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Entrepreneurial University Archetypes:
A Meta-Synthesis of Case Study Literature

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Discussion Paper # 12

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Entrepreneurial University Archetypes:

A Meta-Synthesis of Case Study Literature

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Abstract

Most research on entrepreneurial universities is case-study based. While this helps us understand specific characteristics of particular cases, integrative studies that build on cumulated knowledge have yet to be conducted. This study aims to synthesize existing research and to generate archetypes of entrepreneurial universities by conducting a qualitative meta-synthesis of empirical literature. The underlying assumption of our research is that there is no single model or best type of entrepreneurial university. Notwithstanding, we expect to see entrepreneurial universities converge into a few distinct archetypes that display similar organizational attributes. As primary data sources we used twenty-seven case studies on entrepreneurial universities, which we synthesized into four empirically grounded archetypes: the 'Research-preneurial' or research driven; 'Techni-preneurial' or industry driven; 'Inno-preneurial' or service innovation driven; and the 'Commerce-preneurial' or knowledge commercialization driven. This meta-synthesis provides a taxonomy of various structures, strategies and resources that characterize entrepreneurial universities, serving as conceptual framework for a heterogeneous body of literature.

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Keywords: Entrepreneurial University; Higher Education; Case Study Meta-Synthesis; Configuration Theory; Archetype Theory; Grounded Theory

1 Introduction

Over the past two decades, universities have been facing a period of profound changes and unprecedented challenges. The rise of new public management (Greening, 2001) has disrupted the institutional setting of higher education (Teichler 1996; Neave 1995; Dill and Sporn 1995), increasing pressures to comply with new rules, requirements, and expectations from government and other stakeholders. The rise of managed education implies a more active role of government in monitoring and auditing educational organizations, while at the same time promoting autonomy and competition in the name of academic excellence and efficient exploitation of knowledge (Münch, 2011; Reihlen and Wenzlaff, 2014). While normative pressures drive universities towards structural homogeneity and facilitate isomorphic change (DiMaggio and Powell, 1983), at the same time market deregulation and increased autonomy foster the emergence of distinctive structures. Hence, this paradoxical policed deregulation stimulates creative strategic responses and novel organizational configurations, which have been described as the entrepreneurial university (Clark, 1998; Sporn, 2001; Kirby, 2006), third-generation university (Wissema, 2009) or the triple-helix model of university-industry relations (Etzkowitz, 2003; Etzkowitz and Ranga, 2010).

As universities struggle with the organizational challenges of creatively responding to a shifting institutional paradigm, it becomes essential to investigate first the emergent organizational structures of entrepreneurial universities, and second the strategic initiatives that facilitate the entrepreneurial transformation. Through the identification of relevant organizational characteristics in numerous case studies on entrepreneurial universities, we aim to generate a comprehensive taxonomy of the empirical literature and to identify distinctive emergent organizational archetypes.

On the basis of an inductive qualitative analysis of twenty-seven case studies, we develop a taxonomy of emergent university archetypes, which provides a more comprehensive understanding of recently evolving structures, processes and strategies in higher education institutions. Moreover, by describing aggregate generalizable patterns, this study should help to overcome some of the context-dependency and non-generalization issues associated with single-case studies. Additionally, archetypes could serve as conceptual tools for practitioners in designing, steering, and foreseeing organizational development in their organizations

The paper is structured as follows: first, we review the literature on the entrepreneurial university and define our understanding of its reach and scope. Subsequently, we present a short summary of configuration theory and the contribution of archetypes to the understand-

ing of organizational structures and strategic change. Next, we explain the methodological approach and design of our research, which will use techniques based on the grounded theory analysis (Glaser, 1992) to investigate qualitative data of twenty-seven entrepreneurial universities cases. Through this process we aim to inductively identify structural attributes and organizational processes, which we later analyze in order to identify emergent patterns in organizational configurations. Afterwards, we look at the existing literature on entrepreneurial universities to help us enrich and contrast our results. Finally, we summarize our findings and propose some directions for further research.

2 Theoretical Framework

2.1 Defining the entrepreneurial university

The field of entrepreneurship is characterized by a lack of agreement on precise definitions and key terms. Austrian economist Joseph Schumpeter (1936), in the early days of the academic discipline, emphasized its innovative nature, defining an entrepreneur as a person who carries out new combinations, causing discontinuity. This broad understanding was amongst the most widely accepted until the past few decades, when increasing disagreement on the term and scope of the field has emerged. Our essential understanding of the term entrepreneurship is how opportunities are discovered, created, and exploited to bring news goods and services to the market (see Venkataraman, 1997). It thus often entails, but goes beyond, a narrow understanding of entrepreneurship, which relates to the creation of new organizations or spinning them off from existing ones. In line with recent discussions in the entrepreneurship literature, we argue that entrepreneurship is opportunity-seeking and opportunity-exploiting behavior (Reihlen and Werr, 2012, forthcoming; Shane and Venkataraman, 2000) beyond means that are currently available, and manifests itself not only in individuals, but also in organizations such as firms or governmental institutions (Bull and Willard, 1993). These chances to exploit future goods and services are not simply taken, but created through new organizational attributes and interaction within the micro-, meso- and macro-institutional levels (Venkataraman, 1997; Reihlen and Werr, 2012, forthcoming), thus resulting in many new organizational configurations that tend to converge into a few distinctive archetypes (Hinings and Greenwood, 1988).

The concept of entrepreneurial university in the academic literature tends to be diverse and ambiguous (Kirby et al., 2011). Significant differences in the meaning and scope of the term arise from the literature, depending on the context and specificity of the cases studied and the discourse of the researchers (Blenker et al, 2008). Moreover since 1998 when Burton Clark introduced the term entrepreneurial university, several scholars (Röpke, 1998; Sporn, 2001; Etzkowitz, 2003; Kirby, 2005; Rothaermel et al., 2007) have used the term, while others have proposed alternative terminology such as third-generation university (Wissema, 2009). Clark's seminal work on entrepreneurial universities identifies five elements of entrepreneurial behavior in many detailed case studies that he conducted during the 1990s of various university transformations. This five-element approach has become the benchmark and point of reference in the entrepreneurial-university literature over the past two decades (Bratianu and Stanciu, 2010). The elements defined by Clark (1998) are: an 'expanded developmental periphery', which involves research transfer centers, joint ventures with industry, spin-offs, tailored educational and training programs for industry partners, etc.; a 'diversified funding base' by looking for alternative streams from local, regional and supranational public agencies, NGOs, revenues from student services, and alternative platforms such as e-learning, symposia and networking events; a 'strengthened steering core' with decision-making authority and autonomy, professional and accountable; a 'stimulated academic heartland' in which purposeful scholarly work is recognized, encouraged and innovative, collaborative research is pursued and remunerated according to its relevance; finally an 'integrated entrepreneurial culture' represented by a strong set of beliefs, principles and consistent practices, all of which 'ought not to be treated independently of structures and procedures through which they are expressed, thus an institutional perspective is required. The first four of the five elements are means by which transforming beliefs are made operative' (Clark, 1998: 7-8).

Various understandings on the boundaries of an entrepreneurial university and its relevant characteristics can be included in a wide reaching definition, which would come closer to the original essence of the term entrepreneur, to help us frame the structure for our study. An entrepreneurial university is one that responds strategically to field logic changes, by acquiring and employing resources in an innovative manner, underpinned by an integrated entrepreneurial culture that provides support structures in order to fulfill its strategic goals.

Clark's seminal study on entrepreneurial universities was aimed at identifying recurring elements among the cases he studied. In other words his methodology intended to identify empirical regularities among the five organizations that he researched. Clark's approach makes sense when trying to identify and define novel phenomena through unprecedented em-

pirical research. As a result, he tends 'to homogenize what is, in reality, a pluralistic phenomenon' by discovering unifying themes, principles and thereby downplaying some of the multifaceted nature that entrepreneurial universities entail (Glynn, Barr and Dacin, 2000). In contrast to that approach, this study aims to look for empirical heterogeneity within Clark's homogeneous but general framework, on the premise that organizational divergence in higher education is favored by new market logics and deregulation, and on the evidence from literature suggesting that differing types of universities are all being described as entrepreneurial, even though in fact there is great variability among their organizational characteristics. In consequence, this study should generate, through the identification of archetypes, a more refined framework of specific organizational characteristics among differing forms of entrepreneurial universities

Despite the heterogeneity regarding the term 'entrepreneurial university', we would like to derive two recognizable generalizations. First, universities in the Western world are increasingly experiencing profound transformations. These changes take different paths across organizations because each transformation is shaped by a unique institutional setting, which is one reason for the differing entrepreneurial-university models reflected in the literature. Second, the entrepreneurial characterization implies the framing of universities as an opportunity seeking and exploiting institution (Shane and Venkataraman, 2000). However, existing literature tends to reduce that 'opportunity seeking and exploiting' behavior to the capitalization and commercialization of academic knowledge (Yusuf and Jain, 2008). While this is an important part of entrepreneurial behavior, it still overlooks the multidimensionality of the entrepreneurial phenomenon, which also relates to innovative approaches in the main academic areas of education and research. In addition to engaging in entrepreneurial activities per se, universities also need to embrace an entrepreneurial culture at all levels, from teaching and research to governance and management (Clark, 1998). Hence, the organization and its members need to interact with the organizational field in an entrepreneurial manner as well (Röpke 1998). Accordingly, an entrepreneurial university would not only be an advocate of various support initiatives for entrepreneurship, but also an institution that develops and implements innovative strategies, including education and research (Salamzadeh et al. 2011).

The level to which the entrepreneurial culture is represented within the organization will depend on the degree to which actors in and around the university behave in accordance with entrepreneurial values and beliefs (Greenwood and Hinings, 1993). In other words organizational attributes represented by structures, resources and strategies will be determined

at the most basic level by entrepreneurial socio-cultural attitudes of university stakeholders. Hence, we can understand archetypes as being underpinned by entrepreneurial values and belief, represented within each organizational configuration through a set of attributes that denote the behavior of members in and around the university.

2.2 Archetypes as framework for analysis

This study draws on configuration and archetype theory in organizational studies as the theoretical framework in order to synthesize the diverse and complex structures of universities with the aim of finding discrete clusters of configurational schemes that serve as idealized types for comparability, design, and predictability (Greenwood and Hinings, 1993; Meyer et al, 1993; Miller, 1986, 1996; Miller and Mintzberg, 1983; Mintzberg, 1979; Weber, 1978; Harlacher and Reihlen, forthcoming).

According to Meyer et al. (1993) the term organizational configuration can be used to 'convey any multi-dimensional constellation of conceptually distinct characteristics that commonly occur together'. The study of configuration denotes the identification of certain key dimensions that together offers and represents how organization functions. Numerous dimensions of analysis such as structures, strategies, and environments tend to cluster together to forms a representation of ideal types or gestalts within a defined organizational field (Greenwood and Hinings, 1993). Configurations may be derived conceptually or inductively from empirical data, and emerge from diverse forces that cause organizations to cluster together (Meyer et al., 1993). Some authors have suggested, based on population ecology theory of the firm (Hannan and Freeman, 1977), that selection drives organizations to converge into uniform clusters. Others such as DiMaggio and Powell (1983) as well as Hinings and Greenwood (1993) argue that powerful isomorphic pressures based on normative or coercive regulation or mimic behavior force the diffusion of a few common structures and strategies within a defined organizational field. Miller (1987) has explained how endogenous homeostatic forces drive organizations towards uniform configurations (Miller et al, 1984). Meyer (1982) describes how organizational ideologies and socio-cognitive processes undermine formal structures and shape consistent responses to external threats, which points to shared 'interpretative schemes' within organizations to support the emergence of a discrete set of recognizable structures and systems that tend to congregate among few 'archetypes' (Greenwood and Hinings, 1993).

Configurations result from interlinked relations among attributes across different dimensions such as structures, processes, resources and strategies. These configurations may be

derived conceptually as typologies, or empirically as taxonomies (Miller et al., 1984). Configurations of single organizations tend to group within differentiated clusters whose boundaries represent 'ideal types' or organizational archetypes (Greenwood and Hinings, 1993). The archetype concept of Greenwood and Hinings (1993) expands on the configurational framework to extend it with a strong institutionalist perspective. They define archetypes as 'a set of structures and systems consistently reflective of a single underpinning interpretative scheme' (1993 p. 1057). This idea conveys the important role that values and belief play in determining the manner in which groups of organizations operate within an institutional arena.

We use configuration theory as theoretical basis to review and synthesize several case studies using the grounded theory framework (Glaser and Strauss, 1967) and methodology (Strauss and Corbin, 1998) in order to identify different groups of entrepreneurial universities operating in distinct environments. Just as in other organizational fields, we might expect universities to converge into a few clearly differentiated configurations that display similar organizational attributes, which can be identified and described as ideal models or archetypes.

3 Research Methodology and Design

A growing body of literature on entrepreneurial universities has accumulated over the past decade, and case studies represent a vast amount of it. As in many fields of social sciences where aggregate, complex and context-dependent phenomena are the object of analysis, case-study research in higher education stands out amongst the most commonly used research designs, especially in the areas of management and governance. However, since single-case studies are individual by nature, these suffer from issues of empirical generalizability and non-reliability (Newig and Fritsch, 2009). By combining a grounded-theory methodology (Greenwood and Hinings, 1993) for the analysis of a large number of cases, we hope to overcome some of the limitations of previous research by offering a synthesis of existing case-based research.

3.1 Grounded theory as methodological approach for meta-synthesis of case studies

The term meta-analysis has long been commonly used by quantitative researchers to synthesize and analyze large amounts of existing data accumulated from previous studies. Notwithstanding, in social sciences numerous researchers have also used meta-analysis tech-

niques for synthesis and analysis of accumulated qualitative research (Yin and Heald, 1975; Mintzberg, Raisinghani and Theoret, 1976).

Based on grounded-theory methodology we seek to synthesize and find patterns in high-level constructs derived from our case studies. Grounded-theory methodology is a systematic approach to theory building through data-coding techniques and pattern recognition (Strauss and Corbin, 1998). These emergent explanatory concepts and models are understood to explain the phenomenon under study and thus to be grounded in the data (Glaser, 1992). In this regard, variables and dimensions in this meta-synthesis will not be defined a priori, but will emerge directly from the raw data as relevant attributes and relational patterns.

Even though grounded theory was not initially intended to conduct meta-synthesis of case studies, Glaser and Strauss (1967) in their seminal work wrote, 'When someone stands in the library stacks, he is, metaphorically, surrounded by voices begging to be heard. Every book, every magazine article, represents at least one person who is equivalent to the anthropologist's informant or the sociologist's interviewee' (p. 63), suggesting that drawing on published studies based on qualitative empirical data is in many respects similar to first-hand data collection because it allows richness and context. This qualitative meta-synthesis draws on grounded-theory methodology for research synthesis and meta-analysis.

Building on qualitative meta-analysis techniques and grounded theory, we follow a methodological approach that we have defined as a qualitative grounded meta-synthesis. This approach provides us with the means to synthesize and analyze rich qualitative data of case studies for the development of theory grounded in data. The procedures focus on identifying emergent concepts and abstract categories from separate studies, then on building categorical relationships in a cumulative manner in and across studies, and finally on grouping these similar categories while looking for relationships and patterns among them (Stall-Meadows and Hyle, 2010). Ultimately, the emergent constructs are compared and contrasted with existing theory about the related phenomena. These constructs would only hold for the specific studies that have been synthesized. However, since the number of cases taken into consideration has substantially increased, we can expect that the results can be empirically generalized to a greater extent than single-case studies (Hossler and Scalese-Love, 1989). Figures 1 and 2 provide us with a graphical overview of the iterative analytical process applied in the study and the methodological approach followed in order to derive the archetypes.

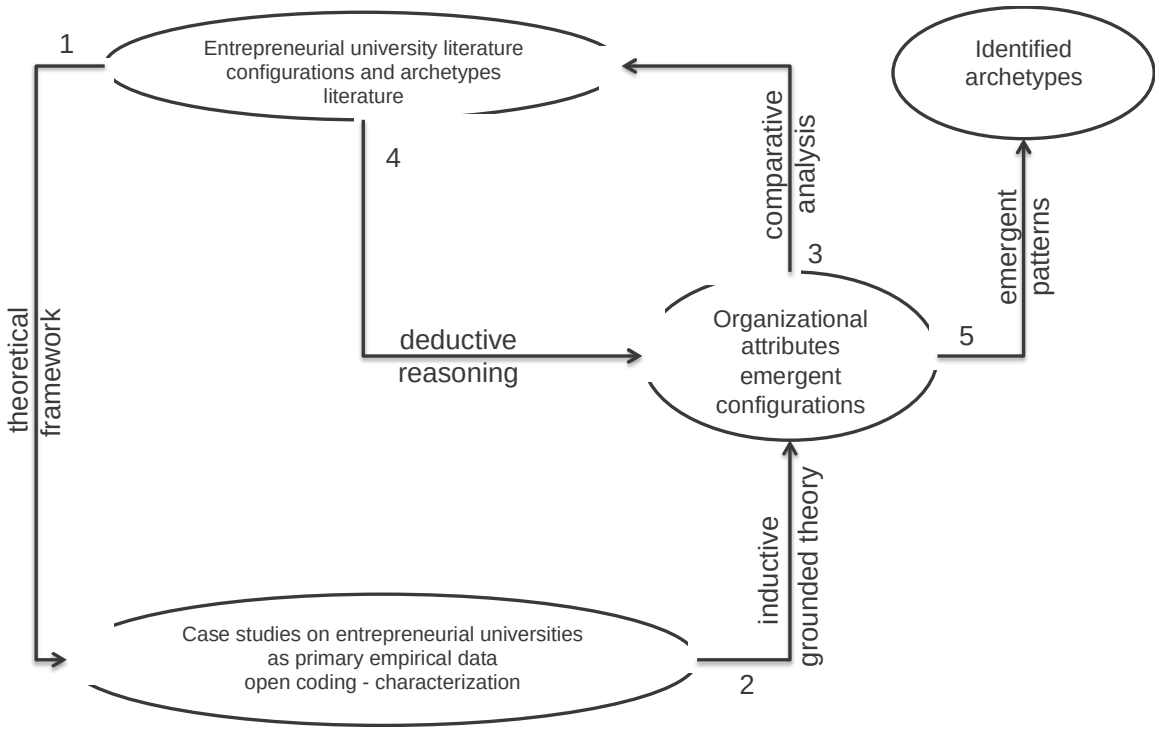

Figure 1: Analytical process for the identification of empirically grounded archetypes

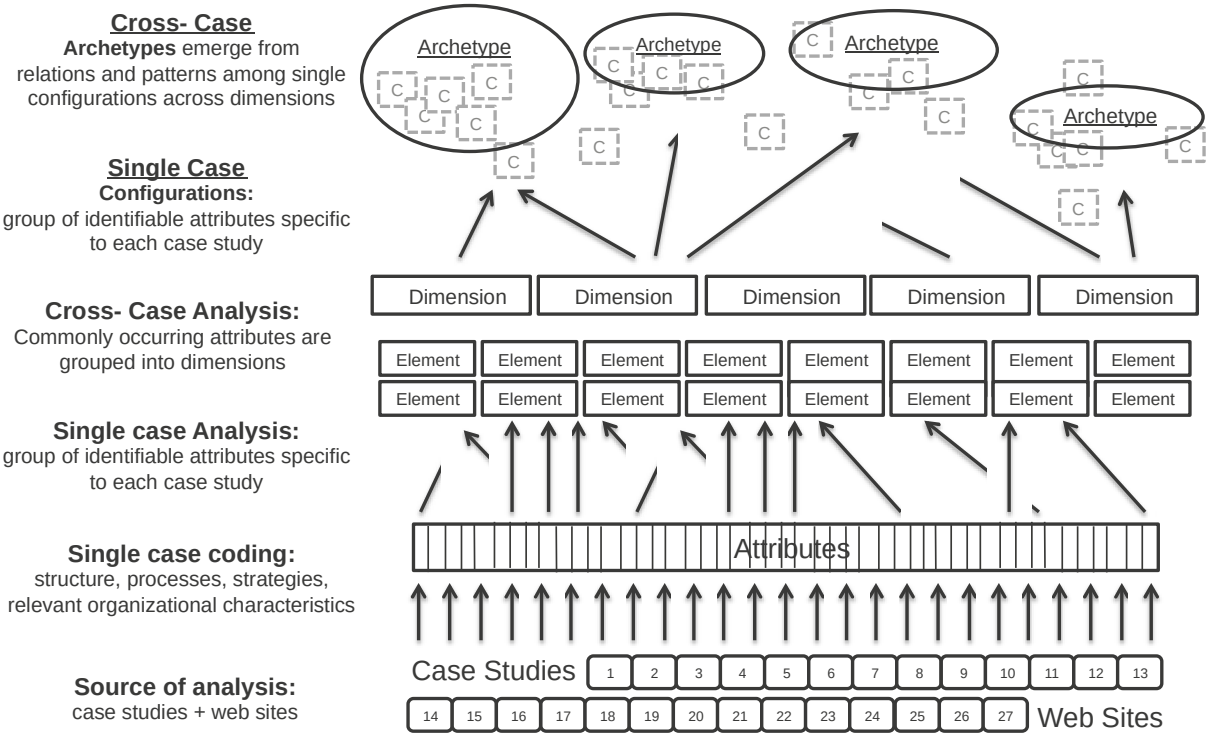

Figure 2: Meta-synthesis of case studies and the emergence of archetypes

3.2 Data collection

We have searched for relevant case studies of entrepreneurial universities published in refereed academic journals in the field of management, higher education and public administration. Additionally, books and articles on entrepreneurial universities based on empirical data were also included for pre-selection, as well as academic papers presented at specialized entrepreneurship and higher-education conferences. We specified an inclusion criteria aiming at incorporating between 20 to 35 cases relevant for our study. The search was conducted using the most comprehensive databases and academic search engines available in the field, namely EBSCO Host, Web of science, Google Scholar; we also consulted dedicated scholarly books covering the topic of university management and knowledge transfer, which contained descriptive case studies on entrepreneurial universities. We performed a simple Boolean search using the following pre-defined keywords 'entrepreneurship' and 'university'; and/or 'entrepreneurial university'; and/or 'knowledge transfer' and 'university'; and/or 'university governance' or 'university management', and/or 'triple-helix' and 'university'; and 'case study'.

In general terms, the main inclusion criterion was aimed at finding rich qualitative data in the form of peer-reviewed case studies on entrepreneurial universities. Regardless of the topics addressed and the scope of the cases, these studies needed to have defined the university depicted in the case as an 'entrepreneurial university', in accordance with Clark's (1998) parameters or any of the commonly used alternative terms, such as 'third-generation university', 'enterprise university', or 'triple-helix model'. Moreover in order to enhance the reliability of our raw sources, selected cases had to contain enough qualitative and descriptive data with regard to the organizational structures of the universities being studied (Yin and Heald, 1975). We selected twenty-seven case studies that fulfilled the inclusion criteria, containing at least five pages of qualitative data based on the theoretical framework and research methodology. In the appendix 1 we present the selected data sample, which contains cases from eighteen different countries in Europe, North and South America, Asia, Russia and Australia, thus representing a global sample of entrepreneurial phenomena in universities, and portraying differences in environmental factors such as legal frameworks, culture, socio-economic factors and contextual characteristics related to each country specific higher education market. Nonetheless, owing to the cross-sectional nature of the meta-synthesis, we have worked at a level of analysis which seeks to describe the attributes present at the meso-organizational level, hence coding and abstracting only organizational and environmental characteristics present cross-sectionally in the data sample. In line with the cross-sectional nature of this study, the

data set includes case studies of entrepreneurial universities ranging from 1998 to 2013. Moreover as the case studies used for this analysis are mostly descriptive and represent in-depth analysis of single organizational units usually through time and in relation to a specific context, the data set includes a wide historical range within the time dimension, but without being chronologically ordered or longitudinally compared at any point in time.

3.3 Data analysis

Open-coding and single-case analysis. The level of analysis is the case study itself, not its raw data. Case studies constitute our primary data source for the analysis (Noblit and Hare, 1988; Hoon, 2012), which in this case are analogous to the raw data or narrative account from an expert interview (Glasser and Strauss, 1967). Each case is assessed with the open-coding procedure, which is defined as the process of purposefully examining, comparing, abstracting and categorizing data. Using qualitative analysis software, relevant information from the cases has been identified and coded. The process of ground-level concept identification is repeated for each individual case.

Cross-case analysis and axial coding. Once single case analysis and open coding had been performed, we proceeded to the cross-case analysis. According to Strauss and Corbin (1990 p.99) axial coding 'consists in linking subcategories to another category in a set of relationships denoting causal conditions, phenomenon, context, intervening conditions, action/interactional strategies and consequences'. We make use of causal network techniques (using the software ATLAS.ti ®) to display first and second level concepts and their relations to higher level dimensions. Analogous to the axial coding procedure, we looked for patterns on data by making connections among categories resulting in related groups or families. Then, similar concepts were grouped into abstract categories, broad enough to comprise all cases under synthesis. Subsequently, emergent patterns are conceptualized into formal statements describing the relations among categories.

Theory building and selective coding. We rely on our theoretical framework to selectively integrate related first-level concepts (variables) that form abstract categories (organizational attributes), which aggregate into distinctive dimensions (configurations). Stall-Meadows and Hyle (2010, p. 416) describe selective coding as the integration of concepts into theories. In this regard, we analyze and contrast emergent configurations with existing literature in order to describe and label archetypes. The result of this final process, which emerged

from the open and axial coding, is a comprehensive conceptual representation of all cases being studied, grounded in the data.

4 Results

4.1 General elements of entrepreneurial universities

We have conducted this meta-synthesis in order to gain a more comprehensible understanding of the structures, processes and strategies that shape distinct entrepreneurial universities. After a qualitative synthesis of 27 selected case studies, we were able to inductively derive and categorize common characteristics that shape the organizational configurations of the studied universities. These general characteristics found in the data sample, together with the elements and dimensions derived from all coded traits, provided the framework for the analysis and identification of entrepreneurial-university archetypes (see table 1). After open coding all qualitative data, we have identified numerous traits that represent the entirety of attributes arising from each particular case studied. Subsequently, coded attributes were arranged into separate elements that define entrepreneurial universities. The arrangement was done by inductively arranging families of coded data and by deductively categorizing codes, using previous reviews on entrepreneurial universities and its design parameters as analytical frameworks (e.g. Handscombe, 2003; Gibb and Hannon, 2006; Rothaermel et al., 2007; Yusof and Jain, 2008; Guerrero and Urbano, 2012; Gajon and Urbano). Moreover, the elements defining entrepreneurial universities were classified into aggregate dimensions according to the nature of the resource, capability, and strategy pertaining the organization. Furthermore, these dimensions were separated into internal and external factors based on a meso-organizational level and following the conceptual model for entrepreneurial universities proposed by Guerrero and Urbano (2012).

A foundation for the identification of archetypes was the arrangement of 176 coded attributes inductively identified in the 27 cases. These organizational attributes were coded and classified, generating 32 general organizational elements grouped into five internal and two external dimensions. As represented in table 1, internal dimensions are: structure, financial resources, human resources, tangibles and intangibles. External dimensions are: environmental and contingency. Moreover, table 1 serves as our analytical framework by providing a general overview of the organizational attributes, elements and dimensions that underpin the four identified archetypes, each of which in turn represent a distinctive cluster of single configurations derived from the synthesized case studies.

Factors	Dimensions	Elements	Atributes	Codes
Internal Factors	Structural	Governance	Bureacratic / Hierarchycal	SGbh
			Collegial / Decentralised	SGcd
			Managerial / Corporate	SGmc
			Entrepreneurial / Flexible	SGef
		Organization	Faculties	SOf
			Departments	SOd
			Institutes	SOi
			Schools	SOs
			Research centres	SOrc
			Rigid / Traditional structures	SOts
			Flexible / Novel structures	SOns
		Size	Large	SSl
			Medium	SSm
			Small	SSs
		Legal Form	Public	Slpu
			Public-Private partnership	SLpp
			Foundation	SLf
			Private	SLpr
		Transfer Structures	Research centres	STrc
			Transfer / Patent offices	STtp
			Incubators	STi
			Science Parks	STsp
			Conference centres	STcc
			Spin-offs	Stso
	Human Resources	Faculty	Academic	HFa
			Scientific	HFs
			Industry links	Hfi
			Research / technical	HFr
			Entrepreneurial / Role models	Hfe
			Flagship academics / entrepreneurs	HFf
		Steering Core	Autonomous	HSau
			Partly autonomous	HSpa
		Decision Making	Centralised	HDc
			Decentralised	HDd
		Management	Professional	HMp
			Academic	Hma
		Leadership	Strong leader	HLsl
			Collective leadership	HLcl
			Low leadership	HLll
		Industry	High cooperation / dedicated personnel	Hlhc
			Low cooperation / little to none dedicated personnel	Hllc
		Students	Positive attitudes towards entrepreneurship	HSTp
			Neutral or negative attitudes towards entrepreneurship	HSTn
			Strong alumni network / Industry	HSTsa
			Entrepreneurship role models	HSTer
	Financial Resources	Historical	Well-financed	FHw
			Underfinanced	FHu
		Diversification	Diversified	FDd
			Undiversified	FDu
		Source	Public	FSpu
			Private	FSpr
			Mixed / Multilateral / NGO's	FSmm
			Research / Project based	FSrp
			Knowledge transfer / Lisencing / Patenting	FSlp
			Knowledge Commercialisation / Spin-offs	FSso
		Public Budget allocation	High	FPh
			Medium	FPm
			Low	FPl
	Tangibles	Infrastructure	Research centres	TIr
			Transfer offices	TIt
			Incubators	TIi
			Science Parks	TIs
			Conference centres	TIc
		Location	Urban	TLu
			High-Tech clusters	TLh
			Industrial	TLin
			Isolated	TLis
		Technology	Industrial based	TTh
			Knowledge based, new economy	TTk
		Facilities	Teaching oriented	TFto
			Research oriented	TFro
			Transfer oriented	TFtr
			Student friendly	TFsf
			Industry friendly	TFif
			Above average facilities	TFaa
			Average or bellow facilities	TFba

Factors	Dimensions	Elements	Atributes	Codes
Internal5 Factors	Intangibles	Strategic(foci	Academic(/(scientific(excellence	ISas
			Commercialisable(basic(research	IScb
			Applied(research(programmes	ISar
			High:tech(transfer	ISht
			Market:oriented(graduate(education(/(in(cooperation(with(regional(businesess	ISmo
			In:job(training(programmes(/(Industry(cooperations	ISij
			Post:graduate(education(/(praxis(and(entrepreneuraly(oriented	ISpg
			Knowledge(transfer(/(industry(cooperation	ISti
			New(economy(/(knowledge(transfer(through(commercialisation(of(professional(services(/(consultings(/(training(/(counseling	IScc
			Knowledge(commercialisation(/patenting(/(spin:offs	ISkc
			Incubation(/(High(tech(venturing(/(	ISiv
			Marketable(innovations(/(Spin:ins	ISmi
		Incentive(structures	Meritocratic	IIm
			Performance(Based	IIp
			Goal(based	IIg
			Research(aimed	IIr
		Rewards(systems(	Rewards(academic(entrepreneuralism	IRSa
			Rewards(knowledge(transfer(and(commersialization	IRSk
			Does(not(rewads(transfer(or(entrepreneuralism	IRSn
		Entrepreneurial(Initiatives	Support(meassures(for(Start:ups	IEss
			Entrepreneurship(education	IEee
			Spin:off(incentives	IEso
			Spin:in(service(commercialisation	IEsi
			Patent(commercialisation(offices	IEpc
			Entrepreneurial(courses(for(faculty(and(staff	IEef
			Tailored(graduate(trainingship(programmes	IEtg
			Start:up(funding	IEsu
			Lisencing(agreements	IEla
		Reputation	Elite	IRe
			Strong	IRs
			Increasing	IRi
			Weak	IRw
		Networks	Regional	INr
			Global	INg
			Academic	INa
			Industry	INi
			Capital(markets	INc
			Government(/(Lobbying	INl
External5 Factors	Enviromental	Historical(Conditions	Long(trajectory(/(Tradition	EHl
			Short(trajectory(/(New	EHs
			Experimental(/(Pilot(proyect	EHe
			Teaching(university	EHt
			Research(University	EHr
			Applied(Sciences	EHa
			Technology(oriented	EHto
		Higher(education(market(	Competitive	EEc
			Non(competitive	EEnc
			Global	EEg
			Regional	EEr
			Local	EEl
		Politics	Public(policies(favour(regulation(and(academic(orthodoxy	EPfr
			Public(policies(favour(entrepreneuralism(and(competition	EPfe
		Community	Favours(entrepreneruship	ECfe
			Indiferent(towards(entreprenurship	ECie
	Contingency	Regional(economic(base	Industrial	CRi
			Service	CRs
			High(tech	CRht
			New(economy	CRne
			Small(and(medium(business	CRsm
			Global(enterprises	CRge
			High:growth(dynamic	CRhg
			Low:growth(sluggish	CRlg
		Legal(Framework(/(Public(policies(	Strongly(regulated(field	CLs
			Moderately(regulated(field	CLm
			Deregulated(field	CLd

Table 1: Identified attributes and analytical framework for archetype synthesis

4.2 Entrepreneurial-university archetypes

In our study we found four archetypes of entrepreneurial universities derived from an empirical sample of 27 case studies. This study does not suggest that all entrepreneurial universities are convergent towards the four archetypes; rather these are idealized types from specific arrangement of organizational attributes that together represent clusters of single organizational configurations having common attributes (as represented in Figure 2). Nonetheless, we do suggest that entrepreneurial universities will tend to converge non-lineally in the long run towards these configurational clusters, contingent on their path-dependency and baggage of internal factors, economic environment, socio-cultural and political influences, as well as the vision, leadership and commitment of the academic faculty, steering core and various stakeholders. As Bunge (1996) suggests, 'real types are "impure" - that is, mixtures of ideal types' (p. 66).

Subsequently, we describe various design elements and environmental factors present in the following entrepreneurial universities archetypes found in the study: 1) 'Research-preneurial' or research driven archetype; 2) 'Techni-preneurial' or industry driven archetype; 3) 'Inno-preneurial' or innovation driven archetype 4) 'Commerce-preneurial' or knowledge commercialization driven archetype. In table 2, we portray a comparison of main elements present in each archetype. Altogether we have synthesized the general organizational attributes (in table 1), resulting in 22 relevant elements that are grouped into five distinguishable dimensions: structures, human resources, financial resources, strategies and external (in table 2).

Dimensions	Elements	**Research-preneurial** research driven	**Techni-preneurial** industry driven	**Inno-preneurial** innovation driven	**Commerce-preneurial** Commerce driven
Structures	Organization	• Faculties and departments • Traditional structures	• Faculties and departments • Traditional structures • Professional schools	• Project driven • Ad hoc – novel structures	• Faculties, institutes, research centers
	Governance	• Collegial and participatory	• Bureaucratic and hierarchical	• Entrepreneurial / Flexible governance promotes autonomy	• Managerial / Corporate governance. Hierarchical but allows for flexibility
	Transfer Structures	• Science parks • Research centers in cooperation with industry and government	• Strong formal and informal industry cooperation links • Patent and TTOs • Incubators	• Cooperation networks. • Consultancy, training, and Start-up support centers • Innovation Incubators	• Techno-parks • High-tech R&D centers • For profit firms (spin-offs) • Technology incubators
	Infrastructure	• Dedicated science labs basic research centers • Above average facilities	• Applied research and development centers • Training facilities	• Service oriented transfer and training centers • Student centered facilities	• Techno-parks. Conference and network centers • Sector specialized world-class facilities
	Legal Form	In general all archetypes strive for a legal form which would grant them more autonomy and flexibility			
Human Resources	Academic Heartland	• Scientific and academic faculty with strong research background	• Practice oriented faculty with strong links with industry	• Strong formal and informal links to professional service and knowledge firms	• Academics and scientist with strong research and technical background
	Steering Core	• Academic and partly dedicated managers • Centralized • Institutional leadership	• Academic and partly dedicated managers • Centralized • Personal leadership	• Professional and dedicated management • Decentralized • Collective leadership	• Professional and dedicated management • Decentralized • Institutional leadership
	Networks	• Academic • Industry • Government • Supra-national	• Academic • Industry / SMEs • Regional and national	• Professionals service firms • Entrepreneurs / SMEs • Peripheral knowledge and service providers • Private professionals	• Global network links with influential academic, business, financial and political interest groups • Regional and global
	Alumni Networks	• Cooperation in research and development	• Strong involvement in training and teaching	• Strong cooperation in consultancy and services • Alumni role models	• Cooperation and direct stakes in firms / start-ups • Flagship business leaders
Financial Resources	Public Funds	• High	• Medium	• Low to medium	• High to medium
	Budget Allocation	• Project based applied research. Joint-ventures	• Project based knowledge transfer and training	• Knowledge transfer projects. Marketable IP • Spin-ins, joint-ventures	• High-tech research and development. Start-ups • Spin-offs. Investment funds
	Income stream Diversification	• Partly diversified • Dependent on major governmental grants	• Partly diversified • Important multilateral, and funding from industry	• Well diversified • Important third party, private income streams	• Well diversified • Own income and third party funding. Licensing

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Table 2: Comparative synthesis of entrepreneurial university archetypes

Dimensions	Elements	**Research-preneurial** research driven	**Techni-preneurial** industry driven	**Inno-preneurial** innovation driven	**Commerce-preneurial** Commerce driven
Strategies	Strategic Focus	• Academic excellence • Knowledge advancement • Differentiation through high standards / Elite	• Incremental research • Cooperation with industry • Regional support and economic development	• Service innovations • Innovative education • Customer orientation	• High-tech R&D and product development • Commercialization of academic knowledge • Self sustainability
	Mission	• Academic excellence • Basic and applied research	• Training and teaching • Cooperation and transfer • Incremental innovations	• Innovations • Intellectual property • Professional services	• Knowledge commercialization • Disruptive innovations • Marketable products and services
	Entrepreneurial Initiatives	• Basic and applied research initiatives in cooperation with industry and government	• Tailored educational and training programs in cooperation with industry • Entrepreneurship education, advise	• Consultancy services • Patenting, licensing, innovation transfer offices • Joint-ventures and incubators. New economy	• Business venturing, TTOs, Incubators, • Start-up funds, spin-offs
	Techno-orientation	• Basic and applied • Knowledge creation	• Incremental. Innovations • Applied technical expertise	• Service and knowledge intensive industries	• High-tech: mainly applied • Disruptive innovations
	Incentive structures	• Academic meritocracy • Research based cooperation with industry • Research grants attainment	• Technology transfer • Training and teaching • Cooperation with industry • Technical innovations	• Knowledge innovations • Customer satisfaction • Service offers	• Academic and technical meritocracy • Knowledge commercialization • Venture creation
	Image	• Long trajectory in research and teaching • Academic excellence • Tradition and reputation	• Important trajectory in applied-science and teaching • Strong reputation and networks with local industry	• New pilot project Evolution from technical to knowledge intensive • Forced reinvention • Erratic trajectory	• Innovative research university with strong cooperation with industry • Strong image, public relations and lobbying
External	Developmental periphery	• Industrial • Global enterprises • Research intensive industries (ex. life sciences)	• Strong industry base, technical, engineering • SME's, regional and some global players	• Knowledge intensive • Innovation clusters • Creative industry • New economy	• High-tech industries • Leading global firms in the field of expertise
	Higher Education Market	• Very competitive • National or global	• Not very competitive, regional niche • Regional and national in some cases dependent on field of expertise	• Competitive • Regional or national	• Very competitive • Global
	Socio-political attitudes	• Favor academic orthodoxy and formalities • University as knowledge originator and provider • Moderate involvement with university	• Favor practical knowledge • University as technical innovator supports industry • High involvement and cooperation with university	• Favor student consumerism • University as knowledge service provider for clients • Moderate involvement with university	• Favor competition and deregulation • University as for profit economic actor • High involvement and cooperation with university
	Public Policies	• Although country specific, in general public policies favor competition and deregulation in the higher education sector • Performance indicators and output measures aimed at assessing return on investment in higher education • Publicly funded knowledge transfer projects and programs supportive of entrepreneurial activities in higher education			

Table 2 cont.: Comparative synthesis of entrepreneurial university archetypes

A ‘research-preneurial’ archetype can be described as a research-driven university. Its main mission is the advancement of knowledge and academic excellence. It is structurally characterized by its collegial and participatory governance structures, supported by public policies and socio-cultural attitudes that favor knowledge, expertise, and academic meritocracy. It is traditionally structured into faculties and departments with dedicated knowledge-transfer structures. Among those, research centers and science parks in cooperation with public and for-profit organizations are an essential characteristic of this archetype. Most faculty members have a strong scientific and basic-research background and emphasis is placed on cooperative joint research projects, either with industry or government/research foundation funds. Financial resources are partly diversified, but most income stream tends to flow from public and multilateral research funds; however these are project-based and mostly with an applied perspective in cooperation with industry. Universities corresponding to this archetype possess dedicated hi-tech research facilities thanks to state funding and direct private investment from stakeholder firms. Strategic initiatives are focused on achieving the highest academic and research standards and on developing leading expertise in a specific field of research. Accordingly, incentive structures and rewards systems are aimed at fostering elite recognition among peers of the scientific community. In this regard, incentive systems emphasize transferable scientific discoveries, which in addition to the advancement of knowledge, also serve practical purposes. Thus, a strong emphasis is placed on developing and maintaining university-industry networks and lobbying for research funds for applied research projects. Path-dependency plays an important role in defining the archetype with which a specific university tends to comply, and consequently research-preneurial archetypes are universities with a long tradition in research and teaching, and a strong reputation in academic and scientific excellence. These entrepreneurial universities usually benefit from public policies favoring scientific excellence and academic specialization as the basis for industrial and technological advance. Examples of this archetype are Stanford University, Technical University of Munich, University of California at Berkeley and Universidad Católica of Chile among the nine entrepreneurial universities comprising the research-driven entrepreneurial archetype cluster.

The ‘techni-preneurial’ archetype is steered by its technical expertise and a focus on applied sciences, seeking to serve and support surrounding industries through transfer of specialized knowledge and technical training. This type of organization plays an important role in developing and sustaining a robust and dynamic regional economy, for instance by way of

incremental innovations and through technical cooperation and training programs, jointly developed with regional industry and public authorities. A traditional applied science university has initiated its entrepreneurial path together with government support and strong cooperation between its academic staff and regional enterprises. This strong link between academic staff and industry partners is paramount to the techni-preneurial archetype as formal and informal networks with regional businesses form the essence of the entrepreneurial characteristics of this archetype. Flagship entrepreneurs and regional industry experts usually form part of the faculty. Partly autonomous and centralized management allows for a harmonic symbiosis between a traditionally collegial and a goal-based managerial administration. Funding is partly diversified, but still most financial resources come from public sources. Nonetheless consultancy services and tailor-made training programs become an important income stream for this technically oriented entrepreneurial university. In this regard, technology transfer departments, entrepreneurship training facilities, as well as consulting offices and multi-purpose rental facilities form part of the important entrepreneurial infrastructure of this organization. The strategic focus provides technical and academic support for regional industry, delivering market-oriented graduate education, and tailor-made technical training in cooperation with industry partners. Incentive structures reward applied scientific research and teaching along with on-the- job training programs and entrepreneurship education. This type of university has a strong regional reputation and support. A history as a university of applied sciences and a strong focus on technical need-based training are common defining elements of this entrepreneurial archetype. Also a solid support from regional small and medium-size enterprises and strong staff and student involvement are environmental factors crucial for supporting entrepreneurial initiatives started from within the organization. A moderately regulated higher-education field, which promotes competition, entrepreneurialism and cooperation with industry, is necessary for supporting the internal organizational structures of this type of university. Among the case studies we can mention University of Joensuu, University of Waterloo and Hamburg University of Technology among the five entrepreneurial universities that form part of this industry-driven group.

An ‘inno-preneurial’ is a service-oriented university that pursues knowledge innovations and customer-oriented entrepreneurial endeavors. This type of university adapts to market characteristics and external surroundings through novel internal changes and structural flexibility, thus it portrays project-driven and ad-hoc structures as well as flexible and autonomous governance practices. Schools and interdisciplinary institutes foster service-driven innovations and knowledge transfer oriented toward problem solving. We find various entre-

preneurial structures such as incubators, intellectual property and transfer offices. Additionally, we can observe some novel service structures, as for instance consultancy departments and privately sponsored professional schools with tailor-made teaching and training programs. This type of university has strong formal and informal links with professional services and other knowledge-intensive firms, which strengthen cooperation projects and widen opportunities for knowledge commercialization activities. Innovation, service, and problem-solving orientation are fostered through interdisciplinary research projects and well-nurtured cooperation networks with industry, local government, and communities. Professional management is autonomous and decision-making centralized. Financial resources are well diversified and income streams from private partners are important. The inno-preneurial archetype engages in knowledge-commercialization activities such as consultancy and business services, intellectual-property commercialization and applied research projects carried out together with external cooperation partners. Thus we can label this archetype as a service-oriented university, focusing on tailored teaching, training and transfer activities. Also, formal and informal services innovation and knowledge transfer is embedded in performance-based incentive structures. The innovation-driven archetype benefits from public-funding programs and private sponsorships directed at favoring innovation, promoting entrepreneurialism and knowledge-based regional development. The public policies and legal framework that influence this model tend to favor autonomy and active involvement of higher-education institutions in economic development and commercial activities. We notice that this type of university tends to be located in larger urban areas or knowledge-intensive clusters in which innovation, research transfer and consultancy services are more valued. Among the case studies analyzed, we found six that converge within the inno-preneurial cluster, including Warwick University, Copenhagen Business School and University of York.

The fourth archetype is the ‘Commerce-preneurial’, which is driven by entrepreneurialism focused on knowledge commercialization and sector-specific hi-tech research, seeking to capitalize on disruptive innovations and marketable products and services. Academic and scientific staff have strong links with, and cooperate with, industry in applied research projects and hi-tech start-up venturing. The institutions are characterized by novel and flexible, but complex structures, such as faculties, departments, research and transfer institutes, as well as business units, incubators, technology parks with cooperation partners, and spin-off businesses. The commerce-preneurial university also engages in start-up investment, intellectual-property capitalization, hi-tech capital venturing and service enterprises, together with more

knowledge-intensive professional services such as consultancy, mentoring, institutional advise, and project management. The steering core is professional, autonomous, and empowered through managerial governance structures and strong leaders in key steering positions. This allows for a centralized performance-based organization, with flexible and participatory strategic decision-making. Funding streams are well diversified, relying less on direct governmental funding and more on market-oriented project funding from various private and public sources. This archetype engages in start-up incubation and funding, harvesting links and networks with corporate and venture capitalists, as well as seed-funders and entrepreneurs. Patenting, licensing, spin-offs and joint ventures, along with property-investment and venturing funds are among the various entrepreneurial and commercial activities in which this type of university engages. Mostly located in knowledge-intensive urban areas and technology clusters, the developmental periphery of the commerce-preneurial archetype is characterized by top notch hi-tech research centers and information technology facilities, where the university engages in hi-tech basic and applied research, in cooperation with industry, government and multilateral cooperation partners. Global cooperation networks with industry, public sector financial and research communities are essential and thus well developed, supported and maintained by this type of university. The university engages actively in lobbying activities in order to ensure funds and policies that support its own research, transfer and commercial agendas. Also, important emphasis is laid on public relations and marketing, aiming at developing symbolic capital and a strong image. This type of entrepreneurial university is usually an evolution of traditional elite research universities with a long history of academic excellence and cooperation with industry in technological developments. It is located in regions where policies favor deregulation and competition in the university field, and where community attitudes toward entrepreneurship are favorable. Moreover global firms and hi-tech start-up tend to be physically located in the surroundings and actively cooperate with the university and benefit from its entrepreneurial endeavors. Among the cases analyzed in this meta-synthesis, seven were found to be within the knowledge-commercialization archetypical cluster; the list includes Twente University, Bandung University of Technology, and Waseda University in Japan.

In general terms the meta-synthesis shows that the dominant legal framework and the regional industrial base exert an important influence on the archetype encountered. In addition, factors such as legal policies, socio-political attitudes and the competitiveness of the higher-education market influence the structures and strategies found in each individual case. Moreover there seems to be an important relation between the organizational heritage and the

type of entrepreneurial university, suggesting a path dependency for the individual configurations, which are in turn reflected in the archetypes. For instance, traditional research universities tend to display attributes pertaining to the cooperative research archetype. In contrast, technical and applied-science universities tend to conform to the technical archetype. However, as clarified in the methodology section, it is important to point out that this study did not take the temporal dimension into account, focusing mainly on static identifiable characteristics. In this regard, further empirical research would contribute to determining how path dependency as well as contingency and environmental factors underpin the set of internal attributes adopted by each entrepreneurial university.

5 Discussion

Studies on the entrepreneurial university have become a lively research field, which, predominantly, pursues its investigations by using a qualitative case-based research strategy. Regrettably, the cumulative evidence from these cases on the nature and forms of the entrepreneurial university has not yet been systematically analyzed. This study therefore makes a dual contribution. First, we suggest a very different method that helps to generate cumulative evidence available from case study research. Our approach follows a recent call from Rauch et al. (2014) to use "a systematic synthesis of case studies to aggregate the findings of qualitative research". By analyzing patterns of organizational forms and practices from numerous case studies, our qualitative meta-synthesis facilitates the integration, clustering, and reflection of earlier case-based research into idealized types of entrepreneurial universities, here defined as archetypes, which allows for a detailed and generalizable classification from empirical cases in the field. Second, the results of our study contribute to a more comprehensive understanding of the nature of the entrepreneurial university. We identified four differentiated archetypes of entrepreneurial universities, naming them in accordance with their underlying strategic intent: 'research-preneurial' or research driven; 'techni-preneurial' or industry driven; 'inno-preneurial' or service-innovation driven; and 'commerce-preneurial' or knowledge-commercialization driven. In the following part of this discussion, we reflect on the research implications and limitations of our study

5.1 From heterogeneity back to commonalities

In general terms, our meta-synthesis shows that some of the identified elements play a more preponderant role in driving the entrepreneurial transformation, even having the potential to influence its mission and strategic core. In this regard, internal actors such as managers and academics are crucial to the accomplishment of the entrepreneurial shift. Also, diversified funding is paramount because it contributes to the accomplishment of institutional autonomy from the state and its politically influenced resource-allocation policies (Clark, 1998). Moreover, managerial and entrepreneurial governance structures are important enablers to support the entrepreneurial transformation. Interestingly, we did not find a dominant governance structure across archetypes supporting the entrepreneurial transformation. Rather, we found a broad range of different viable governance forms such as collegial, managerial as well as entrepreneurial governance (see Harlacher and Reihlen, forthcoming). Furthermore, performance-based incentive structures that reward entrepreneurial activities tend to encourage applied innovations and knowledge-commercialization activities (Debackere, and Veugelers, 2005). Additionally, a professional management with autonomous decision–making authority and leadership roles directs and sustains a focus on entrepreneurial activities as the strategic priority for the organization (Middlehurst, 2004). Likewise, organizational structures and tangible infrastructure such as business incubators and technology-transfer offices are strong support mechanisms in knowledge-commercialization activities, such as start-up formation, joint ventures, spin-offs and spin-ins (Link and Scott, 2005; D'Este and Patel, 2007). In addition, entrepreneurship training aimed at improving faculty and student skills helps to promote creative thinking and innovations (Kirby, 2004). Finally, location plays a preponderant role in defining entrepreneurial activities of universities, as distance to knowledge and industrial cluster influences the extent of cooperation with industry and the extent of engagement in entrepreneurial and commercialization activities (Siegel et al., 2003; Fini et al., 2011).

5.2 University entrepreneurialism and institutional complexity

Entrepreneurship is a social institution based on specific social values, norms, and a social order (Brandl and Bullinger, 2009; Jennings et al., 2013). Particularly, we see entrepreneurialism in higher education as a strategic choice to engage in innovative and entrepreneurial activities, in response to changing socio-cultural expectations about the role of modern universities in the broader economic context and society in general. This entrepreneurial drift in

higher education is closely related with the rise of managed education, which based on a market ideology that fosters autonomy and competition, has led to policy changes and reform of higher education systems in most western countries (Reihlen and Wenzlaff, 2014). Our study suggests that the institutional shift towards academic entrepreneurialism does not, however, represent uncontested prescriptions for change and adaptation on the organizational level, as we recognize the emergence of more diverse organizational responses than traditionally assumed (e.g., Münch, 2011).

From an institutionalist perspective, the rise of different entrepreneurial forms and practices in higher education raises an interesting question. What institutional sources account for these variations in entrepreneurial forms and practices? In other words, universities under the regime of managed education do not follow universal field-level isomorphic pressures that result in very similar organizational adaptations, but rather display heterogeneous responses. One explanation why this may be the case is the institutional complexity hypothesis, which is enjoying increasing popularity among institutionalists. In this regard, Greenwood et al. (2011) explain that 'organizations face institutional complexity whenever they confront incompatible prescriptions from multiple institutional logics' (p. 318) such as the logics of science and of commerce. Our research provides further tentative support for this argument, and indeed extends it.

The results of this study suggest that under the regime of managed education, four different logics drive the nature of the entrepreneurial university – researching, industrialization, servitization and commercialization. We also showed how these logics have been translated and incorporated into different organizational features on the organizational and intraorganizational levels. Even so, future research into the entrepreneurial university should study the differences between these logics and how they are enacted, reproduced, or changed on the organizational and intraorganizational levels. As Greenwood et al. (2014) suggest, 'the central themes in institutional analysis – "institutional logics" – clearly point to the expectation that organizations will exhibit differences. From this perspective, the presumption should be of organizational difference, not similarity, and the guiding framework should be comparative analysis.' Following this plea will contribute to a deeper understanding of the institutional sources and underpinnings of different entrepreneurial forms and practices in higher education.

5.3 Limitations and suggestions for further studies

Among the limitations of our study, firstly we would like to discuss a potential for self-selection bias in our sample. A self-selection bias arises from the use of non-random samples to assess (Heckman, 1979; Shehata, 1991), in our case, the entrepreneurial behavior of universities. We included cases of universities that were self-identified by other scholars as entrepreneurial universities (see appendix 1). This can be considered as a limitation of our study because different researchers may have applied different criteria for what can be considered an entrepreneurial university, thereby generating inconsistent results. However, the findings of our study can also be interpreted from a different point of view. Social constructivism claims that all social facts are constructions of 'meaning communities' (see Bunge, 1996; Crotty, 2003). Meaning is socially constructed in discourse. In this view, an entrepreneurial university is a phenomenon which is not objectively out there, but is constituted and reconstituted in discourse and thus becomes a social convention – a shared and negotiated understanding of what is meant by the idea of an entrepreneurial university. The four archetypes we found in our meta-synthesis of existing cases represent the different connotations and meanings that scholars associate with the concept of the entrepreneurial university. As such, our study represents different types of 'social constructions' of entrepreneurial universities.

Another limitation concerning the cross-sectional meta-study refers to the subjectivity of the case studies used as primary sources of data. Our data sample consists of qualitative studies with differing research objectives and foci of analysis. Likewise, the broad chronological range and various levels of analysis as well as potential interpretative biases of the studies' authors constitute potential pitfalls that call for further studies. Therefore multilevel and longitudinal studies, which analyze changes in time among comparable units of studies, can further contribute to a broader understanding of how university structures evolve over time, in relation to changing environmental factors and expectations from various stakeholders.

Overall, research on entrepreneurial universities can clearly benefit from more comprehensive studies that go beyond methods commonly used in the field. As current research into academic entrepreneurialism and entrepreneurial universities further develops beyond single-case studies and historical analyses, we call for more complex studies in the area. Likewise, analysis and synthesis of the rich but dispersed case data would help build upon accumulated knowledge in the field, thus promoting a more systemic understanding of the elements, actors, process and environmental factors influencing emergent changes in the higher-education field across the globe. Also, longitudinal and cross-sectional studies would

further contribute to our understanding of dynamics and contextual elements involved in the emergence of entrepreneurialism in higher education. Finally, interdisciplinary research efforts and multiple methodological approaches across various levels of analysis will further push academic knowledge in the field to go beyond understanding specific elements of individual and isolated cases of entrepreneurialism in universities, thereby helping to generate generalizable and applicable knowledge that would benefit not only scientific understanding, but also practitioners, policy makers, and stakeholders in the fields of knowledge commercialization, transfer, academic entrepreneurialism and higher education in general.

6 Conclusion

The underlying assumption of this research is that there is no single model or one best way to the entrepreneurial university. Rather, its environmental contingencies, path dependency, and unique structures, systems, and cultures affect the emerging type of entrepreneurial university. We argue that just like other groups of organizations in particular institutional fields, we might expect to see entrepreneurial universities converge into a few clearly differentiated archetypes that display similar organizational attributes. We analyzed several empirical case studies, using grounded theory as our qualitative analytical approach, in order to identify and describe different archetypes of entrepreneurial universities, following configuration and archetype theory as our conceptual stance (Meyer et al., 1993; Miller, 1987a, 1996; Miller and Mintzberg, 1983; Mintzberg, 1979; Weber, 1978).

The identification of entrepreneurial-university archetypes contributes to a more comprehensible understanding of the elements, structures, and strategies that shape emergent higher-education institutions. By describing emerging patterns from a heterogeneous set of case studies, this research facilitates the arrangement of entrepreneurial universities into idealized clusters of homogeneous configurations. Hence, this qualitative meta-synthesis helps to overcome the context-dependency and non-generalization issues associated with single-case studies. Furthermore, archetypes can serve as conceptual tools for practitioners in designing, steering and foreseeing organizational development in their organizations.

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Appendix

	Authors, Year	University Case Study	Country
1	Clark, 1998	Warwick University	England
2	Clark, 1998	University of Joensuu	Finnland
3	Clark, 1998	Twente University	Neatherlands
4	Clark, 1998	University of Strathclyde	Scotland
5	Clark, 1998	Chalmers University of Technology	Sweden
6	Kristensen, 1999	Copenhagen Business School	Denmark
7	Etzkowitz, 2003	Stanford University	USA
8	Bernasconi, 2005	Universidad Católica of Chile	Chile
9	Yokoyama, 2006	Waseda University	Japan
10	Martinelli, Meyer & von Tunzelmann, 2007	Sussex University	England
11	Guerrero & Urbano 2007	Autonomous University of Barcelona	Spain
12	Huggins, Jones & Upton, 2007	Cardiff University	Wales, UK
13	Azele, Meyer & van Pottelsberghe, 2008	Université Libre de Bruxelles	Belgium
14	Bramwell & Wolfe, 2008	University of Waterloo	Canada
15	Zhou, 2008	Northeastern University in Shenyang	China
16	Berger, 2008	Technical University Munich	Germany
17	Ma, 2008	University of California at Berkeley	USA
18	Crow, 2008	Arizona State University	USA
19	Wissema, 2009	University of Rousse	Bulgary
20	Wissema, 2009	Bandung University of Technology	Indonesia
21	Prausse, 2011	Wismar University	Germany
22	Dodgson & Staggs, 2012	Queensland University	Australia
23	Goddard, Robertson & Vallance, 2012	Newcastle University	England
24	Vorley & Nelles, 2012	Hamburg University of Technology	Germany
25	Avotins, 2012	Ventspils University College	Latvia
26	Uvarov & Perevodchikov, 2012	Tomsk State University	Russia
27	Minguillo & Thelwall 2013	University of York	England

Appendix 1: Selected case studies on entrepreneurial universities

List of previously published Discussion Papers

 # 1 Reihlen, Markus; Smets, Michael; Veit, Andreas (2010) Management Consulting Firms as Institutional Agents: Strategies for Creating and Sustaining Institutional Capital.

 # 2 Reihlen, Markus; Nikolova, Natalia (2010) Knowledge Production in Consulting Teams: A Self-Organization Approach.

 # 3 Reihlen, Markus; Lesner, Monika (2011) Führungssysteme: Eine machtpolitische Analyse.

 # 4 Reihlen, Markus; Werr, Andreas (2012) Towards a Multi-level Approach to Studying Entrepreneurship in Professional Services.

 # 5 Reihlen, Markus; Mone, Mark (2012) Professional Service Firms, Knowledge-based Competition, and the Heterarchical Organization Form.

 # 6 Smets, Michael; Reihlen, Markus (2012) Institutional Entrepreneurship: A Literature Review and Analysis of the Maturing Consulting Field.

 # 7 Klimkeit, Dirk (2012) Organizational Context and Collaboration on International Projects: The Case of a Professional Service Firm.

 # 8 Klimkeit, Dirk (2012) Global Integration and Management of Professional Service Firms: A Review of the Literature and Suggestions for Future Research.

 # 9 Reihlen, Markus; Wenzlaff, Ferdinand (2013) Institutional Change of the German Higher Education System: From Professional Dominance to Managed Education.

 # 10 Reihlen, Markus; Ringberg, Torsten (2013) Uncertainty, Pluralism, and the Knowledge-based Theory of the Firm: From J-C Spender's Contribution to a Socio-Cognitive Approach.

 # 11 Harlacher, Dirk; Reihlen, Markus (2013) Governance of Professional Service Firms: A Configurational Approach.

 # 12 Bronstein, Johann; Reihlen, Markus (2014) Entrepreneurial University Archetypes: A Meta-Synthesis of Case Study Literature