt that when UOC started, it was a true pioneer in the application of technology and a knowledge entrepreneur, as the opportunity to develop a new knowledge service was initially realized. In fact, constant technological innovation was the only way forward, as there were neither precedent, nor peers from which to learn. However, once the technological beast had been tamed, the technology backbone turned increasingly into a black box. The complexity of the soft- and hardware infrastructure became so high that around 2000 further development became more and more difficult due to the volume of individually documented and highly complicated interrelations and interfaces. The beast fell asleep in 2002 when a decision was implemented to discontinue the current virtual campus software and start anew. Because of financial struggles resulting from entrepreneurial ventures into the private education business, UOC decided to form a political alliance with other regional universities to solicit local government funding for the development of a new campus. It took until 2006 before the partners agreed and the development project could finally be launched. Since the development of the virtual campus was retarded by these changes, the Educational Technologies Department was mandated to bring in beneficial innovations whenever possible.

3.4.2. History

Before the UOC, only one Catalonian distance education initiative had been noted. In the 1930's the Mancomunitat de Catalunya, a vocational correspondence education programme, was setup by the Extensio Tecnica Professional. UOC was founded in the context of a reemergence of the political and economic autonomy of Catalunya. In 1994 Jordi Pujol, Catalunya's long term president (1980 - 2003), initiated the project to found a Catalonian distance university after the Universidad Nacional de Educación a Distancia (UNED) denied the self-organisation of its Catalonian professors and thus effectively prevented the autonomy of Catalonian's higher distance education from its central campus in Madrid (UOC faculty 1). Naturally, Pujol consulted with Gabriel Ferraté (see UPC and UOC leadership for more detailed information), who had tremendous experience in higher education politics, and the two collaborated effectively to give genesis to what would become one of the most successful distance universities. The decision to base the university's pedagogy on internet based communication was a strategic, but also very opportunistic one (UOC faculty 2). Given Ferraté's background as an engineer, he was not afraid of technology. Since his vision for the new university was an entrepreneurial and efficiency driven one (De Jonghe & Van Poeck, 2005), it was based on the idea of exploiting IT based opportunities for automation and the acceleration of communication. Consequently, the institution was designed as a semi-private entity outside the established university system in order to ensure the possibility for strong leadership with the objective of responsiveness to the rapid societal development. Hence, we witness a new organization; the Fundacio per a la Universitat Oberta de Catalunya (FUOC) – a consortium of local government representatives and key leaders from instrumental Catalonian

¹ Opportunistic is used here positively, as in taking advantage of an opportunity.

companies. This consortium was founded in 1994 as a 'holding' for the higher education enterprise.

Following his vision, Ferraté contracted the manager (who a role akin to that of a CEO) and the first bootstrapping management team² from his personal network and they immediately started to implement his revolutionary plan.

The fact that UOC started to admit its first two hundred students already in the following academic year 1995-1996 indicates that Ferraté did effectively create the non-bureaucratic university he had in mind. (See the business model for an analysis of the economic- and organisational-aspects, as well as the e-learning platforms for the pedagogical and technological aspects of the UOC model).

Professors remember how in these early days of the web and of IT in Spain, students had to be taught how to use a mouse and the whole setup was highly experimental from the technological point of view. And a successful experiment it was indeed. In the following year 1500 students had already matriculated. It was thus that the first version of the virtual campus that did not require special client software was introduced. In these very early days, the pioneering atmosphere of the web was ubiquitous- but was coupled with a feeling of taming a technological monster that bucked forward in surging complexity.

In 2000 UOC's biggest strategic (joint-) venture was formed with one of the central Spanish media companies in order to enter into the Latin American market. The joint project lasted until 2004, when UOC bought up all shares of the joint venture and now maintains internationalisation activities on its own. Today, there is one established UOC subsidiary in Mexico, which is developing organically, but which faces competition from Mexico's national distance education provider. Additionally, UOC has strategic outposts in Beijing and Brussels. In early 2006, after a political power shift in Catalunya's government, Dr. Ferraté, who had created and lead the UOC for 11 years, was ousted form his own university. Dr. Ferraté, who at that point was 74 years old, did not leave under harmonious terms, but to a certain degree he did not leave the institution another choice. There was, and still is, no defined term length for the rector; Instead, the council appoints and re-elects the rector on a consensual basis.

A new era began at UOC, when in late 2005 Imma Tubella took office as the institution's second rector. Prof. Tubella, who knows the university well through her long engagement as professor and researcher, has set out to turn UOC into a 'great university' (UOC, 2006), which she seems to contrast to the business logic driven institutional mindset promoted before. Naturally, she has replaced almost the whole management team, as well as partially restructured the organisational architecture. Nevertheless, while subtle changes in the

² Instead of an academic leadership team as in a traditional university (ibid. p.8)

collective mindset are observable, up till now (2007), the new management has not publicly presented their elaborated strategy. Nevertheless, several projects representing the new, more academic line have been initiated. For example, all UOC faculty is urged to obtain doctorate degrees, and research has been given a more central role than under the old leadership. It is still too early to sincerely evaluate the changes thus initiated, but it can be said that UOC is still a very young institution, and one that has accomplished much in its short history.

3.4.3. Setting & Typology

3.4.3.1. Members

UOC has shown an incredible student growth rate. Today it boasts an enrolment of 40,707 students, taught by 1462 online mostly external tutors and about 160 UOC professors. The student body is emotionally and strategically coached by 305 counsellors (UOC, 2005). 93% of UOC's students are working and 77% have previous university experience. Hence, UOC's courses are focused on a target group of people between 25 and 45. Almost 73% of the students come from Catalunya, 22% from the rest of Spain and 5% are foreigners (EIPais, 2005), the latter coming from 45 countries (el Mundo, 2006) Despite the foreign element, the vast majority have some relation to the Catalonian language. In fact, in 2001 60% of UOC's students were living in Barcelona (Ros Híjar, 2001). The most international part of the UOC is the doctorial program where (in its fifth edition) slightly more international than Catalonian students participate (UOC web). UOC has a slightly higher percentage of male students (56%) which is most likely due to the inequalities regarding the perception of technology as a barrier.

Even though young people also take UOC's services in their educational development, the university's official mandate is understood to be offering learning opportunities for adults interested in continuing their education. Many students are taking the chance to improve their career chances by enrolling in a UOC course after they just started working (31,6% of students are between 25-29). Hence, even though this condition does not play out in academic decisions, the UOC's students are on average much older than students at other universities.

3.4.3.2. Location

In the case of the UOC, two types of physical locations exist. First, the spatial setting of the core administration, faculty and the research centre, and finally the support centres. When the UOC was founded in 1995 it took its venue in a representative building in Barcelona, which still hosts the university management and some faculty. Over the years, several new spaces have been added following the UOC's natural growth pattern. In 2001 and 2006 a research centre in the outskirts of Barcelona and a big building in the new business district have been added, respectively. It is clear that the UOC is a highly dispersed organization by nature, even without the support centres, which are naturally spread far apart from each other.

As marketing points and to further facilitate student administration and community activities, 11 support centres in Catalonia, and eight throughout Spain, have been setup at points with high UOC student populations. Additionally, as described in the history, UOC has one subsidiary in Mexico which also hosts a support centre. As a more strategic global effort, UOC has setup support centres in Beijing and Brussels as well.

Even though physical location has to be read in a less dominant context than with the other universities (because it does not directly influence the learning experience) it remains an important aspect of inquiry. For the UOC, the fact that its administration is distributed widely across Barcelona hinders cross-departmental collaboration and a community atmosphere, even though UOC's staff is naturally very computer savvy and capable of replicating many communal aspects through online substitutes.

For the students, the availability of the support centres makes the learning experience less virtual, which can improve learning and motivation for some students. However the exploitation of the support centres as a collaborative learning space is generally not fostered as conditions are meant to be equal for everybody (UOC student 21).

3.4.3.3. Specialization

The UOC is offering the equivalent of bachelors and master degrees in eight academic disciplines. While most of the disciplines are selected for their suitability for distance education, there are also some studies, like psychology or languages, where the limits of online pedagogy is a great challenge to the professors. Nevertheless, UOC's specialization can be clearly stated as Social Sciences and Computer Sciences. In fact, of UOC's 40 thousand students: nearly 20 thousand are doing Business Studies, 11 thousand are in Computer Sciences and Multi-Media, 8 thousand are in psychology and Educational Sciences, 6 thousand are in Law and Political Sciences, 4 thousand are in Humanities and Languages, while the rest are enrolled in rather small faculties (UOC, 2005).

In research, the UOC has decided to focus on one theme – information society. Research was added to UOC's practices in 2000 when the internationally eminent sociologist Manuel Castells was chosen to guide the efforts of the university in this gambit. The university's thematic research centre, the Internet Interdisciplinary Institute (IN3), was founded with the aid from the Catalonian and Spanish government and the European Union³, and the UOC began its work on a large-scale multi-sector research project (PIC) to investigate the conditions of the Catalonian region in regards to the "information society." The IN3 also houses the virtual PhD programme on the information and knowledge society that accommodates and frames this present research project.

³ Who subsidized the building

3.4.3.4. Business-Model

Probably the most unique aspect of UOC as an institution is its juridical form. The university itself is not a juridical person (BOE, 1995). As see in figure 3.4.4 it is a line of operations or 'brand' of the UOC Foundation. The Foundation is a non-profit entity with the mandate to provide life-long-learning opportunities and related knowledge services and products. It is founded and led in equal parts by the local government and private enterprises. This has most interesting implications for UOC's status and subsequent modus operandi. Because the Foundation is half private half public UOC can manoeuvre and argue on a by case basis whether to apply public or private status. This has far reaching practical business consequences. For example like a private university it has more far reaching freedoms in determining most aspects of its price structure but on the other hand it can participate in state funded joint public university projects.

Exploiting this hybrid condition, UOC's business model stands on four legs. As a semi-private educational institution it receives governmental funding, which used to make up about half of UOC's income (Sangra, 2003) but this subvention is lately declining to about 36%. Next, it charges student fees, which are dependent on the national origin of the student as well as on the type of program in which they are enrolled. In fact here is where its hybrid status has the most significant effect, UOC practically functions as a public university for Catalonian students- and as a private university for Spanish and foreign students, who pay about three times the price of the subsidized locals (ibid). In 2003, fees made up about 44% of the universities budget (In 2006 about 60%). Furthermore, the university is quite successful at wining funding from regional, national and supra-national bodies. Such success facilitated many of its research facilities and conduct projects. Finally, there are UOC's private companies, which are known as UOC Group, as well as business of UOC 'like' a private e-learning provider.

As alluded to in the history section, UOC was, from the beginning, set upon a rather business oriented trajectory. Even as the intention of the leadership was to limit the growth of tenured faculty and researchers in order to guarantee agility and effective leadership, emerging business opportunities were realized with determination. Hence, UOC setup a host of for-profit companies, operating under the UOC 'Paramount Foundation,' each meant to allow for further expansion of the not-for-profit core entity – the university (figure 3.4.1).

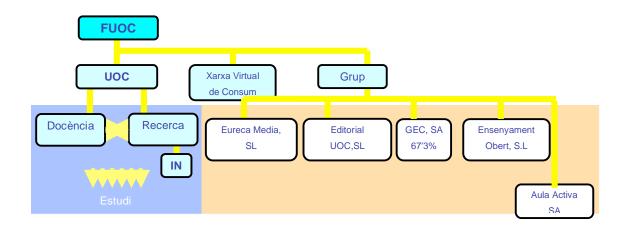


Figure 3.4.1 - Oranigram of organizations of the UOC Foundation

According to ex-vice-manager Carles Esquerre, "this network of companies develops from an entrepreneurial spirit to offer UOC generated services to the society and at the same time generates a cash-flow that nurtures the university financially" (De Jonghe & Van Poeck, 2005, p. 10). Generally, this part of the business model is reported to have delivered mediocre results. While some of the companies have been able to evolve to a self-sustaining level, various others went out of business, or had to be maintained through interventions made by the university. This situation extended into 2005 but strategic management decisions where fruitful and in 2006 almost all enterprises where profitable (UOC, 2007b). In 2006 UOC's 'private business' activities (including delivering 'corporate training', e.g. for the local police) has brought in ca. 4% of the funds.

As mentioned in the history, UOC always had very close relations and partnerships with both local and national companies. At present, it is offering corporate e-learning solutions through the 'g e c' company. This strategic service bears much resemblance with the LSE Enterprise.

3.4.3.5. Finance

Despite the fact that UOC is a private foundation, its finances are controlled by the Catalonian Government (Sangra, 2003). UOC's overall budget in 2005 was 46,741,145 €, and in this year alone it made investments of more than 5 million Euros. These figures only reflect the finances of the university⁴. In general, UOC has a rather high standard working conditions in the office space it provides, and the fixed staff report to being satisfied with the payments. The 'external staff' of hired teachers are less satisfied, reporting medium-to-low satisfaction due to low salaries.

In liberal fashion, UOC is donating 0.7% of its budget to direct international cooperation activities (Sangra, 2005).

⁴ Statements for the businesses of the UOC group could not been obtained.

3.4.4. IT Setting

3.4.4.1. History & Approach

The UOC was born with the promise of efficiency gains made possible through internet technology. The venture was started with an internet connection based on a rack of 30 modems in 1995. For the first years, the virtual campus was a stand-alone software platform. The internet connection was increased to 2Mb the following year. Generally, the system grew rapidly to serve the exploding user base. UOC started in 1995 with 200 students and in 1996/97 it already had 1500 students connecting themselves to the interface through Telefonicas Infovia service. Over the years, the architecture of the core application – the virtual campus – has evolved from a 'closed non-standard solution,' to a monolithic, but more standardized solution using mostly CGI scripts (1996,) to its third generation version utilizing mainly Java (2002). Development of the virtual campus was basically frozen from thereondue mainly to financial constraints, and because since 2004 a complete new version was planned. Today, that project is now taking shape in the form of a UOC led project to develop an free software based campus for all Catalonian universities. The project is substantially financed by the Catalonian government, which was formative in its long political anamnesis.

In spite of the important role technology has played in the functioning of the UOC, the organization has always stressed that the student's learning itself, and not the medium of its transmission, was deservedly at the centre of its pedagogic attention.

From the very beginning, UOC opted to outsource most of its technological development (UOC faculty 3). Nevertheless, they maintained a reasonably small team of computer specialists who monitored, and tweaked the system as per necessary. This solution proved less expensive than spending high amounts of money on continuous in-house development.

One of the leading IT consultancies had been entrusted to review the architecture in 2003, and again in 2006, and their advice continues to serve as a blueprint for strategic technological decisions regarding model and process development.

The appropriation of innovations meant to enhance UOC's knowledge services is entrusted to the Educational Technology Department. Here, eight fulltime staff and 16 freelance specialists dedicate their efforts to scan the market for innovations. The department is receiving only basic funding from the university (480,000 € in 2007) and has managed to secure 1.5 million € (in 2007) The UOC has achieved these numbers by pursuing opportunities at the regional and national level, in partnership with other companies and universities. Recently, they have also begun to address both foundational and European Union funding (UOC administration 35).

3.4.4.2. IT Infrastructure

In 2007, UOC spent around 11% (5,532,040 €) of its overall budget on IT services and hardware (UOC management 29). Considering that there are only 37 employees to be paid from this budget, there is sufficient room for development. However, this was not always the case, stakeholder reports show that IT investments were not sufficient for several years during the final phase of the first management team (UOC management 24). This perspective seems relatively true⁵ when reviewing the concrete receipts of money spent (see table 1).

	2004	2005	2006	2007
Cost	1.834.178,43	1.958.507,44	2.061.911,58	2.670.732,91
Investment	1.225.746,25	1.504.654,38	2.175.873,74	2.861.307,66
Total	3.059.924,68	3.463.161,82	4.237.785,32	5.532.040,57

Table 3.4.1 - UOC's IT budget development

UOC installed and still maintains the servers for the virtual campus which serves about 70,000 logins per day, or-- 24 and a half million logins per year (UPC management 25).

All of UOC's work stations come with an internet enabled PC and employees have the option to connect to their workplace from home over the internet. The intention of the IT department is to have the workstations replaced every three years (UOC management 30).

At the time this research was being conducted, UOC had undergone a profound reassessment of its IT infrastructure⁶. The result of this self-reflection was a genuine evaluation that asserted several problems. Specifically, out of the 19 elements considered essential for UOC's IT landscape, only three were without issues, while four were singled out as having big issues, and 11 were cited as having 'some' issues (Gartner, 2006). A fundamental reorganization of the systemic architecture, which will end the monolithic composition of functionalities (outlined in illustration 1), has been thusly recommended.

⁵ The budget nearly doubled since 2004 but the increasing trend was already present during the last years of the anterior management.

⁶ implemented by one of the top five technology consultancy firms

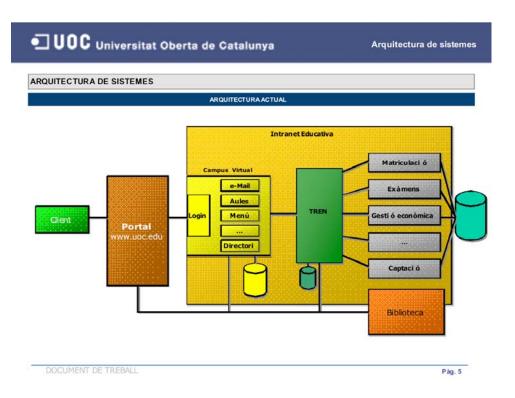


Figure 3.4.2 - UOC current IT Infrastructure

In the current system, there is a very high degree of complexity and abundant interfaces because, as can be seen in the diagram, there is one central authentification function (TREN). Contrast these between a host of back-end services and front-end services that were gradually developed, making the TREN function a highly complex non-standard piece of software.

The external consultants, in close collaboration with several UOC specialists, have developed a proposition for an IT strategy that is meant to give UOC an IT landscape using global standard based enterprise architecture (namely Service Oriented Architecture). The suggested plan has been presented to the 'techie' community and, after having been debated among the internal stakeholders, its implementation is set to begin (see figure 3.4.3).

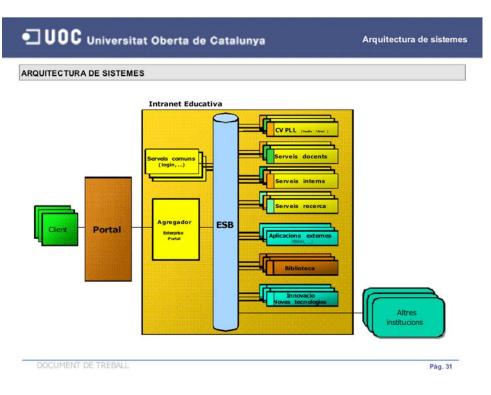


Figure 3.4.3 – UOC future IT Infrastructure

3.4.5. Condition

3.4.5.1. Leadership

As with the LSE, the historic and the current leadership teams are portrayed in order to grasp a full view of both the past and current leadership conditions. The historic condition has been aptly described buy the UOC's former Director for Continuous Education: "Gabriel Ferraté is the leader with a view for the future, the one who always searches for new ways to improve the organization. Xavier Aragay is the 'receiving' leader, who clearly sets and defines the objectives to put the ideas of the rector in place" (De Jonghe & Van Poeck, 2005). So, similar to the FU, today the UOC had a visionary rector and a swift implementing right hand administrator. Also similar to the FU, this historic leadership of the UOC had a rather patriarchal and authoritative style. Resulting from his experience with the political university system and internal university practices, Ferraté first created a "list of things that were to be avoided," which contained the following point: "In traditional universities I needed three years to reach something due to all the obstacles which one encounters" (ibid. p.2). In fact, while the university was given the paradigm of the client centred organisation under their rule, internally employees joked that it was actually a solar system with the rector at the centre (UOC 6). The university was set up and managed like a business wherein the organisational functions were perceived to be of more importance than an academic need for special treatment. One indication of this condition was the long struggle that transpired before a worker's council had been organized. The initiative had to be implemented using an external union party to request

its creation because the employees were anxious about upsetting the management. Decisions were made by the lead entrepreneur following the understanding that the university was his creation. While Ferraté officially included the right to such 'errors' in an informal house rules document, the authoritarian style resulted in a situation where university staff was not integrated in the decision making process and the rapid expansion of UOC's spin-off companies was only one result of the personal vision of the leadership team.

This era ended on the 12th of December 2005, when Imma Tubella was named the new rector of the UOC by the board of the UOC Foundation. Mrs. Tubella holds a doctorate in social sciences and had previously been UOC's vice-rector for research from 1999-2003 and, since its inauguration in 2000, she has also been co-directing UOC's research centre IN3. During her distinguished career Mrs. Tubella has developed a clear profile as an expert on the 'information society,' and especially the Catalonian identity in this ICT-centric age. It comes hence as no surprise that she immediately stressed research and a general 'academitization' of UOC's teaching staff. Under her leadership, several new research lines have been started and staffed with young researchers. Also, all UOC faculty is strongly encouraged to engage in, or quickly finish a PhD project.

UOC's constitution states that the vice-rector posts are self-selected by the rector; Consequently, Mrs. Tubella has chosen her new management team. The new management team held several strategy sessions and has since shared with the UOC community their strategic principles and objectives. The program stresses the following development: "to move from a great project to become a great university" (UOC, 2006) which allows insights into the leadership's core value set. This point is further elaborated by the UOC's desire to maintain its founding principles whilst evolving into a proud benchmark of academic quality, stellar education and cutting-edge research. Furthermore, the team plans to anchor and integrate the university deeply into the European higher education schema, while at the same time stressing and expanding its growing regional importance as a Catalonian institution. Also, the central objectives reveal the team's assessment of the current situation and their central emphasis; the first point of which is a change in organizational culture. What Mrs. Tubella and her team are looking for is participation and co-responsibility. Another point stresses the technological relaunch of the virtual campus by using free software and incorporating recent innovations such as blogs and other multi-media services. Despite these goals, institutionalized organizational culture and ingrained decision-making channels prove to be challenging bodies to change. Mrs. Tubella has struck a decidedly different leadership chord, but it still seems that it will take a while for the trickle down effects to have adequately reached all parts of the organization. As a leader, she is reported to be more of a team player and a person willing to delegate responsibility.

She is also the only rector in this research sample, and is in fact one of the first university rectors world wide who is pioneering the use of a personal blog as a legitimate communication

medium. This blog has been celebrated by stakeholders as a great communication channel and a means to learn about the personal perceptions of the institution's leader. Dr. Tubella uses her blog primarily to share interesting information, but sometimes she also reflects and shares her first-person understanding of UOC related matters.

3.4.5.2. Governance

As already alluded to in the history and the leadership sections, the UOC was setup to have an effective top-down double-headed leadership structure, implemented by the rector in concert with the manager. They, in turn, are supervised by the Governance Board for University Matters, and the Board of Trustees, in questions regarding UOC's group enterprise activities.

In contrast to the other universities, UOC is a non-profit private foundation, with the Catalonian government as its main trustee. The UOC Foundation (FUOC) is the 'paramount holding entity' under which all UOC related activities take place. It consists of the university and a host of up-and-down-stream enterprises, which e.g. produce multi-media content for UOC or publish books and other products sold through the university. FUOC's chief executive is UOC's manager who reports to a group of representatives of the founding companies and the government. This board of trustees have oversight power to dismiss and appoint the rector and the manager, and authority to approve or request changes to the constitutive and strategic organizational matters. The board is assisted in its functions by a parallel FUOC committee; The committee consists of members of the Catalonian government and a broader stakeholder group, both bodies represented in an advisory role. The daily business of the FUOC is conducted by the permanent commission (See Figure 3.4.2).

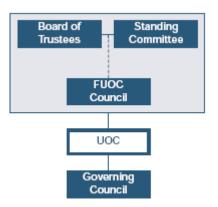


Figure 3.4.4 - UOC Governance Structure

The business of the university itself is steered by UOC's Governance Council, which plans and decides the UOC's organizational development. The council is constituted of the management team (the rector, the vice-rectors and the manager), who themselves also preside over the strategy and coordination commission. Furthermore, the strategic commission is made up of the leaders of the academic departments, the functional leaders and the leaders of the

companies. The 25 people participating in the strategic commission meet once per month to debate strategic matters.

After realizing that the faculty, as well as administrative staff, do have the intention to express and contribute their views to the organization, the Academic Commission and the Management Commission have been created to give them such a space for debate.

There is no democratic element in the governance structure, instead, all selections and decisions are based on merit and/or leadership criteria; even the rector is appointed by the Catalonian government on the basis of a proposal made by the trustees.

3.4.5.3. Culture

Catalonian

The commitment to the Catalonian region and culture is surely the most obvious and celebrated feature of UOC's organizational culture. Catalonians are a nation that is still recovering from the atrocities of the Franco dictatorship and in consequence, all stakeholders promote the UOC internally and externally as a hotbed for the creation of a vibrant Catalonian information society. Hence, the university is constructively contributing to the creation of a new Catalonian identity based in research and education but also through dissemination and discursive events.

The Catalonian cultural factor is so strong that as late as 2001 Hijar reports that there were doubts about offering courses in Spanish (Ros Híjar, 2001). Today, internationalisation and multilingualism have become part of the new leadership team's strategy (UOC, 2006, , 2007a).

Business Venture

The UOC has been a hybrid between a public and a private for-profit university since its beginning. It is the grand project of the new leadership team to transform the institution into what academics understand under the ever evolving idea of the 'university.' The most conspicuous proof of UOC's business culture is the language used to describe its practices and institutions (e.g. Product Management System (Sangra, 2003, , 2005)). Hijar (Ros Híjar, 2001) describes this development to have entered in UOC's culture beginning in 1997 when, according to her, the university developed a new language and a new direction. She lists a number of terms, like 'client', 'cost-effective', etc., that were introduced and, in the beginning, caused problems with the professors and the e-learning consultants. She states also that it did not take long before the students got the image that the UOC "is a money making machine" (ibid).. Another indication for the lack of academic culture is the low rate of faculty without a PhD (70%) while 35% do not even have a masters degree (Sangra, 2003).

As outlined above (section 1.4.1 on Leadership) the new rector has explicitly set the objective to create a more academic culture. Nevertheless, the traditional culture has been well established since its foundation, and transformations will take time and effort to self-realize.

Oxymoron

The UOC is, even more so than other institutions, something different to each stakeholder, and especially to the students. Several conditions cause this perception, but manly it's the university's virtuality, which allows for a greater emotional distance, and secondly it the exceptionally wide variety of students settings. The UOC is perceived as having many paradoxical characteristics at the same time: Some students, mainly those who live in the countryside, enjoy the internet based services as a great technological improvement, and see it as a vanguard educational platform (UOC student 26) while others, who might be more technologically savvy and follow the impressive internet evolution, perceive it as lacking (UOC 27). Some students experience the community elements as very attractive and develop social networks and friendships (UOC student 31), while others do not participate in the community life at all (UOC student 32). A third and maybe the most relevant and difficult aspect concerns the learning. Some students are de facto experts on their subjects, the take the courses to certify their knowledge and add some theoretical augmentation. Others simply want to improve their career chances but are not interested in the intellectual challenges involved. Still others are sincerely interested in their subjects but they pose a severe workload and challenge to certain students.

Of course there are always perceptual discrepancies like the ones described, however, because of the more extensive variety of student backgrounds and expectations, and because the UOC experience is less immersive, it is more difficult to find one generic 'student' identity.

3.4.5.4. Organizational Learning

While research and teaching on knowledge management is implemented by UOC experts, no specifically defined organizational learning or knowledge management program could be identified. Knowledge sharing happens on a collegial basis and in social networks. The UOC website and especially the intranet serve as an organizational memory, a place where institutional documents, policies, etc. are stored. This unregulated and organic system is used rather than a codified communication or collaboration platform. Hence, there is no culture to critique, nor an adequate way to discuss, the institutional texts among the UOCian public, much less offer contributions to their pedagogic development. A suggestion mail box, similar to the 'bright idea institution' at the LSE, is hardly ever used (UOC management 30) due to lack of institutional incentives and culture. There is an application that serves as an internal phonebook and it also offers some yellow page functionality as it allows for functional browsing

through the organizational charts. UOC does not offer any informal spaces besides the canteen, but maintains a rather informal style in general by mostly providing shared office space and a casual dress code.

3.4.6. Knowledge Entrepreneurship

3.4.6.1. Environmental Awareness

UOC stakeholders naturally report to an extensive use the internet for keeping themselves up to date on their respective fields of interest. They are generally members of mailing lists, and habitually read articles in the magazines and journals that deal with their subjects. Like their peers in the other university faculties which were investigated for this thesis, UOC staff also participate in conferences and interact freely with their peers. The linguistic group of Catalonian scholars witnesses above average levels of exchange. The local administration offers media for the professors to share didactic materials through the libraries. Even though virtually all of the interview partners understand English, there is a certain language barrier which made Spanish or Catalonian idioms more dominant. There are also institutionalized information services in the form of mail bulletins which share information about the academic congresses and other scientific opportunities.

When it comes to internet based innovations, word of mouth is the general way relevant technologies are communicated. For the IT professionals, there is a community of practice that holds meetings and has a "virtual workshop" where discourse and sharing is allowed to happen. In practice, information is exchanged in private networks.

3.4.6.2. Entrepreneuring (Strategy & Vision)

The university has founding documents, which outline a rather holistic vision for the university to serve and facilitate society's improvement in its transformation towards an information society (Generalitat, 1995; , 2003; UOC, 1996). On the practical side, the university's leadership develops a mid-term strategy every three years. They hold thematic workshops and each area is developing its objectives and priorities. In a separate process, employees are asked to define their individual goals, which are naturally somehow connected with an overall strategy.

As in the case of the FU and the UPC, no ICT strategy or vision is developed. Rather, technological values and objectives form part of the larger institutional strategy and are given room to emerge organically. In general, UOC is in its current moment, describing itself as an 'integrator not innovator' of emerging technologies (UOC management 22). Given the scale of its operations and the Spanish location, it is nevertheless on the forefront of this virtual pedagogic environment.

As described in the section on the technology approach, it is also worth mentioning that UOC has chosen to outsource a substantial part of its technology development; while the final decisions are implemented by the vice-rector and his confidants. Meanwhile, for the long-term assessment of macro technological evolution, (including the development of scenarios and recommendations) the UOC has successfully contracted one of the leading technology consultancy firms.

3.4.6.3. New Project Support

As in most other universities⁷ no defined process for the initiation of a new project exists. Instead knowledge technology innovation has a home in the Educational Technology Department. Due to the pedagogic approach and the business model, and in contrast to the other universities, the academic freedom of the professors is constrained, because the material has to be first developed and then the course is later implemented by contracted consultants. For each new 'teaching project' to be started, the educational viability and the business potential has to established. The decision usually lies with the dean of the program but it is a joint political decision in actual practice.

As said, new projects in the area of internet based tools are institutionalized in the Educational Technology Department. Here, new functionalities for the virtual campus are test driven and then gradually added to the 'life space.' The department has an existing budget for testing and running experimental projects.

3.4.6.4. Risk Tolerance

As in the UPC, risk is perceived as something incompatible with university practice (UOC management 33). Naturally, risk minimization has been stressed by decision makers, possibly because UOC had engaged in several entrepreneurial ventures that were not particularly successful. These included small start up's as well as bigger efforts like the cooperative alliance with a media company to expand into the Latin American market.

The constant evolution of internet based technologies makes it impossible to enter into a new sector without taking a risk, and UOC's stakeholders are aware of that. The IT professionals are continuously assessing new tools but are rather cautious in introducing new functionalities to the virtual campus. Two reasons have been stated: Security is a constant concern of system administrators, the second is associated with familiarity. The UOC hopes that the users are comfortable with the system the way it is, any changes have to be of proven benefit before they are implemented (UOC management 34). According to the vice-rector of technology, risk is still not accepted as a necessary part of 'campus life' (UOC management 40), but the leadership is facilitating the necessary techno-cultural changes.

⁷ except the UPCnet

3.4.6.5. Communication

UOC has the most developed internet based communication practice of the universities investigated. It provides a host of communication channels. In fact, there are so many in existence, that it is difficult, if not impossible, to be aware of them, let alone to speak about them or to scan them all. The latter is made more difficult by the fact that the contributions cannot be read through RSS⁸ or UOC external mail, but are available exclusively within the circuitry of the virtual campus⁹.

On the one hand, UOC stakeholders are well connected, but these connections are developing almost exclusively around the individual employee's network. As stated, various public and special community channels exist but these are used to a much lesser degree¹⁰.

With respect to the communication about new internet based innovations, communication is happening in social network channels.

3.4.7. Internet Use

3.4.7.1. E-Learning

Tools Integration (Technology)

As touched upon in the section on UOC's IT history and approach, the university has a lean model of technology development and planning. The identification and exploration of software tools that might be beneficial to the learning practice of the students has been institutionalized in the Educational Technology Department. Once a technological opportunity has been assessed positively, it is next implemented in a test environment where further evaluation and testing is underway. Innovations tested in this way undergo a fomenting process until a certain positive threshold is reached, a suitable 'live' test can be arranged and the political climate is assessed to be adequately suitable. New technology like wikis and blogs are then deployed in some courses- on a voluntary basis at the professor's discretion.

Special mention has to be made of UOC's own e-learning developments. Despite its general approach of utilizing available technology whenever possible, UOC has a long tradition – starting with the campus itself - in developing innovative software to solve problems where no standard solutions have yet been developed. One example of such a tool is the MyWay application¹¹ which allows the transformation of content into different formats. MyWay uses the XML formats feature of separating and structuring content and presenting information in order

.

⁸ Real Simple Syndication – a information exchange format

⁹ There is the possibility to have the messages forwarded to an external mail account.

¹⁰ The internal forum has had 86 postings and the notice board 39 in 6 months (18.12.06-16.5.07)

¹¹ http://www.uoc.edu/in3/myway/

to enable the same textual content to be favourably displayed: on paper, on a website, accessed through web-interfaces for the impaired, having the content recorded to be played on a DVD-player, or transformed into an audio-book.

Current Practices (Use Cases)

The following paragraphs outline the organization of the e-learning platform imparted by the UOC. Each field of study is managed by a director who reports to the governance council and participates in the strategic committee. All careers within one field are managed by a program director who is the overall manager of the educational conduct within the line of study. The actual e-learning, is delivered through a highly distributed collaboration of subject specialists. The e-learning material is developed by the course author, whose work is then put into a multimedia format and home study packages (consisting of text-book-style reading material and sometimes books and CD with video or software) by one of UOC's sister companies. Once the course is produced, one of UOC's teaching staff is made responsible for the academic supervision. He/she takes care of managing the course tutors, who are the ones who actually lead the courses and deal with students, etc. Additionally, each student has an assigned counsellor, who consults and advises on whatever questions the student might have. Last but not least, there are support functions implemented by the technical program manager. This individual ensures correct compliance within the administrative/bureaucratic flow of the activities being implemented by the students and professors.

UOC's pedagogy has been developing since the first years of operation and is now constantly being refined through the application of insights from UOC's own research into, and reflections upon, its own practices. UOC's initial e-learning approach has been laid out extensively by a volume developed by UOC stakeholders and edited by Sangrà i Morer & Duart Montoliu (2001). The approach and tools developed in the first years have proven to be effective, and they have therefore been only partially amended over the last years¹². Up till now, UOC's pedagogy has been purposefully, and exclusively asynchronous (Ferrate Pascual, Alsina, & Pedro, 1997). Basically, each course has at its core, a virtual classroom with a calendar, a forum, and a digital learning resource library, and printed textbook style material. The students engage in text-book work and, if adequate, complete the exercises and send them to their teacher via the virtual campus. The second important element, which makes the online medium superior to traditional print or video based distance education, is that the learning community engages in debate and poses questions dynamically, which are then answered by the teacher or peers. Depending on the type of course, an assessment and final examination is either based on

2001).

¹² Please excuse the very brief outline of UOC's pedagogy given herein. To treat and discuss the finesse of UOC's reflections and variations of this institutionally, both obviously such important themes, simply exceeds the possibilities of this research. The interested reader is referred to the publications cited as well as e.g. (Godoy, 2003; Ros Híjar,

participation and the online delivery of learning products (such as conducted exercises, or free homework papers) or conducted at a final physical examination location.

3.4.7.2. E-Research

Tools Integration (Technology)

On an institutional level UOC's is primarily utilizing four e-research instruments. The hub for presenting UOC's investigation efforts is the website of the IN3 research centre. Here, information about the research groups, publications and the flagship Proyect Internet Catalunya are available.

Next, there is the Researchers Portal (GIR) which serves as an information hub and internal curriculum/portfolio builder for individuals and research groups. More concretely, the GIR offers the following functionalities: An agenda is used for publishing information about relevant conferences. Under the title 'Convocatories,' the editors publish funding opportunities. The Curriculum Builder is one of the core features of the GIR. It allows the UOC to build one central database that contains all of the personal data (like education, professional and research experience) of its researchers. Furthermore, the GIR provides access to some of UOC's research applications (an online bibliography builder, and the survey tool described below)¹³.

Third UOC is publishing eight e-journals¹⁴ and thematic publishing spaces. This printing platform serves to build up institutional reputation but also represents a publishing opportunity for UOC's researchers as the thematic focus is naturally matched very well with the interests of its own scholars. The journals are all accessible via UOC's website and are therefore a primary dissemination instrument for UOC's research work.

Lastly, UOC has – in line with its outsourcing approach - a close collaboration with a local online survey service provider. Small as well as large scale questionnaires can be created and managed completely in an online space. This practice immensely facilitates data collection since all input is directly computable, which also leads to the elimination of transcription errors.

Current Practices (Use Cases)

Almost all research done at the UOC has some e-research component. The common research practice has been summarized quite nicely by one faculty member who stated that UOC is

¹³ There are several functions of the GIR dealing with research group management, intellectual and industrial property (also a website building tool is listed in the manual section) that were not functioning when evaluating the GIR.

¹⁴ It has to be pointed out that only some of the journals can be considered scientific as some lack peer-review processes etc.

offering all possibilities for developing research themes, as long as they are accessible through the internet for negligible costs (UOC faculty 28). UOC's researchers are pursuing e-research, deploying a host of methodologies and subjects, from cyber-ethnography to e-business and open-source programming. While there are many individual or small team collaborations, especially from the 473 doctorial researchers (2005), the large scale Project Internet Catalunya Study serves as a springboard for many such related research efforts. The IN3 is also maintaining an email bulletin service which provides information about relevant funding opportunities on an ad hoc basis.

Overall, it is assessed that even though UOC's researchers do use the internet extensively as a subject for their research, there are no particularly advanced uses of internet based innovations (such as research on virtual worlds, or publishing methods like Dspace or even PLSone¹⁵)

3.4.7.3. Website & Intranet

Tools Integration (Technology)

UOC has always run its own servers and is therefore responsible for a much wider scale of technology than an institution like the LSE. Since its early days, UOC's technology has undergone an enormous evolution to what is now a highly differentiated system with the capacity to organize and enable the learning and work of more than 40,000 students, 1500 tutors, 160 professors and 503 administrative staff. UOC's internet connection is setup as an autonomous system¹⁶ which ensures availability and an aggregated bandwidth of 50 MBit through its various ISPs (UOC management 36).

UOC's website and large parts of the campus used static websites until quite recently. Since 2006 the website has been based on a content management system which highly facilitates the distribution of work between technical and editorial staff. The new website also offers new features such as RSS news feeds.

Current Practices (Use Cases)

The main pages of the website are offered in Catalonian, Spanish, and English. The website serves, as mentioned above, mainly two purposes: On the one hand, it provides access to marketing information such as the program of degrees and courses offered, on the other, it allows interested parties to read and print UOC's thematic online journals and other publications.

¹⁵ www.plsone.org

¹⁶ Which means that it manages its subsystem of IPs and their routing to the internet.

UOC's intranet – the virtual campus – provides access to community forums, news (including UOC's approach and endeavours regarding the Bologna process), UOC's self-developed email system, administrative services, access to the library, and of course to the virtual classrooms. One element that is perceived very positively is the presence of a photograph besides all messages that are send and received within the campus. The intranet is also the space for student participation in governance, but the usage statistics speak for themselves (see table 2). Generally there is not much activity except for the Law and Political Science forum which proves that the structure can work if it is promoted and utilized appropriately.

Department	No. of Posts	Period
Law and Political Science Commission	952	(19.6.06 – 16.5.07)
Information & Communication Science	42	(18.6.06-16.5.07)
Business	96	(20/06/0616.5.07)
Language and Cultural Studies:	90	(30/06/06-16.5.07)
Computer Science	196	(19/06/06-16.5.07)
Humanities	47	(19/06/06 -16.5.07)
Psychology and Educational Sciences	326	(30/06/06 – 16.5.07)

Table 3.4.2 - UOC Student Commission Communication Statistics

Additionally, there is a 'corporate' intranet, which contains information about internal university affairs, internal forums, as well as personalised services such as salary statements etc.. Most forums are rather inactive, but what is really in constant use is the UOC internal e-market, especially the housing (1002 messages in 16.5.07-17.11.06) as well as sports and IT equipment.

3.4.8. UOC Position (Institutional Results)

Because of its status as a semi-private virtual university, UOC is not included in many evaluations. However, as is described in the paragraphs dealing with teaching and learning, UOC was quite successful in the rankings it did enter into. In 2004, it received a certification with the Gold Seal of European Excellence from the European Foundation on Quality Management (EFQM) in recognition of its governance model.

Overall, the UOC has been extensively celebrated on all levels as a modern education institution.

Economic Autonomy

As explained before, UOC is a semi-private enterprise and therefore it depends on the instructions and leads it receives from its board, while also having considerable freedom to develop its own strategy and practices and markets. UOC's relative autonomy results from two

conditions: on the one hand, most stakeholders are no experts in internet technology and hence the possibilities of an internet based university are hard to judge resulting in a post-hoc controlling functionality rather than a steering function of the board. Even more fundamental is the overall innovative mission of the institutional model, which persists at being recognized as an experiment and 'testing ground.' Once fully realized, this platform will give UOC considerable leeway to explore and experiment with new possibilities¹⁷.

Website

The UOC was considered in the university ranking of university websites conducted by InternetLab (Webometrics, 2006). There it received the 41st rank of 100 institutions evaluated in Spain and the 1007th place on the global ranking. According to this ranking, UOC provides extensive scholarly and rich media material. Ultimately, its relatively low global ranking suggests that usability and other factors have been assessed more negatively. The website offers good information for interested students (marketing material) and news about UOC's activities. Also, some more in depth information about the university's structure is presented, but strategic documents are published only retrospectively in the form of the Annual Reports.

3.4.8.1. Teaching and Learning

Especially in the years between 1997 and 2001, UOC received several prizes for its innovative institutionalization of the e-learning model. In 1997 it received the Bangemann Challenge Prize of the European Commission due to its innovative use of the Internet for distance education. In 2000, UOC's model and practice platform were recognized internationally through the World Information Technology and Services Alliance (WITSA) prize, and the Digital Opportunity Award. In 2001, UOC reached the preliminary climax of its reputational development; the International Council for Open and Distance Education (ICDE) selected UOC for the Award of Excellence for the World's Best Virtual and Distance Education University. It has to be noted here that, as has been described in the section on UOC's culture, the learning and social opportunities offered by UOC are perceived and exploited very heterogeneously. In fact the EUA expert review reports students "having the impression of being in the 'third division" of academic institutions; it states further that students are aware that their "degrees are not well recognized" (EUA, 2007). It depends primarily on the mindset of the student (and to a lesser degree on the motivational skills of the tutor) what quality the learning experience has cumulatively. In fact UOC needs a knowledge entrepreneurial mindset to identify, evaluate and realize the opportunities to learn. UOC's continuously high student satisfaction ratings imply that it is offering what the students want – on the one hand interesting learning opportunities, and for the one's who are only interested in the certificate, a defined process to reach the degree.

¹⁷ Presumably following the logic that in case of success these can be applied to other Catalan institutions

3.4.8.2. Research Results

The UOC was originally thought of as a pure teaching university and it added research capacities around 2000 when the Internet Interdisciplinary Institute (IN3) was founded. Before that, in the first five years, only a few individual research efforts and limited participation in European Union projects took place. Since the inauguration of the IN3, UOC has developed a considerable research infrastructure. In 2006, efforts have been systematized through the recognition of 30 thematic research groups each run by at least one senior UOC researcher, and supervised by a member of the scientific board. The scientific board is a group of 'high calibre' researchers from around the world who serve as consultants and figure heads, delivering cutting edge practice, topics and credibility (see more detailed elaboration in the Unique Strange Attractor section).

Table 3.4.3 give a good overview of UOC's scientific production in 2006-mid 2007.

	scientific Articles	Books	Book chapters	Conference contributions	Other activities	TOTAL
Computer Science and Networking Technologies	18	2	23	29	28	100
Communities and activism	18	6	15	40	79	158
Digital Culture	17	4	19	44	73	157
Law and ICT	25	8	57	52	37	179
eGovernance	7	8	13	20	31	79
eLearning	13	4	15	50	34	116
Information Systems	1	1	0	23	14	39
New Economy	20	5	3	28	66	122
Technology and the education system	9	1	1	18	20	49
Research Program on Gender and the Information Society	1	0	3	5	3	12
Research Program on Immigration and the Information Society	0	0	1	2	2	5
Research Program on Risk Negotiation	0	0	0	4	11	15
Research Program on Technology and Health	8	3	1	5	10	27
TOTAL	137	42	151	320	408	1058

Table 3.4.3 - UOC's Scientific Production 2006-mid 2007 (internal document)

When reviewing table 3.4.2, which outlines the production of UOC's thirteen research fields, the following observations can be made: Under the new leadership team UOC has increased its research lines to now 13 different themes. The most active discipline, according to the data

presented in table 3.4.2, is in Law and ICT, closely followed by Communities and Activism as well as Digital Culture. With slight distance New Economy as well as Computer Science and Networking Technologies scholars can be considered core contributors to UOC's research production. As mentioned in 2006 a number of strategic research programs have been setup (the last four in the table). These small research teams were still in the incubation phase and are expected to start to produce publications etc. in the months to come. During the same period as presented in the table seven PhD thesis where defended and 39 in supervision. Hence the PhD program is beginning to deliver results and it can be expected that UOC's research potential will increase over the years with more and more of its constituents holding a doctorate.

3.4.9. Rival Explanations

UOC shares both of these aspects with the UPC so this section is developed in more detail in the UPC case study (3.3.11.) as it comes first chronologically.

3.4.9.1. National Context

For the latter part of the 20th century Spain and Spanish universities have played a catch-up role within the European community (WorldFactBook, 2007). In 2006 the economic growth had slowed down to a 3,6% GDP. This figure is still quite high in contrast to the other two countries (UK and Germany) investigated in this study. In general, the Spanish context is assessed to be rather positive, but less and less important as the centralized powers of Madrid are relinquished in exchange for a more federated system. Catalonia as a region is definitely one of the political powers leading this process (as is the Basque Country etc).

3.4.9.2. Local & Regional Context

The Spanish province of Catalonia is a nation without a country that is striving for political autonomy from Madrid. The nation 18 is mainly held together by its language - Catalonian (Castells, 2004) and since the Spanish dictatorship, that mercilessly crushed all dissenters under its political doctrine of one egalitarian Spanish nation, ended in 1978¹⁹. Catalonians have enthusiastically revived their distinct traditions, especially the cultivation of their language. Utilizing its strong industrialization, the Barcelonan region especially was eager to increase its influence on education, and subsidized local universities as much as it could.

It was decided that by 2010 3% of the GDP will be invested in research and development²⁰.

The UOC is the only distance university that teaches in the Catalonian language; this distinction naturally makes it the first choice amongst Catalonians world wide. Nevertheless,

¹⁸ Catalonia is the mainland of a society that consists of various additional 'Catalonian enclaves' that all formerly belonged together.

¹⁹ With the new Spanish constitution.

²⁰ http://www.upc.es/catala/recerca/plardi2010/plardi2010.pdf p.3

since 2000 it has also offered a growing number of degrees and courses in Spanish, consequently it is in direct competition with the Madrid based UNED. Instead of forming an alliance with this peer institution, the UOC has, at least on an institutional level, refrained from developing strategic contacts. Within UOC's strategic priorities is the goal to increase the efforts for national, and European expansion. Also, an intensification of its international efforts, especially in Latin America, but also in China and Brussels (targeting the Spanish expatriate community therein) has the UOC facing some very interesting opportunities for national and international expansion. In conclusion it is also interesting to note that the UOC, which was initially though to be a complement to the existing universities, is now, after being criticized by it peers for exploiting the lucrative market only, taking up more universitarian duties, contributing to the Catalonian university system.

A comprehensive overview of the Catalonian higher education environment can be found in the relevant part of the UPC case study – chapter 3.3. section

Again, UOC naturally faces very similar conditions to the UPC, however there are some differences worth pointing out. Even though the vast majority of Catalonians live in grand cities which all offer university education, the region also contains a large hinterland with small villages in remote valleys. Another 'strange attractor' is the student population from the Catalonian speaking country of Andorra, Valencia and the Balearic Islands who do realize the UOC opportunities to enrol in subjects not offered e.g. by the specialized Andorranian Higher Education Institutions²¹.

3.4.10. Unique Strange Attractors

3.4.10.1. Virtuality Pioneer

UOC is the youngest of the institutions investigated and therefore in many aspects it is still in its formation phase, especially since it lacks role models to emulate. As a sui generis, the UOC (Bates, 2000) continues to be one of the very few exclusively virtual organizations. Most organizational design need first be pioneered, and UOC's virtuality has been suitably assessed to accommodate many characteristics of a complex system (Salas i Beltran, 2002). In fact, Salas' paper utilizes (coincidentally) the very organizational paradigm of complexity science and Deleuze's 'becoming' theorem that is framing this research approach. This indicates that the organization²² is internally aware of the continuously emergent character it embodies. Given that the UOC is condemned to constantly evaluate and continuously adapt to the vibrant evolution and paradigm shifts happening in cyberspace, observers need to be indulgent as institutions follow cyclical versioning bio-rhythms. The UOC 2.0 is an evolving and plastic

²¹ Which are also not offering e-learning/distance education programs.

²² Or at least parts of it.

pedagogic experiment, as such and it will continue to serve as a pioneering landmark for virtual organizations everywhere.

3.4.10.2. The Virtual Campus

The virtual campus is the real home of the institution. Most communication and information processed are handled over this platform. The virtual campus has been developed from scratch, and is in consequence, an enormous innovative accomplishment. Over the years many features have been added, today it is a highly complex learning and communication platform. Unfortunately, development was largely discontinued after the last official release in 2002. The internet as a whole has evolved immensely since then, especially with regards to enabling collaboration (e.g. wikis) and more sophisticated tools for information and communication (e.g. RSS and blogs). The virtual campus does not foster the dynamic formation of UOC initiatives based on (knowledge) opportunities because authoring is happening mostly through institutional channels²³.

In general, the *technological legacy* (Ciborra, 2002) that the UOC is forging in the form of the virtual campus is possibly the most serious hindrance to internet based innovation. The campus is a complex of hundreds of functional components, which have grown together over the last 10 years. The situation is further complicated by the fact that there is no holistic documentation system, and knowledge is thus spread broadly across the organization.

As mentioned above, a team comprised of experts from almost all public Catalonian universities, and under the leadership of UOC's IT managers, is working on the development of an free software based virtual CAMPUS platform since mid 2006. The "project is part of the Digital University program promoted by STSI [the local governments]. The goal of the program is to facilitate the transmission and sharing of knowledge via the information and communication technologies" (web) The project team has, after a period of deliberation and debate, identified and positively assessed the opportunity to realize the Campus deploying the emerging standard called the Open Knowledge Interface (OKI). OKI is a series of software specifications defining the interface environment for all sorts of e-learning services as well as the connection to the enterprise software environment. With this project, which is the first of its kind and scale UOC is planning to 'wake up' and become the innovator it was in the beginning. The potential is very high, the Campus is meant to scale up to perform with 10 000 simultaneous users, and realize a host of innovative opportunities like the Shibboleth (Web) authentication scheme. Furthermore, the architecture (see figure 5) is meant to facilitated interoperability ²⁴ and evolutionary continuous development allowing UOC (and the other

²³ Which is naturally not the case for the forums, which allow for interaction but with limited success.

²⁴ in fact one of the aims of the project is to provide 'adaptors' to be able to exploit the best functionalities of the two leading free software e-learning platforms Moodle and Sakai (See figure 5)

universities) to enter in the constant change and innovation mode characteristic for cyber-frontier. The CAMPUS project is due to be finished by the end of January 2008.

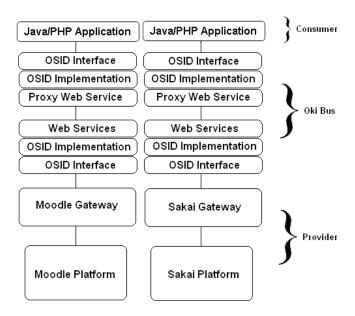


Figure 3.4.5 - CAMPUS Project Architecture (web)

3.4.10.3. Scientific Board

UOC has developed a very unique way to strive for research excellence by setting up a board of eminent researchers meant to supervise and consult UOC's research groups and investigators. The board consists of first-class subject specialists who meet to consider UOC's research activities in general, and more concretely to monitor the individual groups, reviewing their work and coaching their members. Unfortunately, under the anterior management, the scientific board seems not to have had the positive impact it might have had. The board met only a few times and has had very little opportunity to collaborate with the researchers (EUA, 2007). The new vice-rector for research has concrete plans to augment and better exploit the knowledge capital of the scientific board.

The Scientific Board is chaired by Manuel Castells, an eminent sociologist who's work on the 'network society' has given him a world-wide reputation as a specialist on societal development, especially regarding the positive and negative effects which networked technology has on private and professional lives. He has been asked by the former rector to work with the UOC in early 2000 and has been a central figure in political and research related questions. His role as a stakeholder and influencer has been evident since his very first day. He has directed both of UOC's major research projects dealing with the use of the internet in Catalonia (PIC) and has been a great support resource in setting up UOC's research facilities in general and – because of his excellent contacts with the academic world - the institution of the scientific board in particular.

3.4.10.4. UOC Students - Knowledge Entrepreneurs & their Second Life

In general UOC's students are adults; and most of them are professionals who have finished their education and have a fully established career. These students generally decided to realize the mature student knowledge opportunity UOC has to offer. Most of these students are already engaged in work and many in domestic family affairs, they build and pursue their continuing education as something like a second life. This is especially true because of the virtuality of the environment and the fact that most students develop a 'virtual identity' for the first time. Consequently, this newfound anonymity can make it a new and emancipatory experience. The entrepreneurial spirit is also confirmed by the 2007 PIC study in which UOC's students come out as some of the most entrepreneurial, especially amongst the slightly older student population (Duart, Gil, Pujol, & Senges, 2007).

3.4.11. Analysis and Conclusion

There can be no doubt that the UOC is a truly successful knowledge venture that has helped thousands of people who otherwise would have had difficulties in achieving a university degree. UOC embodies a knowledge opportunity that gives a second chance to many prospective students. It is a highly adequate instrument to elevate the educational level of society. Having said that, it is not the objective of this research to assess the impact UOC has on society, but rather- to investigate what enables it and its stakeholders to engage in effective knowledge entrepreneurship. This analysis and conclusion reflects UOC's current condition, while the specific phenomena found to enable knowledge entrepreneurship are further developed in the following chapter Cross-Case Analysis. Also, it is important to state that UOC was during the period of this research still in its first epochal leadership transition, and that "the change process is still underway and most of the consequences are not yet consolidated nor fully implemented" (EUA, 2007). This reality made it obviously difficult to assess the condition and all analysis included herein must be understood as a newly emerging atmosphere culture and practice.

3.4.11.1. UOC the Shy Adolescent Organisation

UOC is the organisation that publishes the least information about itself and its members on the internet. The professors have no personal space to present themselves and their qualities, neither do the individual departments²⁵. UOC seems to be following a traditional marketing approach to present only positive public relations copy to the public. This is a logical attempt to control its image by controlling what comes out of the organisation. This has resulted in a climate where UOC's faculty and researchers feel controlled rather than empowered (UOC faculty 39) by the institution.

²⁵ Besides the 'marketing' information put as information for potential students.

But also internally there is not much transparent discourse (see 3.4.5.3). In fact a good indicator for the fain public debating culture is the non existence of information and debate during the transition between the two leadership teams. While there where reports and discussion about the happenings in the external press, internally there was no official statement nor debate until the decision processes was over.

Since the beginning of the new leadership epoch there have been plans to introduce a blogosphere and similarly participative and collaborative innovations. This might be the right remedy to create an open organisational discourse where innovative ideas are allowed to fall on fertile ground. Such a constructive critique is best based through informed discourse; eventually and ideally, transparent decision making become the norm.

3.4.11.2. Still Emerging Organisational (Infra-)Structure

UOC is a new kind of organization and therefore it is facing problems that have a distinctly different character than other universities. Because of the technical nature of the university, it is logical that the IT professionals have some influence in almost all aspects of university life. The same trend applies for the vice-rector of innovation.. The fields of marketing and community outreach are also broadly influential cross-cutting themes; the approval of these two departments is often solicited in order to move an initiative forward. These multi-stakeholder scenarios are found all over the UOC. It is largely the absence of defined procedures for decision criteria combined with an un-clear responsibility distribution schema that has been observed to fosters the necessity for political negotiation processes. In the absence of clear rules, ones relative position in the complex hierarchy determines who is going to have the last word. This condition is a legacy from the foundational institutional design, one which was meant to create an agile institution that could efficiently be led from the top. It was their leadership style and they succeeded in pioneering a new kind of university. It is the new leadership's challenge to develop a transparent and evolving structure, (policy architecture) and impregnate the organization with the governance practices they represent.

3.4.11.3. Student = Client = King = Lower Academic Standards

The UOC is a client centred organization. It has the obvious objective of giving the student the best service possible. However, as Hijar assessed some 6 years ago, there seems to be a "real "obsession" with the level of satisfaction of the students, that sometimes negatively influences the quality of the education" (Ros Híjar, 2001). This is when the student's corrupt the idea of 'best service' to be understood as a degree that is easy to earn. As one tutor complains, in the first years "students were motivated and hard working, but later, they turned into people who simply wanted to obtain a university title the easiest way possible" (UOC faculty 23). The problem he writes about occurs when the course managers at UOC placed the satisfaction of their students as the principal priority, even loftier than maintaining the academic rigor which made the pursuit of such studies noble in the first place. This means, according to this academic, that students can, and do, complain and ask for failing exams to

be marked as passed.. The natural, and unfortunate result of this corrupt calculus is that the program manager pushes the professor to change the mark rather than having to pass the complaint to the next institutional level (ibid).

3.4.11.4. Internet Based Innovation Appropriation

Like at the LSE and the FU, a specialized institution has been mandated to identify and appropriate internet based innovations meant to improve teaching and learning. The team is quite well supplied and has managed to attract substantive funding from third parties. Due to the officially 'frozen development' of the virtual campus, and while 'waiting' for the new free software campus, the team is in limbo with regards to realizing future opportunities. No concrete procedures or other institutions have been found that would allow the team to receive input from other stakeholders. Instead, the team maintains trust in its environmental awareness and its natural social network. Transparent and inclusive communication channels have been suggested to improve this situation (UOC management 37). Also, the fact that there is no explicit IT strategy makes it more difficult to determine the priorities at hand, as well as whether or not individual innovations are relevant. Here, the historic approach towards lean management and less fortified in-house IT knowledge, has led to a dependence on outside experts. These experts analyze and propose the most adequate state of the art solutions, with UOC's IT managers working in concert to implement the recommended strategic changes and maintain the system. The new vice-rector for technology has identified and stressed the importance of an IT strategy and the first document is being developed.

Like in the other university, e-research has not been recognized as a defined field. Thus, we witness the opportunities therein to improve research practices whilst positioning the university as an entrepreneurial leader in the emerging field.

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Cross Case Study Analysis

& Theory of Knowledge Entrepreneurship in Universities

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4.1. CROSS CASE STUDIES ANALYSIS

The following four sections represent the heart of the insights obtained during the research project. First the universities differences are demonstrated by contrasting their historical and conditional differences. Then relevant environmental and systematic phenomena and insights that have been observed or deduced to be decisive for the analysis of knowledge entrepreneurship in universities are presented. The first section prepares the setting for the elaboration of the two main sections of this chapter, which are deduced from the existing body of knowledge, the findings of the case studies, and the action research conducted. These are: (Section 4.1.3) the insights regarding the application of the concept to the appropriation of internet based innovations as entrepreneurial opportunities; and (Section 4.2) the attempt to describe the meta-physical and physical elements (attractors) of knowledge entrepreneurship.

4.1.1. Formally contrasting Setting & Typology

In this section the investigated universities are contrasted by looking at some key indicators. As can be observed when looking at table 1, the investigated universities are substantially different in almost all aspects. They all have a different disciplinary focus, as well as represent a different type of university. While the UOC and the UPC share similar governmental as well as economic environment conditions, they are still rather different considering the differences caused by the distance education mandate.

	LSE ¹	FU ²	UPC ³	UOC
Focus	Social	No	Technology	Information
	Science			Society
Туре	Research &	General	Technical	Continuing/
	Elite	(Trans-		Distance
		disciplinary		Education
		Area Studies)		
Nationality	British	German	Catalan	Catalan
Foundation	1895	1948	1970	1995
Students	7800	34 000	27 510	40 707
% Foreign Students	32 %	16%	5% ⁴	
Professors	600	540 ⁵	2554 ⁶	1767
Prof/Student ratio	1:13	1:63	1.11	1:26
Administration	800	2200	1363	503

¹ Figures based from ConStats, 2006, Annual report 2005

 $^{^{\}rm 2}$ Figures from 2006 – except IT budget and staff which were calculated by author from 2007 data

³ Figures from 2007

⁴ 1504 students

⁵ Half of the shared clinical professors at the Charite are counted

⁶ lecturers

student / admin ratio	1:0,1025	1:0,064	1:0,049	1:012
Budget	135 247 000	350 000 000	292 301 718 ⁷	46 741 145
- per student	17 339	10 294	10 625	1148
IT budget	2 381 537		3 980 000	5 532 040
- % of the whole	1,76%		1,36	11,83
- € per Student	305		144	136
IT Staff	39.6		98	37

Table 4.1 - Cross-Case-Study University Overview

All universities are rather young institutions. But within this category the sample is spread between 112 and 12 years. Furthermore, we have a great variety of size indicators, which follow the disperse structure of the sample. For example, while the LSE is the smallest organisation in student numbers, it is still hiring more professors than the FU. And while the remaining three universities can all be classified as 'big', the UOC's impressive 40 thousand has to be assessed in the context of non-spatial limitations along with a better profit rate for highly popular courses. Unfortunately, the number of professors is not really comparable; the concept of professors is different in the universities' divergent countries and the UOC actually uses a pedagogical model where no classical professor exists. The same is true for the professor student ratio, which looks even more dispersed than expected. Within the administration we find the expected absolute variation, more or less at a similar rate for the big presidential universities. We also note a comparatively higher rate for the LSE because it cannot take advantage of the economies of scale. The UOC naturally shows a very good student to administration ratio. The budget per student indicator gives (possibly) the most relevant impression of the state of the universities investigated. The LSE has the most resources by far, followed by the two traditional universities, which have a comparable per student rate, and followed at a significant distance by the UOC, which naturally offers a much cheaper education. This pattern is repeated when looking at the IT budget per student, while the LSE and the UPC spent about the same percentage of the overall budget on IT, the money the LSE has available to spend per student is more than double that of the UPC. The UOC is obviously weighting IT spending differently. Here 11% of the overall budget is spent. However, when looking at the spending per student, it is even less than the UPC. Unfortunately, no data could be obtained for the FU in either this nor the next aspect of investigation, because of the nature of the distributed function. Also, the number of IT staff is telling in regards to the approach that the universities have. The LSE is well staffed with almost 40 workers, striking when compared to the 98 workers for UPCnet. A small difference in numbers for an institution that is more than triple the size. This can perhaps be explained by an effective exploitation of the varied divergent economies of scale. By examining the strategic number of IT staff at each

⁷ 2006

university, one can easily observe UOC's lean management approach described in section 1.3.2

4.1.2. Strategy and Practise in the case of Internet based innovation Appropriation

Several studies investigating the integration of ICT in higher education have been conducted (Bates, 2000; Collis & Wende, 2002; Pittinsky, 2003) and it is not the intention of this research to elaborate on how this process can be theorized. Rather it is used as an example of how opportunities, that arise from the rapid evolution of cyberspace, are sized as an instance of possible knowledge entrepreneurship⁸.

Before the various approaches implemented at the examined universities are described, the universities' web activities are contrasted and analyzed.

4.1.3. Web Data

A comparison of the daily page views (number of unique pages viewed per user per day for this site) allows for a realistic assessment of the institutions utilisation of the web (Figure 1). The UOC (red line) receives by far the most page views per day because all students and teacher activity is conducted on the site. The FU (blue line) comes out next in the number of pages accessed. However the UPC stakeholders produce about the same number of page views as the institution is offering content on both www.upc.es (broun line) and www.upc.edu (green line). As was expected content from the LSE website, even though well structured and adequately representing the organisation, is requested the least.

⁸ Again, as raised in the section on knowledge entrepreneurial practice, the university as an institution, not individualistic strategy and practices are analyzed.

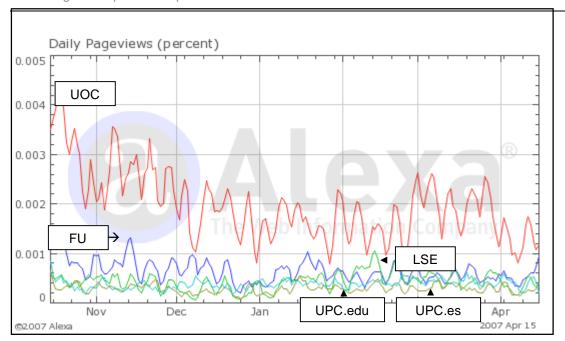


Figure 4.1 - Daily Page Views of Universities' Websites in percent9

To complement the analysis of the daily page views a number of indicators have been collected. Given the expected heterogeneity and sometimes awkward results (e.g. international access) of the dataset obtained, only selected results of the Alexa source are presented here (Table 4.2). The important conclusion that one can extract from the indicator collection is that the sites like the institutions have very different features and that for incoming links, which can be interpreted to represent global interest and popularity of the site the LSE is leading by far, followed by the FU, and the UPC and UOC follow almost at the same level. The universities' home country traffic rank seems not really expressive as the relative national environments are very different. E.g. there are much more sites overall in Britain.

	LSE	FU	UPC	UOC
Website stats ¹⁰				
International	61%	48%	68%	30%
access:				
Home country				
traffic rank:	1196	500	_11	99
Incoming links	2719	1639	1216	1189

Table 4.2 - Alexa website statistics comparison

The other source consulted about website evaluation is the Webometrics project conducted by the Centre for Information and Documentation at the National Research Board (table 4.3).

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⁹ Graph provided by <u>www.alexa.com/</u> Apr. 15.2007

¹⁰ Based on <u>www.alexa.com</u> Apr. 15.2007

¹¹ Could not be determined as the two pages rank is not representative

Indicator ¹²	LSE	FU	UPC	UOC
Ranking	21/325	1/82	8/318	41/1007
(national/global)				
Size (pages)	566	121	447	1.497
Visibility	309	134	409	754
Rich content	448	98	243	1.712
Scholarly content	134	25	95	1.433

Table 4.3 - Webometrix ranking

Again the measurements and methodology of these statistics are not established but still emerging and several of the results can not be interpreted. The FU receives a very good ranking, despite the fact that it is not very as well structured as the LSE. The LSE actually performs also quite good given the fact that it is a social science institution and its members are not too innate in the digital. The UPC is represented quite realistically in all accounts. For the UOC, as the only fully virtual university, the fact that it turns out 41 in the national ranking must be considered mediocre. Especially as it has very high rankings in all categories, there must be some factor not accessible to the researcher that influenced this result.

4.1.4. Approaches

IT is opening the *space of opportunities* (derivative of *space of possibilities* (Mitleton-Kelly, 2005)) and serves as feedback channel thereby balancing/reinforcing feedback loops (Ibid). All researched universities have setup dedicated entities for the exploitation of these opportunities. For technology innovation the LSE has the Centre for Learning Technology (CLT), the FU has the CeDiS, the UPC has ICE and the innovation unit at UPCnet, and the UOC has the Learning Technologies Department. From all these entities only the outsourced independent ICT service provider UPCnet has a properly defined process of how to detect, test and decide whether to implement an innovation opportunity.

Because ICT is only an add-on to traditional practices¹³ most universities have introduced elearning and e-research on a voluntary basis and even at the UOC, where ICT provides the sole environment for the educational process, no innovation is rolled out as obligation. Furthermore many ICT functionalities are perceived as superfluous. One professor summed up the widespread understanding, that by using 10% of the functionality of the e-learning suite one reaps 85% of the potential benefits (LSE4).

¹² According to the authors: Size represents the number of web pages container in the domain. Visibility includes number of external in-links to the web domain. Rich files is the number of pdf, doc, ps and ppt hosted in a domain. Scholar refers to the records appearing under the institutional domain of the university using the google scholar search engine.

¹³ except of course in the case of computer sciences

In the following paragraphs the different strategies and practices of the investigated universities as narrated.

4.1.4.1. LSE - Small but Beautiful

The LSE is a comparatively small elite university that deploys a proven business model allowing for relative independence from state subsidies which make up only around one forth of its budget. Given this good financial standing the LSE can afford a special team dedicated to learning technology. The team was initially responsible for the introduction of the e-learning platform and has now become a permanent institution (Centre for Learning Technologies - CLT) with the mandate to provide learning technology support services and promote innovation. The school has established an inclusive strategy formulation process and the CLT has defined and measured objectives to pursue. These expectations are however not too demanding, given that the school is specialised on non technical disciplines and has thus rationally chosen not to attempt to be an innovator but rather incorporate ICT based knowledge tools as a late early adopter or even early majority. The CIO equivalent at the LSE summarizes the technological innovation approach as "moving forward without pushing" (LSE management 9). These results in innovative technologies are identified, assessed and selected by the specialist team and then offered to the stakeholders as opportunities. Given the monetary well being of the LSE splendid opportunities can be offered.

Two areas with room for improvement have been identified in this otherwise benchmark scenario:

The potentials of e-research tools have not been given the attention one would expect as the LSE is an institution heavily stressing its research profile. While some newsletters and mailing lists exist, and an open access e-publishing platform has been setup, the multitude of opportunities for collaborative research and discourse are not fostered by a dedicated institution but left to emerge from their disperse use-contexts.

Secondly the strategy repeatedly mentions the centrality of user needs and demand as driver for the innovation process, but some informants uttered relatively modest demands, regarding e.g. email attachment size and other basic services, which apparently had not been identified. This raises questions about hyper-complexity (the delivery of data according to measurement criteria) and the truthfulness of the meta-scenario presented in the reported results.

4.1.4.2. UPC/FU - Patchwork

The two big universities investigated are both pursuing an approach employing a variety of internal, semi-internal institutions and consultancies with the provision of IT related services. Naturally each institution has a specialized function and is responsible for innovation in this

area. Neither the UPC nor the FU are assessed to have a clearly defined governance structure and subsequently no dedicated holistic leadership for IT services.

Obviously these highly dispersed and semi-structured arrangements result in a multitude of interfaces and ensuing complexity. Coupled with the absence of a defined distribution of responsibilities the quality of the services provided to the clients varies greatly and depends on the individual owner and local agreements respectively.

At the FU it is predominantly the weak governance structure resulting in a lack of a holistic strategy process, which is assessed to negatively influence IT opportunity exploitation. On the positive side the entrepreneurial mindset and practice at the CeDiS proves its benefits in comparison to the traditional bureaucratic model.

This entity has developed a business model, which until today proved financially and institutionally viable ¹⁴ while providing a continuous stream of substantive opportunities to improve knowledge practices. While no defined process architecture was identified, practices at the CeDiS seem to follow rather defined customs, and this might be an adequate solution as long as stakeholders feel the motivation to develop new opportunities. This is exemplified in the voluntary formation and participation in communities of interest (called working groups). Especially the strategic move to position the e-learning consultants permanently in the academic departments is assessed to be very beneficial for the centre because thereby the information about the opportunities is diffused effectively, and the exploitation is facilitated through someone who has the chance to develop a trust relationship, and last but not least the needs of the clients can be continuously observed and reported back to the centre.

With regards to governance, it is assessed that the foundation of the CIO institution as a committee has not resulted in leadership nor was it able to resolve the turf fights happening amongst the different IT service providers. This is mostly due to the facts that none of the CIO committee members has the necessary expertise nor are they dedicating the necessary attention to the issues, because of time restrains. Notwithstanding these conditions the provision of services is, thanks to the quality of the leadership and staff in the specialized entities, rather good. Yet the university has a highly heterogeneous ICT landscape and innovation diffuses with very little cross-fertilisation and many times without exploiting economies of scale. It has to be said that this is a problem, which is of course also a result of the overall polycentric and heterogeneous nature of the FU. In conclusion it is assessed that, while there are certain positive effects resulting from the competition and the subsequent need to perform, the FU would benefit from a defined governance structure, stronger CIO leadership and a holistic strategy.

¹⁴ The long-term sustainability has still to be proven as 'business opportunities' are based on political funding allocation.

A much more organised but still polycentric environment has been found at the UPC. As at the FU, the sheer physical distance between the locations of the schools that make up the UPC impede the exploitation of economies of scale and promote the autonomy of local solution providers. An interesting strategic move was the decision to create the ICT management firm UPCnet as a spin off. UPCnet employs almost exclusively former UPC IT administration staff and UPC graduates and has therefore a very intimate knowledge of the institution. On the other hand it does not follow the bureaucratic and political logic of a university as a public institution, but can fully exploit the organisational flexibility and managerial leadership possible in private companies. As mentioned above, UPCnet was the only institution found during the research that is working with a defined organisation wide process-architecture and role based responsibility assignment, including a role and process for innovation.

At the UPC all IT related matters are simply fit into the overall strategy and, even though no turf fights or competition was reported, the absence of a coordinating CIO institution is judged negatively.

4.1.4.3. UOC - Outsource

When Gabriel Ferrate was *entrepreneuring* UOC's ontogenetic plan was aiming at a highly efficient and flexible organisation. It seems that he would therefore always prefer to grow only where he saw an increased benefit or new field of income for the organisation. Or at least this is what the observable structures today look like. Lean management seemed to be the key paradigm and that translated in the case of technology into outsourcing as much as possible from what was not considered core business areas.

At its foundation UOC was pioneering the use of innovative technology for educational purposes, but once the monster called technology was tamed and framed to be maintained in a manageable condition. There seemed to be not much ambition nor was the necessary budget assigned to feed the system innovations that would probably cause it not mutate.

Already in the initial bootstrapping phase much work was sub-contracted and this approach became cultivated so that today the following scenario has been observed: A top-notch international technology consultancy firm is contracted in order to assess the situation. UOC's IT project manager discuss and interpret the recommendations in order to slice them up, classify and prioritize them so they can be sub-contracted to local IT development and installation firms.

Until today the majority of the IT staff is dealing with maintenance, a team of project managers is sub-contracting development work and a group named the Educational Technologies Department is responsible for innovation. But the IT budget is reported to have been constantly so low that not much innovation was pushed out or offered to UOC stakeholders. In fact the development of UOC's virtual campus has been virtually frozen since 2002.

The technological obsolescence had been immediately assessed a major thread by the new management team that entered in 2006. Hence it was the first mission of the new vice-rector for technology to lobby and consequently conceive a heavily local government funded project to develop a completely new open source based virtual campus. As a collateral, given the political dimension of this project, the virtual campus is not meant to be used by the UOC exclusively but rather a solution beneficial to all Catalan universities has to be developed. Naturally this implicates a multitude of coordination and creation of human and technological interface issues; so while development is moving forward the students and professors are not thought to be experiencing the new campus before the end of 2008. Until then they will have to make do with what is essentially the virtual campus of 2004.

The UOC management team traditionally gets together every three years to spend some days on working on the strategic directions and priorities. Technology is one aspect considered. Furthermore do the IT leaders keep up to date about key strategic themes by following the media and consultancy reports.. It is a pity that the expertise of the computer science and multi-media departments is not exploited in the design or management of UOC's systems. As seen in the FU and partially at the UPC they have preferred to setup their own infrastructure. The practice of the UPC programming professor, who is actively developing and participating in the community of the e-learning platform is assessed to be a valuable practical and strategic asset.

4.1.5. Web Knowledge Entrepreneurship

4.1.5.1. Formally contrasting web knowledge entrepreneurship

In the following section the situation at the investigated universities regarding the approbation of internet based innovations is contrasted. As for the formal cross-case analysis at the beginning of the chapter, it has to be pointed out that a comparison between the institutions is not aimed at as they are too different¹⁵. The following innovations are reviewed as they are assessed to represent opportunities to improve access, practices, and knowledge about the institution: Wireless internet access, innovative knowledge media, Wikipedia presence, and other stakeholder empowering aspects.

Wireless Internet - Access to Knowledge

One of the most fundamental opportunities provided by universities is the free connection of its members to the internet. This opportunity has recently been amplified by offering wireless internet access through standardized IEEE 802.1 hotspots, enabling members to connect with their individual machines.

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¹⁵ And maybe more importantly, the datasets are not normalized (or based on a standard). The data has been obtained from a mail survey with IT professionals in the organisation.

This innovation has been identified and assessed positively by all universities in the sample (table 4.4.). There are however differences in the degree and mode of access provision. The FU has made wireless internet provision a strategic project and has reached a coverage of all the university locations except the botanical garden. At the UPC and the UOC provision of wireless access is advanced more on a need basis based on entrepreneurial agents identifying the beneficial opportunity and realizing the bureaucratic steps. At the LSE provision has been limited to the social hotspots – the library, the lobbies and the gastronomic areas.

Innovation opportunity	LSE	FU	UPC	UOC
Wireless	50%	90%	60%	60%
	Private	Private	Public	Public key

Table 4.4 - Campus Surface Covered with Wireless Internet Access

Another interesting dissimilarity is the philosophy and subsequent method regulating eligibility to the internet service. Three different modes are present in the sample: The LSE and the FU provide the most secure but also most exclusive mode of access. Only registered university members gain access by providing their assigned username and password. At the UOC a semi-open approach is taken by allowing official visitor to access the web using a 'public' account for which information is provided through service personnel. The UPC provides truly anonymous access to the www through their wireless hotspots. An interesting discussion of how this kind of practice promotes a society deploying architectures of 'technology of control or 'technology of access' has been developed by Lawrence Lessig (1999).

Innovative knowledge media

The observations in this section make up the heart of knowledge entrepreneurial review of the practices to appropriate internet based innovations. The conditions of the universities are compared looking at the use of e-learning, mailing lists, online video and audio content, as well as more advanced services such as blogging, wikis, virtual worlds and the provision of services for mobile devices. Table 4.5. shows the information provided by the universities.

Innovation opportunity	LSE	FU	UPC	UOC
e-learning (%/courses)	50%	25% ¹⁶	20%	100%
Running mailinglists	10	276 ¹⁸	400	150
(subscribers)	1879 ¹⁷			40 000
Hours of video content	Hundreds	Hundreds	No	24

Based on data provided for 2006/2007 at http://www.cms.fu-

berlin.de/lms/allgemein/Semesterstatistiken/Wintersemester_2006_2007/index.html

http://listserv.lse.ac.uk/archives/index.html on 15.5.2007

¹⁸ As identified at the Computer Science department server

Hours of audio content	Non- standardized		No	No
Video Conf	Yes (<100/year)	-	~	No
wiki service	Beta	No	Yes	Beta
				6 courses
Blogging service	Beta	Yes	No	Beta
				5 courses
Virtual worlds	No	No	No	Pilot course
Mobile	Email access &	-	Blackberry for	Grades per
	experiments		VIP's	SMS

Table 4.5 - Appropriation of Knowledge Media

E-learning is the most obvious item in this list and the results are highly diverse (see chapter 3 LSE section 3.1.7.1, FU section 3.2.7.1, UPC section 3.3.9., UOC section 3.4.7.1.). With reference to the percentage stated but also for the actual exploitation of the value e-learning can add to the learning process. The UPC has probably given the most conservative estimate by stating that about 20% of its courses have an e-learning component. At the FU the use of the e-learning platform almost doubles yearly in the most recent periods (2004:261; 2005:438; 2006:1006). In the winter semester 2006/2007 a bit less than 25% of the 4203 courses listed in the register used the e-learning platform (see footnote 42). The LSE has reached a relatively high 50% utilization of its platform; again here we have to understand that a main usage of the tool is to provide access to the electronic versions of the articles on the courses reading list. It goes without saying that the UOC is offering 100% of its courses using e-learning.

Mailing lists are the most popular tool for coordination, knowledge sharing and discourse amongst a community of interest (like a event organisation committee) or a community of practice (like meteorologists). All universities investigated offer mailing lists to its members. The LSE has only ten mailing lists developed but these seem to be of high relevance as there are nearly two thousand subscribers. At the FU the fact that the main mailing list service is run by the computer science department underlines the polycentric architecture. Almost 300 lists are hosted, but as the creation of a list is possible for all universities members in an automated fashion (and without restrictions on quantity) there are many short-term lists dealing only with one semester or for a thematic exchange. As the resources necessary to run such a service are next to nothing, the FU approach is considered best practice as it provides this opportunity to use a knowledge medium freely. At the UPC about 400 mailing lists active and many of them are embedded in the universities open source project collaboration platform La Farga. The UOC is using mailing lists only sparsely and their creation is handled by IT specialists on request. It prefers forums as mode of communication. At UOC a non-standard self-developed solution is used which integrates very well with the virtual campus, but makes participation from non UOC members impossible.

When it comes to more advanced uses of the internet for knowledge services an even more heterogeneous picture is obtained. The LSE provides several hundreds of video content using a celebrated best practice system (UCISA, 2007), while the UPC is not offering this kind of media and the UOC has about 24 hours of content. A more homogenous but not more positive picture is painted when looking at audio content. Even though podcasts ¹⁹ are technologically quite simple and the value added of making a lecture available over the internet is substantive the practice is still only conducted by individually motivated faculty – none of them identified at the institutions investigated. The same is true for video conferencing. The cost of adding video conferencing capability to a computer with internet connection are negligible, as is the technological complexity. Nevertheless only the LSE offers video conferencing as an institutionalized service. Surely the is quite a number of unreported cases where video conferencing is implemented individually.

Wikis (Alier, Forthcoming; Augar, Raitman, & Zhou, 2004; Leuf & Cunningham, 2001) and blogs are perhaps the most interesting internet based opportunities to creatively destruct knowledge practices, because both practices are highly empowering (enable simple publication of arguments and knowledge claims). At the LSE both technology have been positively assessed by the CTL but first user acceptance tests have shown that most users do not embrace the associated practices yet²⁰. The CTL is offering both instruments on demand and there is a growing but still small number of early adopters who exploit the technology. No wiki service has been identified at the FU but it is the only institution that has an open and institutionalized (branded) blog service for all teaching and learning members²¹. The service was just launched in March 2007 so the amount of 76 created blogs seems to indicate good user acceptance. The CeDiS is offering initial trainings and documents which certainly contributes to the good acceptance. At the UPC we find just the opposite scenario. Because the new wiki of the e-learning platform was developed by a UPC professor, wikis are featured in all e-learning courses, while blogs are only present as individual initiatives. The usage of the wikis is however pretty much limited to a handful of courses. At the UOC both services have been assessed positively and beta tests are being conducted with 6 courses using a wiki and 5 courses using blogs.

Virtual worlds are being discussed as opportunities for innovative scenarios for knowledge construction and deep learning (Alier, Senges, & Deluna, Forthcoming) and all universities investigated have identified the possibility. None of them, except UOC, has actually taken steps to implement any projects in this regard. While there are more than 200 universities present in the virtual world SecondLife but most of them are American institutions. At the UOC a community of interest has been setup and after political negotiations it has been decided to

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¹⁹ The recording of 'events' such as lectures in mp3 format and the publication thereof in an RSS feed.

²⁰ And those who de have other places they use for these services

²¹ It is unclear why the administrative staff is excluded. http://blogs.fu-berlin.de/

join the big American New Media Consortium²². Furthermore UOC is offering a summer course on Second Life with a substantial part of the course also being activities in the virtual world.

Last but not least the universities were asked to report any additional internet innovation appropriation initiatives and three of them reported to work on services for mobile devices. The LSE is the most advanced in this regard. It already offers email access over mobile phones. The UPC and UOC are offering Blackberry mobile email services to the higher management. And the UOC has one service that enables to check course grades per SMS.

Knowledge Discourse about the Institution

One rapidly emerging phenomenon is the global, user written and peer reviewed encyclopaedia Wikipedia. The collaborative knowledge project is today one of the 10 most important websites on the internet²³ and because of it user driven content approach, it has become a good reflection of what is thought about any given subject or institution (doxa) and how relevant it is to the people. Hence to assign someone within the university to nurture the Wikipedia article is understood to be an opportunity to improve the public knowledge about the institution. All universities investigated do have an article about themselves (see table 7).

Innovation opportunity	LSE	FU	UPC	UOC
Size of main Wikipedia	6002 (en)	6856 (de)	295 (cat)	84 (cat)
article			408 (es)	-
Wikipedia Languages	20	14	5	2

Table 4.6 - Universities Wikipedia Article

The UOC makes the least effort to present itself well and so far nobody in the organization was motivated to develop an adequate article. What underlines the Catalan focus is that there is only a Catalan and an English version, but no Spanish. Different the UPC, which is present in all five most likely European languages (Catalan, Spanish, English, French, and German). It has a relatively well structured article with links to sub-institutions and persons in Spanish and Catalan. The FU has the most extensive article of the four, but many paragraphs are directly taken from an existing information material. Nevertheless it is represented well and the fact that it has articles in 15 other languages is consistent with the international stand the university has. The LSE is, as would have been expected, the most prominent of the four universities. It has articles in 20 languages and its main article in English is not only well structured and informative, it has also caused considerable debate on the discussion forum, because LSE is

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²² www.nmc.org

²³ http://en.wikipedia.org/wiki/Wikipedia:Awareness_statistics

accused to provide favourable marketing information and not follow Wikipedia's neutral point of view policy.

Cyberspace to empower the individual

As touched upon in the section on wireless internet access, internet technology can be used to improve administration through automation and enhanced control, or it can be used to empower the people by giving them access to new ways of creating, expressing, communicating and accessing services and information (Lessig, 1999). One way that universities can do that is by promoting its members through the use of web pages that show their accomplishments. The LSE does provide a very well structured and up-to-date profile of its fulltime and eminent academics through their LSE Experts portal (which is run by LSE's private arm.) On top of that, many scholars do develop personal pages within their departments website. The same is true for the FU. The expert service is not as high level as at the LSE but most professors do develop personal pages and profiles on their department's site. In Spain there seems to be less of an English-ego culture to do so.

	LSE	FU	UPC	UOC
Student profiles	Yes	Yes	On request	No
(public/internal)				
Professors webspace	Yes	Yes	Yes – moodle	No ²⁴
(public/internal)				
Professors profiles	Yes	Some	Yes	No
(public/internal)				

Table 4.7 - User Empowerment Through Profiles and Webspace

Another opportunity to empower university members is to allow them to develop their own website as a sub-page of the university or to also give students profiles (which would actually motivate them to do better as their results would be part of the online identity). Unfortunately, the opportunities are apparently not assessed to be very relevant to most universities investigated. Only the LSE gives at least a list of their students.

4.1.5.2. Strange Attractor Phenomena

This last section on the findings and concepts developed based on the investigation describe two phenomena that negatively influence the integration of internet based innovations in universities.

²⁴ There is a biography published when a professor publishes a paper.

Taming Mutant Technology to Create Advanced Entrepreneurial Environments

Saskia Sassen once proposed technology to have the potential to mutate (Sassen, 2005). Indicating that technology has an intrinsic drive that makes its application take a different shape than foreseen by its creators. Of course these 'mutations' are caused by humans or nature (or are unconsciously embedded in its development) and not emerging from an impetus of the technology itself. But nevertheless this drift is a property of the technology. Ciborra has defined the phenomenon as: "Drifting describes a slight, or sometimes significant, shift of the role and function in concrete situations of usage, compared to the planned, pre-defined, and assigned objectives and requirements that the technology is called upon to perform". At the universities examined mutations are happening just like in other organisations, but especially students tend to be prone to using opportunities – for example university bandwidth – for non intended purposes and obstruction. Nevertheless more radical reactions to new technologies – like sabotage, passive resistance - are also known to have happened at university.

On the same token, another trend involving the dynamics of technology has been observed to be troubling universities. Technology has always developed further and improvements have changed the *gestell*. As the speed of development increased during the industrial revolution institutions and private consumers had to learn to deal with so called product replacement cycles – the buyer already knows that the acquired product has only a defined and continuously shortened usage before it 'has to be' replaced by the next generation. In ICT these cycles have traditionally been rather short, but with the advent of the internet and the inherent possibility to update software or even directly run the software as a service, product cycles have been replaced by services being permanently in a beta – meaning unfinished – state (Stark & Neff, 2002).

So, how to encounter this shimmering constantly changing technology? Ciborra (2002) suggests a central role for what he conceptualizes as hacking a sort of bricolage of tactics to encounter the rapid changes.

Another metaphor that can be deployed to describe what is important when integrating new technologies is taken from Antoine de Saint-Exupéry's "Little Prince" (1943). Encountering a fox, the little prince learns about how to tame such a wild animal. Taming "means to establish ties," it means to build a relationship with the technology and to carefully learn to understand it. The fox says "One only understands the things that one tames". Continuing the metaphor, the prince travels on and, just like the user craving of technology turns obsolete, they are both sad to part. Once tamed, one tends to develop a sentimental relationship towards the technology. Following this analogy, technology providers have the role of professional dompteurs (French and German word for tamers). A dompteur is a professional in taming and teaching (or drilling) their subjects into following their command.

While private sector enterprises already have great difficulty in dealing with this mutation and constant amendment of technology, universities and other public sector institutions are even more challenged as their bureaucratic setup makes them less agile and flexible in reacting to these constant changes. How do the examined universities deal with this issue?

Case Analysis

The first answer is that they all struggle with it, as it is an omnipresent characteristic of modern technology. They deal with it like a father dealing with the developmental phases of his baby – by acknowledging it, but not taking it seriously through an assumption that inherited dominance will prevail. The FU Chancellor represented this view when he spoke of his staff still being in a 'Fremdel-phase' (being shy with strangers) regarding a new organisational innovation brought upon them (FU 18).

At the UOC, the argument of respecting the effort involved in taming technology resulted in the head technology manager reporting that one reason for not innovating is the 'the people are accustomed to the virtual campus as it is' (UOC management 18).

For the same reason – not overtaxing the users – the preferred method of innovation is piecemeal improvements or patchwork development (LSE/UOC 16). One problem with this kind of development is that (a) it is easy to loose focus for strategic priorities (UOC 19) and (b) that given natural generational changes in the human administration, techies inherit technologies from their predecessors that they might not understand (LSE 17). Furthermore, as organisations attempt to control their ICT environment and do not allow people to pursue their individual innovation interests and needs, the users develop a technology sub-culture, using non-approved software and services (UOC 20)

The Ivory Professor

Another finding regarding the practice and strategic importance of the integration of internet based innovations, is that the lack of entrepreneurial spirit in regards to the creative destruction of knowledge practices at universities makes the academics and their respective institutions less influential in today's society. This marginalization occurs because the new media and the internet cause, as Habermas (2006) correctly assessed, yet another structural change of the public sphere. While the increased condensation of communication networks has enabled more intensive and inclusive exchange, the de-formalization leads to less differentiated roles and thus to a loss of influence for traditional knowledge and opinion authorities, like professors (ibid).

Juan Freire, professor at the University of Coruña, eloquently outlines this understanding in his blog-post entitled, "On authorities, hierarchies and the death of the academic" (Freire, 2006). He has an understanding that the academics are not using blogs and wikis and thus are

missing out on the new modes of communication, thereby ultimately becoming themselves irrelevant. For him, academics represent a particularly conservative section of society; the internet and especially the web 2.0 represents a challenge to the status quo the scientific community has traditionally enjoyed, as such they largely oppose rather than embrace it. He continues by proclaiming the death of the academia because it is neither willing nor able to make the transition to a globalized post-modern world.

While Freire's assessment seems overly pessimistic, it is true that the quantitative study Project Internet Catalunya showed similar trends as well. This is largely because most senior academics do not use but a fraction of the internets potential (Duart, Gil, Pujol, & Senges, 2007), and in the case studies it was observed that they especially have problems when it comes to following the continuous stream of opportunities. On the other hand, in the universities examined, there were many cases of professors who proactively exploited internet based innovations. It was, as one might expect, the younger generations at the universities, the ones that grew up within a quickly changing world, aligned within the mode of continuously transforming beta modes of innovation. Ciborra (2002) used the evocative metaphor of blind giants to depict the situation that theses decision makers, in this case the senior academics, have the most power to influence the trajectory of new technologies within an organisation. But as described, these decision makers are the ones who do not have a suitable knowledge base to choose the right opportunities. Therefore, they do not generally grasp technology innovation opportunities. Innovation takes longer within universities, but they are also less likely to overheat and are generally more stable institutions. The potential of cyberspace is slowly but surely being realized by higher education institutions.

4.2. THEORY OF KNOWLEDGE ENTREPRENEUSHIP IN UNIVERSITIES

4.2.2. Cybernetic Analysis of a complex system

As explained in the theoretic background, cybernetics (especially in its conceptualisation of system design and system optimization based on feedback information) and the modality to describe the strange attractors (as interacting phenomena positively or negatively influencing the functioning of a system regarding a particular outcome) taken from the complexity sciences, are deployed to describe the insights of this research. The following paragraphs develop some concepts found influential in setting the investigatory scene.

4.2.2.1. Entrepreneurial and Second Order Cybernetics

Birnbaum (1988; 2004), who describes the functioning of higher education institutions from a cybernetic perspective, proposes the following cybernetic loop, which serves as a point of departure for the model developed in this study: There is a change in the internal or external

environment of the HEI which somehow triggers the organization to respond. Subsequently, one or several important variables change, and this change is perceived by a sensing unit. The sensing unit reports to the controlling unit and the latter causes again an organizational response. This cycle is continued until the feedback value is acceptable (Birnbaum, 1988, p.192). Of course this works in both directions; what the system asks from the individual and what the individual expects from the system.

In this approach the leadership structure would be best explained by working through what Mintzberger described as management by exception. Time is spent on responding to disturbances. This seems to be an adequate management style in stable or only gradually changing times. Another important role of cybernetic leadership is designing the system, or more precisely, designing the feedback variables that allow to measure the state of the system. This latter activity can be understood as entrepreneurial cybernetics as it is directed towards the future, as such it is engaged in pre-sensing (Scharmer, 2002) or planning future states.

As a senior manager at UOC expressed, creating and maintaining productive technology environments is like cooking (*UOC 7*), one needs the right ingredients, in the right amount and quality, as well as the right timing and the competence to prepare them adequately. It is the combination of an entrepreneurial mindset and the physical infrastructure and resources that unleashes the positive strivings of entrepreneurial practice. As the individual responsible for the FU's entrepreneurship program put it, entrepreneurship can cause meaning, (*FU 7*) but it needs a supportive practice environment or milieu to enact it. Edgar Schein (1993, p.15) expressed this sentiment with his understanding that leadership and culture are two sides of the same coin. There is no mindset disconnection from infrastructure, but it is epistemologically rewarding to analyse them separately. What Wittgenstein called "*Begriffswelt*" (Wittgenstein, 1969), the meta-physical understanding formulated in words and what Heidegger named "*gestell*" (Heidegger, 1994) – the procedural (technological) infrastructure of things.

"Observing the observers" (Beyes, 2005; Luhmann, 1992) is the title of a paper analysing the 'optimisation' of reported results based on the understanding of the actors, in regards to what feedback is expected and not based on actual changes in the practices. Bureaucracies, with their rigid reporting framework, are assessed to be particularly susceptible to this effect. As the stakeholders of the university will always perceive and change their behaviour relative to what the system proposes, one ends up in a system of eternal complexity as the feedback loops will never end. This phenomenon has been entitled *hyper-complexity* or the problem of the *second-order-observer* (ibid). The result of this phenomenon is that actors change their positions taking expected behaviour into consideration. For example data and reports can be cooked up until they look the way the controlling/observing institution expect or demands them to be.

Cross Case Analysis

The second-order observation phenomenon is a dominant shaper of the official face of institutions, flourishing on in-transparency. Let's look at some examples from the case studies:

In the case of the FU, for example, the leadership is said to have put a befriended consultancy in charge of evaluating and advising on the structure of the IT landscape, which subsequently produced a report favourable to what the management's intentions were beforehand (FU management 2).

Even more striking is the case of the FU's radical improvement of 46 positions in a university ranking about institutional support for business creation, without substantive changes in the practices or infrastructure (Trosien, 2005). The only variable was that the person completing the survey had a more adequate knowledge base regarding the expectations of the ranking's authors.

The UPC has, as was described in the case, an indicator culture (UPC administration 1). The same conclusions had been assessed by an expert commission: "The 'point system' introduced by UPC leaders to account for the research contribution of staff has led to the quantitative assessment of time allocation in other fields – teaching, administration, services, etc [...] thus making the exercise so complicated' (EUA, 2005). Naturally, this is a fertile ground for a double life, with one formal and official face (UPC administration 2) while on the other hand, the bureaucratic practices are passed by and actors default to what they individually perceive to be the best practice, because there is no culture to control the practice but the final indicator itself (UPC faculty 3).

At the UOC, a similar case was reported regarding the selection of new research lines. While the official version speaks of a neutral assessment process benchmarking other universities etc. (UOC management 4) others sources report that it was a decision based solely on the expertise and authority of individual leadership.

Paralysis Through Change

However, another problem arises when the stakeholders do not know what is expected from them. Many non-entrepreneurial entities will reach a state of paralysis when they do not know what is expected, but believe that some new expectation is about to manifest:

This phenomenon could be observed in the case after the UOC board had appointed the new rector. All stakeholders were expecting change and (next to the natural reassignment of positions) some immediate effects, like an improvement of how the administrative managers were treating the academics (UOC faculty 14). Nevertheless, the institution remained in an

alert state, everybody ready to adopt and comply to new leads and demands, even though there were only general indications as to what 'new changes' were expected; eventually, all actors defaulted to a 'let's not change anything now' mantra – adding the silent addendum 'as we don't know how the new leadership will influence this' - some months later.

The FU also has a long tradition of ennobling an indicator culture, only recently has the leadership begun to demand that individual administrative stakeholders design their own goals. This is a radically new practice because sub-divisions are used to "kicking themselves free" (frei strampeln) from bureaucratic guidelines, as a result, the management expects them to engage in dynamic negotiations about their planning. The leadership commented that "the system is in the process of learning this in the moment" (FU Chancellor 3), it became clear that, while some departments are entering naturally into the new practices, others are paralysed by the new responsibility that comes with the flexibility.

4.2.3. Knowledge Entrepreneurship in Universities

It is the challenge of this thesis not only to describe the phenomenon of 'knowledge entrepreneurship' in its actualization in universities, but to also propose it as a unified systematic paradigm based on the phenomenological action-research conducted and the findings of the case studies. The analysis is divided into two parts (Figure 4.2.). On the one hand, the mindset and values assessed to be fruitful for the development and expression of an entrepreneurial persona²⁵ (Erikson, 1974) are described. On the other hand, environmental factors (infrastructure and resources), that were observed to influence the existing milieu that facilitates the acting- out of the entrepreneurial persona, are depicted.

²⁵ Persona is a psychological concept here meant to describe the ideal identity possible – how one would like to be.

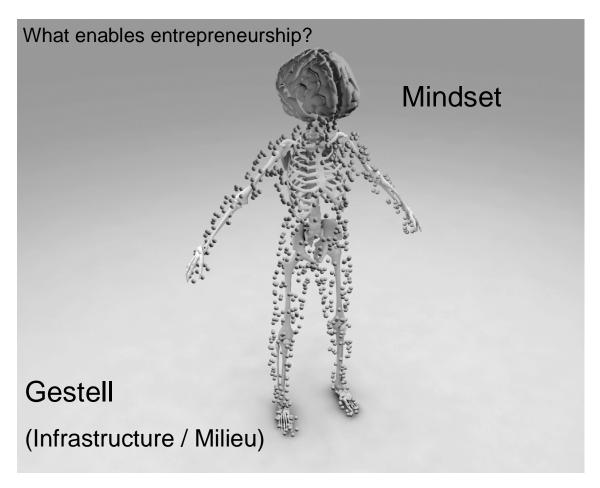


Figure 4.2 - Organisational Mindset & Gestell

For both aspects, the understanding and terminology of complexity science, and *strange attractors* and *fractality* in particular are deployed. In figure 1 the organisational mindset is represented by the ball elements and the brain, which compose the institutional mindset out of all individual stakeholder mindsets in a fractal manner. The gestell on the other hand is represented by the spine, meant to symbolize the supporting structure of the organisational governance structure, process architecture, physical spaces, and resources.

4.2.4. Mindset & Values

In the following section, a conglomerate of meta-physical dispositions is developed based on phenomenological action-research and feedback based system optimization. The philosophical themes are thereby understood to be strange attractors influencing the construction of the entity's persona as well as the concrete practices of the entity (Figure 4.3). In universities the codification of the persona happens through mission, vision and strategy statements.

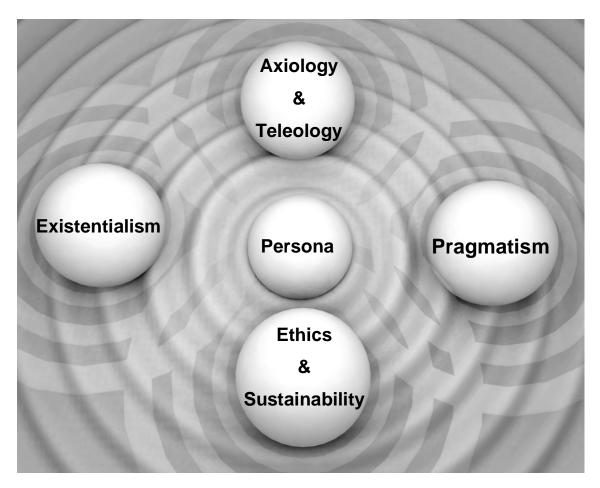


Figure 4.3 - Philosophical Model of an Entrepreneurial Mindset

Following Faltin (2007), an entrepreneur needs to have a "creative mindset" in contrast to a businessman who needs to deal with creating order, through controlling administrating practices. The result of the phenomenological action-research is a life-philosophy based model of entrepreneurship, which is not based on a materialistic-mechanical world and science view, but rather contributes a position to what Durkheim felt to be the achievement of modernity: "The possibility to dynamically differentiate and elaborate values" (Welsch, 1998). Thereby, as is customary in life-philosophy, the creative and initiative aspects meant to create meaning are given central stage in a holistic (or totalitarian) approach.

Allow me to recount Sloterdijk to elaborate on the intention of the approach deployed. He says regarding the role of philosophy²⁶: "Philosophy is stylizing the human being with the practice of terminological gene-technology ('begrifflicher gentechnologie'), thereby developing new taxonomies of human existence" (Sloterdijk, 1999). He further explains that philosophy creates meta-physical concepts of human beings and their condition, which serve as archetypical development paradigms when perceived and internalized. One example given by Sloterdijk, is

²⁶ Which beautifully corresponds to this research's perspective outlined under "Mechanics of existence and constructed reality".

Freud's creation, or the meta-physical engineering of the Oedipus complex. The proposed philosophical model of an entrepreneurial mindset is meant to contribute such a typology.

Naturally, the question regarding the embodiment of a collective mindset comes to mind. It has already been dealt with (in general) in the section about the fractal perspective (Chapter 1 section 1.2.3) so allow me to delve on quickly into Erikson's (1974) analysis of group-identities and what he calls a life-plan. He recounts the example of American Indians, who were meant to undergo a reeducation process meant to imbue a modern 'life-plan' which aimed for a house and a richness expressed by filled bank account. Erikson writes that the Indians' collective historic identity as buffalo hunters was oriented around such fundamentally different reasons/goals that even communication about the divergent 'life plans' was itself difficult.

Two methods for the transmission of a life-plan seem possible: Firstly, a role model (the individual knowledge entrepreneur) can explore new goals and practices which are then imitated (see section on Apprenticeship and Imitation 5.1.1.6.); or the collective can communicate and discursively develop an 'organizational persona' represented through a mission/vision statement, long-term strategic goals, role and process definitions, etc; this is accomplished by continuously and critically reviewing and creatively destructing the organizational information and communication environment. For this process, conditions and practices suggested in Habermas' communication theory might serve as normative guide, as has been discussed e.g. by Heng and de Moor (2003).

There is a double relation between the institution embodying an entrepreneurial mindset and its entrepreneurial performance. Firstly, an institution with an entrepreneurial philosophy will set entrepreneurial goals and strategies as a whole, but maybe even more importantly, it will foster an entrepreneurial milieu, allowing each entity to pursue emergent opportunities (see Emergence, and Fractality). In short, philosophy leads to a climate which in turn causes values which lead to practice.

Hence, this research complements such works Hutchin's "Cognition in the wild" (1995), who analyzes a whole team of naval navigators as the cognitive unit or as computational system. There are also parallels to the emerging field of 'collective intelligence' (e.g. (Zara, 2004)) and exploiting the 'Wisdom of the crowds' (Surowiecki, 2005) of stakeholders. Zara notes that since collective reflection is more explicit, discursive and conversational it therefore needs a good gestell – especially when it comes to information and communication technology.

Cross Case Analysis

Organisations have an amazingly well functioning social communication system, a.k.a. bush telegraphs (FU management 14), when it comes to 'gossip' and creating the internal mythology

of the organisation. These (sometimes real) stories about circumstances or people have very concrete influence on the attitudes of the stakeholders and subsequently on their practices. This becomes most obvious in the case of the reputation of, or the myth about, how the leader and his team are in actuality. At the LSE it was a wide spread myth that 'the new boss is a manager'; the same is true for the FU. At the UPC, the former leadership team has been described as both socialists and syndicators. And, at the UOC, everybody 'knew' about the strong leadership characteristics of the old rector; they knew what was possible and what not, whose word was influential and whose wasn't. A defined mythology had developed. Now within the new leadership, these myths are still forming. But one message with mythical potential has already been sent out: "She wants to transform the UOC into a real university"

These claims might be true, but what is important is that it becomes an influential in-direct attractor even for actors who never deal with the leadership directly.

The four poles of an entrepreneurial mindset

The following four poles that were developed mainly through the phenomenological action research method, are found to influence the individual as well as collective/institutional entrepreneurial identity, *persona* or mindset²⁷. They are presented in sequential order, however, they are simultaneously active and intermeshed in their influence. Each pole is formulated with a central question alluring to and provoking a Platonian midwife technique. The 'we' form is used, as the model is applied to the collective mindset of a university.

The circle begins with exploration and realising existence, which is argued to lead to an *internal locus of control*. Next, the meaning of life question is formulated as "what do we want", which is argued to be most adequately contested with axiology and teleology. This permits the setting of priorities and subsequently leads to the possibility of engaging in *entrepreneuring*. With the entrepreneurial ambition clarified, the implementation and practice comes to the forefront, combining with pragmatist philosophy and with cybernetics. These trends are believed to instil the creative bootstrapping practices of 'trial and error' based optimisation favoured by entrepreneurs. Lastly, the *life-plan* is set in relation against the rest of world. Ethics as well as sustainability are questioned, because only just causes that consider their environment are successful in the long term. This last pole introduces the 'other' not only as part of a shared world, but also as differentiating factor. Thereby, it gives raise to yet another level of reflection. The differentiation, and thereby definition, of the 'self' contrasts and complements other beings, values and practices.

²⁷ While the three terms – identity, persona, and mindset – are very closely related, it is useful to have them differentiated: identity is what one construct oneself to be, persona is what one aspires to be, and the mindset is the concrete conceptualized (thematic) model, a representation of a part of the persona.

4.2.4.1. Existentialism

Human ontology is one of the oldest and most extensive fields of philosophy. Until the present day, philosophers and scientists have been exploring and researching how to understand the human consciousness, (e.g. Dennett) and so far there is no unifying insight or model. Allow me therefore – to avoid being tangled up in the deep waters of competing schools of thought – but instead to develop a simple but uncontroversial chain of thought connecting Cartesian proof of existence to Existentialist free will, and then subsequently to an inner locus of control.

While many philosophers had previously developed theories for human existence Descartes was the first to conduct a scrutiny for implementing radical methodological doubt. Descartes' achievement was therefore twofold: firstly he deployed a scientific empirical method of philosophy enabling it not only to serve as midwife for meta-physical understanding and construction of the world, but also to deliver the 'hard facts' of the conscious human being (if something like that can exist); secondly, he delivered the founding stone of scientific philosophy: cogito ergo sum. Archimedes' dictum "Give me a fixed point and I will move the world," receives a new perspective when there actually is a meta-physical fixed point. It allows for the development of one's reality.

Building upon Descartes' central insight, the Phenomenologists and other meta-physical sciences like psychology and sociology began to emerge and analyze the world in meta-physical terms, but on an empirical basis. After some time, the more practical meta-physical traits, first and foremost psychology, delivered very useful and applicable results. It was however only in the 20th century that, after the massive and terrible sufferings enabled in great part by modern technology, the psychologist Vicktor Frankl dealt with the most essential question of human existence: The question of the meaning of life. While Frankl developed Logotherapy as a method to facilitate the individual's search for meaning²⁸ (Poller, 2006), Existentialism developed as the first popular philosophy outlining a program of individual freedom (Enlightened free will and subsequent responsibility towards the world.

Existentialist philosophy stresses the human beings freedom to act. In fact, following Sartre, humans create and give meaning to their individual lives and the social world only by mindfully choosing their actions. In other words, the individual is what it does, and defines itself only by its actions. Sartre himself has formulated the first principle of Existentialism as: "Man is nothing else but what he makes of himself" (Sartre, 2006) and "full responsibility" for his existence rests on him. Within this radical school of thought, all action can be seen as entrepreneurial as one creates ones life by constantly making entrepreneurial choices. Even though it is theoretically (and if internalised also practically as in Sartre's case) possible to perceive and live one's live in this absolute freedom, which he himself felt to be a condemnation, it is more realistic to also

²⁸ And in my understanding Logotherapy can be seen as a method to enable individuals to live their lives entrepreneurially.

take the later structuralist relativistic complementation into account, which counterbalances the Existentialist claim of individual freedom and in fact reverses it, saying that the individual is incapable of originality but only able to express the social conditions in which it resides or grew up.

While acknowledging both theories, they have to be interpreted as two sides of the same condition, meaning that the individual is free to, and in fact responsible for, its actions, cumulating in its individual life enterprise. While it is also true that each human character is massively influenced and formed by the conditions of his/her *Lebenswelt* (lifeworld). The later concept of conditioning is explored in great detail by Pierre Bourdieu, who termed this unconsciously impregnated state *habitus*; A concept whose relation to the educational system is worth observing in some more detail.

Pierre Bourdieu (1988; Bourdieu & Passeron, 1990) has done seminal work on the formation process and its relevance in social power reproduction and his account on how education is responsible for much more than simple scientific knowledge transmission, but in fact is also a main influencer in character development and the individuals ideals or belief set. He introduced the term *habitus* to describe the natural (and as such unquestioned) unconscious ability to perceive and produce activities. As such *habitus* is a structuring structure, which means that it has the ability to create something within a structure. Furthermore, he did he not understand learning as a the act of practiced individual activities, but as learning of production for the creation of activities. As such, learning is a holistic process where a creative, or entrepreneurial, ability is apparent.

In his book "Reproduction in Education, Society and Culture (Theory, Culture and Society Series)" (Bourdieu & Passeron, 1990), he presents five principal hypotheses, as one complete and self-contained theory on the sociology of education. The style and content of these hypotheses are extremely complex. For this work, relevant interpretations are made here in order to develop an argument for (1) universities as locations of critical review and (2) on education for reflexive capacity. In the first hypothesis he states that: symbolic violence, which he defines as the unconscious impregnation of habitus, is always a repetition of a constellation of materialistic violence²⁹. Subsequently, he says in hypothesis three, that one can always analyse the social organisation of a community through the observation of the educational system. Educational systems form the habitus of the social fabric, and thus constituencies dichotomize into those who follow 'truth' (as in natural sciences) or into those people who as non-conformists within the system tend to pursue less dogmatic sciences like language and philosophy (Nemeth & Hefler, 2001). One interesting claim is expressed in the fourth thesis, where he says that the educational institutions are no exception to the rule because they are

²⁹ Materialistic violence represents materialistic means (money etc.) by which power is reproduced.

obsessively engaged in ensuring their own reproduction (continued existence), which results in a deep dependence on what Bourdieu calls the arbitrary violence of the present power conditions on which they depend. He therefore denies the 'freedom of science' and their vaunted search for truth, so often claimed as it is, to be at the heart of all science and educational systems. For ultimately, claims they are, as illustrated easily by an observation of practice in totalitarian regimes, and which is subtly true for all societies, serving thusly as an example of materialistic and political power.

There is one positive process within this rather drastic evaluation. Educational systems transmit the dominant *habitus*, but they also enable (at least some) to understand and become conscious about the *habitus* itself, this is the first step to analyse and subsequently propose original changes and amendments to the current system.

This is the basis for the following argument: humans who (at least to a certain level) posses the capacity to reflect upon and critique historical and emerging thought structures, represent a very valuable social and cultural resource produced in universities. This means that students and faculty are responsible to continuously watch that this exact feature of universities is not lost. It is by working out this aspect that Bourdieu's approach can be helpful; in so much that it serves to evaluate and demand the education for reflexive capacity and social awareness.

From there we examine the connection to what researchers in entrepreneurship have found to be a fundamental disposition of *entrepreneuring* human beings – an internal locus of control (Koh, 1996; Mueller & Thomas, 2001) – comes natural. Internal locus control describes the psychological attitude that the world is an environment shaped by our actions, rather than one being shaped by the overarching fatal turmoil of the aggregated currents and particular temporal happening on this planet³⁰.

One visible expression of an entrepreneurial philosophy and an *inner locus of control* is the choice to engage in self-fashioning (Fleischmann, 2006). Self-fashioning, a term introduced by Stephen Greenblatt (1980) to describe how Renaissance noblemen used to create a physical image and work on their reputation as part of their efforts to shine according to social standards, seems to express (from an aesthetic and visible side) how an entrepreneurial philosophy plays out.

balanced scenario.

³⁰ The theme of external versus internal locus of control is the local representation of the structure versus agency discourse, which has been fought for decades (in my understanding) ending in a stalemate of acceptance that both are valid perspectives delivering useful insight. Once again it is complexity sciences with its setup of environment and strange attractors that delivered a Gordian solution (Kurzweil, 1991) to the problem by suggesting an inclusive

The following paragraphs examine how this element was observed at the universities investigated.

Cross Case Analysis

As might have been expected, LSE presented itself with a very expressed inner locus of control. One vice-rector summarized their proud and determined attitude in "We decide to change" (LSE Vice-rector 1). Given the LSE's founding story and mission, this claim could not only be applied to its internal environment but could also be extended to include the policy environments and society that surrounds it. This positive and creative proactive disposition was present on all levels. It is this integral understanding of the need for and the accepted possibility to actually shape their individual and collective future as the core reason for the LSE's excellence.

Quite another and more complicated case could be observed at the FU. Even though the foundation was an entrepreneurial act, there was enormous dependency on the historical political dimension. Hence the FU's development has always been closely coupled with the political situation and the consequent ups and downs of financial support. The last 20 years have seen the university suffering immensely. It acutely perceives itself as the plaything of external atrocity. All that was left was to administer the hardship and the internal control (spielraum) to be handed to the decision makers, even though this was felt as a burden rather than a creative opportunity. This changed during the current presidency and with the conduct of the Excellence Initiative (see 3.2.10.5). Despite the fact that the initiative was launched externally, it had a great effect on the university's self-perception and instilled a pioneering internal locus of control. Even though there had been no concrete positive results from the Excellence Initiative, almost all stakeholders reported the university to being visionary and affirmed its stern dedication to becoming one of Germany's leading universities. Even though the FU has so far not managed to win one of the sought positions as an elite university, the sheer change in the mindset has had a very positive influence on the self-perception and motivation in the institution. The mood has changed to 'we are in crisis but only we can rescue ourselves'.

As described in the case study, the UPC is one of Spain's leading technical universities and has an accordingly well developed self-esteem and internal locus of control. It stems foremost from the understanding that the professors working there are the experts in the field and that they are either setting the benchmark for research in their area or as one entrepreneurial stream of scientists (UPC management 53) expressed are pursuing the 'Sciences of the artificial' (Simon, 1969). Additionally, the UPC is proud to have lead and continue to lead substantial innovation in the relation between university, government and the private sector. The UPC was the first Spanish university to elaborate and use a strategic plan, consequently

its technological subject matter facilitates the introduction of good management as a paradigm for success. Even though the UPC is a highly polycentric institution, the university as a whole was perceived as having a strong *inner locus of control* when designing its internal machinery.

A very ambiguous case in regards to the locus of control is the one of the UOC. Being the child of a determined entrepreneur, the UOC was shaped more than other institutions investigated by the will of its founding fathers. It was the very cause and intention of Dr. Ferraté to create a university that was more able to control its own faith, and he managed to steer the institution through the political decision landscape, not without compromise, but with a certain determination. The internal reality reflected this solar setup even more; while sometimes compromise was necessary, the center of control was firmly established. All this changed when, due to political shifts in the Catalan government, the UOC board decided to select a new rector. The new female leader showed a more team-oriented style, even though the institutional conditions stayed the same, it had become clear that UOC's faith was directly coupled with the political majorities in the Catalan government. Being the youngest of the universities investigated, it seems adequate to assess that as an institution it is still a bit unsure as to what degree it is in control of its own faith. After a very autonomous and entrepreneurial adolescence a contemplation of conversion to traditional academic matters and practices seems to be on its way.

Individualisation

Another phenomena relevant to developing an internal locus of control is individualization. Sloterdijk (1999) elaborates on the genesis of the 'individual' as a self-determined being, symbolized by the moment of cognition when one escapes the self-incurred tutelage, when one realizes that one is one's own guild, as Oedipus does in Sophocles' famous saga, the individual is 'set in the world'.

In this moment of individualization, the man decides to cut his family ties into which he has been born and actively elects upon the kind of being he wants to be and what taxonomic groups he wants to belong to.

The positive and most common condition for this self-cognition is when one observes oneself positively and one's features as potentials, finally, individuality is accepted. Sloterdijk jokes in describing the moment's thought as: "Ok, if this is my condition, I volunteer to be me" (Sloterdijk, 1999).

Cross Case Analysis

In the case of the universities investigated, quite different moments of individualization or emergences of their internal locus of control can be observed. The LSE and the UOC were founded by entrepreneurs who transmitted their mindset. But at the LSE the self-cognition has, in the light of its good condition, continued, while at the UOC a certain regression of its internal locus of control can be observed with the negative developments of its market operations and the new weaker leadership (which puts the other stakeholders in a new position of shared responsibility which they are not used to). At the FU we have the non-typical antipodean example of an organization forced into individualization through crisis. While the UPC is quite a self-determined entity, it has a very technical understanding of itself and has never 'broken' with its parental authorities, but rather regards itself as a leader of its family of polytechnic universities and as instrument of the state. It simply did not need to develop its individuality in order to develop its internal locus of control.

Angst and the Tolerance of Uncertainty

One negative attractor - a phenomenon that restrains entrepreneurship – closely related to the *inner locus of control* and the freedom and responsibility that comes with it, is *angst. Angst*, the German word for fear, is commonly used in English and usually means an intense feeling of emotional strife. In his work "*The concept of Anxiety*", Kierkegaard (Kierkegaard, Thomte, & Anderson, 1980) employs the concept to describe a profound dread and spiritual condition of insecurity and despair happening to free human beings. In his rationale, *angst* stems from man's fear of doing something wrong as he carries the responsibility for his deeds.

Angst is used here as one of the essential human conditions and no matter where on the Maslow pyramid you are struggling, it remains one of the dominant human emotions. It is defined here as the anxiety to make an existential decision ³¹ in condition of uncertainty. Its presence or absence hence influences the propensity for entrepreneurship.

Adorno's (1964) interpretation of Heidegger is interesting in this context. Adorno philosophizes about the primary importance of 'Wohnen' (housing, reside, dwell, settle) for the whole human being and quotes Heidegger, who elaborates on the topic of housing shortage: "The actual plight of housing does not consist in the shortage of housing but that the human has lost his own entity and therefore does not come to rest. The actual plight of housing consists therein, that the mortals have to learn 'Wohnen' (housing, reside, dwell, settle). To learn to reside means: to grasp the necessity that the human, while facing the threatening, creates a rescuing space and with confident spirit takes up residence" (bold added, ibid p. 13).

³¹ As elaborated above, all decisions can be interpreted to be existential. This depends only on the reality perceived by the beholder.

It is this confidence and ease of mind, the absence of pressure and *angst* that is needed to have humans live out their entrepreneurial potential.

Hence an environment of constant recess, like at the FU will make entrepreneurial action less likely because there is a constant stress and *angst* concerned with losing the job. However, the civil service status of many employees lessens this *angst*.

Responsibility as Trigger for Cognitive Development

Once Enlightened, recognition of one's *inner locus of control* and the accompanying responsibility for free will choices have been reached, the following sequence³² of questions are rational. First, the values and objectives are explored, then the principles for the practical implementation are conceptualized, lastly-- one questions and audits the choices made "because only I can chose myself, and this absolute choice of myself is my freedom, and only in having chosen myself absolutely, have I made a differentiation, the difference between good and evil" (Kierkegaard, 1992). It is through this attractor that the conscious identity question "Who am I" is made possible. It triggers reflected differentiation from others as well as a continuity and sustainability of the mindset.

4.2.4.2. Axiology & Teleology

Next, once the relative autonomy from surrounding circumstances has been realized, the question: "What is important for us, and in what priority?" emerge naturally. The institution explores its values and decides what causes to pursue. Here, the science of axiology and subsequently teleology, offer insights and suggest ends towards which to strive. Axiology, from the Greek axia ($\alpha\xi\imath\alpha$, value, worth), is the study of how phenomena and ends are valued and evaluated. It is often related to ethics as indeed axiology often times includes questions of inter-personal conduct. However, the two are differentiated by defining axiology as the study of what values can serve for human teleology. Before the telos value is discussed, one value, the value of autonomy in the decisions, is proposed to play a substantial role in an entrepreneurial mindset by influencing motivation.

Once the insight of the internal locus of control and free will has been reached, it is held as a value in itself. This value causes a strong bias towards intrinsic motivation and what has been described as a *hacker's work ethic* in contrast to the still dominant work ethic described in Max Weber's "The Protestant Ethic and the Spirit of Capitalism" (Weber, 1930).

In contrast to the Protestant Work Ethic, which is centred around one's duty to constantly work as part of fulfilling one's calling by God and to reach salvation, hacker work ethics stress the

³² As said the presented sequence is logical but in practice all attractors are simultaneously present.

need for intrinsic motivation and passion as a result of engaging with self-set challenges. For Himanen the most important result of hacker ethics is the "general passionate relationship to work that is developing in our information age" (Himanen, Castells, & Torvals, 2001). It is for this reason that entrepreneurs are not commonly found in hierarchical organisations where authoritarian leaders reign and processes are rigidly defined. Entrepreneurs need the distributed leadership described below. They need spielraum (see below).

Constructing the Telos

"Institutions, in a word, inculcate duties and generate outcomes. In order to generate outcomes, they must rely on cognitive and moral resources, which, in their turn, are to be created by administrative fiat. **There is no administrative production of meaning**" (Habermas as quoted by Ozga, 1998, p. 152 [bold added]). Agreeing with the words of Habermas, this section deals with the construction of meaning or telos.

Teleology, (from Greek telos: end, purpose), is employed here as the practice of the philosophical discourse on the degree of finality that human creation and "beingness" follows. Since the human condition has been established as dependent upon the free will of the individual, this purpose, as a Platonic *causa finalis*, has to be elected (conscious or unconsciously). Teleology is not dependent upon intrinsic finality (doing something for the perfection of its own nature) and is even less dependent upon extrinsic finality (realizing a purpose outside and greater then that being). Rather, teleology is used in the sense of V. Frankl's self-chosen logos (reason) for being. In his seminal work "Man's Search for Meaning" Frankl (1963) writes: "Logotherapy...considers man as a being whose main concern consists in fulfilling a meaning and in actualizing values, rather than in the mere gratification and satisfaction of drives and instincts" "Everything can be taken from a man but ...the last of the human freedoms - to choose one's attitude in any given set of circumstances, to choose one's own way" (ibid p. 104), expresses very closely the central theme of the attractor described in this section.

Another potent approach for exploring and defining one's values is derived from George Kelly's work on personal construct theory (Kelly, 1955). This early constructivist theory is used by Peavy (1992) to propose a vocational counselling approach that represents uses for constructivist psychology in career counselling. Here a career is understood to be "a carrier for meaning" and "as a path that provides direction, structure and meaning to life" (ibid p.218). In this approach, the values that give the (entrepreneurial) career meaning are constructed or chosen based on free will.

³³ However Frankl seems to perceive that meaning as something like an extrinsical value to be detected (ibid p. 157) rather than promoting an autonomous construction of one's telos. This becomes more explicit when he writes: "It did not really matter what we expected from life, but rather what life expected from us. We needed to stop asking about the meaning of life, and instead to think of ourselves as those who were being questioned by life - daily and hourly" (ibid p. 122).

Before some concrete examples of values motivating entrepreneurial projects are provided, it seems important to make explicit that it is not the popular and conformist moral of the good that drives entrepreneurial action. An entrepreneur can not accept the established understanding of values nor can he/she value traditional practices simply for historical or cultural reasons. An entrepreneur follows³⁴ what Nietzsche (1885) described in "Beyond good and evil" as a master moral. Nietzsche writes "The noble type of man experiences itself as determining values; it does not need approval; it judges, 'what is harmful to me is harmful in itself'; it knows itself to be that which first accords honor to things; it is value-creating" (ibid). In this sense, an entrepreneur does not accept a given state or practice but creatively destructs the current paradigm to give birth to innovation.

On a more profane level, the teleological approach has been captured by the eminent American entrepreneur and venture creation consultant Guy Kawasaki (2004a) in his book "The Art of the Start" where he advises entrepreneurs to "make meaning".

From his extensive empirical experience, Kawasaki extracts three categories within which entrepreneurs drive to create meaning (Kawasaki, 2004a, , 2004b): (1) Increase the quality of life (e.g. through a more usable computer service); (2) to right a wrong (e.g. through the introduction of a garbage recycling system); and (3) by preventing the end of something good (as in the case of e.g. a 'slow food' restaurant being replaced by a modern fast food practice).

So what are the values that qualify as teleological or that make meaning? Naturally, all instrumental values and goods can be neglected as they are only stop-overs on the way to the causes of motivation and finality: the intrinsic values. The distinction first made in Plato's Republic allows for a relatively rapid but astonishingly correct classification of what can be considered teleological values. Another influential conceptualisation of values was developed by Kant (1948), who developed the dichotomy of hypothetical and categorical values. Employing the same logic present in his categorical imperative, he defines a categorical value as being universally true, that is true under all circumstances in contrast to hypothetical values which are true only in some conditions: i.e. it is good to be rich only if that does not imply that one is spending great amounts of time doing a work that one does not enjoy.

The philosophical discourse on *what* and *how* these true values *are* is very old and is of course ongoing. Naturally, it is not the intention herein to propose or discuss "the" telos or logos for life, instead -- four prominent values that have been observed as various combinations in the entrepreneurial motivation of human beings are presented in their expression as telos. Nevertheless, the three conditions suggested by Habermas in "Theory of Communicative Action" (1981) as necessary conditions for a valid statement might be deployed to examine the

³⁴ In this context – later ethics and the interactions and consequences for others and the environment are considered.

validity of a postulated telos. These three conditions are: *normative rightness ('We')*, *theoretical truth* ('It') and *expressive or subjective truthfulness* ('I'). This translates to the questions: Is the telos acceptable within my normative believes? Is the telos congruent in my life's context? Do I truly feel like pursuing that telos?

In the following four values: wealth, power, justice and knowledge are presented from their axiological aspects.

While the following presentations intend to articulate the distinction between the teleological drives, it is acknowledged that in reality they almost always simultaneously interact (possibly also with other values such as love or health or aesthetics).

The most dominant teleological value of modernity is monetary wealth, most figuratively exemplified in the successful businessman. Given its central role in common entrepreneurship theory and today's capitalist society in general, it is presented herein, but it will be analysed on the meta-physical axiological dimension since it does not qualify as a cardinal value. Basic monetary wealth is of course fundamental in that it fulfils the first two primitive needs - physiological maintenance and safety - from Maslow's pyramid of human needs³⁵ (Masslow, 1943). However, when it come to the higher human needs – love/belonging, esteem, and self-actualization – wealth is only an effect (wirkung); just like happiness (Welsch, 1998) but with a distinct causation. Therefore, do people who claim to be motivated by wealth, mostly substitute money for other values like power or pleasure.

The power telos is dealt with in the following paragraph. The hedonistic motivation of pleasure is rather short-sighted and thinkers such as Frankl have warned not to indulge in affluence and materialism as the paramount logos in one's life (Frankl, 1963). Thus, even though being rich is probably the most common entrepreneurial motivation, it does not represent a sustainable (cardinal) value to strive for, but only serves to permit the consumption of pleasurable goods and services.

Power as motivation might be best developed as a meta-physical concept in Nietzsche³⁶. He writes: "[Anything which] is a living and not a dying body... will have to be an incarnate will to power, it will strive to grow, spread, seize, become predominant — not from any morality or immorality but because it is living and because life simply is will to power... 'Exploitation'... belongs to the essence of what lives, as a basic organic function; it is a consequence of the will to power, which is after all the will to life" (Nietzsche, 1885, §259). The strive for power

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 $^{^{\}rm 35}$ In this regard it is naturally the primary motivation for the poor.

³⁶ Even though there is much controversy as to how he meant the *will-to-power* to be interpreted.

finds one of its purest forms in political entrepreneurship³⁷ (Taewook, 2004; Younkins, 2000): People who identify and realize political opportunities in order to gain power and to promote their political position. However, most political entrepreneurs also tend to have a particular understanding and motivation to bring justice³⁸ to the society. The latter being the leadmotivation of the social entrepreneur, a phenomenon which lately has received quite some attention (Bornstein, 2004; Leadbeater, 1996; Mair, Robinson, & Hockerts, 2006). Or the altruistically related notion of the 'green entrepreneur' (Anderson, 1998; Taylor & Walley, 2003), who creates ventures where the dominant telos is the promotion of sustainability.

After quickly reviewing the teleological motivation of the established entrepreneurial paradigm for business, politics and social work, let me now turn to knowledge as a motivating value for entrepreneurship. In the theoretical background, the historic scientific trajectory of knowledge entrepreneurship has been outlined. Allow me to develop in this paragraph the meta-physical argument for knowledge entrepreneurship. As an motivation knowledge entrepreneurship has been researched under the concept of curiosity (Kashdan, Rose, & Finchmam, 2004) and more specifically scientific curiosity (forscherdrang) (Vidler & Rawan, 1974). The psychological approached pursued by these researchers however is rather descriptive and analytic than normative as is intended here.

Proposing knowledge as a teleological value replicates the traditional academic argument of knowledge as an end in itself. Much discussion has orbited around this argument because knowledge as an end in itself allegedly caused the academics to retreat into an ivory tower. Lately the view that, so called, Mode 2 knowledge (Gibbons, 1994; Nowotny, Scott, & Gibbons, 2001) - knowledge that is generated within a context of application - is taking over scientific production, has been widely accepted. I will not repeat the argument on why knowledge entrepreneurship is an adequate paradigm for universities, but rather seek to depict why knowledge is an intrinsic value for many universities. The ancient Greeks distinguished two forms of knowledge, techne and episteme. The first, techne, can be neglected as categorical value as it can be classified as instrumental knowledge, the knowledge of how to do something, mode 2 knowledge. The second, episteme, however touches the core of what a categorical value might be as it deals with life and the understanding (making sense) of one's reality as such; thus making it the recursive motivation for reflection upon life and one's motivations. It is this knowledge, described by Lombardo (2007) as "understanding the big picture" and "deep

related public policy, while the benefits they hope to gain involve voter support, public recognition, and personal popularity.

³⁷ Taewook's definition is: A political entrepreneur refers to a political player who seeks to gain certain political and social benefits in return for providing the common goods that can be shared by an unorganized general public. These common goods that political entrepreneurs attempt to provide to the populace generally include foreign- and domestic-

³⁸ Justice is, in daily life, a highly subjective term and many controversial activities/projects have been started in the name of it.

learning", that causes wise men to say they know that they don't know. It is this knowledge that motivates wise men to study endlessly.

As expressed before the elaborations of the different motivations, most entrepreneurs are motivated by a conglomerate of values, but usually one of the values is dominant as is the case for academics – who as knowledge entrepreneurs - do want to focus on their research or teaching and have no intentions of commercializing their work.

Cross Case Analysis

The LSE was founded by entrepreneurial intellectuals with the purpose of developing knowledge about how to improve the conditions in society. Contemporary stakeholders describe its mission to "ask important question" and to "challenge existing thought" (LSE5) thus to explore answers to the issues society has not accepted as tradition and conserving argument. Lately however, the same informant reported a notion (especially amongst students) characterized by the director as the "death of idealism" (LSE 6). She elaborated that many students express a somehow naïve telos of promoting the good, what she dubbed a "Robin Hood approach", when they study at LSE. Once they leave the school they embark on philanthropic and social work only to realize after a while that the same profane obstacles of corruption and malpractice are present in these environments and many subsequently decide to pursue what seems 'realistically' the most beneficial career for them: business consultancy and the like. Hence, while no direct relation between the change in the mindset of the director and the students can be verified, a trend seems to show that more and more LSE students don't follow a justice and political trajectory, but rather embark upon a wealth accumulation telos. On an institutional level knowledge entrepreneurship is today as present as telos was before, and finds its expression in the mission statement 39 and its strategy. undeniable is that the economic aspects, which are even mentioned in the mission statement, gained importance with the increasing responsibility caused by the retreat of government funding.

A lesser defined teleological scenario has been encountered at the FU. While the university developed a visionary proposal for what the institution could look like, the Chancellor explained that there was a project to define a mission statement but that it was abandoned as the mission/vision statements according to his assessment "all convey the same" (FU Chancellor 40). One interesting temporary axiological shift occurred when, during the 1960's, the student experimented at changing the FU's teleology and experimented with the finality of becoming an institution for the emancipation of a critical society. Even though the experiment as such,

³⁹ http://www.lse.ac.uk/collections/campaignForLSE/MissionOfLSE.htm

lasted only for a very limited time, its teleological spirit had a long lasting effect and is still faintly present today.

The instrumentalist telos of excellence found at the LSE is also present at the UPC. While no explicit mission or vision statement has been identified, the UPC expresses a competitive attitude to defend and extend its leading role as *The* Spanish university for polytechnic subjects. Thereby, it quite explicitly follows the three mission telos of teaching, research, and socio-economic services, especially in its manifestation of Etzkowitz's triple-helix paradigm.

The UOC represents an interesting case as it started with quite an overt economic entrepreneurial domination-- but has now, under its new leadership, embarked on the difficult task of reorienting its telos towards knowledge entrepreneurship. UOC's former Vice-Rector for strategic development still expressed UOC's self-image as an institution in the "business of knowledge" (UOC11). It will be suspenseful and interesting to see where the new management team takes the university's telos.

One notable case that complements the findings of the case study was investigated because the opportunity emerged and was assessed as relevant to the research's subject matter. The CEO of the private Barcelona based private sector research venture Starlab⁴⁰ was interviewed and reported the following approach: The company's goal is to have an impact on society by making meaningful knowledge products (research) in the area of science and technology (*Starlab 1*). Hence it is a good example of an entrepreneurial organisation with a heterogeneous teleology. It is engaging in knowledge entrepreneurship in order to improve the societal condition, while aiming for monetary profit through income generated on the private market. In short, their business model is to identify competencies, interests, and funding opportunities, develop strategic priorities, and compete for research funding in order to pursue knowledge that fits the strategic agenda of the company.

The German futurologist Horx summarizes the "axiology & teleology" attractor in a forward looking way: "Our culture will give rise to a kind of entrepreneur, who relates more to his work than money: He wants to model a sound and exciting life-art-work" (As cited in (Faltin, 2007, p. 54)). Put differently, entrepreneurs are motivated by multiple telos.

Two aspects have to be mentioned when thinking about envisioning, and planning for the future dubbed *entrepreneuring*: (1) Agreeing with the observations of Emil Durkheim, and

an organic growth rate (Starlab web, article, old-web).

⁴⁰ Starlab was founded by a wealthy business entrepreneur, who pursued the vision of setting up a high end multidisciplinary research laboratory, which would engage cutting-edge researchers and commercialize their findings. The venture, which was started during the late 1990's internet boom, was growing fast and engaged in a multitude of high risk research projects. It collapsed with the market consolidation of 2000/2001. But the informant who had at that point recently founded the Barcelona subsidiary, decided to carry on-- and reports to be doing sufficiently well and producing

especially considering Max Weber as a representative of idealist German sociology, who stated that there is a profound anomie and disenchantment of social life and the individuals *Weltanschauung* (world view). Given these factors, it is argued that the irrational side of humans, is not to be dismissed as biological, instinct based, superfluous, or may such a thing be tamed by the modern rationalistic and positivist belief hierarchy, but instead that it is most relevant for creativity and thus for the act of envisioning objectives and scenarios (Durkheim & Giddens, 1971; Kramer, 2002). In short, it is the irrational act of dreaming for an almost impossibly positive scenario, which is represented by the term *entrepreneuring*. (2) It is also important to clarify that the practice of *entrepreneuring* is strongly dependent on the pragmatic attractor described in the following section. If perfection and the 'true plan' would be sought after ad infinitum, there would be no implementation but only envisioning and reflection. The following develops the pragmatic attractor in detail.

4.2.4.3. Pragmatism

Pragmatism is probably the most obvious and most researched component of a philosophical entrepreneurship model, because it deals with the question of 'how to implement?'. An entrepreneur is most distinctly characterized by his ability to practically implement a project rather then for meta-physical considerations. The actitudes of making decisions and experimenting are the two entrepreneurial practices most clearly related to pragmatism. Pragmatists are interested in practical consequences or real effects. They have their focus on the results rather then on the essence of a phenomenon. Refusing any kind of dogma, pragmatists believe that there is no absolute or objective reality, but rather that stress changes as the only constant. Hence, what is right is what functions (Poller, 2006). A pragmatist is not interested in the ideal solution, but always seeks a connection to the concrete problem at hand. Or as Wilhite (2006) differentiated: "Pragmatic decision makers adjust their view and their decisions to the state of the world. Ideological decision makers follow a guiding principle making decisions that do not change with circumstances". While entrepreneurs do engage in entrepreneuring, envisioning ideal scenarios, they focus on realistic goal attainment rather than the pursuit of the ideal. In this context the notion of the entrepreneurial cybernetic is introduced.

Cybernetics is the science of steering any kind of system through adjusting practices, based on feedback information. Following this initial understanding, it is a classical post-hoc management approach as the cybernetician waits for feedback information to come in and than adjusts the system accordingly. In order to add the attributable entrepreneurial essence, the work of a cybernetician has to move pro-actively and employ human creativity (see 4.2.2.). An entrepreneurial cybernetician first creatively designs a system which pursues a specific telos and then continuously uses creative destruction in order to optimize the system to either adapt to new environment conditions, to improve performance, or to represent an amendment in finality.

One benefit the cybernetic perspective adds to the pragmatist aspect of this entrepreneurial mindset is its practical functionality for the entrepreneurial project as a system with an input, an output, and feedback based on steering or decision-making. Another element expressed by the cybernetician perspective is the entrepreneur's relation to control. While he can delegate responsibility and does not have to be omni-presently controlling all processes, an entrepreneur like a cybernetician needs to understand and know the status of the system in order to precipitate a decision about how the system is to function from now forward. Spender (2006, p. 10) adds an interesting argument highlighting the creative parts of steering a system: "Enlightenment philosophers assume all of us have imaginations, without which we could not make our way through the world, for it enables us to deal with the shortcomings of our knowledge about the world. Strategy is evidence of our imagination, not our reason, and to chase our tails endlessly looking for a positivist theory of strategy is to busy ourselves so much that we miss its essence. The knowledge view is useful because it helps us see strategizing is about the creation of knowledge, the process of dealing with knowledge absences rather than with knowledge asserts".

Following this tangent, the notion of an entrepreneurial cybernetician combines the traditional concept of the university as bureaucracy (a cybernetic automaton), with the entrepreneurial attitude of an adhocracy (an "organization that cuts across normal bureaucratic lines to capture opportunities, solve problems, and get results" (Waterman, 1990). Put differently, the pragmatist philosophy also enables the entrepreneur to accept ambiguity and live the paradox of emergence (i.e Deleuze's becoming and the local independence of living organisms) and planning (of final the ends).

As already explained in the introductory section about hyper complexity and second order cybernetic, the universities act most obviously as entrepreneurial cybernetician in their interrelation with their policy environment. All investigated universities are observing the feedback that they receive from the corresponding government institutions and change their practice accordingly. (For more information on the theme of hyper-complexity see section. 4.2.2.1.)

Cross Case Analysis

At the LSE a pragmatic mindset shows when realistic goals are set for almost all stakeholders in a cascading fashion, and then even more so when strategic objectives are not held to rigidly but opportunistic practices and emergence are allowed to happen naturally when they are deemed beneficial to the school (see chapter 3 LSE section, 3.1.5.2 and 3.1.11). As such, the LSE is a good example for an entrepreneurial cybernetic institution.

At the FU pragmatism has to be dominant in its paraphrased nuance of pragmatic resource management: 'reaching the most with what is available' even though it is not enough 'we make the best out of it'. The administrators speak of working in the *realm of exigency* (FU management 35) which is still today the dominant modus operandi. The single most stifling constraint to an adhocratic mindset unfolding at the FU is felt to be the "1/3 ballast" (FU management 12) of traditional state bureaucrats still employed at the university and anchoring and slowing creative movement.

A positive example of the new spirit is the example of the pragmatic support the FU entrepreneurship team gave to the initiators of the "Direct to the Chancellor" socio-political entrepreneurship (see chapter 3 FU section, 3.2.10.7.).

The UPC presented itself as an exemplary entrepreneurial cybernetic system using a sophisticated input-output-based feedback system for strategic steering (see chapter 3 UPC section, 3.3.7.2.). The UPC deploys a formal and cascading strategy process and allows generally little change to the strategy once it is approved (except for minor adjustments done by individuals without formal request). Following a technocratic paradigm, no humanist ideals are prevalent, but efficiency and effectiveness are the dominant evaluation criteria for most stakeholders. Even though the UPC presents itself in good institutional shape by embracing Clark's entrepreneurial paradigm, it does not implement the dynamic flexibility of a true adhocracy but rather stays in the bureaucracy paradigm.

The UOC was born out of its founders desire to be able to pragmatically and unbureaucratically decide strategy and lead a university (see chapter 3 UOC section, 3.4.2. and 3.4.5.). Subsequently, a system evolved in which one persons pragmatic understanding of the lateral option space dominated. Curiously enough, this led to a highly political decision making culture wherein every move of the stakeholders had to be auto-analysed and positioned in order to follow the leaders disposition. Today, the university is in a recuperation phase. But institutions meant to deliberate pragmatic ideas for improvements like a virtual suggestions box continue to be very little used (UOC management 12). This doesn't suggest it is a hopeless cause, as one vice rector remarked, it takes time for the system to change (UOC management 40).

4.2.4.4. Ethics & Sustainability

While values and their priorities have been the content of the axiological attractor described, the influential component carved out in this section deals with normative evaluations meant to allow for decisions regarding human interaction (especially under the consideration of dilemmas). The central question: How to relate one's practice to the rest of the world? And namely: How to behave with regards to other humans and human institutions and how to behave towards the natural environment? Considerations about sustainability are hereby included following the logic of the necessity of a functioning (resource) environment for future

generations.⁴¹ This attractor therefore deals with Habermas' condition of whether the already discussed attractors on finality and practice are normatively right in an alignment with what one normatively should do. It is important to point out that this learning stage 'is not something added, rather it represents a fundamental reorganization of the system' (Macy, 1991, p. 126). What Macy wants to highlight is that being in harmony with the world is a step that is required and that might cause the whole vision to change. This is so because it allows for the individual to identify and evaluate opportunities, because an opportunity only exists when it is attractive to others, and it can constrain or even eliminate an opportunity if the consequences for others has by its nature negative results.

While there are several concepts of departure in making considerations about ethics and sustainability (as alluded to when elaborating on axiologies), Kant's categorical imperative is the cornerstone of his moral philosophy as well as the basis for deontological ethics which are most commonly used for scrutinizing ethical validity. It famously reads: "Act only according to that maxim whereby you can at the same time will that it should become a universal law" (Kant, 1948).

The ethics attractor was the most difficult to investigate for the universities, because it is not directly codified nor made explicit in the interview. In fact, this is, following the cybernetician Heinz von Foerster, a normal state. He proclaimed that ethics need to be implicit (Foerster, 1994, 1999).

Responsibility of Modern Philosophy and Procrustes

Another weighty argument for the inclusion of the ethics and sustainability attractor is Auschwitz. It is the argument of the Frankfurt school and others (Welsch, 1998), that, even though philosophy has not directly caused the barbarism of the second World War, and especially the holocaust, it has not prevented it. Some philosophers were even used to argue for its legitimacy. The claim is that no philosophy after Auschwitz can neglect the indirect responsibility or at least weakness that it did not give the mindset to the people to resist and prevent the atrocities (ibid). It is in this sense, a model which considers ethics and sustainability as the discipline that sets out to demands ethical practices and long-term preservation of resources. Each individual is responsible for his being. Each philosophy is responsible for the consequences of its application.

Over thousands of years humans have learned to tame – as in dominate –our external nature. With the raise of modernity the inner nature of the human being is more and more tamed, or dominated by systemic instrumentalization. Through homogenization, through uniformization,

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⁴¹ To some degree the ethics and sustainability attractor overlaps with the telos of justice; in comparison to the function as telos, here it is conceptualized as necessary condition for rational entrepreneurial practice and as trigger for reflexivity.

and standardization, individuals are made into numbers, incidents of statistics and instruments. We become social automats, a cybernetic system housed in an organic shell. Horkheimer and Adorno write in "The Dialectic of Enlightenment" (Horkheimer, Adorno, & Schmid Noerr, 2002), that the success factor of (modern) reason is to make "the unity of the manipulated multitude [-manipulated through the authoritarian power structures -] consists in the negation of each individual and is scorn on the kind of society which was capable of facilitating his individuality" (as cited in Welsch 1998, p. 15). Put differently, the dehumanization of work in the industrialized production of the conveyor belt has caused an external locus of control. The modern knowledge worker on the other hand needs to be an individual again and by achieving an inner locus of control regains agency and sovereignty.

"The horde is not a relapse into the old barbarism, but the triumph of repressive egalitarianism." (ibid p. 355). In "Negative Dialectics" (Adorno, 1973) this claim is applied to the concentration camps. The people who died in the camps died as specimens; therefore all others who escaped the measure suffered meta-physically the same fate.

The omnipresent paradigm of standardisation and quantification bears parallels with the practice of Procrustes, the disreputable host of Greek mythology. Procrustes happily received all visitors and offered them a bed to rest. However, being a perfectionist, he wanted to ensure that the visitor fitted the bed just right. Rather than adjusting the bed to the human, he amputated lapping limps, or stretched the guest on a rack until he would fit the bed. The total levelling of uniqueness (*Gleichmacherei*) is impeding entrepreneurship in this sense. On the societal level, the logic of normalisation which allowed for economies of scale and automation, developed into a systemic logic interested in maintaining the status quo; on the individual level, this system caused a feeling of impotence towards the enormous organisations. The logic of pessimism plays out in 'normal vocational/life trajectories' resulting in limited sanctioned opportunity sets of career paths (positively discriminated by the system).

Case Analysis

One definitive instance of a missed attempt to create a just environment was reported. In the early bootstrapping phase of the UOC, many practices were not regulated and some professors created personal web pages about their work and professional interests. After some time the institutional environment became more closely defined and one informant reported that he was approached by the technical managers and asked to close his page as other professors would feel inferior for not having the skills and passion to setup a personal page (UOC faculty 13). Even today the UOC does not provide personal pages for their faculty. This

form for egalitarianism creates a neophobe⁴², an atrophied organisation that does not allow new features and practices to emerge because they would create an un-equal condition.

Even though the attractors comprising the entrepreneurial mindset are simultaneously at work, there is a certain logic as to how one depends on the other, on which order the narrative is based. The last step in closing the dependence circle happens when the entrepreneur defines himself in relation to the *other*, considered in this case as an ethical attractor. He is now ready to enter in systemic differentiation.

Trust - transparency coupling

One sufficient condition for ethical conduct is that there is trust between the parties involved. In this paragraph the connection between trust and transparency is established. Next,, interesting practices within the LSE are reviewed. Lastly, the particularly effective role that information and communication technology can play in implementing transparency is highlighted, regrettably using examples from the governmental and the private sector; this was the case because the cases investigated did not have state-of-the-art internal online information environments.

The term transparency is used in the humanities to describe how an organization or individual is documenting and communicating practices and changing facts about itself. An activity can be considered transparent when all relevant information about it is published and freely available to the public. This openness increases accountability as outsiders can review, critique and, if necessary, denounce the practice and conditions. If an entity practices transparency in its activities it thereby increases the trust and credibility (Welch & Hinnant, 2003).

Wikipedia founder Jimmy Wales addresses the theme in a simple equation: "community needs trust" (Wales, 2006) and many executives want the positive effects of community but are afraid to create open systems with open social rules that can be adopted to new circumstances and amended based on experience. According to Wales, communities are 'responsible' when you give them the responsibility to decide for themselves and the tools to make decisions collectively (ibid).

Case Analysis & Empirical Support

The only institution investigated where informants have stressed that trust has been identified and consciously nurtured as a fundamental value, is the LSE. One representative even said that the whole organization is based on trust "if we break the trust everything would collapse"

⁴² Neophobia is the fear of new things and experiences.

(LSE 10). This value is lived out and shows in the way the website gives a relatively deep insight into the organization, how strategy documents and reports are published, and probably most convincingly, through the openness displayed during the interviews. Another example where trust was raised as a key factor was the case of international partnerships. Potentially mutual benefits in these scenarios are immense, but before the joint projects can take off and the inter-institutional learning process can take place, trust needs to be grown gradually and over time (LSE management 11).

For the governmental sector, positive effects on the use of internet based information and services have been recorded to elevate transparency and consequent trust and citizen satisfaction (Welch & Hinnant, 2003). It is in the private sector, however, that the positive transparency-trust relation has been taken furthest, naturally, with the legitimate intention to maximize the benefits for their companies. Some of the first to articulate the call for openness and transparency were the authors of the "Cluetrain Manifesto" (Locke, Levine, & Searls, 1999). Clive Thomson (2007) argues that, the rampant corruption and environmental pollution scandals, cause consumers to value honesty very highly. He continues his article with a description of what is known as radical transparency, a practice where organizations publish not only results and facts, but also engage in a very open conversation about everything from new products and services, to internal and customer services, to rumors and feelings. And what makes it even more surprising is that the blogs and wikis are open to comments by users, to a degree that even external critiques are totally accepted. Even though this practice is surely not dominant now, the author supplies a whole list of cases where it has been successfully practiced. Two key positive effects are claimed.

First, the transparency creates trust, or put differently-- a good reputation, and as internet users are investigating and writing about organizations anyway, the best way to deal with the organizations doxa (public knowledge/opinion) is to be honest and build trust. The second benefit comes from the value that users add when interacting with – and giving feedback to the organization. The concept has been described by Howe (2006) as 'crowdsourcing', or more generally by Toffler as 'prosumtion' (Toffler, 1980). Users are sharing ideas, giving constructive critiques and sometimes even taking over part of the development process or service. "Customers become working partners" (Thompson, 2007). One negative constraint is also hard-wired with the implementation of this kind of transparency: Writing all this information takes away valuable time, otherwise spent on directly productive business processes.

Co-dependency

One central element to justify the constitutional necessity of the ethic and sustainability attractor is based on the systemic causality or (in its historic life-world expression) on

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⁴³ Another point to set the concept into perspective is that not everything needs to be told. Transparency is meant to put an end to lies not secrets (Thompson, 2007).

dependent co-arising (Macy, 1991). After a long epoch of investigations on specifically 'independent' cause-effect relationships, users piece together a worldview, we are now, with the advent of complexity sciences, returning to holistic approaches dealing with interdependence and mutual causality. The necessity of this attractor is based upon "the ethical imperatives inherent in a world view where no absolute exists to constitute an ultimate locus of power and moral sanction" (ibid p. 1). Because we have to continuously, discursively deliberate to reach an inter-subjective understanding of the world and our intentions, the ethical and the sustainable are important constituents enabling productive interaction. Without the ethical and sustainable as preconditions all interaction is bound to lead to unsustainable practices.

The above argument is taken from the most interesting work of Macy (1991), who develops the parallels between our scientific understanding of general systems theory (and cybernetic) on the one hand, and mutual causality and the 2500+ years old Buddhist teachings of *paticca samuppada*. Her work shows the traditional accessibility and importance of the concept of codependence in the life-world of this community as well as how it is matched with today's scientific paradigms.

Another author who deals with the responsibility for sustainability – this time in the area of modern work and family life – is Carnoy (2000). In his book "Sustaining the new economy: work, family, and community in the information age" he discusses what factors are changing work and family experiences and gives some cues about what might lead to sustainable and positive conditions. His work is brought up at this point, because it is an example of how sustainability is understood in this research. Not in its 'protecting the environment' usage but in its broader meaning as an equilibrium of personal freedom and the environment⁴⁴.

Co-dependent practices

The following paragraphs propose two original concepts, "knowledge products", or memes, that describe normative work practices: (A) cothink and (B) collabouriting.

A) Cothink

One ability that is very useful to enable ethical and sustainable behaviour is *cothink*. *Cothink* a term introduced as translation of the German word *mitdenken*⁴⁵ and meant to express the act of following someone else's train of thought. *Cothink* is commonly subsumed under broader concepts like collegiality or thinking as a team. In contrast to compassion logic and rational

⁴⁴ It seems important to point out that the creative destruction of sustainable practice is absolutely possible as long as the innovative practice or product is equally or more sustainable.

⁴⁵ Translated by e-Langenscheit 4.0 as: 1. show some initiative, think (things through); 2. [please cothink!] help me (oder us) think; 3. follow someone's train of thought.

peer support are central. Another aspect of practicing *cothink* is that it incorporates the complexity paradigm in satisfying the need to understand all "ventures" as part of the whole.

Two conditions have to be met to enable *cothink*: (a) the individual entity has to be motivated to help (it has to be aligned to the other's telos, and the venture in question has to be ethically right) and for that condition (b) the entity needs to know / have information about the scenario. While information and communication technologies can play a role in facilitating the discourse on collective teleological agreements, they can play a central role in the creation of the transparency prerequisite of the latter. The same phenomenon is described as contributing to an innovative environment in Mitleton-Kelly's research as the practice to "consult their colleagues and to invite their critique" (Mitleton-Kelly, 2005).

Case Analysis

In the case studies, the following practices that describe *cothink* were found: At the LSE, community is mostly based around the reciprocal respect based on the elite reputation of the institution and its members. Most researchers do collaborate with their peers in the department but communication is mostly restricted to peers within the same department. On the student side, the chairwoman of the entrepreneurship association has reported that there is an alert forwarding of opportunities indicating that people related to the subject also *cothink* when finding opportunities relevant to others (LSE student 12).

At the FU the ongoing state of crisis has a bonding effect and creates a "we are all in the same boat" community. Unfortunately because there is no directions of what is expected and given the rather bureaucratic (non-initiative) mindset, coupled with the polycentric setting, not many opportunities are shared because not many are perceived. (This might have changed at least partially as now there is the vision the FU has developed for the Excellence initiative. Effects are thought to be limited though, as the development process of that vision was rather exclusive.)

In the UOC, with its rather feudal power structure (Inayatullah, 2005), *cothink* happens mostly within family like communities, while an almost competitive thinking has been observed when dealing with other clans or outsiders.

B) Collabowriting

Another concept related to co-dependency is the practice of *collabowriting*. *Collabowriting* is a portmanteau of the words 'collaborate' and 'write' and meant to describe the practice of writing a document together and collaboratively. *Collabowriting* has been possible long before the advent of wikis and other IT collaboration tools, but the practice of jointly letting a document

emerge was much less dovetailed and was formerly less interactive. True *collabowriting then,* is a rather recent phenomenon and good practice is still the exception.

Case Analysis

Nevertheless, the practice of *collabowriting* has been found in some form in all of the universities investigated. At the LSE, documents are understood to be conversations (LSE management 7) and the practice of co-signing a document is usually applied in order to share the ownership of documents and decisions (FU administration 13).

One decisive attractor of this practice is however – according to an LSE informant – that the document has a clear champion; someone who feels responsible and pushes the process forward. If there is no champion, *collabowriting* efforts fail (LSE management 8).

4.2.4.5. Reiteration - Reflexivity, Differentiation

At this point we are entering into the meta-reflexive or hyper-complex cycle; the actor has reflected about himself, his values and goals, his practices, as well as his relation to others. He re-enters the cycle with this understanding and is now (especially as the attractor) interested in developing the positive differences i.e. the unique selling points. Codifying the unique history is one strategic element in creating the myths that make up the cultural identity. In this sense universities can apply the practices that they used in early modernity as codifiers of national history and culture (Delanty, 2001).

This second order abstraction can be based theoretically in the notions of Spencer Brown and Luhman (1992), who have their work originate from the reflective state of drawing a difference. They begin with a first distinction, the system and the environment, and from there on move to cycles of re-entry – differentiations of what has been differentiated – ad infinitum. What is more, Marc Casson, who is one of the responsible parties for reviving the scientific discourse on entrepreneurship in the early '1990's, concludes: "*The essence of entrepreneurship is being different*" (Casson as cited in (Faltin, 2007, p. 54))

Case Analysis

In general it is assessed that at universities advances in self-reflection are triggered by crisis just as Habermas stated (1987). But at the FU this self-reflection has not lead to reconciliation with the historic trajectory of exploring new branches of the idea of the university; instead it led to the creation of a vision of the FU as excellent university following today's standard dominant paradigm.

The practice of benchmarking – as in comparing one's standing and practice to others has been stated by several informants in all universities in the context of environmental awareness. An available intranet especially creates the meta-environment for reflections and collaborations of that kind.

4.2.5. Institutional Infrastructure and Gestell

As described in the sections introducing complexity science (chapter 1 Annex C) the following section will elaborate the components of what provides the environment for an entrepreneurial mindset. First, the power- or political-structures of the institutions in question are reviewed and to a certain degree set in relation. Then several complementary spatial and contextual arrangements are looked at, while in the last section the important aspect of resources (i.e. the forms of various types of capital) are discussed for the cases investigated.

The aspects of the institutions described in this section are seen to be as instrumental to implementing the goals defined at the mindset level. As such they are structure in the sociological sense or what Heidegger called gestell. Gestell - a German word that means 'skeleton', frame, shelf and in the variation 'Untergestell' chassis and infrastructure – is used by Heidegger to describe the phenomenon of modern technology as that which "captures all what is extant and makes it available through a stock to be put in circulation" (Ciborra & Hanseth, 1998, p16). Applied to universities, Gestell in this sense means all physical and technological infrastructure 46 necessary to fulfil the universities three missions. Hereby it is important to point out the function or the phenomenon of the gestell, which can be distorted and is not always what it seems. Using the example of the telephone Heidegger writes "machines created by technology can only shorten distances, but at the same time do not give access to proximity and farness", rather he says they deliver undifferentiated availability (Heidegger, 1994 as quoted in Ciborra 1998). Later at a conference in Munich he elaborated on the real potential that technology has. "The essence of what technology can do for human causes is to reveal. The revealing that rules in modern technology is a challenging... Such challenging happens in that the energy concealed in nature is unlocked, what is unlocked is transformed, what is transformed is stored up, what is stored up is in turn distributed, and what is distributed is switched about ever anew. Unlocking, transforming, storing, distributing, and switching about are ways of revealing... the revealing reveals to itself its own manifold interlocking paths, through regulating their course." (Heidegger, 1978). Heidegger did most likely not have information technology in mind but was rather thinking of production chains such as the one leading from trees to paper, to newspapers. Nevertheless, when we take his notion of the phenomenon of technology being revealing to information and communication technology we end up in a scenario where technology is used to reveal (unlock, transform, store, distribute, and switching about) the informational essence of the institution. And as Ciborra points out, Heidegger defines gestell as the reunion of the organising process, which "overcomes in a

⁴⁶ Including human labour as it is 'standardized'

felicitous way the dichotomy between the 'structural', i.e. static, aspects of infrastructure and their dynamics" (Ciborra & Hanseth, 1998, p.19). It is in that way that gestell is used here.

4.2.5.1. Formal Governance Structure

It is necessary to elaborate on both terms 'governance' and 'structure' in order to reach a clear understanding of what is described under this attractor. Governance refers to acts and processes of governing and is meant to describe the organisation of power in the entity. Structure refers to an understanding that it is only the blueprint, the theoretic setting created by the policies, laws, and the otherwise institutionalized practices as well as the role descriptions of the individuals and mandates of the institutions. Giddens explains "Structures are necessarily (logically) properties of systems or collectivities, and are characterized by the 'absence of a subject" (Giddens, 1979, p. 66).

The LSE is specialised in the study of the architecture and practice of social institutions and as such it comes as no surprise that it has applied its expertise to design a sophisticated governance structure that is defined and capable of dealing with all levels and all subject areas (see chapter 3 LSE section, 3.1.5.2.). In general, subjects and themes fall in the responsibility of a committee while leadership and implementation are handed to individuals. Also, while the continuous paradox between the need for standardization and the desire for individual flexibility (*LSE2*) is present and commented upon, it seems to be dealt with on rational grounds – leaving individual flexibility, but standardising where the business case is more compelling. Another expression of the robustness of the LSE's governance structure is the fact that, even though the stakeholder basis complains about a managerial shift, most practices and structures remain unchanged as the institutional body is defined so clearly that it continues to work with various figureheads.

After many years of structural egalitarianism in the German university governance system, the FU was one of the first to test and apply a reformed approach (see chapter 3 FU section, 3.2.5.2.). The new way was meant to give more steering capacity to the university management and it succeeded in doing so. Similar to the UOC the FU is run by the top brass pair of the president and the chief administrator (Chancellor). When interpreting the observations, it seems that the FU has had so many micro- and macro-experiments with governance that when the new experiment started and a leadership team who rolled up their sleeves and took things in their hands appeared (colloquial), all stakeholders (faculty, administration and students) were somehow happy with letting them implement their vision, because crisis was, and still is, apparent. The result is that, even though there are multistakeholder governance structures, it seems that most administrative matters are decided by the Chancellor and his vassals (archaic word), while the President was the chief architect for the universities future vision as elite university. The FU represents a case for a strong leadership setting – resulting in clarity and consistence in practice (FU Chancellor 63) but also

fostering clan-like-behavior and conspiratorial atmospheres due to power politics made possible by a lack of transparency and focus on trust relationships.

The UPC has perhaps the most democratic governance system (see chapter 3 UPC section, 3.3.7.2). All stakeholders vote for their schools leader but also for the rector and his management team who have presented their political program beforehand. This highly democratic system works in spite of, or maybe exactly because, the majority of the stakeholders are not very political, and to the degree of what could be observed during the investigation, no profound conflicts are present within the university community. Even though the former management team has been denounced as a socialist (UPC administration 15) and has made some non-market-conforming decisions, the UPC can be classified as a democratic technocracy. It is a university with a well-oiled machinery functioning according to a designed and standardized process architecture.

At the UOC a similar setup as for the FU has been observed (see chapter 3 UOC section 3.4.5.2). The absolute central role of the rector is complemented by a strong manager, who is responsible for the administrative matters. In contrast to the FU the UOC was purposely founded this way and only now, after the leadership change, have there been some signals that there might be a somewhat wider distribution of power. However, for now, - except for at the departmental level - there is little, or minimal participation of students and faculty in institutional governance. As is the case at the FU this concentration of power, lack of communication and subsequent opaqueness causes power politics and clan-like behaviour.

Distributed leadership

Universities traditionally divide their organizational structures between academics – (which have relatively extended academic freedom) and the administration (which is organized hierarchically). Both spheres are characterized by top-down (meritocratic) leadership with a clear centre of control. Especially within the administration there are well defined role based responsibilities and one is not meant to think or participate in areas that are not with ones own domain.

In most investigated universities, a culture where superiors were controlling the results was present, the LSE was the exception and serves as benchmark as it displayed a practice of identifying clear individual responsibilities (champions), while at the same time arranging for disperse collective stewardship (control) in form of committees and other collectives.

Even though the main argument of this research is against a direct application of business management techniques, it has to be stated that it is also not positive that the majority of principals and senior managers have arrived in their post following a career in the education system (UPC administration 16), have few or no formal management qualifications and rely on experiential learning that draws heavily on their previous posts within further education

(Birnbaum, 1988). This does not mean that all HEI managers need a Master of Business Administration but a Master of Higher Education Administration or similar would be desirable.

One phenomenon that is becoming more and more dominant in human resource management and investigations dealing with motivation is the phenomenon of employee engagement- or staff empowerment, (named distributed leadership in this research) (Gallup, 2007; Hornstein., 2002; Lotter, 2007; Mitleton-Kelly, 2005). The general insight is that, as work becomes more and more dependent on knowledge application and creativity, intrinsic motivation is a very determining factor. One study on how to create an innovative environment has expressed this insight as simple as: "We treat them as adults" (Mitleton-Kelly, 2005) meaning employees are not excessively told what and how to do their jobs. The Gallup Institute has surveyed 4.51 million employees in 112 countries (Gallup, 2007) and reports that employee alienation from his work and his company – is causing significant damage to organisations worldwide. These results are assessed to be ultimately true for the universities investigated. Subsequently the practice of giving *spielraum* is found to be a positive attractor, while *facelessness* is a negative attractor.

Case Studies

The mindset and structure observed at the LSE serve as benchmark for the description of this attractor (see chapter 3 LSE section 3.1.5.1.). One administrative staff summarized the leadership as a "*light steer*" and the "*strategy is general we interpret*" (*LSE 13*). This creates the high-performance atmosphere where everybody feels responsible for his area.

The UOC and the FU are very characteristic cases for the traditional leadership paradigm still very dominant in HEIs (see chapter 3 FU section 3.2.5.1.; UOC section, 3.4.5.1).

UOC's leadership style has been described as a solar system – officially, the students were in the centre, but in reality the rector and the manager were in total control (*UOC 6*). Again the situation today is difficult to assess as the new leadership team is just coming into power. The fact that the rector appoints everyone intrinsically has the effect that even when the code of honour drives him/her not to select a 'family' into decision maker positions, opposition is virtually impossible, as there are no checks and balances. This structural centralism is supported by a comparably traditional and hierarchical culture in Spain. The traditional and conservative business environment is humorously illustrated by Mrs. Tubella who commented in her blog that the female form *rectora* is still recognized as a spelling error in Microsofts Office Suite (Tubella Blog).

The UPC in contrast showed a rather formal and defined leadership. Here each leader has to define the roles and objectives for he/she and his/her subordinates in a cascading fashion. The result is a rather holistic strategy and coordinated practice; but leaders do not necessarily

empower their staff. One manager summarized this notion by answering the question about strategy construction: "What strategy do we have? My strategy!" (UPC 8)

In summary, the universities investigated have not – with the exception of the LSE – embraced distributed leadership. As has been elaborated in the paragraph on the ICT based opportunities for creating transparency (see 4.2.4.4.), the sharing of information as one aspect of empowering employees and creating a positive work atmosphere, results in better performance (especially) with regards to quality.

Spielraum

At the FU the rhetoric for enabling instead of controlling environments is common, and the understanding that some *spielraum* (leeway, or flexibility) is necessary and positive in the case of finance and governance structures (FU Chancellor 4) especially when it allows us to transpose the responsibility for budget or personality cuts. As such the practice is not meant to stimulate bottoms up participation but rather is sharing the burden and responsibility without co-determination of an overall strategy (Chancellor5). On the other hand, some FU students and professors agree that the freedom some had fought for and that was subsequently imposed upon (FU5) the following generations has not been taken adequate advantage of (FU6).

The concept of *spielraum* seems very fitting to describe the phenomenon of giving the steward of a task some flexibility to be able to feel intrinsic motivation and react to changes in the environment. Let's look at the term and its meaning in a bit more detail. The eminent German philosopher Gadamer (1965), best known for his work on hermeneutics, explained *spielraum* with the example of the wheel of a bicycle. The wheel is attached to the bike through the axle that is held to the bike's frame by a nut. In this case he says that it is "*important not to tighten the nuts too tightly, else the wheel could not turn. 'It has to have some play! [...] then he added, '... and not too much play, or the wheel will fall off" (Miller, 1996).*

Facelessness

One negative attractor found in relation to distributed leadership is named *facelessness*, meaning not attributing work to the individual, but only to the organisational function. This practice is traditionally common in governmental organisations but is more and more amended by mentioning both the name and the function. As one senior UPC professor with an extensive leadership record paraphrased it: "leadership is always personal" (UPC4). Hence it is very surprising that at the UOC for example, most official messages are not signed by the individual but instead by a function. Arguably, the reason is that several administrators serve that function and that they might change, nevertheless, there is no obstacle to combine the signature with the function.

Prepare for Serendipity

The last element in this section treats the mental and physical preparation for serendipity. Serendipity, a term taken from an old Persian fairy tale about "The Three Princes of Serendip", was first coined in today's meaning by Horace Walpole (1754, according to (Borselli, Borselli, Remer, & Tramezzino, 1965)). The tale deals with three Ceylonese princes, who were constantly making accidental discoveries. Walpole's point however is that these are not accidents. Instead the appropriate background is necessary to recognize a discovery as valuable. An obvious analogy is the disregard of so called supposed errors, "noise" or chaos in scientific experiments until someone recognizes a pattern in them. In the university's entrepreneurial context, the preparation for serendipity means that the organisational mindset and infrastructure needs to be opportunistic; which in turn is only possible when its members are empowered, have *spielraum*, as described above. When Maturana and Varela's concept of autopoiesis (auto (self)-creation) (Luhmann, 1992; Maturana & Varela, 1980) is added as causal factor, the preparation for serendipity means to be vigilant for opportunities to re-create one-self (or the institution) while adapting to the changing environment by means of mutation.

Given the fundamental and pervasive nature of serendipity in the non-stratified, non-defined phenomenon of random chance. The FU's Chancellor has for example has acknowledged that many times "chance brings the initial spark" (FU 16). In the first place there is of course pure chance, when people just happen to receive a phone call from someone bringing up a theme that had just been identified as interesting (LSE 14).

Traditional bureaucratic organisations simply neglect these kind of accidental opportunities. At the UOC for example big research projects are used for obstetrics in regards to developing research dynamics in the institution (UOC 15). But established procedures and hierarchies have to be taken into account and no real dynamic has emerged until recently. It is thus a controlled and not a dynamic process.

A preparation for serendipity is needed because employees do not realize incidental potentials when they follow their well defined routine; they will and maybe even cannot react to opportunities and "allow things to bubble up" (LSE 15). What is necessary is to prepare the right mindset, plus the right infrastructure for serendipity to be allowed a venue to occur; and thus to allow for entrepreneurship. Again the phenomenon and its benefits are widely known and both at the FU and the UPC managers have expressed the need to create the right milieu, (FU 17, UPC 9) which is exactly what the following sections intend to describe based on the findings of this research.

4.2.5.2. Far From Equilibrium Spaces

According to the research of organisational scientists applying the complexity sciences paradigm, heterogeneity is generally advantageous (Mitleton-Kelly, 2005). This is also true for physical environments regarding education and research.

While there are hefty differences between the physical spaces provided by the researched universities, we find lecture halls, smaller tutorial rooms, computer rooms, faculty's offices, as well as research centres with working islands and the library (including group study rooms) as professional working areas, in all investigated universities. The mix of lectures, tutorials, and personal consultations with the professor, as well as individual and group study is assessed to provide the adequate stimuli for the performance demanded of higher education students.

In the case of the UOC, efforts are made to provide for a similar stimulating environment by providing different areas on the website and offering room for study in the regional centres. However, the situations of the IT based learner always dominates the scenario (except for the time studying the printed material) and little effort is made to encourage students to network and collaborate.

For research another distinction can be made. While the natural science scholars at the FU and UPC are observed to work extensively in teams, their peers in the social-sciences work individualistically with the only point of reference being collaboration on journals or conferences. In this case the UOC's practice is very similar with the other universities as most research happens individualistically.

4.2.5.3. Informality

The water cooler has been recognized as important organisational institution for a long time now and it is a long known secret that the coffee breaks during, and drinks after a conference or meeting are very important venues for networking, information exchange, coordination and the initiation of new projects. The MIT professor Van Hippel even considers informality one of the most important factors for creating an innovative milieu (Hippel, 2006). In the following paragraphs the universities' provision in this regard are reviewed.

At the LSE (see chapter 3 LSE section 3.1.3.2.) it is common culture for the students and young researchers to meet and network in one of the three campus based pubs. The comparatively cheap venues are the central meeting spot and melting pot for the many cultures present at the school (LSE 54).

For the faculty, the senior dining room fulfils this function. Once again the small size of the school plays out in its favour. Because the number in each stakeholder group is small and because the campus is not dispersed, many informal events are trans-disciplinary. Additionally, the LSE has a very large number of mostly vibrant student associations which complement the informal environment.

The FU and the UPC (see chapter 3 FU section 3.2.2.2.; UPC section 3.3.3.2.) can be dealt with simultaneously in this regard, as both have a highly polycentric setup, which hinders informal meetings, and have to provide space for rather big numbers of students and faculty. As a result, more or less each unit has developed its own informal culture with some crosscutting events like Erasmus parties or political engagement. Generally the provision of these universities with regards to informal spaces is assessed as positive because both seem to provide sufficient student places and promote an atmosphere of liberty where new spaces emerge whenever needed. In the case of faculty, once again the situation varies widely, but here institutional action might be considered as faculty clubs and other strategic institutions might be useful to improve inter-departmental, policy discourse and general morale.

Again, UOC's students suffer in this case an intrinsic disadvantage of its virtuality. Informal forums are provided within the virtual campus platform but comparatively little leisure time is spent there and usage is mostly centred around virtual billboard listings. More 'privately' UOC students gather on external forums and websites to discuss courses and exchange critiques. Also, the regional centres are used by some to gather but, due to the library setting, meetings are rather course oriented.

UOC staff and researchers are also hindered from holding informal meetings because of the dispersion of the locations.

4.2.5.4. Resources

Even though bootstrapping – the ability to kick-off and implement a project with minimal resources – is one of the quite interesting entrepreneurial abilities, there can be no doubt that the availability of resources has a decisive influence on the viability and outcome of all entrepreneurial activity. The following paragraphs consider mainly the institutional perspective, but the same resources are relevant for individual knowledge entrepreneurship as well. Even if in the case of purely theoretic or meta-physical 'knowledge entrepreneurship opportunity realization' only minimal monetary resources are needed while human capital is always absolutely indispensable. Furthermore, political capital, the connections to market the knowledge products are essential. Lastly, monetary capital may or may not be necessary for the individual knowledge entrepreneurship project as such, but it is almost fundamental for ensuring the basic standard of living.

In the following paragraphs the situation of the investigated universities is set in contrast.

Human capital - Expertise

Human capital is what has been referred to traditionally as labour and means the stock of productive skills and technological knowledge present in the entity. Gary S. Becker elaborates on what human capital is: "expenditures on education, training, medical care, [...] produce human, not physical or financial, capital because you cannot separate a person from his or her knowledge, skills, health, or values the way it is possible to move financial and physical assets while the owner stays put" (Becker (1993, p. 16) in .(Schonewille, 2005)). Generally it is the time experience, knowledge and abilities of an entity which can be used to fulfil its mandate (amended from (Husz, 1998)). Human capital thereby includes emotional capital (as value from engagement and commitment).

The LSE is benefiting from the almost completely privatised market for professionals working in higher education found in Britain. Its elite position is of course based on the outstanding researchers that it employs and, as described in the case study (see chapter 3 LSE section 3.1.11.), a positive spiral regarding the excellence of faculty and quality of the students that has been observed. The British liberalisation of the system has also significant effects on the administrative staff.

The FU is still suffering from a long crisis where many good people preferred to leave and very few could be hired due to a wave of generational change (see chapter 3 FU section 3.2.2.3). On the other hand the university is now in a situation to be able to replace almost half of its professorships within the next few years. This naturally poses a great chance to re-energize the faculty with young, high-potential professors while on the other hand being a great administrative challenge to fill all these posts with adequate candidates. When it comes to administration is – according to a manager – they are still dragging 1/3 of the non-performing bureaucrats along.

Human capital at the UPC seems to be well furnished as it can attract and hold most good Catalan as well as a significant number of Spanish and Latin American researchers (see chapter 3 UPC section 1.2.1.). Most administrative posts have been switched to non-functionary contracts so that the typical bureaucrat is less and less common. In general, administrative staff as well as other faculty left a relatively dynamic and motivated impression.

The UOC is once again a special case among the universities researched (see chapter 3 UOC section 3.4.2.. and 2.4.3.1.). It was setup as a distance teaching university with the understanding that the vast majority of the actual teachers (consultants) are contracted as external staff, while the core staff consists mainly of administrators and 'learning managers'. With this scenario as a legacy the UOC has embarked (for some years already) on the process to increase the number of PhDs among its employees responsible for the implementation of the educational programs. This is particularly pressing as the UOC is interested in developing

research capacity (most notably through it Internet Interdisciplinary Instritute) in order to seize opportunities for research co-operations as partner in European Union projects. On the administrative side UOC's employees are relatively young, well trained and motivated.

Political capital

Political capital is defined as "the individual powers to act politically that are generated through participation in interactive political processes" (Sørensen & Torfing, 2003). Political capital thereby includes social capital (as value from relationships) but only as strategic resource. In the case of universities, political capital refers to the relations developed with external stakeholders as well as the political capital each knowledge entrepreneur holds internally.

Firstly LSE is institutionally connected to the external environment through its board of trustees which is made up of eminent personalities (see chapter 3 LSE section 3.1.5.2.). Secondly it has the Enterprise LSE entity which connects its scholars to the media and consultancies (see chapter 3 LSE section 3.1.10.1). Thirdly the Corporate Relations Unit is constantly exploring possibilities for partnerships with other research institutions and the private sector. Overall the LSE is assessed to have a rather thorough connection to its external environment and uses it to develop its core practices as well as to stay informed.

The FU has a long tradition of partnerships with foreign universities and its Foreign Affairs department counts extensive cooperation agreements (see chapter 3 FU section 3.2.2.1. Footnote 2). Also, the new governance structure employs some eminent personalities from public life as well as one politician in its structure. And FU scholars have reached best in class rankings regarding the securing of external funds (see chapter 3 FU figure 3.2.1.). Lately these efforts have been joined by technology scouts whose task it is to facilitate the exploitation of FU researchers results either by themselves or through private sector partners. The president also has a name for being a networker and bringing the FU onto the agenda of various public settings (see chapter 3 FU section 3.2.5.1.). Nevertheless, compared to the LSE, the FU is in a much more difficult situation as it does not have the developed identity (brand) and lacks the professional expert service as well as the necessary paradigm in the development of external relations.

The UPC makes quite an effort to attract foreign students and scholars and connections to foreign universities through vehicles like the Erasmus Program. However, the international alliances are not as strong as in the former two cases but the UPC is a member of several relevant European associations. On a local level the university seems to be much more integrated and connected. It hosts a chair for higher education management which has a good name and influence within the local administration. Furthermore and most notably, it has undertaken very successful efforts to foster connections with the local industry (see chapter 3 UPC section 3.3.6.). On the one hand the Innova program facilitates entrepreneurial business

creations based on UPC research, and on the other the UPC technology parks are meant to connect local business with their research. Yet more projects such as the UPC's internet 2 project I2CAT or the knowledge 2 market K2M initiative are cooking up future opportunities for university industry co-operations. As such, the UPC confirms its technocratic position with a strong focus on developing ties to industry, while nurturing limited but good connections with local policy makers.

The UOC has traditionally had very good top level connections to local politics and industry (see chapter 3 UOC section 3.4.2. and 3.4.5.2). These are naturally intended to be maintained by the new leadership (UOC web) even though this seems difficult in the eye of different political alignment and the slow evolving nature of trust relationships. In the early years many collaborations with local businesses were setup and some of them endure even today. During the heated growth phase around 2000 efforts were made to expand UOCs reach to Latin American countries, but they were revoked after encountering extensive difficulties. Today the International Relations Unit is in principal responsible for connections with other universities, and collaboration agreements are developed. The UOC is intrinsically well connected through its wide stakeholder base (consultants and adult working Student), but as far as could be assessed it is not exploiting this coverage as no programme for private sector relations is currently maintained⁴⁷.

On a research level UOC managed to contract a very high profile team of international experts, which serve as consultants to the in-house research teams and advise on opportunities and conduct of projects. Overall the UOC is doing well regarding its connection to the external environment; it could arguably do much more given its virtuality and the connected possibilities.

Financial capital

Financial capital is defined as the current availability of monetary resources especially in aspect of what money is available for (intra-)entrepreneurs in order to implement new ventures.

The LSE is the wealthiest of the universities researched (see chapter 3 LSE section 3.1.3.5.). Even though in real terms the FU and the UPC have a higher budget, the LSE's specialisation on social sciences does not make investments in costly technology and laboratories maintenance. Its business model permits it to keep the inventory at a high standard and even to maintain the department of learning technology to constantly monitor and experiment with relevant innovations.

The FU in contrast is the one suffering worst from financial hardship (see chapter 3 FU section 3.2.3.5). Given that in the still guite regulated German higher education sector most

⁴⁷ Except for a discount alliance

administrative staff as well as professors are paid according to predetermined and egalitarian salary schemes, the flexibility of hiring or dismissing any staff is virtually non-existent. The unwritten rule is that one can engage in everything that does not involve a cost but investments are only made if a clear return can be estimated. However, there are no official guidelines and processes are hand-steered by the decision makers.

The UPC's budget had been continuously expanding until some years ago and has now been more or less stable for the last years (see chapter 3 UPC section 3.3.4.3.). Neither complaints nor praise has been observed during the investigation, generally faculty seems to be content with the possibilities offered. As most IT services are outsourced to UPCnet a good price-effectiveness ratio could be established.

At the UOC the financial balance has been re-established (see chapter 3 UOC section 3.4.3.5.) after some rather difficult financial years before the leadership change (UOC management 38). The semi-private entrepreneurial ventures and co-operations UOC had engaged in turned out to be mostly non profitable and have undergone several rounds of re-structuring, until they are now believed to be in competitive shape. As elaborated in the case study, UOC's business model works best when offerings are scaled to a high quantity of students. Given the relatively small amount of employees UOC's financial fitting can be considered quite good.

Due to the overall negative outcome of some of the economic entrepreneurial ventures UOC's former management invested in, there was a need to strategically assign the budgets to invest in. The management did not consider ICT investments to be absolutely necessary and the technology managers did not convince them of the opposite. Hence technological development of UOC's platform virtually stopped in 2002 due to under-financing (UOC management & faculty 16).

4.2.6. Knowledge Entrepreneurial Practice

In the following section the correctness of the multiple aspects of the originating theory of knowledge entrepreneurship, based on the pioneering work of McDonald (2002), are examined for individuals and for the collective ⁴⁸. Thereby the five elements proposed to influence knowledge entrepreneurship have been classified under the general entrepreneurial activities of identifying, evaluating and realizing opportunities.

In general, the EUA report for the UPC formulates the insight of this research with regards to knowledge entrepreneurial practice: Set aside a budget for knowledge technological services innovations and define the practices. The EUA report writes: "However, in the creation of a

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⁴⁸ While it has to be made clear that the dispersed agency and fragmented identity of a university entails essential differences to individual (micro-) knowledge entrepreneurial practices, the majority of the practices are applicable to individuals and institutions.

stimulation fund - to which all parts of the institution could turn in order to launch new initiatives - would make sense to develop institutional coherence, would not an extra 2 or 3 % be accepted to feed a pool of resources that would reinforce the flexibility and adequacy of support to new teams and projects thanks to specific institutional care?" (EUA, 2005)

4.2.6.1. Identifying Opportunities

The first elements investigated to influence knowledge entrepreneurship are **environmental awareness** and **communication**.

While all interviewees reported to value and practice environmental awareness and stressed their intention to "stay up to date" nowhere was there a defined and assigned practice. Most informants reported to go to conferences and participate in some sort of community of practice, but these processes are not institutionalized and also reporting happens on an informal basis⁴⁹.

The same situation has been observed for communication processes. Within work teams information is exchanged on a daily basis but administrative groups are reported to work separated (Anonym 8) and academic information exchange is silo-ed along discipline line (Anonym 3).

The LSE has probably the best communication environment (see chapter 3 LSE section 3.1.6.5.). They have contact information and a profile for almost all staff members on the website, so people can and are contacted online. Additionally, the relatively small size of the institution as well as its compact spatial arrangement provide for good communication, even though the communication lines generally follow practice areas.

At the FU a "communication deficit" has been assessed by the leadership (Chancellor8) but to the researchers knowledge no action has been taken or is planned to address this issue (see chapter 3 FU section 3.2.6.5.). Faculty clubs have been suggested as one measure to improve faculty communication (FU Prof 9).

At the UPC we find that, due to the similar polycentric setup, the same communication problems between the separate schools are present. Senior faculty members describe a culture of not reading the broadcast information because of information overload and because the communication style is very bureaucratic. Also, here the need for transversal communication channels has been expressed (UPC6). At the IT service provider UPCnet an interesting measure has been introduced to engage staff in a discourse about innovation. They give a small present to the employee who comes up with the best formula for innovation (see chapter 3 UPC section 3.3.8.5). This not only brings the theme on the lunch table but also

⁴⁹ Except FU's ZEDAT

communicates that innovation is wanted and facilitates that people feel and identify with the changing environment.

Also, at the UOC the stakeholders are aware of the relatively restrained communication (see chapter 3 UOC section 3.4.6.5). Most exchanges are happening based on personal contacts (UOC9) and the technical manager acknowledged that they are explaining little of what they are doing (UOC10).

4.2.6.2. Evaluating Opportunities

In this paragraph the institutions attitude and practice towards *entrepreneuring* and risk tolerance are reviewed.

When it comes to *entrepreneuring* (see chapter 3 LSE section 3.1.6.2, FU section 3.2.6.2., UPC section 3.3.8.2., UOC section 3.4.6.2.) the practice of developing and exploring visions and objectives based on the corresponding organisational/personal teleology - the interviewees generally reported very little to no practice in this area. LSE, UPC and UOC have an institutional strategy process but none of them engage in defining entrepreneurial visions for the university. Only the FU engaged in such a process due to the current Excellence Initiative which requests just such visionary outlooks from the universities. Also, at the FU one successful professor reported the practice to give visionary and possibly interesting research ideas to masters students, who then delve into the subject and assess feasibility and potential benefits (FU Prof 11). At the UPC two senior stakeholders, both with extensive experience also reported about creative visions that they implement within their institution.

Risk traditionally has quite a negative connotation and only in the context of potential opportunities has it recently been accepted in organisational practice as an intrinsic component of innovation and change management (see chapter 3 LSE section 3.1.6.4., FU section 3.2.6.4., UPC section 3.3.8.4., UOC section 3.4.6.4.). Nevertheless, none of the universities under review professed to be voluntarily engaging in taking a risk. All stressed their measures to minimize risk or claimed not to take any risk at all. It has been argued that the concept of risk is not really present in the context of knowledge production, because all results have value (UPC administration 26). Nevertheless, risk can be conceptualized in terms of 'lost time' in exploring tangents that do not contribute to the final result.

At the LSE a high level management team as been created to deal with risk management. Besides this specialized entity technological risk taking in particular is minimized by not pushing for innovations but rather offering them on a voluntary basis, thereby ensuring change of practice only in case of perceived benefits by the users.

The FU is probably the institution which is most openly admitting to be in a condition full of risk. While most stakeholders express optimism, the situation has been described as 'reconstructing

the boat in the sea and at full speed' (FU administration 64). Herewith the FU's transformation from a traditional full university to a modern full university offering all disciplines but only a highly specialized and trans-disciplinary basis is alluded to. This risk is accepted as a necessity and in conjunction with the promising vision. As is the case for the LSE, technological risk for learning and research is hedged through voluntary and coached rollout. The FU is also taking a technological risk with regards to the introduction of its Enterprise Resource Planning (ERP) system.

In the two Spanish universities it seems almost taboo to speak of taking risks. A UPC manager stated his understanding that "universities do not take risks" and similarly the UOC Manager did not want to acknowledge any risk taking. At the UPC technological risk is spread amongst several institutions and at the UOC the responsible vice-rector for technology stated that he is aware that the university needs to take risk in order to innovate but also expresses that this will take time to change. Another UOC techie said "we are not innovators, we are integrators" (UOC management 22)

4.2.6.3. Realizing Opportunities

The realization of opportunities naturally starts with the initiation of a project. However **new project support** (see chapter 3 LSE section 3.1.6.3, FU section 3.2.6.3, UPC section 3.3.8.3, UOC section 3.4.6.3.) is either (a) bureaucratic and defined but generally a bit slow process in universities (as e.g. observed at the LSE), or (b) entrepreneurial stakeholders decide or influence decision makers to decide to start a new project and (c) the bootstrapping process employs mostly the modes of bricolage as not 'showing up on the radar' (UPC7) and only after results can be shown and a certain routine is established is the project officially recognized. In the FU and the UOC no consistent institutional pattern could be observed as the feasibility and velocity of new project support seem to depend heavily on the personal influence and contacts.

At the LSE initiative documents have been described as conversations, which are undergoing a certain ripening process until they are supported by key-stakeholders which mostly depends on them comprising a solid "business case" and being positioned as being in tune with the official strategy.

The FU on the other hand has no financial margin to support new projects that are not perceived to be absolutely necessary for the reformation of the institution. Basically, stakeholders still enjoy the traditional freedom for which the FU has a reputation but only as long as there are no costs involved. Otherwise, new projects depend on external finance, as has been successfully conducted for the entrepreneurship support program.

The two modus operandi mentioned above are both common practice at the UPC. On the one hand exists a stringent strategy process operating on top of a defined process architecture and (most mid and large size) projects are officially started through this channel. On the other hand

entrepreneurial stakeholders bootstrap and initiate projects without official support and only after the incubation time is over can success or failure be estimated. At this time these projects (in the former case) are reported to the authorities.

The former rector of the UOC is internally known to have promulgated a list of UOC employee rights, which included the right to error. Nevertheless, the readiness of UOC staff to experiment and start new projects is not very developed. Most new initiatives take a substantial time in the 'preparation phase', wherein input and affirmation from stakeholders from various areas are solicited.

4.2.6.4. Providing Opportunities

Next to the entrepreneurial practice conducted by the institution, a cascading provisional scenario can be defined. The university provides institutionalized knowledge entrepreneurship opportunities for professors and both the institution and the professors provide opportunities to the students. Research and teaching improvement opportunities are provided by the institution in the form of new technologies, or fellowships. The universities' general offer of courses and programmes can be seen as providing knowledge opportunities to students, and the General Studies (as institutionalised by the FU) - a one year program in which a very broad array of subjects is offered with the goal of facilitating the evaluation process – can be singled out as a good practice of facilitating knowledge entrepreneurship as it promotes the internal locus of control and the teleological decision of the students⁵⁰.

⁵⁰ It is not clear whether this program is being closed in relation to the standardisation of the Bologna process.

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Best of Breed Knowledge Entrepreneurship & Conclusions

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5.1 INTRODUCTION

In this final chapter, the findings of the research are summarized and placed in perspective, and then lastly, the research questions will be formally answered. In the first section, certain exogenous cases of paradigmatic¹ "best of breed" knowledge entrepreneurship outside of the universities herein investigated are presented to allow for a better understanding of what exactly knowledge entrepreneurship is. Next, distilled insights regarding the question of how to implement knowledge entrepreneurship are depicted in relation to Burton Clark's pioneering work on entrepreneurial universities. In a third section, some particularly interesting phenomena found at universities regarding entrepreneurial reactions to the flood of opportunities from technology innovation were investigated. Other opportunities for the digitization of the higher education sector as a whole were also brought forward. The thesis then closes with the formal answering of the research questions.

5.1.1. Best of Breed Knowledge Entrepreneurship

Naturally, all the universities investigated – being education and research institutions - live knowledge entrepreneurship to a certain degree. However, it is equally normal that, given that knowledge entrepreneurship as a normative paradigm is a concept developed in this research and not as an established paradigm in its own right, neither do (nor can) any of the institutions embody the concept fully. Allow me therefore in this section to use some 'best of breed' examples, identified during the research project, to support some of the conclusions and claims made within the paper.

The following examples were chosen to represent the variety of opportunities pursued by knowledge entrepreneurship and because they make extensive use of the internet. In the following paragraphs, a best of breed example for the following aspects is given: research practices (Internet Governance), teaching & learning practices (MIT's Open Educational Courseware, Collaborative learning), as well as for an improvement in knowledge systems.

5.1.1.1. Contribution of Knowledge Assets as Public Goods

The Massachusetts Institute of Technology (MIT), is evaluated to be the worlds most advanced university when it comes to web usage (Webometrics, 2006) and has a name for being a vanguard of establishing the 21st century idea of the university. In 2001, the MIT decided to pursue the opportunity of Open Educational Resources (OER) through its Open CourseWare ² (OCW). Following an internal discourse and driven by the initiative of knowledge entrepreneurship, the MIT decided to take the risk of possibly losing students

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¹ In its original meaning - exemplary

² The OCW is a digital archive where MIT scholars can publish materials like course outlines, assignments, readings, recorded lectures or whatever they develop digitally, using an open license, which allows others to base their work – e.g. translations, or further developments, on the material.

because they will enrol somewhere externally whilst benefiting from MIT's materials. There was also the likely occurrence that MIT's materials would be copied and used in other institutions. MIT's leadership decided to take these risks for two very different reasons. First, it is the university's top mandate to spread knowledge, and secondly, because it was foreseen that the marketing effect from people all over the world accessing and using MIT's material would contribute greatly to MIT's reputation. Despite the possible criticism that the latter was more important than the university's moral obligation to spread knowledge, the practice can still be considered as predominantly positive and knowledge entrepreneurial because of the dissemination of knowledge assets as a public good.

5.1.1.2. Constructivist Collaborative Learning in an Online Environment

The philosophy department at the University of Vienna is probably one of the youngest of its kind. Created in 2002, it represents an excellent example of how philosophy can make use of innovative technology and creative marketing. Impressively, the department has its own 100% open source web portal and e-learning platform. It produces a philosophical radio show, recordings of which are published, catalogued, and archived, for download in an online Audiothek (German word) together with taped lectures and presentations. This alone is unique in its professional utilisation of the internet within the philosophy discipline.

Yet, one faculty project goes even further, the project *Freiraum*³ (freespace) is taking philosophy studies to another dimension. *Freiraum* is a MOO. The open encyclopaedia Wikipedia⁴ explains: "MOOs are network accessible, multi-user, programmable, interactive systems well-suited to the construction of text-based adventure games, conferencing systems, and other collaborative software. Their most common use, however, is as multi-participant, low-bandwidth virtual realities". As such Prof. Hrachovec has used the text and scenario of Nitzsche's Zaratustra to create the basis of a virtual reality. This virtual reality is now populated by students who are free to interact with the locations, actions and persons present in the virtual reality. We will not go into the description of what is possible within a MOO, but instead will analyse the effects of the use of the MOO for the learning experience of the participant.

As such, the MOO enables the participants to make a connection between the historical and present, the concrete and meta-physical, meeting both virtual and real-persons. In this scenario, participants are truly immersed in the content of study as they self-create a dynamic empirical learning experience never possible before cyberspace. Let us look at the new characteristics and activities of both professor and participant:

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³ http://freiraum.philo.at/links.html

⁴ http://en.wikipedia.org/wiki/MOO

Naturally, this kind of learning requires new skills from the professor. His/Her role becomes threefold, while all of them have elements of the traditional character, most are radically different in the way they are conducted. The new roles are: Creator - the professor is the creator of the learning and interaction universe. This role obviously includes the traditional responsibility to select the rough learning content (text, video, etc.) but it goes much further than that. The professor not only provides the content but puts it in environmental settings (locations, people, artefacts, etc.) as such, he creates relationships between the objects, which builds a holistic whole, and he creates quests, which serve as motivators for the students. No matter how creative the professor is, once the MOO is opened, the participants will creatively destroy his setup. They will move artefacts and people, but more importantly, they will add personal comments and new 'original' texts, thereby creating new objects, locations, artefacts and digital persona. What is perhaps the most difficult modification to accept for the author, is that the participants might delete some of the original environment. To 'referee', 'supervise,' and 'administer' all of these activities is the second role of the professor. This role has its equivalent in the traditional task of 'herding the cats' in the classroom, but with the exception that in virtual space, there are countless corners to hide, and generally too many possible activities to control the environment. Given the difficult logistical realities of such an elastic virtual environment, the 'coach of a team' seems the only feasible metaphor. The third role might be the most difficult and it is even debatable whether it is possible to perform this task solo at all. This third role is that of the evaluator. Traditionally professors assessed the performance of students by evaluating a single artefact (a test/exam) containing the codified understanding of the individual. In a MOO, performance is fractured into many interventions with various other participants, objects, etc. Additionally, a timely development is occurring as well. Therefore, a combination of self-, peer- and teacher-assessment, supplemented with a statistical overview of user activity seems the most fair and suitable solution. Reviewing all the new roles of the instructor, it appears that the workload has increased. This is a possibility but the originality and entertainment aspects of teaching have also improved.

5.1.1.3. Live Research - The Discourse on Internet Governance

It is opportune and not tautological to investigate the effect cyberspace can have on scientific work by observing how the practice and institutions dealing with the politics and regulations of cyberspace are evolving under the contributions and interventions of the academy. It is opportune for two reasons. Firstly, the academics involved in this sort of material are – in contrast to most others - very well trained in using and understanding the use of the tools employed to enable the global discursive exchange and collaboration. Second, internet governance is (in 2007) the only global discourse where the politicians have agreed to implement and exploit multi-stakeholder modalities.

The theme of Internet Governance (IG) has been tabled for the first time in a non-technology founded international context, at the first phase of the World Summit of the Information

Society⁵ where a number of experts from the private sector and science met with politicians (most of whom heard of the problems and especially their technological grounding for the first time). As was to be expected, there were no political results to be negotiated as governments first had to build up at least a certain capacity and understanding of the matters being discussed. At this point (and this has not substantially changed) politicians assessed that the internet had become too important as a global (especially business) infrastructure, that it represented massive power, which subsequently meant it needed to be monitored on a political table. A rather good and innovative solution has been found by launching a multistakeholder working group, bringing the expertise and interests of the private sector, civilsociety and myriad governments together at one table. A substantive report has been produced in a highly transparent, collaborative innovative manner 6. This report was discussed at the second phase of the World Summit of the Information Society. politicians (who are the only officially negotiating entities at such summits) bear only one part of the expertise needed it was agreed to follow the recommendations to initiate a new institution for specifically deliberating and debating IG. This agora, named the Internet Governance Forum (IGF), is a wholly new kind of institution as it is comprised of only very few coordinating and administrative staff, meant to fully embrace multi-stakeholder modalities, while doing most of its substantial work online, with one physical plenary meeting taking place once a year.

This scenario is fertile ground for the integration of academic expertise and reason into politics. But let us look at how the academics contribute and, benefit through the recognition and relevance that they develop as actors, thus benefiting from the discourse taking place. Scientist influence and contribute to the discourse through the exchange of arguments in online discussion groups, and the timely publication of articles and findings. Remember that these are real-time negotiations, only online publishing guarantees timely and global availability and that such discussions occur with a 'neutral⁷' peer reviewed documentation and analysis of the topical happenings. Thereby, academic expertise is immediately influencing the political subjects under negotiation, the architecture and nature of the institution formed, as well as the field of IG as a trans-disciplinary academic discipline.

As academics enter the discussions with the aura (and at least the ambition) for seeking the truth and therefore the 'scientifically' (thus rationally) most logical solution, their voice (theoretically) is more valuable than that of private sector groups who naturally lobby for their commercial interest as well as special interest groups who lobby one particular cause. In this

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⁵ The concept and discourse has of course started earlier and more detailed historical documentation and analysis can be found e.g. at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=990757

⁶ In fact proceedings were reported in mailing lists and also the documents were made available online and discussed in the communities of interest.

⁷ Obviously no true neutrality can be reached, but at least the attempt is made.

context, the traditional academic value of integrity and neutrality becomes of enhanced importance. While before it was only a matter of honour to contribute the truth, now in this highly political power-play, the question of (financial) autonomy has to be reviewed from a different angle.

The whole theme of IG represents an even better example of the *agora* concept developed by Gibbons and Nowotney (Gibbons, 1994; Nowotny, Scott, & Gibbons, 2001). In fact, it goes even beyond trans-disciplinary agency, as actors (especially knowledgeable academic experts) have to act trans-professionally, changing roles between media reporter, political advisor of national committees and their (preliminary) 'home' in the civil-society groups. These are the work scenarios that are likely to emerge more and more in this new millennium.

5.2. CONCLUSIONS

5.2.1. Practical Knowledge Entrepreneurship in Universities

"All types of entrepreneurship are based on innovations that require changes in the pattern of resource deployment and the creation of new capabilities"

(Stopford & Baden-Fuller, 1994)

According to the findings of this research, entrepreneurship is always based on free will, it is a voluntary activity that can not be ordered. The practical challenge is twofold. First the right mindset is necessary (see Chapter 4 section 4.2.4.), as the cause of culture, needs to be created (so that stakeholders are motivated and have the right approach to pursue entrepreneurial initiatives). Second the right gestell (see Chapter 4 section 4.2.5.), or institutional infrastructure, needs to be in place. This includes: resources, standardized aids for opportunity development, a strategy which serves as a map for orientation when making decisions, and as a common reference for planning the way forward (by publishing it the also commits and creates trust), while leaving spielraum (see Chapter 4 section 2.2.5.1.) for the individual stakeholders to manoeuvre, exploit opportunities and evade hazards that come up along the way. Deploying Delanty's (2001) terminology of technological- and culturalcitizenship to the specifics of organisational citizenship, the stakeholders have a technical (natural science and logic based) function to fulfil a set of tasks (the professor to teach and do research, the student to study and take exams, each administrator to fulfil the tasks described in his job description), but secondly there is a socio-cultural role/responsibility, to contribute to a positive and 'can do' atmosphere. Hornstein describes this function as: "helping co-workers when one is not required to do so, being courteous (as opposed to simply not being discourteous), and going the extra yard when dealing with customers or even vendors - not to mention turning of the lights when they are simply wasting money and energy - are just a few concrete examples" (Hornstein., 2002). It is the intangible and not rational base of socio-cultural citizenship that makes a well thought through mindset the foremost condition for entrepreneurship. It is impossible to forcefully construct it, it needs to be convincing. In order to make the stakeholders identify with the institution – to create a *We* feeling – the challenge is to align personal and organisational (self-) interest.

In the following section, specific aspects of knowledge entrepreneurship are set in relation to the conclusions given by Burton Clark when he was researching practices and conditions at particularly successful universities using the traditional (read economic) entrepreneurial paradigm. Before the differentiation begins, allow me to state my appreciation and thanks to Prof. Clark whose work has greatly inspired this research. Knowledge entrepreneurship is believed to be central to the spirit of his motivation: to make universities the vibrant, productive and fertile knowledge institutions, we need to reach inclusive and sustainable information societies.

5.2.1.1. Foster Internal Locus of Control

Burton Clark's first element of an entrepreneurial university to strengthen the steering core is amended to reflect the progressive paradigm of distributed leadership, which is fostering an internal locus of control amongst all institutional stakeholders. Clark's assessment that "universities have long exhibited a notoriously weak capacity to steer themselves" (Clark, 1998, p. 5) is in principle agreed with, because their bureaucracy and state dependency has generally resulted in slow and hierarchical organisations. Nevertheless, Clark's solution to increase their managerial capacity, which he continues to describe in terms of a strong leadership capacity, is found to be at least problematic in a federalist and merit based environment like that found in universities. It is the organisational mindset that is observed to be able to rouse the university's internal locus of control (see Chapter 4.2.4.1.). But also outside a university context, strong leadership is a characteristic of traditional bureaucracies, from what has been observed in the cases studied, it is assessed that today's environment needs flexibility and opportunistic capabilities. Such a condition is only available when giving spielraum to the stakeholders and for developing a governance structure enabling distributed leadership (see Chapter 4 section 4.2.5.1.). Contrary to authoritarian leadership knowledge institutions are assessed to work best when all stakeholders realize and accept their own responsibility for the situation they are in. To do so, stakeholders engage in the act of looking for and realizing opportunities to improve (or optimize their position). Clark's understanding of leadership also plays out in the way he describes the following characteristics of entrepreneurial universities. They are all strategic activities to be initiated from a central steering team. Therefore, only some relation can be drawn to the elements deemed important considering the findings of this research.

At the end of Clark's argument about the strengthened steering core attractor, he claims that universities have to reconcile new values alongside traditional academic ones, and that these values are not the values of business and profit, but instead are the values of

entrepreneurship. It is by embodying entrepreneurship that the institution has to undergo a discursive process for exploring and defining its values (see Chapter 4 section 4.2.4.2.); just as described in the telos attractor of the entrepreneurial mindset.

5.2.1.2. Entrepreneuring

Clark, names expanding the developmental periphery, and diversifying the funding base. He speaks about enterprising universities that cross traditional boundaries, and this is exactly what is found to be essential for knowledge entrepreneurship. Clark, however, continues his observations one dimensionally, as they are exclusively market driven. His two elements target the same goal of finding new markets and finding new funding. Here, according to this research, the importance of the *knowledge telos* (see Chapter 4 section 4.2.4.2) for universities becomes important. Universities shall engage in entrepreneuring and develop visionary scenarios for new knowledge products and services, but the focus has to be primarily on knowledge and only secondarily arises the question of how to raise funding. The findings of this research are again in agreement with Clark's observation that specialists and units dedicated to opportunity development and realization are necessary to exploit the potentials available before them. But this is not enough. A more holistic and inclusive strategy process, allows more space for emergent strategy and opportunistic practices. To prepare the organization for serendipity is one objective that is also connected with the distributed leadership.

5.2.1.3. Gestell

Clark's last element of an entrepreneurial university touches on the importance of organisational culture, which he portrays a bit vaguely as consisting out of an institutional idea, which translates into practices. Furthermore, he says that the other four elements are indications as to what the culture should look like for an entrepreneurial university. This research has developed an innovative and holistic idea of entrepreneurship in the context of universities. This core contribution in chapter 4 section 2 stands apart and has to be distinct from the more practical conclusions given here. The following three concrete attractors are meant to support the entrepreneurial mindset/culture through aspects of the *gestell* (procedural, role, and physical architecture) presented herein:

Defined Support for Entrepreneurial Practices

The defined processes on how to identify, evaluate and make a decision regarding innovation opportunities found at the UPCnet (see chapter 3 UPC section 3.3.12.2.) are assessed to contribute extensively to the fertile environment regarding creative destruction and innovation in the institution. Even though more informal and emergent practices found at other institutions did produce similar results, the explicit organisation and support of the innovation process is evaluated to ensure the delivery of good opportunity exploitation on a consistent basis.

While most universities (directly or in-directly) assign innovation as a task to the respectively responsible stakeholders, the development process of new projects is not defined and hence not supported by institutionalized processes. Practice is hence dominated by emergence. This is not supposed to lead to a fixed process architecture but through re-interpreting Eisenhower's great saying "Plans are nothing; planning is everything" there needs to be a gestell of common practice, which serves like fix-points to be counted upon, in order to allow for efficient bricolage.

Cultivate Reflexive Discourse, Transparency and Informality

As described, the transparent and discursive practices at the LSE and the UPC have positive influence on entrepreneurial behaviour, because they produce trust in the reliability of the environment (see chapter 4 section 3.1.5.2).

Another important element of a good communication environment is the fomentation of a culture of informality and the provision of informal spaces. At the LSE the interviewees reported that networking and especially trans-disciplinary (trans-departmental) collaboration was initiated frequently at informal events.

Apprenticeship and Imitation

One element of knowledge entrepreneurship that has not been developed by McDonald (2002) is the immensely enabling role that role models and case studies can have by facilitating imitation and adaptation into one's own context. This is somehow related with Clark's advice to stimulate the academic heartland. But rather than thinking in traditional disciplinary boundaries and "our heartland" departments, the findings of this research suggest that it would be beneficial to give over-proportional support to successful knowledge entrepreneurs no matter what department they are in; because these entrepreneurs initiate the positive spirals needed and thus serve as role models for other faculty and students. At the LSE, the phenomenon is wide spread and senior academics take selected students in a sort of apprenticeship like tutorial to transmit unto them the tacit knowledge, competencies of scientific research and to introduce them to their social network. At the FU and the UPC, this practice has also been identified as successful.

During this research, three computer science professors (two from UPC and one from FU) have been interviewed who incarnate the internet based knowledge entrepreneurship that lies at the focus of this research. All three have been involved in business creations, and are now regularly consulted by students with business ideas. When they see potential they often get involved with projects and the student entrepreneurs incorporate them as business angels or similar.

It seems that the same idea was thought of by UOC's management when designing the research council made up of eminent international authorities; the intention became even more visible when each of UOC's research groups was assigned a research consultant. The problem is that even though the advice and steering coming from the international figure is perceived of positively, the figure is generally too far away to truly serve as a significant role model as contact is too infrequent.

5.2.1.4. Importance of the Regional and National Context

The regional and national context is decisive – as an important aspect of their historical, cultural, and geopolitical conditions. While the LSE is positively influenced by its access to the political stage and the cultural attractiveness of London, it benefits even more from the overall good practice of the UK educational system. In the case of the FU Berlin, its special role in history caused its foundation and the university first grew unnaturally because of the political setting in the divided city and later had to suffer from the city's notorious bankruptcy for more than a decade since the reunification. However, the most recent decisive impulse comes from the German government's Excellence Initiative. In the case of the two Catalan universities there can be no doubt that regionalism is, and will increasingly be, an important influencer. While officially bound through many interfaces to Madrid, Catalan universities are becoming increasingly steered through the educational contracts negotiated with the Generalitat. One complaint uttered by both institutions is that, while the universities produce innovations, there is a lack of a venture capital to take them to the market in the region (UOC/UPC 17).

5.2.2. Internet Based Knowledge Entrepreneurship in Universities

Despite the overall diversity in the type of institution and variations in the level of internet use, all universities, departments, and individuals have been observed to struggle to exploit the opportunities created by internet based innovations. The complexity of the technology makes it difficult for the actors to identify and exploit opportunities. While most organisations offer institution wide solutions (and in fact restrict individual practices), innovation is assessed to be an aptitude that always depends on individuals. Hence it is suggested to empower the individual to innovate by giving him the mandate in the job description and by setting up a supportive architecture. In general, faculty incorporate only very selected technological innovations in their structure and practice, because many of the new innovations of the internet are simply not assessed as valuable because a) their seriousness and value add needs to be proven and b) because they cause a true change in practice not just a more efficient but an altogether different way of doing something. Examples for the latter category are blogging and using wikis for collaborative learning.

Another aspect that has been found to influence innovation is the political aspect of many internet based innovations. As the Cluetrain Manifesto has stated quite famously, "hyperlinks

subvert hierarchy" (Levine, 2000), since most universities are very traditional enterprises they are often entangled in intellectual turf guarding. This isn't an absolute truth because collegiality, de-centralisation and academic autonomy are also deeply rooted in universities. Ciborra's (2002) metaphor of the blind giants comes to mind in this context. Naturally leading positions are staffed with experienced veterans. These mature executives tend not to be too inclined by (especially paradigm changing) creative destruction, because the old way of doing things has brought them to where they are and why should they fix a 'running system'. It is hence one of the great organisational challenges to develop a culture (and supporting architecture) that allows for the 'new' to emerge and be tested, while conserving the virtuous of the tradition.

The internet related innovations that already exist are causing a major challenge to actors and as the flow of innovation can be expected to continue for the foreseeable future, strategies and frameworks that allow for 'taming' of the technology are needed. Institutionalisation of the continuous entrepreneurial process of assessing and incorporating the emerging opportunities will also be important. The developed model of an entrepreneurial mindset, and the strange attractors found to influence the physical conditions, serve as a point of reference for practitioners in the area of university governance as well as for professors.

5.2.2.1. E-learning is Used Mostly to Improve Traditional Practices

A common conceptualisation of new technology appropriation in three phases is elaborated e.g. by Bates (2000). The model depicts a first phase in which the new technology is used to do essentially the same thing, but in a new format. A good example is that the first cinema movies were actually filmed stage plays. Within the realm of the film industry, we are in the second stage when we are talking about the use of different scenery, time lines etc. Finally, in the last stage, the potential of the new technology is fully exploited. Directors create 'new worlds' adding animation and post-production effects with 'traditional' acting.

The universities investigated are assessed to be somewhere between the first and the second phase of e-learning technology exploitation. They mostly use the online platforms to (a) make texts available online, which adds double value because it is much more convenient for students can access texts from everywhere and there is no scarcity of the material; and to a much lesser degree (b) extend the discourse held in class through forums. The potential of e-leaning to create really innovative learning scenarios is generally not exploited by the teachers. However the problem is assessed to be less about the technology or the institutional provider (for example at the LSE, opportunities provision is excellent), but caused by the complexity and subsequent time investment needed in order to truly dominate the opportunities. This is assessed to be a key factor for professors and also for students. Additionally, it is observed to be network effects that give many internet based innovations value. This potential is of course only realized if the university is a big enough paradigmatic

community. Also, new methods like using ICT live in the classroom for feedback and collaboration, are only lightly being touched upon by a few technophile knowledge entrepreneurs, who creatively destroying traditional academic practices.

5.2.2.2. The Opportunities of E-research Has not Been Recognized

The opportunities to improve research practices through appropriation of internet based innovations has been realized to a drastically lesser extent compared to e-learning. Nevertheless, ICT did have an enormous impact on research practice as most researchers simply use the internet to search publication databases and access journal articles. Also, ICT has changed the format of correspondence about research from paper to email. As one philosophy professor stated, "these are far reaching improvements," but as another professor concluded, "they are only using 20% of the technology's potential." Hence, it can be stated that in the universities assessed, e-research is still only in the first phase of exploiting the most obvious benefits, i.e. speed of transmission and location independence. Some researchers also subscribe to mailing-lists, but only a few report to actively participating in a public online discourse amongst a community of practice. Similarly, some researchers publish online, thus making their work available as open access content. This can be considered second stage technology exploitation. The third stage is still experimental and has not been found in the universities investigated. PLoS-one8 the innovative online journal of the US Public Library of Science gives a first glimpse into what we have to expect from stage three, internet technology exploitation for e-research. The journal gives open access to all readers, (all formally correct papers are published⁹) - which is only logical given that there is infinite space, and relevance is determined and weighted by the reader's interest. Furthermore, readers act as peer reviewers and interact, correct, comment, and expand upon the text. Thereby text becomes a dynamic collaborative process and discourse. This kind of scientific exchange might potentially and truly revolutionize how we conduct, and what we ultimately understand to be research.

5.2.2.3. Concluding Assessment of HEI's Exploitation of Internet Based Opportunities

The insights into the state of affairs at higher education institution presented in this research allow for a rough classification in comparison with two other sectors contrasted in the frame of their exploitation of digitization by Sassen (2005; S Sassen, 2005). By digitization she means the imbrications of socio-technological processes caused by the application of ICT. She proposed a set of interrelated effects of digitisation that effect institutions and their practices. In the context of the research presented here, what is important is that digital tools have created global environments that (a) are creating simultaneity e.g. in the case of e-mail that gets sent in seconds around the world; (b) decentralized access/distributed outcomes,

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⁸ www.plosone.org

⁹ Papers need to have the right format, correct language and citations, and the research reported has to be implemented with due diligence regarding research methods etc.

as is the case today when private people buy 'virtually' directly in online stock markets; and (c) interconnectivity, an effect that is casually described in terms such as the *global village*, i.e. the interconnectedness of the local with all other localities. The result of these features are first and foremost an exponential increase in the *orders of magnitude* (ibid) of the interchanges happening. More financial transactions, more political activities, more learning and research is happening today, thanks in large part as a result of ICT. In all cases, more participants can become involved, the internet has made many practices – like international politics, investment in China, or participation in a scientific exchange – more inclusive. But while the increase in participants has allowed for more power for the financial markets, the increased amount of participants in civil society politics and even education has 'watered down' the importance of the knowledgeable expert (Habermas, 2006). However, one can argue that this is a situation which universities can exploit because they are established institutions of authority when it comes to credibility/trust. Consequently, a scenario where they become the hosts of global discourse, certifying and verifying claims can be easily envisioned.

According to her evaluation of the financial markets, they are most advanced in the exploitation of the digitization effects and thus serve as a benchmark. For them, digitization meant an enormous increase in power, because the institutions exploited the efficiency potential and the global scales made possible by digital tools. Civil society organisations were also empowered, but they are still two steps behind as they have not yet managed to exploit the global scaling effects in the same manner. Through individual civil society institutions are present globally, a "politics of the global centred on localities" (Sassen, 2005) is constructed. This is distinguished as a non cosmopolitan, but global presence manifesting through a local exploitation of topics.

When comparing this description of the higher education sector to civil society, many similarities as well as some differences can be observed. The first obvious difference is that, education has felt globalisation's effects caused by digitization, quicker research, and a long history of international exchange. This could be paraphrased as: most scientific knowledge defies location. The other observations about civil society seem rather similarly present in higher education as well. Higher education institutions have developed much more efficient and effective digital practices to distribute their research (e-publishing has had the same effects on cost and global availability as in financial markets), but the digital practice is still not dominant. In this aspect, increasing trends can be observed; one academic at the FU was convinced that it is only a matter of a few years before the current gestell of scientific journals will be creatively destructed (FU 14). Most interestingly however is the similarity of what can be diagnosed as the non-realised potential of the digitization: financial institutions have, while increasing their independence from governments (by threatening to move the

capital elsewhere), at the same time aggregated their collective power in, or their importance for, the global and the local social system.

Admittedly, universities engage in the creation and transmission of knowledge and knowledge has very different features than any economic good. Above all it is not exclusive, and therefore not scarce in the economic sense. This changes the nature of competition within the sector, because when a discovery is made it must be openly shared and the exploitation is carried out by the whole sector. Today, higher education institutions are (in the same way as civil society organisations) engaged in local (or disciplinary) competition for attention and success, rather than constructing a global knowledge agora (discourse space), thereby increasing performance through cooperative practices. While the financial markets on the other hand had a much easier job given that their exchange system could be modelled with discrete units (transaction processes). Hence the advanced exploitation is not magic but due to the fact that civil society and education are dealing in the more difficult currency of 'argument flows' and learning experiences. Actually, according to Sassen, it is clear that it was the global agreement of rules and instruments that jumpstarted the successful embracement of the digital in the financial markets. It follows that it is the global standardisation of tools and rules that will fuel the power aggregation of civil society and the educational sector. A certain consolidation has been observed regarding commercial elearning platforms, but also in the open source sphere. Within this arena, some big players can be identified, but it generally looks more like the developers are basing their code on standards enabling higher and higher modularization and combinations of solutions.

For e-research the possibilities are unexploited. There is little activity beyond making journals available through online databases. Even here, in this Luddite sphere, we find several hierarchical providers rather than consumers dictating rules of use. Even scientific online discourse, including amongst the most tech savvy users – like the internet governance case reported (section 5.1.2.3.) – is basically still limited to email exchange. Highly innovative 'stage three type' exploitations – like PLoS-one (www.plosone.org) or innocentive (www.innocentive.com) - are still in the start up beta phase.

Sassen analyses in detail how the financial markets have managed to aggregate their importance (especially through the accumulated power in a few global centres – comp. (Castells, 1996)) through digitization. In the case of education we find – without a similar power increase due to the lower stage of exploitation of digitization - a similar base scenario of famous grand institutions, like Harvard, Cambridge or the LSE, and then many small ones that fundamentally depend on their locality. Following the current trends, it seems that the educational sector will follow the same polycentric development (several global centres and local hubs) rather than a truly federalist or balanced landscape. However, it is not necessary to have a power centralisation as the virtual scientific *agora* can be composed of decentred

entities. The simple aggregation of power and performance therein increases influence and production.

One last thought in this context is devoted to what is perhaps the most interesting development of the new knowledge domain of the Virtual itself. This is a whole new dimension. As such, it poses challenges to all disciplines. In many ways it demands that the researcher is as creative as the virtual object of study, the environments and identities are themselves constructed online and traditional method are often very difficult to apply. The internet is a powerful enabler for knowledge entrepreneurship, but as universities are designed as bureaucratic institutions it is conterminously exploited mostly by entrepreneurs (from inside or outside academia) who are creating new institutions. But this does not have to be the case, as Faltin (2007) rightly assesses: "The educational system has fundamental advantages against the labour system whenever targeting knowledge, spielraum, and finding ideas. This is especially true when contrasted with daily business with its tightness and the time pressure. New ideas need locations that permit openness, new perspectives and experiments". Both universities and cyberspace are constitutionally places that facilitate entrepreneurship, it is only a matter of conceptualizing the entrepreneurship paradigm in a suitable form (as attempted in this study), in order to exploit the creative and evolving potential of the knowledge entrepreneur as a fluent actor in both environments.

In closing, it has to be clarified that the effect of digitization is naturally much slower in higher education than in financial markets because of the nature of the practice. It is simply much easier to digitally transmit a financial transaction than to make someone understand or know something. Nevertheless, it is the more entrepreneurial mindset found in financial markets that makes them more agile and effective in exploiting the potential of digitization. In the assessment of the author, knowledge entrepreneurship can propel universities, research and education to blossom more quickly through the exploitation of digitization.

5.3. FORMAL ANSWERS TO THE RESEARCH QUESTIONS

The three level of the Platonic research ontology (see chapter 1 section 1.2.2. for explanation) are used to illustrate how the results of the research relate to each other. On level 3, which represents Plato's realm of ideas and values, the research develops a position regarding the idea of the university in the knowledge society (see chapter 1 section 1.3.4. (2) and below). On the second level (Plato's realm of forms or rational theoretic conceptualisations of the world) the research puts forward a systematic conceptualisation of knowledge entrepreneurship in universities (see research question 1. below). Finally on the third, level we witness the instrumentalist level and the question of how the current practice and strategy in universities is with regards to internet based opportunity exploitation. See below for how the focus example of knowledge entrepreneurship is dealt with through the research question 2.

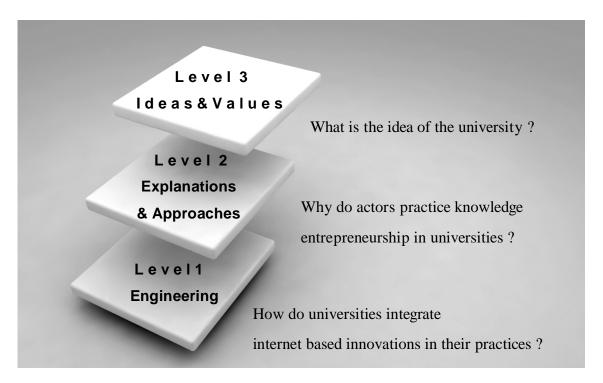


Figure 5.1 - Platonic Research Ontology

Furthermore, it seems important to point out that, while a clear position regarding the idea and mandate of the university is taken (Chapter 1 section 1.3.4.2.), the researcher is aware of the fact that the debate about the entrepreneurial university "is strongly polarized" (Vestergaard, 2007) and one of the original contributions of this research is that it develops a novel — potentially consensual — normative position (level 3 of figure 5.1): Traditional (economic) entrepreneurship (technology transfer, spin-off and company creation, etc.) is not criticized, but rather set in perspective against the core mandate of the university, which is to deliver knowledge products and services. Hence, it is argued that knowledge entrepreneurship allows universities to reap the positive effects of the vitalizing qualities of the entrepreneurial spirit, while not falling into the neo-liberal 'education as business' trap. As such, it is a constructive contribution because rather than arguing against, or for 'entrepreneurial universities,' it is attempting to reframe 'entrepreneurial' to become more adequate in the academic context. Furthermore, it is important to point out that according to the complexity science paradigm, the controversies and disequilibrium of positions inherent therein are good because they stimulate and energize all sides.

Given the dominance of the knowledge telos for entrepreneurial researchers, they are pursuing innovative knowledge products and are thereby opportunity providers for other types of entrepreneurs (e.g. economic or social). This is an important division of labour, because the 'great leader' entrepreneur, who controls and manages everything is a normative illusion. Snowdon makes this point when arguing: "convert all [academics] to spin-

off company technical directors and watch UK academic research output falter as they concentrate their efforts on bringing just one idea to the market' (Snowdon, 2003in Vestergaard, 2007), rather than continuously researching and providing opportunities.

In the following paragraphs the two research questions are answered referencing the relevant sections of the thesis.

1. What enables strategic and practical knowledge entrepreneurship in universities?

According to the findings, two interdependent conditions are needed for knowledge entrepreneurship to happen. First the university needs to develop a knowledge entrepreneurial mindset (see Chapter 4 section 4.2.4). A philosophical model of a knowledge entrepreneurial mindset has been developed and illustrated using the cases investigated (see figure 5.2). It contains the following four attractors: (1) an internal locus of control, (2) a set of values that construct the entity's teleology, (3) pragmatism ensuring a focus on realization and learning by doing (cybernetic) optimisation, and (4) ethics and sustainability have to make up a central attractor to ensure long-term feasibility, (this fosters social acceptance as well as triggers self-reflection and subsequent differentiation).

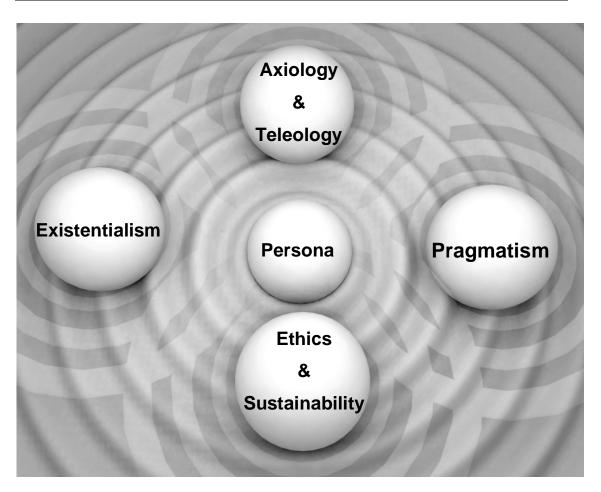


Figure 5.2 - Philosophical Model of an Entrepreneurial Mindset

The second aspect that needs to be present is a supporting infrastructure (*gestell* – see Chapter 4 section 4.2.5) embodying and therefore enabling the implementation of the mindset¹⁰ (figure 5.3 visualizes the two aspects).¹¹. The key elements of the *gestell* for knowledge entrepreneurship are: (a) a governance structure that allows for distributed leadership and *spielraum* (leverage) for actors to be opportunistic; (b) also a wide variety of space for knowledge activities and informal spaces are also singled out as providing fertile ground for opportunities to emerge; (c) the definition and institutionalisation of entrepreneurship support functions as observed at the UPCnet innovation team; and finally, the traditionally prioritized subjects of investigation (d) resources in the form of human-, political- and financial-capital. Naming them last does not neglect their importance, but acknowledges that entrepreneurial thinking is not primarily bounded by resources, but rather by challenges.

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¹¹ One theme for further research would be the investigation of how to codify and spread the mindset. Some indications have been developed in the paper: "A code of conduct for internet use" (Duart & Senges, 2006)

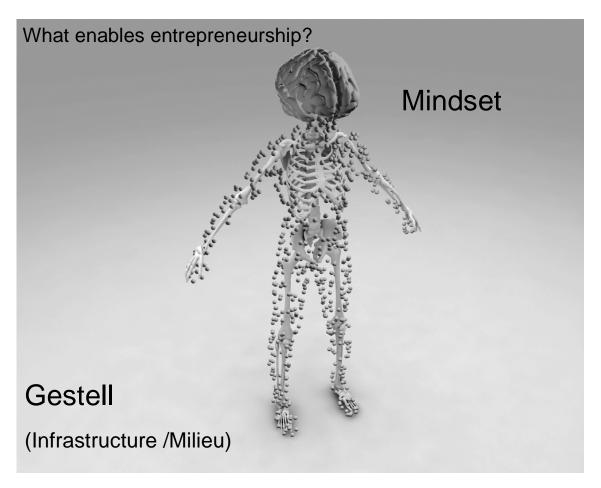


Figure 5.3 - Organisational Mindset & Gestell

2. How do universities integrate internet based innovations in their practices?

No single model has been found to describe the strategy and practices of universities in this regard. Three approaches have been described (see chapter 4 section 4.1.4.) none of which seemed naturally superior. Rather, each approach was a historic result embedded in the organisational context. It is assessed that the lack of an established theoretic paradigm and the heterogeneity of approaches resulted in findings suggestive of the conclusion that optimal practice depends, above all, upon the specific internal and external context of the specific organisation.

The following phenomena have been found across the cases and are hence suitable for generalization:

- i) **Strategy**: While two universities did have IT strategies and two did not, in none of the cases was innovation a defined activity¹². What was treated was always the instance and not the constant phenomenon.
- ii) **Practice**: While there is an extensive heterogeneity amongst user propensity and freedom to engage in knowledge entrepreneurship, nowhere is internet based innovation appropriation supported for individuals. All universities have created a specialized institution with the exclusive mandate to promote e-learning.
- iii) The benefits of **e-learning** are used complementarily to traditional educational practices, and even in the case of the UOC no fundamentally new pedagogy was used, rather processes were simply restructured as in translated in order to exploit the conditional benefits of the medium. Instead, a complete re-engineering (as in new construction) of the practices has been argued to lead to revolutionary results (Privateer, 1999).
- iv) The potential for **e-research** is not yet adequately identified. Some cases of knowledge entrepreneurship are really pioneering new modes of science, as reported in this chapters best practice section (5.1.1.), but generally the activities of the universities investigated are all at basic levels of development.

Also multiple and interesting cases of such knowledge entrepreneurship have been found mostly on an individual basis, but also in the very intriguing cases of the I2CAT research initiative (UPC case study section 3.3.12.1) and the UPCnet innovation team (UPC case study section 3.3.11.2.). These have further contributed to the findings herein reported (Chapter 4).

Herewith I come to the end of this work, hopefully having convinced you of two things:

- (1) That knowledge entrepreneurship is a cogent and apt argument to frame the idea of the university in the 21st century. This is true because it combines the positive creative destruction of entrepreneurship but also acknowledges the socio-transformational mandate of universities (and education as a whole).
- (2) An entrepreneurial mindset coupled with gestell are the necessary components to develop the capacity to constantly exploit the strategic opportunities for innovation (as has been described in the case of internet based innovation appropriation).

In conclusion, the assessment made in 2004 by the chairman of the Spanish Rectors' Information Technology Working Group seems still to be true for Europe in 2007 "less than

¹² Again the exception is the UPCnet innovation team. This is however not a university entity and does not contribute to the institutions strategy.

15 per cent of universities had a long-term strategy on how to integrate new technology" (Warden, 2004). He suggested: "Universities should allocate at least 5 per cent of their resources to this, with the lion's share going to staffing levels and training lecturers" (ibid)

5.4. FURTHER RESEARCH

The concept of knowledge entrepreneurship has been developed in general as well as in its concrete application in the context of today's universities. But many interesting aspects had to be left aside, as described in the demarcation (see Chapter 2 section 2.1.2.) Based on the results of the research project presented herewith, further research could (a) delve into the quantitative verification of the results deduced from the qualitative investigation, (b) apply the concept in a new context e.g. a family or an individual, or (c) focus on one particular conditional aspect such as the role of history, gender, or nationality.

This study pursues an analytic and normative approach and is hence interested in questions that ask for the final purpose, the finalities, rather than about the instruments. On this metaphysical level there is a wide array of questions worthwhile to delve into, conceptualize and construct/propose models. The question on the finality (teleology) of education, which in the end deals with the teleology of human existence, is a theme especially that has inspired ideologies that have promoted social change for a long time, but has recently been 'declassified' as the investigation of means delivers more 'objective' results. I believe it is worthwhile to continue spending more energy in researching, constructing and debating normative memetic models and thereby encouraging reflexivity and sustainable development.

Another aspect immanent but not fully developed in this research is that which deals with the 'what for?' or why question in technology application. Today, especially in the vibrant innovative hot pot of cyberspace, hundreds of new services attempt to improve your life and work practices. It would be an interesting philosophical challenge to conceptualize and discuss the different teleologies that technology can promote and in what conditions. One example of this aspect of philosophy of technology is the 'technologies of access' versus 'technologies of control' concept brought forward by Lessig (1999; , 2001). This field has very concrete applications in the field of ICT development for example.

But from a philosophical/sociological perspective I believe there is above all one research question that is most interesting to pursue: What would a society in which a significant percentage of the population had an entrepreneurial mindset look like? As mentioned in the relevant section about the ethical and sustainability attractor (chapter 4.2.4.4.) it is the long term impact and result that determines the usefulness of a concept. Therefore it would be worthwhile (and I am interested in pursuing this objective) to critically examine whether (and

if so how) the entrepreneurship paradigm can be deployed as a normative philosophical/societal program. Subsequently, once a program for 'entrepreneurship' has been developed, it would be interesting to delve into questions of entrepreneurial social change, as promoted by the social entrepreneur.

EPILOGUE: Rationality and Creativity

Life-philosophy and post-positivistic methodologies have been criticized to neglect rationality and return us to a pre-Illuminated state of irrational speculation. This is not true. Rather, life-philosophy investigates the creative process, that which is unique to life, which has (until now) been proven impossible to be induced into any 'rational' automatons. Obviously though, and specifically because the nature of the subject and the unit of analysis are themselves not 'rational' (at least not in the current vocabulary and understanding), they cannot be described by ways of using only the terminological and methodological toolset of positivistic science. Instead, such exploration has to allow for an expansion with supplementary aids. In this research, both the meta-physical (mindset) and the physical (infrastructure), aspects have been addressed and analyzed, it is thereby believed that the maximum practical utility has been achieved.

As such, it is a hermeneutic investigation and one from which the author draws from "life's richness of the individual" to describe the life's-association as "organism of reality, in which only life pulsates" (Ebrecht, 2007) as Dilthey himself described the approach of the human-sciences. Hence, as the subject is alive, it is necessary to meta-physically 'understand' the reality of the organism under investigation (Lutz-Bachmann, 2007) before the practices and functionalities can be analysed and described.

Ultimately, knowledge entrepreneurs will continue to evolve because the nature of knowledge and the agency of mankind are themselves fluid actors in an increasingly connected and virtual world.

As the electronic revolution continues to reshape our lives, our communications and our commerce, it is within the university, our most sacred vessel of knowledge transference, that the revolutionary potentiality of change can be most influential, and most iconoclastic. We know we can know more.

Knowledge is change. Creative destruction is an electronic manifest destiny and in a digitized world, the universities that realize and utilize this potential will be the new digital lvy League, replacing brick and mortar with bits and clicks. Even though humanism and entrepreneurial human agency will always be at the heart of knowledge production and knowledge services, technology is a mirror of memetic evolution and it empowers modern individuals and institutions. To have a discourse aiming at a knowledge entrepreneurial

mindset and to institutionalize a supportive gestell for entrepreneurship in the university is assessed to be crucial to have universities shape the knowledge society as key players. We know we can know more, and now hopefully, we also know a little more about *how* we can know better.

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ANNEX A - Researchers Position

To apply a good practice from social psychology (Steinberg, 2005) I will make explicit my own position as a researcher as well as the impact of that position on the different aspects of the research. This practice is applied on the premise that there is no such thing as a neutral presentation of objective facts. As will be laid out in more detail in the methodology chapter, this research follows the understandings of (Collins, 2004) who proposed that there is no single universal scientific truth (when we are dealing with problems involving social interaction). Therefore all analysis, interpretation and explanation, as well as the way the problem is positioned and framed, follows a particular subjective standpoint depending on the researchers ontological and epistemological understandings (Markovâa, 1982).

My passion is the internet. Since I first encountered and used the net in 1993 (then aged 15), it has been the red line in my professional development and I enjoy being online and surfing the waves of information and the intellectual challenges involved in processing and understanding all that others have prepared for you to browse. I am aware of my optimism and enthusiasm when it comes to the potential of the meta-physical world created by the internet, and I believe my reflexive capacity as well as my realistic assessment of what is happening online and also an acceptance of what is not happening, allows me to formulate a decent understanding of the options and practices of internet based innovation currently available.

The other maybe even more fundamental passion I have is a thirst for knowledge. My master thesis was entitled "The use of ICT for knowledge networking" (Senges, 2002) and I reported on a pilot project case study in which we initiated a knowledge sharing community for United Nations professionals. The understanding of ICT and business I obtained during the masters program in business information systems, very useful, but I wanted to learn about the wider context and so I decided to pursue the PhD program on the Information Society.

I have a sincere interest in philosophy and ethics and therefore the holistic grounded theory approach that I have chosen was the only rational choice as I was determined to explore the subject of the research from all angles and to reach a certain meta-physical depth. This philosophical interest has also led me to reject traditional knowledge claims regarding mechanistic scientific theories for the realm of the social and especially the application of quantitative methods to measure social conditions. Admittedly, there are many relations and states that can be measured, but the statistical methods do produce an abstract (and supposedly objective) view of the research subject which (in my humble opinion) led to the emotionally cold, alienating and unsatisfying working conditions we experience today.

ANNEX B - Reflection on Scientific Knowledge Production

"The philosophy of the social sciences is at present in a most interesting phase of the history.

The world appears to be extremely diversified and fragmented. One could also say that we are in an interregnum and that there is no clear indication of who, if anyone, will be the victor" (Mouton & Muller, 1990)

The fundamental discourse about what constitutes knowledge and how scientific knowledge is defined in particular, has been going on within the scholarly community for many generations. I will not take sides, but a balanced position will hereto forth be attempted. Agreeing with Joubert, (1990) the relevancy of the produced findings and arguments are taken as the characteristics to evaluate the quality of the research. Professional interest (Foucault & Gordon, 1980; Goldblatt, 2004, p. 125) and discourse justifies the inclusion of information and arguments in the work. Without going into too much more detail, it can be said that truth is pursued and trust or credibility is sought through observed evidence and rational argument.

What is knowledge and what counts as knowledge? When reflecting upon this question it becomes clear that all knowledge production as well as all other knowledge operations are properly situated, as such all knowledge is widely enmeshed in the operations of power. Hence all knowledge is contentious and entangled in social power relations. It is never neutral and through means of scholarly discourse and communication it does always contribute to social change (Habermas, 1978). This research is aware of its context and intents to establish credibility through transparency.

Of course most of the arguments presented depend on the definition of science and subsequently scientific. Kvale's definition of science is adopted: science is the methodological production of new, systematic knowledge. (Kvale, 1996, p. 60)

Greatest possible robustness of the findings is achieved through extensive triangulation (Seale, 1999). All four types of research triangulation outlined by Denzin (1978) are used. Data triangulation through the use of diverse sources of data; investigator triangulation, through peer consultation processes, focus group discussion and subject discourse and member validation, or "seeking agreement from actors as to the truth of a researcher's account" (Seale, 1999, p. 63) as well as team reflection and retrospective in the action research aspect. Theory triangulation is implemented through the convergence of theoretic models from sociology, management and information systems research. And last but not least methodological triangulation through the application of grounded theory, as well as statistical and rational argument methods. On the outer level three sources of evidence are consulted (previous theoretic and empirical work, the university cases and the

phenomenological action research) each of them use a different methodology and thus cast an independent perspective on the concept of knowledge entrepreneurship.

So the focus of this research is to generate and communicate knowledge¹. Thereby it is attempted to use narrative and story telling as well as metaphors in order to communicate and create meaning and understanding. Observation, participation and experimentation are used to allow for understanding, which is then documented and verified through discourse with other scholars. The focus is on intelligibility and production of meaningful models and arguments, which serve as basis for discourse. Rigorous application of methodology and transparency of the applied research practice are taken serious and conducted with due diligence. However the statement of the John Maddox editor of the Nature journal, who stated: "Too many papers were awash with facts and numbers. The most serious enemy to clarity is the reverence for data. Writers are often so anxious that a date should be correct, but so utterly uncaring that what they say should be understood" (Joubert, 1990). It is attempted to provide a clear structure and presentation of the undertaken research².

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¹ At the heart of the qualitative approach is the assumption that a piece of qualitative research is very much influenced by the researcher's individual attributes and perspectives. The goal is not to produce a standardised set of results that any other careful researcher in the same situation or studying the same issues would have produced. Rather it is to produce a coherent and illuminating description of and perspective on a situation that is based on and consistent with detailed study of the situation. (Ward-Schofield, 1993, p. 202)

² Because the researched phenomenon has emerged rather recently, is rapidly evolving and as all sociotechnological phenomena highly dependent on unique conditions, it is not attempted to produce a traditional theory. Rather the instances are investigated with scientific rigor and due diligence within the scientific paradigm of complexity science. Therefore attractors, sates and scenarios will be described (see below), which may serve as a practical framework to explain cases in similar scenarios. The main scientific contribution however lies in exploring and describing the plentiful theoretic and practical relations between the scientific fields. It is attempted to explain the interfaces, influences and interdependence between the perspectives contributing to the overall aim to enable trans-disciplinary scientific ontology. Delanty (2001) tells us that "unlike the modern researcher, the medieval scholar could claim to be able to read everything written." These days will never come again, however to counter the trend of higher and higher specialization and rather to build bridges and interfaces between the different elements of the house of knowledge in order to allow science to offer sustainable (well balanced) solutions, this work does not create new knowledge in the sense of scientific invention, but connects the existing and contributes to the understanding of a concrete problem. In this sense the presented work is meant to explore the connection between the existing theories and apply them in a real setting in order to allow for the exploitation of internet based innovations for knowledge practices.

ANNEX C - Complexity Science & Deleuzian Ontology as Meta-Theories

Complexity Concepts

Over many generations and based on the revolutionary research of Galileo, Newton, Descartes a very consistent linear, mechanistic view of the world has been established. The theories of this rationalist and nowadays traditional scientific school have been immensely successful in discovering and explaining the physical world. With its paradigm modern science and technology – e.g. electricity, air-jets, and the internet - was made possible. However, it is a reductionist, cause and effect approach to science. Thus organizations are seen as machines (translated to the social world as bureaucracies), and classical management theory, and scientific management treats them as objects.

Because this research is especially interested in the social perspective and hence in the role the people ³ in an organization play in transforming that organization, complexity and Deleuzian approaches are appropriate, because they allow for the representation of the individuality of an organization and the many individuals, who are agents of the organizations raison d'etre ⁴.

In the following paragraphs the relevant concepts and features of complex systems and adaptive complex systems in particular, as well as their interpreted representation in the knowledge entrepreneurship at universities setting, are presented.

Complex system – Allen defined a complex system as 'any system that has within itself a capacity to respond to its environment in more than one way. This essentially means that it is not a mechanical system with a single trajectory, but has some internal possibilities of choice or response that it can bring into play' (Allen, 2001, p. 150). Another characteristic of the system term used in this research is expressed by Watzlawick: "each part of a system [...] is connected to all other parts, in such a manner that a change in one entity causes a change in all entities and therewith of the whole system" (Watzlawick, Beavin, & Jackson, 2000, p. 119).

³ Furthermore it is important to point out that this study investigates the adaptation of innovations not just from a managerial perspective which tends to equate 'the user' with one homogeneous group. Instead it is tried to be sensitive to the variety of user grouped implicated in change (McLaughlin, 1999)

⁴ One interesting question to follow up on would be whether it is true that: The better the organizations reason is (collaboratively) defined and deliberated, the better drive an organization has.

Complex adaptive systems - CAS are special cases of complex systems which have the ability to 'learn' and change based on experience. Classic examples of CAS are as diverse as the stock market, the brain, or the immune system. Lately CAS approaches have been applied to social organizations and communities (Fuller & Morgan, 2000; McMillan, 2004; Stacey, 1996). Another property of adaptive systems is that they have many levels of organization. They have elements or agents which are seen as building blocks. What Holland means by that is that agents on one level become the elements of an agent on a higher level. For example an individual might group with others to build a project team or department etc. Adaptive systems are also constantly reconsidering and reorganizing themselves as they gain experience. "Succeeding generations of organisms will modify and rearrange their tissues throughout the process of evolution. The brain will continually strengthen or weaken myriad connections between its neurons as an individual learns from his or her encounters with the world. [...] At some deep fundamental level, [...] all these processes of learning, evolution, and adaptation are the same. And one of the fundamental mechanisms of adaptation in any given system is this revision and re-combination of building blocks" (Waldrop, 1994, p. 146).

Fractals - A new way of looking at the world was made possible with the advent of computers. They could deal with equations which before were believed to result in a unordered complete chaos (McMillan, 2004). When these non-linear equations were fed into computers, it turned out that while there was no result no order that fit the traditional mathematical paradigm, the result shows structural patterns – now known as fractals.

Euclidian geometry can describe and measure many attributes of the man-made-world, like houses, roads, computers etc. but it fails to describe and measure (with the appropriate accuracy) the fuzziness of nature, like trees, mountains, human physiology, clouds, coastlines, etc.. Mandelbrot's new geometry is a universal geometry that is capable of capturing these diverse and complex 'living' shapes. Several concepts of his geometry are introduced in the following lines: self similarity refers to the fractals 'property of endlessly manifesting a motif within a motif within a motif (Coveney & Highfield, 1995, p. 172). The important contribution fractal geometry makes to our understanding of chaotic systems is its holistic view. A hurricane which in one way is a violent storm, however 'seen in fractal terms it is part of a vast continuum that extends from gust of air on a city street to the enormous cyclic systems that race across the planet'. So it encourages us to recognize the locality of our perspective or metaphorically speaking to reflect on the height from which our birds-eye view is looking down. Another relevant concept is that of the edge of chaos. It describes the space between order and chaos. 'Biological life forms appear to exist in a balance between regularity and disorder. [...] Ants as individuals behave in a chaotic fashion. They rush about, have a rest, and then rush about again, thus moving from an active pattern to a stable or inactive one. But their individual behaviors reflect the overall pattern of the colony which as a whole has an orderly rhythmic pattern to it.'(McMillan 2004, p.23)

Because of the universality⁵ of the conditions (attractors) that give shape to the fractals, they have to be present at all levels. Hence only a holistic investigation of the matter is capable of explaining the system.

The fractal perspective on Universities

Following and expanding Clark's approach to take 'entrepreneurial' "as a characteristic of social systems; that is of entire universities and their internal departments, research centers, faculties and schools" (1998, pp. 3-4), the examination and description of the concept of entrepreneurship is applied and in general defined to be the same for individual human actors as well as collectives of human actors who are meant to be bound together by an institutional mandate and can be analysed as distinct and specific system.

This understanding is coherent with the conditions found in so called fractal mathematics, a strand of complexity science. Fractal systems show the same features when visually represented no matter whether using micro— or macroscopic lenses. Applied to organisations this translates to the understanding that the individual is a mirror of the whole and the whole as mirror of the individuals.

The 2500 year old parable of Idra's net, to which Daisaku Ikeda refers as a "beautiful visual metaphor for the interdependence and interpenetration of all phenomena" (Daisaku-Ikeda, 1996) illustrates this understanding from another angle. Charles Eliot recounts the metaphor of Indra's net, which is part of the Buddhist canon: "In the Heaven of Indra, there is said to be a network of pearls, so arranged that if you look at one you see all the others reflected in it. In the same way each object in the world is not merely itself but involves every other object and in fact IS everything else" (Capra, 1982). As in this parable the individual mindset and practice mirror the whole, hence the institutional macro-mindset and practices show the same features as the individuals; with the distinction of their relative inherent net structure. In this way the university is the entrepreneur of itself, like artists can frame themselves to be "artist as art work" as Piper (2003) rationalized in an essay about his 1970 Catalytic performance.

Yet another analogy often used in this context is the organisation as organism (Morgan, 2006, pp. 33-72) or even 'The world as social-super organism and its global brain'

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⁵ Universality is a concept pioneered by Mitchell Feigenbaum in 1975. It proposes that very different systems would 'behave in a similar way when moving from an orderly state into a chaotic one, in other words, that they behave in a universal fashion' Examples include numerical patterns (pedals on flowers), patterns of form (ocean wave patterns) and patterns of movement (fish, snakes, etc) as well as fractal patterning (mountains, coast lines).

(Heylighen, 2000) – as developed by trans-disciplinary cybernetician Francis Heylighen. The former more common metaphor allows for the utilisation of the DNA as analogy for the mindset causing practice, memory and being in organisms and organisations. Heylighen's metaphor allows for the localisation of the individual and institutional being in yet another micro-/macro-perspective, which particularly favours second-order reflections as described in the ethics and sustainability mindset-attractor.

To sum this paragraph about the fractal perspective up; the phenomena/attractors worked out in this chapter have been found to be influential in micro- (individual) and macro- (institutional) contexts.

Sensitivity to initial condition (the butterfly effect) - While the discovery of fractals was received as an interesting but rather theoretical new insight, the whole 'movement' of complexity theory took off when Edward Lorenz from the MIT published his paper connecting the weather conditions with insights from complexity theory. Concretely, when Lorenz was running weather forecast scenarios on his computer and he changed some detail in the initial condition, the results might turn out completely different. This was quite surprising as there were an abundance of interrelated variables and it was thought at this time that changing some initial parameters would still result in a similar outcome as the majority of the systems forces stayed the same. The result of Lorenz observation has been labeled 'sensitive dependence on initial conditions' (popularly known as the butterfly effect).

There are two direct applications of this effect on the research setting. Firstly it results that each case and each individual has to be seen as unique because of the unique initial conditions. And secondly the approached level of understanding has to go beyond the individual case on a level of abstraction that explores the systemic attractors (forces) at work.

Strange attractors – 'basin' of attraction within which a range of similar but non-repeating behaviors take place, behaviors which seem to be magnetically drawn or pulls together within the basin – it has fractal properties. Basically what is described with the strange attractors is that even though the British weather is infamous for its unpredictability, there is a 'basin' which gives it the particularly English style of weather, in that it is clearly different and never behaves like the monsoon or desert-like conditions. 'Although the potential for chaos resides within every system, chaos when it emerges never moves outside the bounds of its strange attractor. [...] the chaotic behavior exhibited is not random and unrestrained, it has its own kind of patterning and its own form of determinism' (McMillan, 2004, p. 20)

The fuzzy knowledge attractor

As the FU Chancellor assessed correctly (FU Chancellor 1), it is very difficult to measure knowledge and even more difficult to standardize measurements across disciplines. To

illustrate this point compare the different modus operandi of philosophy where very few publish in journals and journal citations are even less probable and publications in genetics were all results are send to journals and an average article is cited about 20 times. In the end it does not matter how many publications an academic has but how good they are. Hence to design any sort of cybernetic system for knowledge production in a university is very difficult because the measured feedback will always be one-dimensional.

Consequently the FU Chancellor explained that he intends "not to standardize the thinking but to standardize the processes" (ibid.). However, even that seems very difficult as the processes are closely coupled with the individual disciplines practices. Only the most basic administrative tasks – especially with regards to human resources and student administration – can be standardized.

When it comes to investigation, the assessment of UOC's research development manager is affirmed: It is impossible to teach how to do research (UOC management 5); because it is a tacit knowledge that can only be learned from experience.

Emergence and self-organization - Emergence is the term used to describe the process of evolving, adapting and transforming spontaneously and intuitively to changing circumstances resulting in a new form of being of the complex system.

According to Nonaka (1988) self-organizing teams are essential to enable organizational transformation. It should be noted (Stacey 1996) that self-organization is different from self-managed or empowered teams. For Stacey the synergy effects of the division of labor are logically why institutional organizations occur. An organization is the place, which is 'self-organizing, relating between people in which power, politics and conflict of ordinary, everyday life are at the center of cooperative and competitive organizational processes through which joint action is taken' (2000, p.8)

Allow me to use the example of emergence to elaborate on the practical usefulness of the complexity approach for our understanding of real social/living systems/organizations. Mintzberg and Waters (1989) distinguish between deliberate and emergent strategies. Emergent strategy means those aspects of strategy that are actually implemented and sometimes stand in real contrast to the one plan decided at the point of strategy formulation. Ideally, the pattern of the deliberately developed plan can be observed in the flow of decision making but also in the complex reality inhabited by emotional and irrational actors. However, this is of course, never 100% the case. Sometimes these deviations occur because of rational re-interpretations of conditions, and othertimes, because of intuitive moods, happenstance and serendipity. Consequently, a deliberate strategy is a set of planned and intended interventions, thusly developed to reach well-defined defined objectives. Now in a military scenario the implementation of the strategic plan depends mainly on unforeseeable

influences on the external system. In 'normal' conditions the hierarchical structure of the military bureaucracy will allow for the implementation of the plan. However, if you have a more dynamic, political and federalist system, such as a university, all strategies and objectives are perceived, reflected and acted upon by all stakeholders. McMillian (2004) notes that in a university "individual units have sufficient autonomy to pursue their own strategic change activities without reference to any central vision or plan' (p.69). Thus you have a much higher feedback and self-organizing condition. Hence, to analyze organizations focusing on the emergent strategy and to describe the conditions with the evolutionary concepts of complexity will deliver insights into the natural, the fuzzy aspects of social organization.

The edge of chaos –complex systems always exist in a state which maintains a certain chaos (entropy) while at the same time allowing for emergent processes to happen. One classic example of a system being at the edge of chaos is the emergence of life on earth. The water needed to be fluid and have a certain warmness for the proteins to form; in case the conditions were as such that the water was frozen, or if it was so hot the water would have become steam, no life could have emerged. Scientists believe that for each complex system there is a certain fuzzy domain between other states in which it flourishes. When applying the concept of the edge of chaos to universities we return to the key question for universities in the beginning of the 21st century: What is their mission or what is their purpose – to use the metaphor of water, how can they ensure the maintenance of the right temperature for optimal knowledge (life) to evolve. When they become too hot – meaning they take in too much energy from the market and business, they become vaporous; when they focus too much on the liberal arts (e.g. philosophy) and knowledge as an end in itself, they loose their relevance to the practical problems of society.

Deleuzian Ontology

What scientists started to develop as complexity sciences is reflected in philosophical themes like the ontology of being, immanence and other questions of cosmology. The great discourse on the ontology of being has its beginning with Heraclitus, a proponent of a pre-Socratic cosmology, who stressed 'the only constant is change', and Parmenides, his successor, who insisted on a natural reality which is permanent and unchangeable.

Chia (1998) suggests that after more than 2000 years, and amidst many contrary insights, the static worldview has gained dominance over truly procedural understandings. The dominance of the mechanistic worldview became truly dominant after Newton was able to describe the physical laws of motion using stable entities, because this scientific revolution (coupled with other scientific discoveries) enabled the technological advancement that enabled the exponential economic growth and social transformations of modernity. However, it is exactly that perception of *being* (things are in one particular way) in comparison with the

ontology of *becoming* (things constantly develop and change), a concept where movement, process, and emergences, are core characteristics of reality; Such fundamentals are addressed by complexity theory as well as by Deleuze and other philosophers⁶.

Terminology and concepts from philosophy, and especially Deleuze, are combined with concepts from complexity theory to analyze and describe the conditions and practices of knowledge entrepreneurship in universities. The following building blocks from Deleuzian philosophy are transposed:

The **logic of otherness** describes the way a nut only makes sense when understanding and taking a bolt into consideration; applied to the university one has to take into consideration that it (as an institution/system) only makes sense when seen in its environment (politics, economy, society, competitors, etc.). The concept can easily be related to the demarcation between the 'other states' between which the complex adaptive systems exist at the 'edge of chaos'.

Immanence (a classic philosophical term used to discuss the inner perception of identity and consciousness) can be seen in relation to the 'sensitivity of condition'. Chia (1998) illustrates its meaning with the example of the picture '0 through 9' by Jasper Johns. The leitmotiv of the painting is the logical and historical connectedness of reality. The painter begun by painting a zero, followed by all primary numbers 'superimposed' on top of each other, each leaving its particular characteristics on the canvas. The painting is a comprehensible representation of Deleuzian immanence; the way each number exists and only makes sense in reference to and as part of a sequence with the others. There are two practical interpretations for this study: the way each case (each manifestation) is unique and can only be understood by observing the whole in a systemic way (Senge, 1990) and secondly it can be interpreted to propose the perception that all present states have all history immanently as part of them and are as such immanently and constantly sensitive to the initial condition.

One last and maybe most applicable concept Deleuze developed is that of the rhizome. A rhizome can be interpreted as analogous to the complex system entity. It connects any point to any other in an essentially heterogeneous collective assemblage of occurrences which are called 'bulbs' and 'tubers'. It might be helpful to think of a flock of birds (school of fish, herd etc.). But 'there are no points or positions in a rhizome, such as those found in a structure, tree, or root. There are only lines' (Deleuze in Boundas, 1993, p.31). To propose a scientific interpretation, Deleuze sees the rhizome consist of waves such as the quantum ions, which make up all matter. In the same way as these fundamental elements of the mechanistic

⁶ On a similar tangent Mason (2005) assesses that complexity theory echoes Foucault's emphasis on "polymorphous correlations in place of simple or complex causalities".

scientific paradigm are technically never static⁷, the lines of the rhizome are only vibrations, only existent as substance when measured but truly always changing.

So Deleuze views change as subtle, agglomerative, often subterranean and heterogeneous (Chia, 1998). Reflecting on this assessment, I see internet innovations as a good object of study, because many of them are incorporated as an individual motivation and their organizational incorporation and usefulness is diffused 'by word of mouth'. This 'epidemic' spread resonates in Chia's analogy that "change spreads like a patch of oil" (ibid. p.14)

⁷ Or, in fact, show even more dubious properties of particle and wave.

ANNEX D – Interview Partners

Research Objectives	Political Dimension	Practice Dimension	
Entrepreneurship in	-Responsible for Research	-Responsible for Intellectual	
Research	Strategy & Oversight	Property Rights and	
	(Vice Rector Academic)	Royalties	
		-Responsible for Private	
		Sector Relations & Spin-off	
		Creation	
Transformations caused by	-Responsible for Information	Webmaster	
the internet	and Communication		
	Technology Strategy &		
	Implementation		
Entrepreneurship in	- Responsible for Student	Student representative	
Education	Affairs (Community, Alumni)		
	- Responsible for Teaching		
	Strategy & Implementation		
Entrepreneurship in	-Responsible for	-Responsible for Human	
University Administration	Administration	Resources	
		-Responsible for Fundraising	

Table D.1 - List of Case-Study Interview Partners

Additionally, key actors have been identified by requesting recommendations from the initial interview partners.

ANNEX E – Sample Interview Guide

Note: The interview guide reproduced here contains the core questions. Naturally, the interviews were conducted in English, German and Spanish, respectively. Also, some questions that were targeted at the specific ambit of work of the informant have been added. Additionally, variations of these questions been were in the case of the UOC student interviews and the LSE student focus group.

Introduction

The theme of the research is: **Knowledge Entrepreneurship at Universities**: organisational practice and strategy in the case of internet based innovation appropriation.

The general question investigated in this case study is: **How is the process of introducing internet based innovations into LSE happening?** (And, what is the current use of the internet at LSE?) I am especially interested in understanding the practices from a strategy and knowledge sharing perspective.

The interview is structured in four parts. Firstly, I will ask some questions regarding organisational culture and strategy development. Secondly, there are some questions that deal with innovations/opportunities. Thereafter, I am interested to learn about LSE communication and knowledge sharing.

Questions

Setting

1. What is your background & responsibility?

Questions

LSE as an Organisation

- 2. What are the reasons to come to LSE?
- 3. What was your expectation, and how long did it take you until a "real understanding" of what LSE is about emerged?
- 4. In your understanding, is there something like the LSE project? What is it?
- 5. What/Who are the motors of change?
- 6. Is LSE one entity (an ant population), a flock of birds or a fishing ground?

Knowledge entrepreneurship

- 7. Does LSE support staff who want to tackle new projects?
- 8. How do you find knowledge opportunities (mailing lists, websites, working groups, conferences/external awareness)
- 9. Is there support/training for the planning/strategizing of career?
- Do you think there is room and/or opportunities to experiment? (Lockin/open minded)
- 11. What about communication? What kind of formal and informal communication channels are there? What is the tonality?

Technology (the internet) for knowledge practices

- 12. How is the internet supporting your knowledge practices?
- 13. The internet allows me to construct more knowledge
- 14. The internet allows me to construct better knowledge
- 15. Do you feel LSE is using the internet appropriately?
- 16. What are the demands/needs/expectations you have regarding the internet at LSE?

Knowledge Sharing

- 17. What are LSE's activities regarding encouraging collaborative learning (knowledge sharing) and personal information management (digital literacy/knowledge management)?
- 18. How is knowledge about "good practices" at LSE codified and disseminated?

[In closing]

Could I sit with one of your colleagues to see whether you can let me read some documents that are relevant to my research?

[Here comes a list of documents (policies, budgets, etc.) that deal with topics relevant to the development of the case study]

Could you recommend me a colleague who you consider entrepreneurial and who I might contact in order to organise an interview?

Thank you very much for your time. I will contact you once the case study has been developed in order to ensure a correct understanding and interpretation of your contribution.

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