TECHNISCHE UNIVERSITÄT MÜNCHEN

Department of Informatics

Master´s Thesis in Information Systems

Characterizing Approaches for the Implementation of Digital Business Strategies

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Charakterisierung von Ansätzen zur Umsetzung von digitalen Geschäftsstrategien

Characterizing Approaches for the Implementation of Digital Business Strategies

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I confirm that this master's thesis is my own work and I have documented all sources and material used.

Date Signature

Abstract

During the last decade digitalization has changed the economy with enormous pace. Various improvements in information and communication technologies have led firms to adapt their business models to the new digital era. The traditional business models of almost all industries are challenged. This thesis is about the challenges companies face with growing digitalization in every country and industry. Even well-managed companies have problems innovating entire business models and keep pace with traditional and new competitors. The digitalization requires companies to not just add new products but also to change their organization to become more flexible in adapting to changing market environments. This raises the research question "how to implement new products and services of a digital business strategy". This thesis follows four steps to answer the question. In step one a literature review is conducted to find definitions for IT organization, IT governance, business incubators and corporate incubators. In step two the results from the literature review are used to develop characteristics out of the found articles. In the third step the characteristics are used to develop hypotheses about the digital implementation capabilities of internal and external IT organizations. In the fourth step a questionnaire is used to evaluate the developed hypotheses. In interviews with eight professionals form internal and external IT organizations the hypotheses are evaluated. With the results a realistic overview of current topics and challenges in companies is given and the knowledge base regarding the implications of the digitalization for companies is extended. The thesis researches both organizational structures and gives suggestions for future research that build up on the found results.

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List of Abbreviations

BI	Business Incubator
B2B	Business to business
B2C	Business to customer
IS	Information Systems
IT	Information Technology
ITG	IT Governance
NBIA	National Business Incubation Association
R&D	Research and development

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1 Introduction

During the last decade digitalization has changed the economy with enormous pace. Various improvements in information and communication technologies have led firms to adapt their business models to the new digital era. The traditional business models of almost all industries are challenged. Considering for example the changes for publishers, newspapers and magazines, trading companies, automobile manufacturers or service providers which are fundamentally reshaping their businesses to adapt to emerging technologies (Sambamurthy, Bharadwaj, & Grover, 2003; Weill & Woerner, 2015). For example smartphones and the internet altered the way consumers want to read articles of newspapers. To fit the new customer expectations that emerged with the new digital technologies, established companies need to develop digital capabilities. Bharadwaj et al. (2003) emphasize the design of products and services that take advantage of IT resources. Those new products and services are formulated in strategies which fusion business and IT strategy (Sambamurthy et al., 2003, 2003).

1.1 Motivation

This thesis is about the challenges companies face with growing digitalization in every country and industry. Even well-managed companies have problems innovating entire business models and keep pace with traditional and new competitors. The digitalization requires companies to not just add new products but also to change their organization to become more flexible in adapting to changing market environments. Those disruptive innovations are difficult to manage and will point out weaknesses in traditional companies (Christensen, 1997). Nonetheless increasing the pace of change and reorganizing the corporation to evolve quickly are essential for strong long-term performance (Foster & Kaplan, 2001). Companies like Amazon, Facebook or Google built their whole business around digital and disruptive innovations, where for example Dell and Nokia missed to adapt to disruptive technologies (Keen & Williams, 2013; Weill & Woerner, 2015). One key challenge is building interoperable products and services that take advantage of digital resources and function with other complementary platforms. The results are loosely coupled dynamic ecosystems which do not end with the companies boundaries but integrate other service providers in their own environment (Bharadwaj, El Sawy, Omar A., Pavlou, & Venkatraman, 2013; El Sawy, Omar A. & Pereira, 2013). The development of such an ecosystem is a challenging and expensive task. In general building an ecosystem requires projects that adapt existing products and the development of corresponding new products and services. There are various possibilities to realize the development of those new digital products and services and the overall ecosystem. In this thesis the applicability of the established IT organization and the newer organization of business incubators, as two possible ways for implementing a digital business strategy, will be characterized (Bharadwaj et al., 2013; Cohen & Hochberg, 2014). The main research question behind this thesis is “How to implement products and services from a digital business strategy?” which is motivated and asked by Bharadwaj et al. (2003).

1.2 Approach of the Thesis

For the characterization of an established IT organization and business incubators existing literature is reviewed to find definitions. Both terms define large areas of research and the definitions are used to find sub disciplines that are responsible to realize a company´s strate-

gy. To find characteristics for an evaluation of both, literature will be reviewed and characteristics regarding the implementation capabilities for new products and services will be identified. The characterization of the IT organization and business incubators shall help to understand the current challenges companies are facing while adapting their business models. This thesis therefore contributes to the area of research by identifying characteristics from the literature and evaluating them by interviewing practitioners. The aim of this thesis is to theoretically and practically characterize IT organizations and business incubators in terms of implementing a digital business strategy. This means to research the literature for theoretical characteristics followed by interviews to get practical characteristics for an overview about possible ways to implement a digital business strategy.

With the results a realistic overview of current topics and challenges in companies shall be determined and the knowledge base regarding the implications of the digitalization for companies shall be extended. The thesis researches both organizational structures and gives suggestions for future research.

1.3 Thesis Outline

This thesis is structured in eight chapters. The main body of the thesis is organized in four parts, literature review and development of characteristics, hypotheses development, and hypotheses evaluation. These parts build the following organizational structure for the single chapters of this thesis. The first chapter explains the motivation behind this thesis, summarizes the general approach, clarifies the scientific contribution, and outlines the course of the thesis.

In Chapter 2 – **Research Methodology** – the suggestions of Webster and Watson (2002) regarding literature reviews are explained and for this thesis adapted. Additionally the overall research approach like the hypotheses development is explained.

In Chapter 3 – **Literature review and theoretical foundation** – the theoretical foundation for the research in the following chapters is established. First "digital business strategy" is defined and explained. The terms "IT Organization" and "Business Incubator" are defined and corresponding terms introduced. For both fields of research the relevant parts for implementing a digital business strategy are identified. Then the existing literature is reviewed to find characteristics regarding the implementation capability.

In Chapter 4 – **Hypotheses and questionnaire development** – the characteristics found in chapter 3 are combined to define hypotheses about the implementation capabilities of new digital products and services. These hypotheses are then used to develop a questionnaire. The questionnaire serves as a structure for the interviews conducted with practitioners from traditional IT organizations and business incubators.

In Chapter 5 – **Results and discussion** –the results of the conducted interviews are evaluated and discussed. First the interview partners are anonymously introduced. Following due to the generic questions different results for IT organizations and business incubators are expected and presented. Using the identified differences, suggestions for the applicability and main challenges for new products and services of a digital business strategy are identified.

In Chapter 6 – **Conclusion, Limitation and Future Research** – the results of the thesis are summarized. Also the limitations of this thesis are stated and suggestions for future research, derived from the previous findings are given.

2 Research Methodology

In this chapter the research methodology of this thesis is explained. In chapter 2.1 the general research design for the whole thesis is presented. In chapter 2.2 the literature review is described as the literature is used to develop the basis for the followed work.

2.1 General Research Design

In this chapter the overall research design used in this thesis is explained. Like illustrated in Figure 1, this thesis follows five general steps. The first step identifies the scope within IT organizations and business incubators that match to a company´s strategy realization. This step generates a network of terms for each area and identifies the appropriate sub themes, which handle the implementation of company's digital business strategies. The second step is to search the existing literature for definitions in the identified areas. The third step uses the found definitions and further literature to identify relevant characteristics. Step two and three use a systematic approach and follow the guidelines for literature reviews promoted by Webster and Watson (2002). In step four the characteristics are used for developing hypotheses about the applicability of the identified areas for implementing new products and services and challenges in day-to-day practice. In step five the hypotheses are evaluated with a generic questionnaire. Finally, with the help of the questionnaire interviews with practitioners are conducted and depending on their statements the hypotheses will be accepted or rejected.

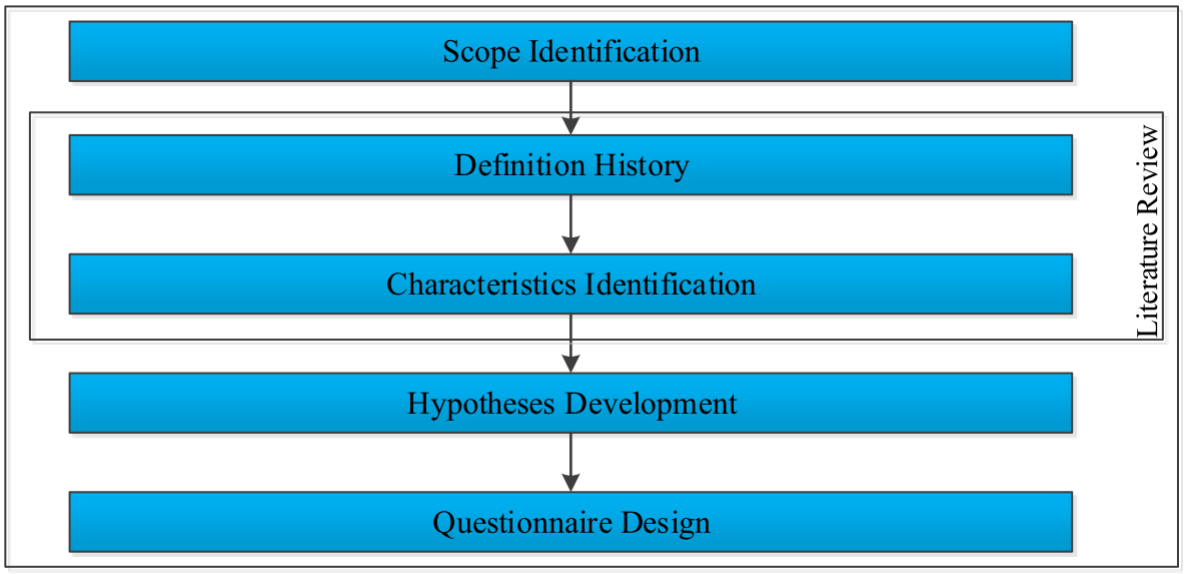

Figure 1: General Research Design

With the overview about supported hypotheses a foundation for further research is proposed.

2.2 Literature Review

In this chapter the literature review is explained. In chapter 2.2.1 the literature review design with relevant databases, keywords and selection criteria is presented. In chapter 2.2.2 the found literature is classified.

2.2.1 Literature Review Design

In this chapter the literature review approach taken to find definitions and characteristics is explained. The literature research tries to identify enough articles to have a sufficient amount of definitions and characteristics to build hypotheses and get an understanding of challenges and dependencies when implementing a corporate strategy. To define the scope of the literature review, the taxonomy proposed by Cooper (1988) is applied to this thesis.

Characteristic		Categories			
1	Focus	Research outcomes	Research methods	Theories	Applications
2	Goal	Integration	Criticism		Central issues
3	Perspective	Neutral representation		Espousal of position	
4	Coverage	Exhaustive	Exhaustive and selective	Representative	Central/pivotal
5	Organization	Historical	Conceptual	Methodological	
6	Audience	Specialized scholars	General scholars	Practitioners/ politicians	General public

Figure 2: Taxonomy of Literature Reviews (Cooper, 1988)

In Figure 2 an application of Cooper´s taxonomy is given by highlighting categories that characterize the literature review in this thesis. The focus (1) of the material that is of central interest for this thesis is on research outcomes and theories rather than research methods or applications. The goal (2) of the literature review is to integrate found article´s statements to general statements, which possibly affect implementing a digital business strategy. Also finding central issues in the research areas are important to formulate hypotheses. Criticism is not a goal of the literature review, because the derived hypotheses will be evaluated after the literature review with the help of interviews and not with other articles. The perspective (3) on the literature espouses a position taken in an article and formulates a general characteristic, which preferably is supported by additional articles, to describe the field of study. The research of characteristics and development of corresponding hypotheses is one main task in the editorial process of this thesis and requires therefore an active role of the reviewer which excludes a neutral representation. With regards to the coverage (4) a representative and pivotal strategy will be employed to find the origins of the fields and their most influential articles. The influence of an article is determined by the amount of later articles citing it. The review serves the purpose of finding definitions about the chosen topics and derives relevant characteristics from them. The definitions, with regard to the organization (5), are arranged anti chronologically, newest first. That allows a sufficient overview about theoretical characteristics. The literature review and overall thesis is meant for general researchers and practitioners, as the thesis tries to characterize IT organization´s and business incubator´s capability to implement a digital business strategy.

For a structural approach to identify representative and pivotal publications for the review, Webster and Watson (2002) recommend the following three steps:

1. The major contributions are likely to be in the leading journals. It makes sense, therefore, to start with them. You should also examine selected conference proceedings, especially those with a reputation for quality.
2. Go backward by reviewing the citations for the articles identified in step 1 to determine prior articles you should consider.
3. Go forward to identify articles citing the key articles identified in the previous steps. Determine which of these articles should be included in the review.

For step one and two the databases listed in Table 1 will be used. For step three "Google Scholar" is used exclusively to find articles citing the identified key articles. Databases collecting articles from various journals and conference proceedings and serve therefore as the basis for an extensive search within relevant subject areas.

Data Sources
Science Direct
IEEE Xplore
Springer Link
Google Scholar

Table 1: Data sources of literature review

For the first step the key words shown in Table 2 are entered into the databases to find a first list of potential articles. The first list of results is evaluated based on the following formal criteria to ensure fitting and younger articles:

1. At least one of the search terms is in title, abstract, as keyword or in its content.
2. Published in the period from January 2000 to June 2015.
3. Article is free with university access rights

After the first formal evaluation, title and abstract where analyzed with regards to content based on the following criteria:

1. Implementation of new products and services
2. Strategy implementation
3. Organizational structures and challenges

Search Terms
IT Organization

IT Governance
Business Incubator
Corporate Incubator

Table 2: Search Terms

The resulting articles build the basis for step two and three. The identified articles will be used for a backward search to find new term definitions and get a holistic overview about the developments in the field of research. The backward search will therefore result in additional articles. In combination with the results of step one the articles found with the backward search will build the basis to perform a forward search in step three. Relevant articles found in all three steps will then be used to define and derive theoretical characteristics about IT organizations and business incubators.

2.2.2 General overview of the Literature

In this chapter a general overview about the found articles is given, while a more detailed and content-oriented overview is given in chapter 3. The literature review resulted in 78 articles from various journals and conference proceedings. Due to the backward and forward search the articles range from 1983 to 2015. In Figure 3 the distribution among years of the found articles is illustrated. One (1%) article reviewed is from 1983, two (3%) are from 1985, two (3%) are from 1986, one (1%) is from 1990, two (3%) are from 1994, three (4%) are from 1996, three (4%) are from 1999, two (3%) are from 2000, three (4%) are from 2002, one (1%) is from 2003, seven (10%) are from 2004, three (4%) are from 2005, six (8%) are from 2006, two (3%) are from 2007, six (8%) are from 2008, two (3%) are from 2009, five (7%) are from 2010, eight (11%) are from 2012, four (6%) are from 2013, two (3%) are from 2014 and seven (10%) are from the first half of 2015.

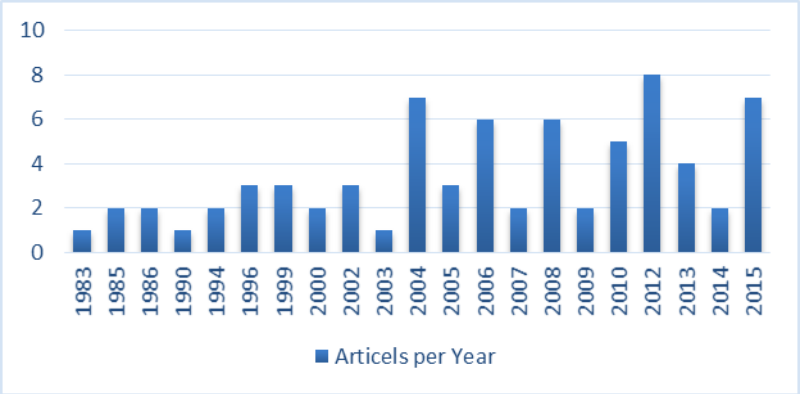

Figure 3: Article distribution among years

In Figure 4 the distribution among journals and conference proceedings of the found articles is illustrated. 48 of the 72 articles were published in 34 different journals or conference proceedings. The other 24, mostly for term definitions, were published in books, standards or websites. From the 48 articles published in journals or conference proceedings, four are pub-

lished in the MIS Quarterly, four in the R&D management, 4 in the Technovation, two in the Journal of Information Technology, two in the Organizational Science, two in the Social Science Research Network Journal, two in the journal of Technology Transfer, two in the International Journal of Innovation Management and the remaining articles in 26 different journals, as illustrated in Figure 4.

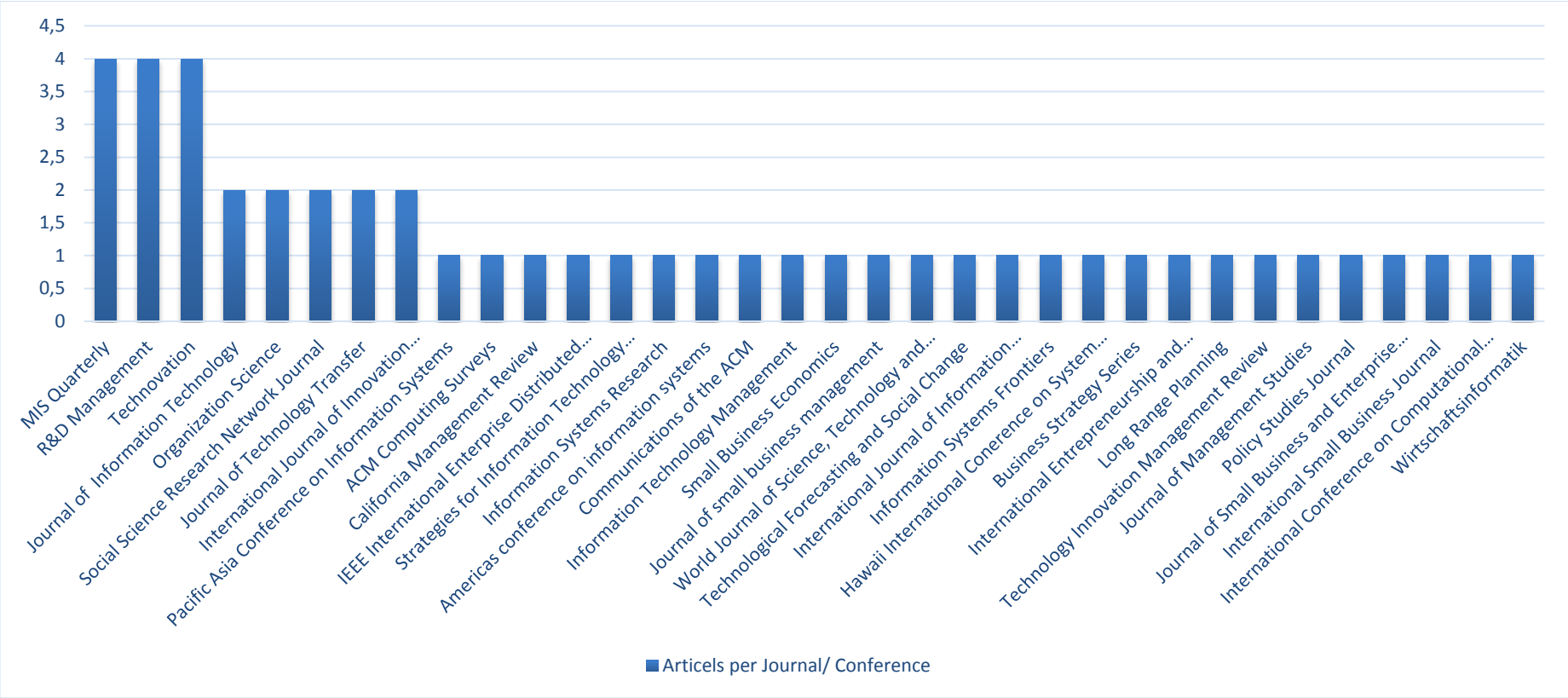

Figure 4: Article distribution among Journals and Conference proceedings

3 Literature reviews and theoretical foundation

This chapter builds the theoretical foundation for this thesis and presents the results of the literature review. In chapter 3.1 the concept of digital business strategy as the motivator for this thesis is explained. Chapter 3.2 explains business incubators according to the results of the literature review and presents found characteristics. Chapter 3.3 explains the results for the literature review conducted for IT organizations and introduces found characteristics.

3.1 Digital Business Strategy

The idea of digital business strategy, explained by Bharadwaj et al. (2013) serves as main motivation for this thesis. Information technology, or IT, enables companies to improve their business and even generates opportunities for entirely new business models. The increasing importance and value of IT for a company´s business also changes the organizational structures of the company (Bharadwaj et al., 2013; Weill & Woerner, 2015; Xu, 2014).

Due to the organizational importance the role of IT in companies changes. This has according to Bharadwaj et al. (2013) an impact on the field of IT alignment. IT alignment is defined as 'the degree to which the business strategy and plans, and the IT strategy and plans, complement each other' (Chan & Reich, 2007). The idea behind IT alignment is to align the IT strategy with the business strategy. That indicates a hierarchical structure within the company, where the IT supports the business. With emerging new technologies IT often disruptively changes the business (Nylén & Holmström, 2015). Using a hierarchical structure does not seem feasible and therefore Bharadwaj et al. (2013) proposes a fusion of business and IT strategy to a digital business strategy. They define digital business strategy as 'organizational strategy formulated and executed by leveraging digital resources to create differential value'. This definition highlights three things (Bharadwaj et al., 2013):

1. By talking about an 'organizational strategy' the pervasiveness of digital resources in functional areas such as operations, supply chain and marketing is outlined.
2. The term 'digital resource' is not bound to technology and systems but includes a resource-based view.
3. The goal 'to create differential value' includes generating competitive advantage with IT.

By adapting the understanding of strategy to the changed circumstances arising with increased value of IT resources the strategy implementation in companies has to change as well. The design and realization of products and services required for the implementation of a digital business strategy is a new challenge for traditional companies. One key challenge is building interoperable products and services that take advantage of digital resources and function with other complementary platforms. The results are loosely coupled dynamic ecosystems which do not end with the companies boundaries but integrate other service providers in their own environment (Bharadwaj et al., 2013; El Sawy, Omar A. & Pereira, 2013). The development of such an ecosystem is a challenging and expensive task. In general building an ecosystem requires projects that adapt existing products and the development of corresponding new products and services. There are various possibilities to realize the development of those new digital products and services and the overall ecosystem. In this thesis the applicability of the

established IT organization and the newer organization of business incubators, as two possible ways for implementing a digital business strategy, will be characterized (Bharadwaj et al., 2013; Cohen & Hochberg, 2014).

3.2 Existing literature on Business Incubators

This chapter analyzes the relevant characteristics of business incubators to implement new products and services form a digital business strategy. First the terms related to business incubators are introduced in chapter 3.2.1 and the most feasible discipline associated with business incubators is chosen for this thesis. Chapter 3.2.2 develops a working definition depending on the conducted literature review. Finally, in chapter 3.2.3 characteristics about incubators are developed.

3.2.1 Terms related to Business Incubators

This chapter identifies the scope within the area of business incubation, which is feasible to the implementation of a digital business strategy. Initially incubators offered services to low-tech and no-tech enterprises and their main goal was to revitalize manufacturing areas. The first incubator was founded in the United States in 1959. In the 1970s the first incubation programs were launched, so that at the beginning of the 1980s around 200 business incubators existed. Today there are more than 7000 incubation programs worldwide, from which around 1250 are located in the United States (Aernoudt, 2004; NBIA, 2012). Due to the foundation of many incubators and related research about incubation in the last three decades, many terms related to business incubators were introduced by the literature. Figure 5 gives an overview about the most common terms. Business incubators support new ventures in launching their businesses and offer them various services as support (e.g. Gassmann & Becker, 2006; NBIA, 2012; Ratinho, Harms, & Groen, 2013). Business accelerators in contrast are a new phenomenon, which is not well researched yet and supports already launched young firms. An accelerator has a shorter supporting period and focuses on the young firm's growth instead of initial launch (Cohen & Hochberg, 2014; Isabelle, 2013). Due to the later stage in the firm's lifecycle and little existing literature this thesis focuses on incubators, but will include employees of accelerators and venture capitalists as supporters for founding a new firm in the hypotheses evaluation.

Furthermore, business incubators are differentiated whether they have a for-profit or a non-profit purpose (e.g. Barbero, Casillas, Ramos, & Guitar, 2012; Bergek & Norrman, 2008). Non-profit incubators focus on economic development by supporting local ventures. According to the National Business Incubation Association, or NBIA, which is an organization advancing business incubation and entrepreneurship in over 60 nations, most (93% percent) of the business incubators located in North America are non-profit organizations (NBIA, 2012). For-profit incubators usually are set up to obtain returns on shareholders investments and according to the NBIA just 7% of the North American incubators serve a for-profit purpose (e.g. Bruneel, Ratinho, Clarysse, & Groen, 2012; Isabelle, 2013; NBIA, 2012; Totterman & Sten, 2005). Gassmann and Becker (2006) are using the term "incubator parent" as the founder of the incubator and introduce the differentiation between government incubator, independent incubator and corporate incubator. The governmental incubator is a non-profit incubator who can be funded by a university, a technology, a Science Park or a local community. The uni-

versity or the community would be in this example the incubators parent. Independent and corporate incubators are for-profit incubators. Independent incubators often are funded by holdings or venture capitalists and a company is usually the parent to a corporate incubator. Due to the focus on digital business strategy implementation of companies and the amount of articles, the focus of the theoretical characterization is on corporate incubators. Nonetheless are employees of non-profit incubators or related organizations interesting for the evaluation part and are considered as interview partners.

Corporate incubators can further be differentiated into insourcing, market and leveraging incubators (Becker & Gassmann, 2006). The types of corporate incubators have a different mission in why the incubator´s parent establishes them. An insourcing incubator tries to identify potential disruptive technologies and invests in ventures using those technologies. The mission is to evaluate the technology for a potential later spin-in. Leveraging incubators on the other hand try to develop new technologies by connecting central research and development with marketing units. Their main goal is to leverage internal resources to create new business opportunities. Market incubators in contrast try to develop complementary technology to increase the demand for the parent company´s products.

Besides a differentiation due to the incubators mission, corporate incubators can also be distinguished according to whether their technology source is from within or outside the company (Becker & Gassmann, 2006). The leveraging incubator focuses on using the internal technology whereas the insourcing and market incubator sources external technology from start-ups or universities to enhance company growth. Furthermore, can the technology either be core technology or non-core technology to the company. For an insurance company the contract management system would be a core system with core technology. Consequently the core technology is strategically important for the parent corporation to stay competitive. Disruptive technologies that challenge the existing core technologies are therefore very important for companies to gain competitive advantages or to keep pace with their competitors (Becker & Gassmann, 2006). According to the NBIA (2012) most incubators have a “mixed-use” mission and therefore all types of corporate incubators are considered as the identified scope for this thesis.

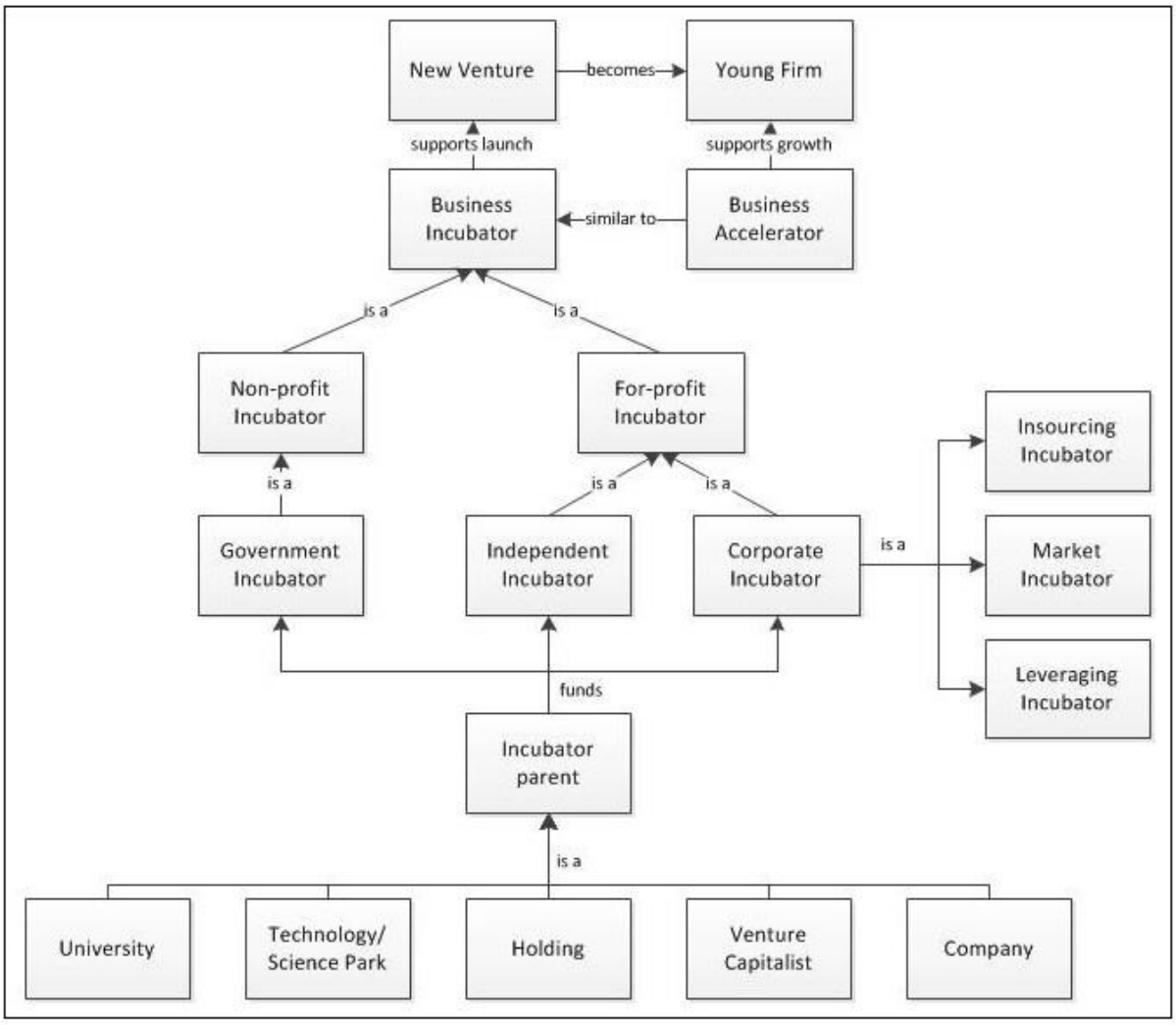

Figure 5: Terms related to Business Incubators

3.2.2 Definitions of Business Incubators

This chapter uses the results of the literature review to find and discuss definitions for business incubators in general and corporate incubators in particular. Table 3 shows the found definitions for business incubators and corporate incubators in the literature. A consensual definition for the term "business incubator" does, despite the maturity of business incubators as a practice and as a research field, not exist. Most definitions about business incubators in general have in common, that the object of incubation is somehow a "new company" (e.g. Duff, 1994; Entrepreneur, 2015; Plosila & Allen, 1985; Totterman & Sten, 2005; UK Business Incubation, 2009). The stage of the small business is not clearly defined among the found definitions. The definitions vary from "early-stage growth" (Allen & Rahman, 1985), "being launched or recently founded" (Albert, 1986), "venture creation, survival and early stage growth" (Allen & McCluskey, 1990) to "growth and success" (Entrepreneur, 2015). A lot authors define the object of the incubator programs as "early-stage companies" (Enterprise Panel, 1996; Plosila & Allen, 1985; UK Business Incubation, 2009) or in recent years as "entrepreneurial companies" (Entrepreneur, 2015; NBIA, 2012).

Another difference in the definitions arises from the type of offered support services to the new companies. This difference is related to the evolution of business incubators which is explained by Bruneel et al. (2012). They identified three evolutionary stages of business incubators:

1. Infrastructure: economies of scale
2. Business support: accelerating the learning curve
3. Networks: facilitating access to external resources, knowledge and legitimacy

In the first evolutionary stage the main service is the offering of affordable office space. Due to the shared resources such as reception, meeting rooms and car parking, tenants profit from economies of scale. Besides the reduction of overhead costs the tenants of business incubators do not have to put effort and time in managing the associated services. The office space offering is found in many definitions, where "rental space, shared office services, and business consulting assistance" (Allen & Rahman, 1985), "shared office-space" (Hackett & Dilts, 2004) or "physical space [and] common services" (Entrepreneur, 2015) are defined as an integral characteristic of a business incubator during the last three decades. Nonetheless some incubators which do not offer physical space where founded in recent years and are called "virtual incubators". Virtual incubators offer support services besides office spaces and aim at incubatees located outside an incubator (Theodorakopoulos et al., 2014).

The second stage acknowledges the need for business support services. New firms often lack the skill of management and marketing to run a vulnerable business. Most entrepreneurs learn over the time in a learning-by-doing manner, which is a slow and gradual process. Also it can lead to a higher failure propensity of new ventures. Business incubators can help ventures by providing them with management trainings and advice (Theodorakopoulos et al., 2014). The literature defines "business consulting assistance" (Allen & Rahman, 1985), connecting with suited "talent [...] and know-how" (Smilor & Gill, 1986), "business development assistance" (Allen & McCluskey, 1990), "business development processes" (UK Business Incubation, 2009) and "coaching" (Entrepreneur, 2015) as additional elements a business incubator offers to effectively support new ventures.

The third stage emphasizes the importance of external networks provided and established by the incubators. One of the key factors for vulnerability when starting a company is the lack of capital and connections to potential customers. A network exploited by business incubators provides new ventures with potential customers and investors to faster build up legitimacy. Also the networks of entrepreneurs enable the incubators to connect the venture with other fitting people, who potentially extend the teams skills (Theodorakopoulos et al., 2014). One definition even defines a business incubator as a "network" (Allen & Bazan, 1990) or others outline "support and business networks" (Totterman & Sten, 2005), the "combination of business development processes, infrastructure and people" (UK Business Incubation, 2009) and "networking connections" (Entrepreneur, 2015) as characteristics of business incubators.

According to the NBIA (2012) "business incubators nurture the development of entrepreneurial companies, helping them survive and grow during the start-up period, when they are most vulnerable. These programs provide their client companies with business support services and

resources tailored to young firms. The most common goals of incubation programs are creating jobs in a community, enhancing a community's entrepreneurial climate, retaining businesses in a community, building or accelerating growth in a local industry, and diversifying local economies". For this thesis the definition of the NBIA will be used, which is in line with many found articles in the literature review (e.g. Aernoudt, 2004; Al-Mubaraki et al., 2015; Isabelle, 2013).

In addition to the definitions of business incubators, three different explanations for corporate incubators where found. The three authors define the goal of corporate incubators slightly different as "enhance a corporation´s technology base" (Becker & Gassmann, 2006), "identify and accelerate new business areas" (Evald & Bager, 2008) and "explore and/or exploit business opportunities" (Ford et al., 2010). All three articles see the corporate incubator as a method for innovation and potential revenue growth. As the object of the incubator programs are "internal entrepreneurs" (Becker & Gassmann, 2006), "internal corporate venturing" (Ford et al., 2010) and "external start-ups" (Becker & Gassmann, 2006) defined. Additionally Becker and Gassmann (2006) highlight, that "corporate incubators have to consider long-term strategy goals and their fit with the parent corporation" which shows the strategic value incubators have for their incubator´s parents. Hence for this thesis corporate incubators are defined as "organizations aiming to identify and accelerate new business opportunities, by supporting external start-ups or internal entrepreneurs and consider long-term strategic goals of the incubator´s parent". The chosen definition emphasizes three important aspects of incubators. Firstly they seek to support new business opportunities, which include emerging technologies as well as optimizing existing technologies. Secondly incubators help external start-ups and internal entrepreneurs with their new business ideas. And the third aspect of long-term strategy consideration outlines the importance of the incubator´s parent. The aspect of strategic fit to the parent company is also the main difference to a non-profit incubator, because the company´s strategy defines the incubators goal which affects the incubators selection process and therefore desired new business ideas (Becker & Gassmann, 2006).

Author(s)	**Definition**
Plosila and Allen (1985)	"A small business incubator is a facility which promotes the early stage development of a for-profit enterprise"
Allen and Rahman (1985)	"A small business incubator is a facility that aids the early-stage growth of companies by providing rental space, shared office services, and business consulting assistance"
Albert (1986)	"An enterprise incubator is a collective and temporary place for accommodating companies which offer space, assistance and services suited to the needs of companies being launched or recently founded"
Smilor and Gill (1986)	"The business incubator seeks to effectively link talent, technology, capital, and know-how in order to leverage entrepreneurial talent and to accelerate the development of new companies"

Allen and Bazan (1990)	“An incubator is a network or organization providing skills, knowledge and motivation, real estate experience, provision of business and shared services”
Allen and McCluskey (1990)	“An incubator is a facility that provides affordable space, shared office services and business development assistance in an environment conducive to new venture creation, survival and early stage growth”
Duff (1994)	"A business incubator offers a range of business development services and access to small space on flexible terms to meet the needs of new firms"
Enterprise Panel (1996)	"An incubator is a property with small units which provides an instructive and supportive environment to investors and entrepreneurs at start-up and during early stages of business"
Tornatzky (1996)	"A technology business incubators gives the investor/entrepreneur the place and time to develop the product, as well as access to the skills and tools needed to create a successful business"
Albert and Gaynor (2000)	"Incubators, created by either private or public bodies, are support mechanisms for enterprise creation, with varying objectives: local and economic development, rejuvenation of deprived areas, creation of employment, technology transfer and support for minority groups"
Hackett and Dilts (2004)	“A business incubator is a shared office-space facility that seeks to provide its incubatees (i.e. portfolio – or client or tenant companies) with a strategic value-adding intervention system (i.e. business incubation) of monitoring and business assistance”
Totterman and Sten (2005)	A business incubator is a framework that supports new potential companies in their development process by giving them credibility, but also by helping them to build promising support and business networks"
Becker, Barbara and Gassmann, Oliver (2006)	"Corporate incubators are specialized corporate units that hatch new businesses and enhance a corporation’s technology base. The object of their support can be either external start-ups or internal entrepreneurs with a promising business idea or technology, henceforth referred to as technology ventures. As part of a larger corporation, corporate incubators have to consider long-term strategic goals and their fit with the parent corporation, but are also able to leverage the parent’s resources for overall development and growth."
Hughes et al. (2007)	“A business incubator is a facility that houses young, small firms to help them develop quickly into competitive business”

Eshun (2009)	"A business incubator is an environment formally designed to stimulate the growth and development of new and early stage firms by improving their opportunities for the acquisition of resources aimed at facilitating the development and commercialization of new products, new technologies and new business models. Business incubation is also a social and managerial process aimed at supporting the development and commercialization of new products, new technologies and new business models"
Evald at al. (2008)	Corporate incubators are property-based organizations aiming to identify and accelerate new business areas to their parent companies through knowledge agglomeration and resource sharing.
UK Business Incubation UKBI (2009)	"Business incubation is a unique and highly flexible combination of business development processes, infrastructure and people designed to nurture new and small businesses by supporting them through the early stages of development and change"
Ford et al. (2010)	Corporate incubators represent a particular mode of internal corporate venturing, whose strategic objectives are to explore and/or exploit business opportunities. Incubators with the strategic logic of exploration invest in opportunities that arise inside the parent firm and actively nurture and develop these so that, over time, they became sources of growth for the firm. In contrast, incubators with the strategic logic of exploitation attempt to monetize the existing assets (such as patents, technologies, raw ideas and managerial talent) of the parent firm within a short time frame, frequently by spinning them out as new businesses.
National Business Incubation Association NBIA (2012)	"Business incubators nurture the development of entrepreneurial companies, helping them survive and grow during the start-up period, when they are most vulnerable. These programs provide their client companies with business support services and resources tailored to young firms. The most common goals of incubation programs are creating jobs in a community, enhancing a community's entrepreneurial climate, retaining businesses in a community, building or accelerating growth in a local industry, and diversifying local economies."
Entrepreneur (2015)	"Business Incubator is an organization designed to accelerate the growth and success of entrepreneurial companies through an array of business support resources and services that could include physical space, capital, coaching, common services, and networking connections"

Table 3: Definitions of Business Incubation

3.2.3 Characteristics of Corporate Incubators

In this chapter characteristics about corporate incubators regarding their capability to implement new products and services of a digital business strategy are derived from the literature. To develop these characteristics the results of the conducted literature review are presented.

Goal of the literature review is to get an overview about the field of corporate incubators in terms of advantages, disadvantages and other aspects of incubators, which can give a better understanding about the possibilities of incubators for digital business strategies.

It is evident from the literature that leveraging external and internal sources of knowledge is one major goal behind corporate incubators. Companies want to use their internal knowledge to nurture good and promising business ideas (Becker & Gassmann, 2006). The internal knowledge is also one of the main benefits corporate incubators can offer to new ventures. The incubator´s staff can connect new ventures with company employees who have critical knowledge for their business ideas. Moreover, the managers themselves have a lot of experience in founding new firms, whereas most start-ups lack that kind of knowledge (Branstad, 2010; Hackett & Dilts, 2004). Some corporate incubators try to explore or exploit their internal knowledge. Exploring internal knowledge is to invest in opportunities that evolve inside the firm and develop these so that they become a long-term source of growth. Exploiting internal knowledge is to monetize the existing assets like patents or technologies of the parent firm for more immediate revenue generation (Ford et al., 2010). Besides internal knowledge existing in the company, external knowledge from other entrepreneurs is beneficial for the company as an additional source of innovation. The new business ideas, which origin outside of the company´s boundaries help to develop radical innovations for long-term competitiveness (Becker & Gassmann, 2006; Branstad, 2010). This leads to business incubator, or BI, *characteristic 1*: *The corporate incubator acts as a knowledge hub where good ideas can be nurtured and from which innovative knowledge is transferred into the incubators parent*.

In addition to knowledge sharing, companies want to enhance a corporation´s technology base and extend the services offered to their clients (Becker & Gassmann, 2006). An extended service portfolio diversifies potential services and products and can lead to more attractive offerings to customers. This most likely serves long-term strategic goals of the incubator´s parent and outlines the goal of the corporate incubator to achieve, in contrast to business incubators, profits from the new ventures (Eshun, 2009; NBIA, 2012). Thus *BI characteristic 2* is: *Corporate Incubators want to achieve profits from their involvement in new ventures by extending the possible services offered to clients.*

A further finding of the literature analysis is the intention to commercialize new business models. Companies have to explore business opportunities outside their core businesses to either generate new offerings as alternative sources of income or innovative ways of offering products to their customers (Becker & Gassmann, 2006; Eshun, 2009; Nylén & Holmström, 2015). An obvious source for new business ideas are internal entrepreneurs that know the current business. By supporting internal entrepreneurship the employees are encouraged to start their own ventures. Those entrepreneurs often have business ideas outside the company´s core business, which would not be implemented within the firm´s divisions due to a missing strategic fit (Bergek & Norrman, 2008; Branstad, 2010). Therefore, *BI characteristic 3* is derived: *Corporate incubators help to develop new business ideas based on research done in the incubators parent but are outside their core business*.

The definitions of chapter 3.2.2 suggest certain support services incubators offer to new ventures. Bergek et al. (2008) summarizes the four key values offered in incubation programs, which also can be found in many definitions presented in chapter 3.2.2, as follows:

1. shared office space
2. a pool of shared support services to reduce overhead costs,
3. professional business support or advice ("coaching") and
4. network provision (internal and/or external).

A shared office space, which is rented under more or less favorable conditions to incubates, uses economy of scale by sharing a reception or car parking to reduce the rental costs (Allen & Rahman, 1985; Entrepreneur, 2015; Hackett & Dilts, 2004). Additionally the incubator´s management has experience in creating new businesses and they support the entrepreneurs with various opportunities for coaching (Allen & McCluskey, 1990; Allen & Rahman, 1985; Entrepreneur, 2015; Smilor & Gill, 1986; UK Business Incubation, 2009). Furthermore, an external network provisioned by business incubators provides tenants with potential customers and investors to faster build up legitimacy. Also the incubator´s internal networks of entrepreneurs enable the management to introduce ventures with new fitting team members, who could potentially extend the team´s skill set (Allen & Bazan, 1990; Entrepreneur, 2015; Totterman & Sten, 2005; UK Business Incubation, 2009). *BI characteristic 4* summarizes the support services: *Incubators offer shared office space, shared support services, professional business support and networking connections as key values to new ventures.*

As explained above three companies have to explore business opportunities outside their core businesses to find innovative ways of offering products to their customers (Becker & Gassmann, 2006; Eshun, 2009; Nylén & Holmström, 2015). This comes from changing customer expectations regarding the time and location they want to use products and services. This shift in customer expectations is caused by the spread of devices with mobile connectivity which allow a time and location independent internet access. Due to the possibilities arising with smart phones and tablets customers expect to use products and services not just at a point of sale. Market incubators focus on non-core technologies that bring the products and services on the customer´s mobile devices with the main purpose to increase the demand for the parent´s core technology and products (Berman, 2012; Branstad, 2010). Hence, *BI characteristic 5 is: Market incubators focus on non-core technologies that, if successful, will increase the demand for the parent's core technology and products.*

One key goal of establishing corporate incubators is to create a less bureaucratic space for internal entrepreneurs. Larger firms become more bureaucratic and react slower to changes in the market (Ford et al., 2010). A corporate incubator is an organizational space which is outside the normal business organization and therefore not involved in the existing bureaucratic processes (Becker & Gassmann, 2006; Ford et al., 2010). Due to this, incubators support corporate entrepreneurship and accelerate the development of new companies as well as protect the new business ideas from cultural resistance within the company (Branstad, 2010; Smilor & Gill, 1986). As stated for BI characteristic 1 and 3, leveraging the knowledge of the corporation´s employees is a valuable source for new business ideas (Becker & Gassmann, 2006).

This leads to *BI characteristic 6: Companies establish incubators to leverage entrepreneurship from their employees.*

A further finding is that the attracted external ventures depend on the incubator´s parent industry. Important for the selection of a new venture and vice versa the selection of a convenient incubation program is that the parent company has something to offer to the venture (Barbero et al., 2012; Branstad, 2010). If the entrepreneurs require the offered services, they will apply to join the incubator. One central service is the provided network to potential customers and vendors, which often belongs to a certain industry. Therefore, it is more likely that start-ups join an incubator if their new business idea and the parent´s business belongs to the same industry (Barbero et al., 2012; Branstad, 2010). According to that *BI characteristic 7* is: *There is an effect between offered services, industry and attracted ventures.*

The network offered by the incubator mainly depends on the incubator´s staff. The staff often consists of long-term employees of the parent´s company, who changed their position to work in the incubator (Branstad, 2010). They offer their own network, which they build during their time in the company, to the new ventures. Besides their connections to the parent's resources, their own experiences are important to support the ventures (Branstad, 2010). Thus, *BI characteristic 8* is: *Entrepreneurial and managerial experiences as well as good connections to the incubators parent resources are important capabilities for the incubators staff.*

The type of insourcing incubators described in chapter 3.2.1 tries to support ventures from the external market and to spin-in the developed firm into the parent corporation (Becker & Gassmann, 2006). The idea of letting knowledge and new business ideas from the outside of a company into the boundaries of companies is called open innovation (Gassmann & Enkel, 2004). The insourcing incubator realizes besides a knowledge transfer from the new ventures to the parent corporation, a technology transfer by integrating the founded firm into the corporation. It therefore not just uses external knowledge for internal innovation but nurtures external innovation by supporting new business ideas. After a successful company foundation the parent corporation then integrates the firm into their organization and profits from their past engagement (Barbero et al., 2012; Branstad, 2010). The opportunities presented by launching a corporate incubator lead to *BI characteristic 9: Incubators present the parent organization with the opportunity to take in innovative technology, fresh ideas and competent new employees.*

The emergence of the digital business strategy led to the requirement for a flexible technology platform, to generate new combinations of resources and match the fast changing customer needs (Ciborra, 1996; Markus & Loebbecke, 2013). Those extended platforms can also integrate third-party service providers to enrich the possible products. Those ecosystems are typically built around a core system which belongs to a large firm (Markus & Loebbecke, 2013). A corporate incubator leads to an extended ecosystem by either integrating the incubated ventures into the corporation or using the ventures as a third-party service provider (Becker & Gassmann, 2006). Hence, *BI characteristic 10* is: *Corporate incubators help to grow their parent companies´ technology ecosystem.*

Additional to external entrepreneurs as sources of innovation a corporate incubator supports internal entrepreneurs. The internal entrepreneurs often have ideas besides the core business

of the company. To extend the company´s ecosystem some non-core business ideas can nonetheless be important for the competitive advantage of the incubator´s company. This characteristic of incubators is described by Ford et al. (2010) as exploration of "opportunities that arise inside the parent firm". To emphasize the importance of internal entrepreneurship (Antoncic & Hisrich, 2003) and awareness of innovation as long-term sources of growth, *BI characteristic 11* is: *Companies establish incubators to invest in opportunities that arise inside their firm and could become additional sources of growth.*

Besides non-core technologies from internal entrepreneurs, potential disruptive core technologies can be supported by the corporate incubator as well. Disruptive technologies revolutionize the current business and face internal resistance due to corresponding changes in the working environment. Therefore, the corporate incubator serves as a protection against internal resistance to change for internal entrepreneurs (Ford et al., 2010). In this regard an incubator can be seen as an approach to test disruptive technologies under faster and more flexible entrepreneurial circumstances. In the incubator entrepreneurs can test their technology and new business model and in case of success integrate the disruptive technology into the existing business of the incubator´s parent. With the background of a successfully founded business and a proved disruptive technology the resistance of change and the decision to switch to the new technology is more convenient than directly testing it in the parent company (Ford et al., 2010; Mol & van den Hurk, 2006). This leads to *BI characteristic 12: Corporate incubators protect new ventures with disruptive technologies from prevailing and prevenient conditions in existing product divisions.*

One reason for companies to establish corporate incubators is to integrate the new firms into the company after incubation. One criterion for merging the new firm into the established organization is that the new business model succeeded. Some critics argue that a start-up requires huge investments and at least five years to generate sufficient revenue (Ford et al., 2010). The underlying skepticism about the potential of start-ups is on the one hand a sign of the mentioned resistance to change. On the other hand it is realistic that not all ventures that have been strategically relevant at their selection will become a company with high potential of revenue. Moreover, they could have a potential of revenue but no longer strategic value to the incubator´s parent (Ford et al., 2010). Nonetheless the effort of incubation is made for the small chance to nurture a company that disruptively changes the core or non-core business, with a high potential of revenue either in an existing or whole new market and a strategic fit to the incubator´s parent. To acknowledge the risks associated with funding start-ups and building an incubator *BI characteristic 13* is: *New ventures in incubators cost a considerable amount of money, take at least five years before they generate some sales and maybe build a niche market.*

One driver for companies behind the digitalization of their business is to keep pace with their competitors or to generate competitive advantages (Barbero et al., 2012; Markus & Loebbecke, 2013). With their digital business strategy companies can either converge with or diverge from the competition. By converging to competitive norms they try to keep pace with the industry environment and by diverging they try to dictate the pace (Mithas et al., 2013). Corporate incubators can serve a converging as well as a diverging purpose by being a tool to extend the company's ecosystem or invest in innovative business ideas. Both alterna-

tives serve the digital business strategy and show the relevance of a corporate incubator that shall support its parent's competiveness. Therefore, *BI characteristic 14* is derived as: *The new ventures of corporate incubators are supposed to contribute to the long-term competitiveness of the parent firm.*

Start-ups can apply to an incubation program and have to fulfill certain selection criteria. Influencing the selection criteria is one instrument of the incubator´s parent to ensure a strategic fit of the applying start-ups to their overall strategy (Ford et al., 2010). Also the incubatee selection is an important management task within the incubator to distinguish between promising firms and those that cannot be helped or actually do not need an incubator (Bergek & Norrman, 2008). Goals behind corporate incubators can be potential disruptiveness, high revenue potential and a strategic alignment to the incubator´s parent business strategy (Bergek & Norrman, 2008; Ford et al., 2010). Thus, *BI characteristic 15* is: *Selection criteria for new ventures are potential disruptiveness, high revenue potential and strategic alignment to the parent's long-term corporate strategy.*

At the end of the incubation process the incubatee can either merge into the incubator´s parent or proceed alone. Whether the incubatee merges into the parent organization or proceeds alone is influenced by the source of the new business idea. External entrepreneurs often leave the incubator and continue their business alone in exchange for shares of the new company. These shares are a payment for the support during the incubation (Becker & Gassmann, 2006). In the case of internal entrepreneurs, who are former employees of the incubator´s parent, a strategic fit of the new business and integration into the parent corporation is more likely. Therefore, those entrepreneurs often merge into the parent organization. Nonetheless it is possible that the incubator´s parent decides to acquire an external incubatee and also integrates their business (Branstad, 2010). On the other hand can those internal entrepreneurs, where the new business does not longer strategically fit into the corporation, leave the incubator and proceed alone (Ford et al., 2010). Hence, *BI characteristic 16* is: *After incubation ventures with strategic value to the parent firm can be integrated into one of the firm´s operating divisions, while those that are no longer strategically relevant can be spun out with a minority stake.*

One reason behind insourcing incubators is to leverage internal entrepreneurship and knowledge to develop new business ideas. For the development entrepreneurs leave the incubator´s parent to join the incubator and start a new business. This has the effect of creating an entrepreneurial environment without bureaucratic structures (Becker & Gassmann, 2006; Mol & van den Hurk, 2006). After the incubation the entrepreneurs join into the parent company. In case of a successfully incubated venture they reintegrate the created business into a company´s operating division. The integration of a new business model into the existing organization can be a source of resistance and is a disadvantage of the business incubation (Ford et al., 2010). Where BI characteristic 12 emphasizes the opportunity to test a disruptive technology in an external organization, BI characteristic 17 outlines risks associated with implementing a new business idea separately from the established organization. Therefore to acknowledge the potential difficulties associated with insourcing incubators, *BI characteristic 17* is: *Integrating successful incubated ventures back into operating divisions is challenging due to resistance of these divisions against new technologies not invented within them.*

One possible selection criterion for new ventures includes the prior employment experience and technical expertise of the venture team. It is important that the incubator management believes that the people behind the new venture are capable of managing their own business (Bergek & Norrman, 2008). One advantage of entrepreneurs who are employees of the incubator´s parent is the degree of knowledge about their managerial competence. The employees have worked in the relevant industry and have their own network in the company. Additionally those entrepreneurs have been subject to a recruiting process that deemed them to be capable and have worked within the company (Ford et al., 2010). Therefore, *BI characteristic 18* is: *Company internal entrepreneurs have the competence to manage the development of the technology and growth of the venture.*

As mentioned for BI 14 one motivation for incubators is the incubator´s parent competiveness. To serve the parent´s competitiveness the new ventures themselves need to develop quickly into competitive businesses (Hughes et al., 2007). To develop a competitive business it is essential to generate revenue by constantly generate sales of products or licenses. The time-to-market for new products and services therefore is one key value for a successful new venture and the incubator. The parent company also has an interest in a fast time-to-market to quickly prove the relevance of the new business idea and underlying technology (Barbero et al., 2012). This leads to *BI characteristic 19: Incubators are motivated to help new ventures to develop quickly into competitive businesses with a focus on fast time-to-market.*

Barbero et al. (2012) analyzed the incubation performance as to which degree the incubator meets its set objectives. The main purpose behind the research was to evaluate whether the different types of incubators lead to different performances. For their research they evaluated 70 questionnaires, answered by Spanish incubator managers. The findings of the research regarding corporate incubators motivate *BI characteristic 20*: *Corporate incubators meet set objectives as they create high returns for the parent company due to reasonable sales growth rates, launch of new products and patent generation.*

The identified characteristics will be used in chapter 4 to develop hypotheses about incubators and IT organizations with regard to implementing a digital business strategy.

3.3 Existing literature on IT Organization

This chapter analyzes the relevant characteristics of IT organizations to implement new products and services form a digital business strategy. First the terms related to IT organizations will be introduced in chapter 3.3.1 and the most feasible discipline associated with IT organizations will be chosen for this thesis. Chapter 3.3.2 develops a working definition depending on the conducted literature review. Finally, in chapter 3.3.3 characteristics about the IT organization will be identified.

3.3.1 Terms related to IT Organization

This chapter identifies the scope within the area of disciplines dealing with IT organizations, which is mainly responsible for implementing a business strategy. The discipline of IT organization has many different subsets and no common definition. Figure 6 gives an overview about relevant terms without making the claim to be complete. The two main disciplines associated with IT organization are IT governance and IT management. This thesis follows the understanding regarding the differences between IT governance and IT management explained by Peterson (2004). They describe IT management as responsible for the supply of IT services and products, and the management of IT operations. IT governance on the other hand contributes to the present business operations and transforms the IT to meet future business

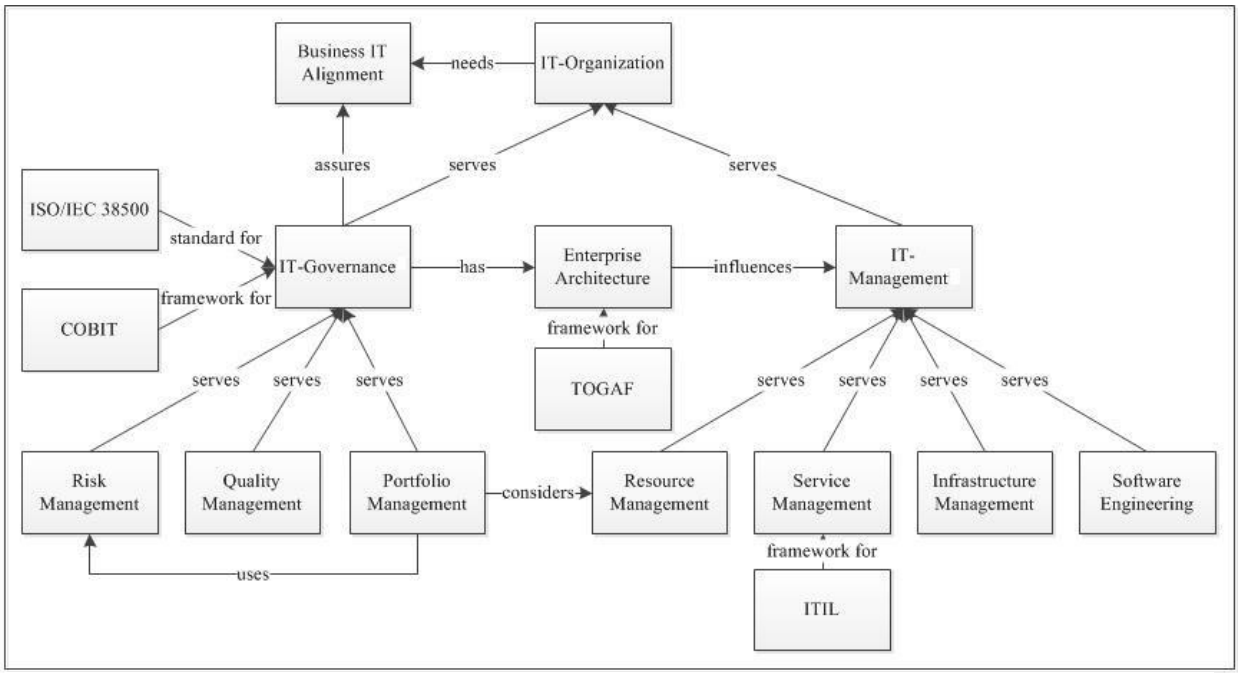

Figure 6: Terms related to IT Organization

challenges. Therefore, focuses IT governance primarily on the future business and IT management on the present business. Considering the time frame of both disciplines, IT management with the supply of IT services can be outsourced to an external provider whereas IT governance with directing and controlling the IT cannot be commissioned to external providers (Peterson, 2004). This explains why the IT governance is responsible for the IT alignment, which is defined as 'the degree to which the business strategy and plans, and the IT strategy and plans, complement each other' (Chan & Reich, 2007). The idea behind IT alignment is to align the IT strategy with the business strategy. Also concerned with the business IT alignment among other disciplines is enterprise architecture. According to Ross et al. (2007) "the

enterprise architecture is the organizing logic for business processes and IT infrastructure, reflecting the integration and standardization requirements of the company´s operating model. The enterprise architecture provides a long-term view of a company´s processes, systems, and technologies so that individual projects can build capabilities – not just fulfill immediate needs". One framework providing principles and practices for enterprise architecture is The Open Group Architecture Framework, which is modeled at four levels: Business, Application, Data, and Technology (The Open Group). Enterprise architecture supports IT governance with the IT alignment and influences IT management to build long-term capabilities.

To ensure the operation of IT the IT management is among others associated with resource management, service management, infrastructure management and software engineering. The resource management is concerned with the effective allocation of IT employees to projects. Infrastructure management is responsible for the supply of hard and software like servers and printers. Software engineering defines and develops products with regard to quality and customer requirements. Finally, the IT service management standardizes the services provision of the IT department and is one key discipline of the IT management (Krcmar, 2015). One framework defining best practices for the IT service management is ITIL. ITIL helps to manage IT services by giving advice for aligning the needs of the business side requiring the services and support its core processes (Axelos, 2015).

The ISO 38500 is the international standard for IT governance and COBIT is a framework for IT governance ("ISO/IEC 38500:2015," 2015; ISACA). IT governance is among others associated with risk management, quality management and project portfolio management. Risk management for IT deals with risk for the business success, origin from the use of information systems. The main task is to establish processes that minimize the risk but also help to create value instead of slowing the processes down (Krcmar, 2015). The quality management is concerned with the offered products and services of the company and tries to establish processes to ensure a constant quality regarding customer focus, leadership and involvement of people or process approach ("ISO 9001:2008"). The project portfolio management selects proposed projects for the implementation and does the prioritization of chosen projects with regards to the strategic fit and the resources management. By doing that it supports the company in achieving organization´s operational and financial goals (Cooper et al., 1998). The disciplines which are assigned to either IT governance or IT management do not clearly belong to one of the two areas. COBIT is described as an IT governance framework but also embraces for example the resource management. The assignment of sub disciplines to either IT management or governance is more a tendency than definite and makes the choice for a feasible term difficult. As new products and services origin from a digital business strategy the IT governance, as not outsourceable discipline, is responsible for the business IT alignment and is considered as identified scope for this thesis. The IT governance has like corporate incubators a strategic purpose for a company which will be further discussed in the next chapter.

3.3.2 Definitions of IT Governance

This chapter uses the results of the literature review to find and discuss definitions for IT governance and IT organization. According to the ISACA, which is an "independent, non-profit, global association, which engages in the development, adoption and use of globally accepted, industry-leading knowledge and practices for information systems" (ISACA, 2015), "an IT

Organization is defined by considering requirements for staff, skills, functions, accountability, authority, roles and responsibilities, and supervision. This organization is embedded into an IT process framework that ensures transparency and control as well as the involvement of senior executives and business management. A strategy committee ensures board oversight of IT, and one or more steering committees in which business and IT participate determine the prioritization of IT resources in line with business needs. Processes, administrative policies and procedures are in place for all functions, with specific attention to control, quality assurance, risk management, information security, data and systems ownership, and segregation of duties. To ensure timely support of business requirements, IT is to be involved in relevant decision processes". The prioritization of IT resources from both IT and business organizations is an important responsibility of the IT Governance as discipline among the IT organization (Luftman & Brier, 1999).

One important aspect of IT governance is that it has the "decision-making authority for core IT activities" (Sambamurthy & Zmud, 2000) which can be found in most of the definitions in Table 4. IT governance is according to the definitions in Table 4 responsible for IT functions (Brown & Magill, 1994), it is "the authority for making IT decisions" (Luftman & Brier, 1999), has "authority for key IT activities" (Sambamurthy & Zmud, 1999), has "enterprise decision-making authority for core IT activities" (Sambamurthy & Zmud, 2000), "describes a firm´s overall process for sharing decision rights about IT" (Weill & Vitale, 2002), is "the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill & Ross, 2004), "describes the distribution of IT decision-making rights" (Peterson, 2004) and "determines where decision making authority resides in the organization" (Gallagher & Worrell, 2008). Therefore the definitions agree with IT governance´s responsibility to setup an organizational structure of decision-making authority in the company to prioritize the allocation of IT resources to core activities.

With the responsibility of decision-making and resource allocation the IT governance has the "capacity to control the formulation and implementation of IT strategy" (Ministry of International Trade and Industry, 1999) and in this way to "ensure the fusion of business and IT" (van Grembergen et al. 2004). The task is to "ensure that the organization´s IT sustains and extends the organization´s strategies and objectives" (IT Governance Institute, 2003) and "making and monitoring decisions on strategic IT concerns" (Peterson, 2004).

Overall the IT governance is part of the IT organization, responsible for IT resource prioritization and the implementation of the IT strategy. Also it shall ensure the fusion of business and IT (van Grembergen et al., 2004) which is one key aspect of the digital business strategy (Bharadwaj et al., 2013). Therefore, the IT governance decides and monitors the implementation of new products and services from a digital business strategy and is the right discipline within the IT organization to serve as scope of this thesis. Hence for this thesis IT governance is defined as "the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT" (van Grembergen et al., 2004).

Author(s)	Definition
Brown & Magill (1994)	IT Governance describes the locus of responsibility for IT functions.
Luftman (1999)	IT Governance is the degree to which the authority for making IT decisions is defined and shared among management, and the processes managers in both IT and business organizations apply in setting IT priorities and the allocation of IT resources.
The Ministry of International Trade and Industry (1999)	The organizational capacity to control the formulation and implementation of IT strategy and guide to proper direction for the purpose of achieving competitive advantages for the corporation
Sambamurthy & Zmud (1999)	IT Governance refers to the patterns of authority for key IT activities.
Sambamurthy & Zmud (2000)	IT Governance defines the locus of enterprise decision-making authority for core IT activities.
Weill & Vitale (2002)	IT Governance describes a firm's overall process for sharing decision rights about IT and monitoring the performance of IT investments.
IT Governance Institute (Gartner IT Glossary, 2015)	IT governance is the responsibility of the board of directors and executive management. It is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives.
Weill and Ross (2004)	IT governance specifies the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT
Peterson (2004)	IT Governance is the system by which an organization's IT portfolio is directed and controlled. IT Governance describes (a) the distribution of IT decision-making rights and responsibilities among different stakeholders in the organization, and (b) the rules and procedures for making and monitoring decisions on strategic IT concerns.
Van Grembergen et al. (2004)	IT Governance is the organizational capacity exercised by the board, executive management and IT management

	to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT.
Gallagher and Worrell (2008)	Governance of the IT function determines where decision making authority resides in the organization. Governance is traditionally discussed in terms of centralized, decentralized, or federal structures.
Gartner IT Glossary (2015)	IT governance (ITG) is defined as the processes that ensure the effective and efficient use of IT in enabling an organization to achieve its goals.
ISO/IEC 38500:2015 (2015)	Governance of IT system by which the current and future use of IT is directed and controlled
ISACA (2015)	An IT organization is defined by considering requirements for staff, skills, functions, accountability, authority, roles and responsibilities, and supervision. This organization is embedded into an IT process framework that ensures transparency and control as well as the involvement of senior executives and business management. A strategy committee ensures board oversight of IT, and one or more steering committees in which business and IT participate determine the prioritization of IT resources in line with business needs. Processes, administrative policies and procedures are in place for all functions, with specific attention to control, quality assurance, risk management, information security, data and systems ownership, and segregation of duties. To ensure timely support of business requirements, IT is to be involved in relevant decision processes.

Table 4: Definitions for IT Organization and IT Governance

3.3.3 Characteristics of IT Governance

In this chapter characteristics of IT governance regarding its capability to implement new products and services of a digital business strategy are developed. To develop characteristics the results of the literature review will be used. The goal of this chapter is to get an overview about the field of IT governance in terms of advantages, disadvantages and other aspects, which can give a better understanding about the applicability of IT governance for digital business strategies.

IT governance structures the decision-making authority in a company to implement and formulate an IT strategy (Sambamurthy & Zmud, 2000; van Grembergen et al., 2004). Tradi-

tionally governance is structured in a central, decentral or federal manner (Gallagher & Worrell, 2008). A central decision making leads to greater efficiencies among the IT department whereas decentralization serves greater effectiveness in serving local competitive needs. The federal structure is a hybrid which centralizes decisions about shared functions such as databases, while decentralizing specialized local application development (Sambamurthy & Zmud, 1999). In large companies the IT governance becomes complex and can slow an organization´s ability to quickly respond to changes in its environment (Gallagher & Worrell, 2008). The ability to sense and respond to changing environments is important to recognise new innovative technologies. This leads to IT governance, or *ITG, characteristic 1: Larger companies are less innovative than small companies because the larger companies business and IT structures are more complex.*

Furthermore, it is important to change the focus of used technology and to build competences in new emerging technologies (Ciborra, 1996). With the fast changing market of technology some competencies acquired in a given field can become useless, so it is essential for firms to early adapt to technological changes (Anderson & Tushman, 1990). Unfortunately in addition to challenges in recognizing and responding to new emerging technologies, larger firms focus on optimizing existing products and processes instead of building new competencies (Ford et al., 2010). Thus, ITG characteristic 2 is: *Large established firms tend towards modifying and refining their existing products and processes, rather than developing radical innovations.*

The ability to change is important in every business and IT department, to react to new emerging technologies. Additionally the existing technology base has to be very flexible to quickly adapt products and services to changed customer expectations (Ciborra, 1996; Markus & Loebbecke, 2013). Larger firms use many technologies and applications leading to interdependencies among different internal divisions with many authority holders in the IT governance domain. Due to the large and complex structures between technologies and corresponding responsibilities larger firms become more bureaucratic and can react slower to changes in the market (Ford et al., 2010). Hence, *ITG characteristic 3* is: *As firms become larger, they become more bureaucratic, leading to slower reactions to changes in market conditions and substantial efforts are required to alter the direction of the firm.*

As formulated in ITG characteristic 2 established firms tend to optimize their existing products and processes, but with the digital business strategy many companies have to use new technologies like mobile applications. The capabilities for technologies already used in the company exist and it is unlikely that new firms can challenge companies with competence-enhancing innovations for these technologies (Utterback, 1994). If a new business idea uses a competence-displacing technology and targets customer groups with different preferences established firms have difficulties in quickly adapting their existing processes and technology base to support the new business idea and to build capabilities for the new technology (Christensen, 1997; Ford et al., 2010). Challenges with entirely new technologies lead to *ITG characteristic 4: Implementing competence-displacing technologies targeting new customer groups with different sets of preferences or utility functions than existing customers prove to be challenging for established firms.*

One challenge of using new technologies, in order to adapt to technology changes, is internal resistance against change (Ford et al., 2010). New technologies change the current business and face internal resistance due to corresponding changes in the working environment. The organization could then focus on optimizing itself and resists changes. Therefore, employees do not contribute possible innovations they recognize in their working environment. Furthermore, they protect their own power and knowledge to secure their own position which impedes innovative projects (Ford et al., 2010). Therefore, *ITG characteristic 5* is: *Established firms turn towards corporate entrepreneurship because of internal resistance to change and inertial forces preventing the generation of novelty.*

In a case study about innovation at Phillips, Ford et al. (2010) states that "innovation would only be successful if new technologies were managed according to a venture capitalist model where the product teams, rather than the corporation's management, were responsible for determining the direction of activity". The reason behind this understanding is that the corporate management focuses on the scope of existing business. If a new technology is outside this scope the division´s managers will not take the risk to implement and use the technology, because they either do not have budget for innovation or fear negative consequences from a failed not totally fitting new concept (Mol & van den Hurk, 2006). This observation emphasizes the requirement to give product teams the responsibility and environment to try out new technologies with an acceptance of failure. This leads to *ITG characteristic 6: Corporation´s management is not well suited to determine the direction for innovative technologies.*

Additionally to the importance of new technologies, the differentiator achieved by innovation has changed. With the digitalization of most business models, competitive advantages do not exclusively come from a new technology, but from totally new business models combining the existing technology, existing business and new emerging technology (Mol & van den Hurk, 2006; Weill & Woerner, 2015). Nonetheless is it important for organizations to digitalize their existing business models to offer customers more than traditional channels to use the company´s products and services. For established firms that means to rethink their business processes and to acknowledge customer data as an important company-wide resource (Weill & Woerner, 2015). Those changes in attracting customers lead to *ITG characteristic 7: More growth comes from introducing digital business models than of adding another feature or new technology to existing business models.*

Effective IT governance is a source of sustainable competitive advantages but requires a harmonized structure aligned with a firm´s objectives and performance goals. The difficulty and responsibility of the senior management is to generate an individual and harmonized governance structure that fits to the company´s circumstances including performance goals, organizational structure and processes (Weill & Woodham, 2002). The complexity of established firms makes setting up a convenient IT governance a very challenging task. The consequences of ineffective IT governance are according to Kien et al. (2013) "duplication of resources, proliferation of IT systems, increased complexity and risk, and the compromise of key business requirements such as agility". Furthermore, according to Ali and Green (2012) ineffective governance causes "inaccurate information quality, inefficient operating costs, runaway IT project costs (e.g., being over budget and under specification), loss of competitiveness" and finally, "the demise of IT departments, or the organization itself". The acknowledgement

of the consequences of an ineffective, while recognizing the importance of effective, IT governance leads to *ITG characteristic 8: Organizations with ineffective IT governance suffer from increased complexity and risk, a lack of agility and inefficient IT project management.*

The IT Governance Institute (Gartner IT Glossary, 2015) defines IT governance as the "responsibility of the Board and Executive Management". This acknowledges that IT governance is important for the CIO but that he is not the primary stakeholder. As IT governance serves the alignment of business and IT, it is essential to involve the business management to maximize IT business value (Peterson, 2004). Especially when IT has a critical part in the business strategy the involvement of the board of directors demonstrates that the organization is trying to establishing effective IT governance (IT Governance Institute, 2003). A lack of senior management involvement will negatively affect the realization of projects and the overall strategy implementation by leading to unfavorable outcomes in IS planning (Ali & Green, 2012). The fact that business management must also be responsible for IT governance fits to the fusion of business and IT, proposed by the approach of a digital business strategy. As the IT strategy is not hierarchically below the business strategy but they fusion to one overall strategy, the control to implement the digital business strategy has to become the responsibility of both, IT and business management (Bharadwaj et al., 2013). Hence, ITG characteristic 9 is: *As IT becomes a critical element of business strategies and core operating processes, there is a need for greater involvement of the board of directors in implementing a digital business strategy.*

One instrument to involve the business executives in the IT governance process is an IT steering committee. The IT steering committee supports information system planning and management. It consists of high-level executives who represent various divisions or functions within the organization, with the main responsibility of linking IT strategy and business strategy (IT Governance Institute, 2003). The benefit of an IT steering committee in IS planning and management is supported by previous studies. For example Vaswani (2003) revealed that an IT steering committee has a positive significant correlation with the level of effectiveness of overall IT governance. Thus, *ITG characteristic 10* is: *The IT steering committee serves as a high-level executive team, comprised of representatives from various divisions or functions within the organization, with the main function of linking its IT strategy and business strategy.*

IT governance has a positive effect on the firm´s performance and positively affects the execution of company´s strategies (Gallagher & Worrell, 2008; Weill, 2004). Especially an improved IT performance leads to reliable, fast and secured solutions in an organization´s IT (IT Governance Institute, 2003). Furthermore, organizations acquire a rational return on investment from effective IT governance and improved IT performance (Ali & Green, 2012). Thus, *ITG characteristic 11* is: *IT governance improves the IT performance and organizations then benefit from reliable, fast and secure IT solutions as well as a rational return on investment.*

While effective IT governance has a positive effect on the firm´s performance, ineffective IT governance has a negative effect (Ali & Green, 2012). One option to overcome bad IT performance is to outsource all or parts of the IT (Ali & Green, 2012). Teng et al. (1995) found that poor IT performance and the decision for IT outsourcing is positively and significantly correlated. Hall and Liedtka (2005) provide ten years later similar results and found that poor

overall firm performance and poor cost control led organizations to outsource their IT function. *ITG characteristic 12* is: *Ineffective IT Governance and poor overall firm performance lead organizations to outsource their IT function.*

The modes of IT governance effect the overall organization of IT functions in a company. Federal IT governance implies centralized infrastructure and shared services and decentralized business unit applications, which leads to standardization for the centralized IT functions and individualization within the business divisions. One advantage of standardizing the central systems is to cut IT costs by leveraging synergies (Park et al. 2006). One challenge standardizing the systems of larger firms is the use of many technologies and applications with many interdependencies among the different centralized and decentralized systems. Due to the large and complex structures between technologies and due to the federal IT Governance, IT organizations face various challenges in standardizing their systems (Peterson, 2004). The federal IT Governance leads to *ITG characteristic 13: IT Organizations face challenges in standardize their systems, cut IT costs, and align the IT organization with business strategies, while simultaneously acknowledging the decentralized business divisions across different countries.*

In contrast to ITG characteristic 13 the successfully implementation of a federal IT Governance with fitting standardized IT systems has multiple positive effects for the organization. The centralized systems cause significant cost reduction due to cheaper maintenance and elimination of duplicate IT developments. Additionally it enhances the company´s research and development as well as improving the time-to-market due to less technical restrictions at business unit level. Overall the IT governance leads to profit growth because of cost reductions and new innovative products (Peterson, 2004). To outline the potential of IT Governance ITG characteristic 14 is: *The implementation of a federal IT Governance model leads to a significant cost reduction, enhances R&D, improves time-to-market for new products and therefore supports profit growth.*

Organizations want to standardize their infrastructure and shared services to realize cost reductions. They also want to build a flexible technology platform, generate new combinations of resources and match the fast changing customer needs (Ciborra, 1996; Markus & Loebbecke, 2013). Those extended platforms can also integrate third-party service providers to enrich the possible products. Ecosystems are typically built around a core system which belongs to a large firm (Markus & Loebbecke, 2013). The standardization of central systems serves the implementation of an ecosystem and the infrastructure can even build the foundation for the core system. Besides the standardization, firms need to invest in innovation and implementation which is fundamental to their competitive success and survival under digital business conditions (Bharadwaj et al., 2013). A federal IT governance model can help to standardize central systems and simultaneously stay innovative on a divisional level (Peterson, 2004), which leads to *ITG characteristic 15: Organizations need to focus on both standardization and innovation, and in the process have adopted a federal IT Governance model.*

One challenge in adapting federal IT governance and therefore be able to support requirements arising with a digital business model is to transform the current organizational and technological structure (Sambamurthy & Zmud, 1999; Weill & Woerner, 2015). Firms differ

in how they view the primary role of IT. Traditionally the role of IT is to reduce cost and duplication, whereas with evolved importance of IT it is seen as enabler for future business strategies (Peterson, 2004; Weill & Woodham, 2002). The firms that still see IT only as cost driver which they have to reduce have a centrally managed IT with a budget allocated from the corporate business (Weill & Woodham, 2002). This leads to *ITG characteristic 16*, which focuses on the traditional role of IT: *Traditional IT focuses on efficiency and reliability to gain competitive advantages from cost reduction in a stable placid market environment.*

The federal IT Governance has decentralized business units and a central organization. Determining the balance between standardized products on the organizational level to generate synergistic effects and agility by keeping products at the business unit level is a challenging and complex task. The dependencies between actions taken on an organizational level and the implications on the business unit level, and vice versa can also restrict the organization´s agility (Gallagher & Worrell, 2008). The organization´s agility describes the ability to react to changes in the market environment and adapt the product design on a local or enterprise-wide level. One example for complications arising with a federal IT governance is the balance of standardizing products. Standardizing for example all products at the organizational level would leave the business units with few options to dynamically change the product design on a local level (Gallagher & Worrell, 2008). Hence, *ITG characteristic 17* is: *Complications arise in organizations because actions taken at the business unit level affect the organizational level, and vice versa.*

Despite the chosen IT governance model it is important to design an adaptive architecture for the organization´s systems as a basis for fast response capabilities. Poorly architected IT systems take more time to change and therefore tie up resources and limit an organization´s responsiveness. Additionally investing in not fitting IT infrastructure and systems may also consume time and money and constrain the ability to respond to changes. Not fitting means in this context, that the requirements, either technological or functional, do not meet the needs of the business and system environment and therefore take considerably more time and money to alter (Gallagher & Worrell, 2008). To acknowledge the general system environment despite the governance model *ITG characteristic 18* is*: Poorly architected IT systems tie up resources, consuming time and money while limiting responsiveness. Also investing in the wrong IT infrastructure and systems may limit flexibility and constrain an organization's range of responses.*

In the case of a centralized IT model the challenges in balancing standardized and local product designs is obsolete. Central IT models are typically used where profitability and cost control is a predominant issue (Weill, 2004). However challenges arise from the dependencies among the applications. In a centralized approach the IT functions are built around the core applications to ensure an efficient and profitable use. Changing one system therefore potentially impacts various other systems, especially when altering a core application (Gallagher & Worrell, 2008). Therefore, *ITG characteristic 19* is: *In centralized IT models changing a single system is a key challenge due to the coordination of changes in various other systems.*

Firms differ in how they view the primary role of IT. Traditionally the role of IT is to reduce cost and duplication whereas with evolved importance of IT it is seen as enabler for future

business strategies (Peterson, 2004; Weill & Woodham, 2002). When IT has the primarily task of controlling its own cost while providing core business functions, IT often provides a bottleneck to change (Gallagher & Worrell, 2008). IT then is seen as a service provider in the background which has to support the business strategy. In this case the IT strategy is aligned to the business strategy and the changes caused by the digitalization will also require an evolvement of IT´s role (Bharadwaj et al., 2013). *ITG characteristic 20* is: *In traditional IT information systems provide an organization with a constraint changing products because the IT organization is too slow to react to change.*

One organizational form in companies is a matrix organizational structure where employees in implementation teams report to their respective department as well as to IT project managers. The matrix organization belongs more to the field of IT management which is described in chapter 3.3.1 but as a very common organizational structure in companies it fits to the distribution of accountabilities for IT decisions as one aspect of IT governance defined by Weill and Ross (Weill & Ross, 2004). In a matrix organization the project teams are not permanent but sourced using dynamically configured teams of programmers, analysts and testers. Therefore every project team consists of different resources and the teams do not work together regularly and cannot develop effectively as a team. Additionally in a matrix organization limited availability of required resource causes a delay in the execution of a project (Gallagher & Worrell, 2008). This leads to *ITG characteristic 21: Limited availability of resources and changing team members in a matrix organizational structure delay project implementation.*

The identified characteristics will be used in chapter 4 to develop hypotheses about incubators and IT organizations with regard to a digital business strategy.

4 Hypotheses and questionnaire development

In this chapter the characteristics, which were derived in chapter 3, will be used in chapter 4.1 to develop hypotheses about IT governance and business incubators. To evaluate the hypotheses in chapter 4.2 a questionnaire is developed to interview employees from different industries.

4.1 Hypotheses development

The characteristics derived from the literature review are summarized in Table 5. The characteristics will be used to develop hypotheses about IT governance, IT organizations and business incubators in this chapter.

BI 1	The corporate incubator acts as a knowledge hub where good ideas can be nurtured and from which innovative knowledge is transferred into the incubators parent.
BI 2	Corporate Incubators want to achieve profits from their involvement in new ventures by extending the possible services offered to clients.
BI 3	Corporate Incubators help to develop new business ideas based on research done in the incubators parent but are outside their core business.
BI 4	Incubators offer shared office space, shared support services, professional business support and networking connections as key values to new ventures.
BI 5	Market incubators focus on non-core technologies that, if successful, will increase the demand for the parent's core technology and products.
BI 6	Companies establish incubators to leverage entrepreneurship from their employees.
BI 7	There is an effect between offered services, industry and attracted ventures.
BI 8	Entrepreneurial and managerial experiences as well as good connections to the incubators parent resources are important capabilities for the incubators staff.
BI 9	Incubators present the parent organization with the opportunity to take in innovative technology, fresh ideas and competent new employees.
BI 10	Corporate Incubators help to grow their parent companies´ technology ecosystem.
BI 11	Companies establish incubators to invest in opportunities that arise inside their firm and could become additional sources of growth.
BI 12	Corporate incubators protect new ventures with disruptive technologies from prevailing and prevenient conditions in existing product divisions.
BI 13	New ventures in incubators cost a considerable amount of money, take at least five years before they generate some sales and maybe build a niche market.
BI 14	The new ventures of corporate incubators are supposed to contribute to the long-term competitiveness of the parent firm.
BI 15	Selection criteria's for new ventures are potential disruptiveness, high revenue potential and strategic alignment to the parent's long-term corporate strategy.
BI 16	After incubation ventures with strategic value to the parent firm can be integrated into one of the firm´s operating divisions, while those that are no longer strategically relevant can be spun out with a minority stake.
BI 17	Integrating successful incubated ventures back into operating divisions is challenging due to resistance of these divisions against new technologies not invented within them.

BI 18	Company internal entrepreneurs have the competence to manage the development of the technology and growth of the venture.
BI 19	Incubators are motivated to help new ventures to develop quickly into competitive businesses with a focus on fast time-to-market.
BI 20	Corporate incubators do meet set objectives as they create high returns for the parent company due to reasonable sales growth rates, launch of new products and patent generation.
ITG 1	Larger companies are less innovative than small companies because their business and IT structures are more complex.
ITG 2	Large established firms tend towards modifying and refining their existing products and processes, rather than developing radical innovations.
ITG 3	As firms become larger, they become more bureaucratic, leading to slower reactions to changes in market conditions and substantial efforts are required to alter the direction of the firm.
ITG 4	Implementing competence-displacing technologies targeting new customer groups with different sets of preferences or utility functions than existing customers prove to be challenging for established firms.
ITG 5	Established firms turn towards corporate entrepreneurship because of internal resistance to change and inertial forces preventing the generation of novelty.
ITG 6	Corporation´s management is not well suited to determine the direction for innovative technologies.
ITG 7	More growth comes from introducing digital business models than of adding another feature or new technology to existing business models.
ITG 8	Organizations with ineffective IT governance suffer from increased complexity and risk, a lack of agility and inefficient IT project management.
ITG 9	As IT becomes a critical element of business strategies and core operating processes, there is a need for greater involvement of the board of directors in implementing a digital business strategy
ITG 10	The IT steering committee serves as a high-level executive team, comprised of representatives from various divisions or functions within the organization, with the main function of linking its IT strategy and business strategy.
ITG 11	IT governance improves the IT performance and organizations then benefit from reliable, fast and secure IT solutions as well as a rational return on investment.
ITG 12	Ineffective IT Governance and poor overall firm performance lead organizations to outsource their IT function.
ITG 13	IT Organizations face challenges in standardize their systems, cut IT costs, and align the IT organization with business strategies, while simultaneously acknowledging the decentralized business divisions across different countries.
ITG 14	The implementation of a federal IT Governance model leads to a significant cost reduction, enhances R&D, improves time-to-market for new products and therefore supports profit growth.
ITG 15	Organizations need to focus on both standardization and innovation, and in the process have adopted a federal IT Governance model.
ITG 16	Traditional IT focuses on efficiency and reliability to gain competitive advantages from cost reduction in a stable placid market environment.

ITG 17	Complications arise in organizations because actions taken at the business unit level affect the organizational level, and vice versa.
ITG 18	Poorly architected IT systems tie up resources, consuming time and money while limiting responsiveness. Also Investing in the wrong IT infrastructure and systems may limit flexibility and constrain an organization's range of responses.
ITG 19	In centralized IT models changing a single system is a key challenge due to the co-ordination of changes in various other systems.
ITG 20	In traditional IT information systems provide an organization with a constraint changing products because the IT organization is too slow to react to change.
ITG 21	Limited availability of resources and changing team members in a matrix organizational structure delay project implementation.

Table 5: Characteristics summary

The aim of this thesis is to theoretically and practically characterize IT organizations and business incubators in terms of implementing a digital business strategy. This means to research the literature for theoretical characteristics as done in the last chapter followed by interviews to get practical characteristics for an overview about possible ways to implement a digital business strategy. The basis for an interview is the development of hypotheses about IT governance, IT organizations and business incubators based on the found characteristics.

Corporate incubators as one possibility to implement a digital business incubator use, as stated in BI characteristic 15 (BI 15), certain selection criteria to decide whether a start-up can join their program or is rejected, because it is unsuitable. The selection criteria range from potential disruptiveness to the strategic fit to the incubator´s parent strategy. The selection is therefore very important to steer the incubator itself, because it affects the accepted start-ups and enables the incubators management to focus on certain aspects of incubatees like revenue potential or innovative technologies. So the incubator fulfills for example an insourcing purpose by emphasizing the potential of the start-up´s technology. What all different types of incubators have in common is the requirement that the new business idea fits to the strategy which led the parent launch the incubator. After successful incubation the strategic fit also influences the possibilities for the new venture. As outlined for BI characteristic 16 (BI 16) ventures with strategic value to the parent firm could be integrated into the firm. Especially for internal entrepreneurs the integration in a firms division is one of the main goals behind the incubators to nurture and profit from new business ideas and innovation. As the incubation process last between one to five years (Isabelle, 2013), the strategic fit of a venture can change. Ventures that after successful incubation are no longer strategic relevant can be spun out as a self-dependent company with a minority stake. The strategic goals behind corporate incubators make them relevant for the implementation of a digital business strategy. The strategic value after incubation is not influenceable by the incubators management and therefore the strategic fit during the selection process leads to *hypothesis H1: Corporate incubators select new ventures according to the strategic fit of the new business idea.*

Corporate incubators want to achieve profits from their involvement in new ventures (BI 2) whereas other incubators are more interested in increasing employment or supporting the economy. Therefore the integration of successful incubated ventures into the incubator´s parent is one goal of the incubator and parent firm. An incubator that achieves profits from their tenants ensures that just profitable ventures succeed and furthermore, just healthy new busi-

ness ideas are integrated into the incubator´s parent. In this regard the incubator serves as a filter and evaluation mechanism for their parent. Ventures that leave the incubator will grow the parent companies´ technology ecosystem (BI 10) either by becoming part of the parent or a third-party service provider. Furthermore, it is important that the new business ideas extend the possible services (BI 2) or in case of a market incubator increase the demand for the parent´s primary products (BI 5). A digital business strategy originating in emerging technologies is likely to extend a company´s service portfolio with new possibilities to communicate with their customers. By nurturing profitable ventures with healthy new business ideas and their integration into the parent´s firm the incubator contributes to the long-term competitiveness of the parent (BI 14) by supporting innovation. Some established companies are not aware of the need for innovation and rather optimize their existing products and services (ITG 2). This explains the characteristic that integrating successful incubated ventures into the parent company´s operating divisions causes resistances (BI 17) because the employees are not aware of the need to innovate and rather stick to their own technologies. Therefore incubators know the benefits of an extended service portfolio but it is also relevant to which degree the company´s staff knows about the importance of innovation. *Hypothesis H2* focusses on the need of extended service portfolios: *A company benefits more from an extended service portfolio than from refining existing services.*

Clausen and Korneliussen (2012) conducted a study about the relationship between entrepreneurial orientation and speed to the market and found a "statistically significant positive effect". An entrepreneurial firm can be defined as a firm that "engages in product market innovation, undertakes somewhat risky ventures, and is the first to come up with "proactive" innovations, beating competitors to the punch" (Miller, 1983). Clausen and Korneliussen (2012) also outline the importance of speed to the market for an incubator´s survival because if their ventures quickly get their new products to the market, they can generate sales and therefore profit earlier. This statement additionally conforms to BI 19, which says that incubators focus on fast time-to-market to quickly develop competitive businesses. This thesis wants to use the hypothesis proposed and tested by Clausen and Korneliussen (2012) to extend their research with more qualitative statements by conducting personal interviews instead of an e-mail survey. Thus, *hypothesis H3* is: *There is a positive relationship between entrepreneurial orientation and speed to the market.*

Established firms turn towards corporate entrepreneurship because of internal resistance to change and inertial forces preventing the generation of novelty (ITG 5). Also the awareness of innovation is not given in some companies (ITG 2) which matches with arising resistance against new products and services from a digital business strategy. One way to support corporate entrepreneurship is to launch a business incubator, who then protects new ventures with possible disruptive technologies from prevailing and prevenient conditions in existing product divisions (BI 12). But it is challenging to integrate successful incubated ventures into operating division because of the existing resistance against new technologies, which is even stronger when the new technology is not invented inside the division (BI 17). Summarized companies use business incubators to overcome internal barriers in established organizations but then face even more resistance when they try to integrate successful incubated ventures, because of their attempt to avoid the initial resistance. Overall the resistance against change, especially with new emerging and potential disruptive technologies leads to *hypothesis H4*:

Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the established IT organization.

As firms become larger, they become more bureaucratic, leading to slower reactions to changes in market conditions and substantial efforts are required to alter the direction of the firm (ITG 3). Additionally larger companies are less innovative than small companies because their business and IT structures are more complex (ITG 1). Especially when the innovation uses competence-displacing technologies which target new customer groups established firms experience challenges (ITG 4). The complexity of the information systems then provides an organization with a constraint changing products to competence-displacing technologies because the IT organization is too slow to react (ITG 20). One reason for problems arising in traditional IT organizations can be an established matrix organization to staff projects, which can delay project implementation due to limited availability of resources and changing team members (ITG 21). The ability to react to change is getting slower when a company grows because of the complex business and IT structure and the interdependencies among them. The fusion of business and IT strategy as underlying a digital business strategy is also causing the fusion of business and IT structures which presents traditional IT organizations with a huge change. Implementing new business models and products, changing the used technologies and adapting internal processes to overall implement a digital business strategy is for traditional organizations a very complex and challenging tasks and therefore very slow to realize. Unfortunately is the competition in digital products manifold and organizations need to keep pace with start-ups and established digital companies like Google or Amazon for a reasonable share on the digital market. Traditional companies will be slower than younger firms because of their established traditional IT. The traditional IT is aligned to the business and often seen as a cost driver, which also implies many changes to fusion business and IT and leads to *hypothesis H5*: *Traditional IT organizations are too slow to implement a digital business strategy.*

Companies want to leverage entrepreneurship from their employees for innovation and new business ideas (BI 6). Nonetheless Branstad (2010) found in a case study that nurturing internal entrepreneurship with a corporate incubator is difficult when the parent firm is facing high workloads. Additionally when the corporation acts in a matrix organizational structure and has limited availability of resources and already delays in their project implementation (ITG 21) it is unlikely that the employees will come up with a new business idea and leave the delayed project to start a new venture. This shows that launching an incubator is not a guarantee for internal entrepreneurs applying with new business ideas. The incubator´s parent has to build a basis to give employees the space and opportunity to join the incubation program. So to support internal initiatives for a digital business strategy with an incubator it is important to consider the environment of the employees to use the incubation program. The working environment in the incubator´s parent should enable employees to try a new business idea but offer them an easy reintegration into the parent in case of a not successful incubation. *Hypothesis H6* summarizes these findings by considering the supporting working environment in the incubator´s parent: *Corporate incubators are not suited to promote internal initiatives for the digital business strategy implementation when the incubators parent does not enable employees to join the incubator.*

The environment of the incubator´s parent is also important to attract external entrepreneurs. The incubator´s parent resources are important for the incubator because they influence what network the incubators staff probably has (BI 8). For instance if the parent is a relatively small and specialized firm in manufacturing of carbon components there will be good contacts to the carbon industry but not to manufactures that mainly work with wood. This suggests that there is an effect between offered services, industry and attracted ventures (BI 7). An incubator in the automotive industry can probably offer services like using their test tracks or manufacture car components for the incubator's tenants. This is an advantage for insourcing incubators who try to attract start-ups that have innovative business ideas for the parent company's core business, which they try to integrate after successful incubation. For market incubators the supporting new technology is not situated in the core business of the incubator's parent and the network could be unattractive for new ventures. Additionally digital products like mobile applications and next generation websites with underlying platforms often are non-core capabilities of established firms like automotive companies or banking institutions their incubators could face challenges in support ventures with business ideas outside the parent company´s primary business. Therefore, *hypothesis H7* is: *The corporate incubator might face challenges to support new ventures with business ideas outside the parent company´s primary business.*

Despite challenges when attracting external entrepreneurs corporate incubators help to develop new business ideas based on research done in the incubators parent but are outside their core business (BI 3). So it helps established firms to overcome the tendency towards modifying and refining their existing products and process, rather than developing innovations (ITG 2) by creating a space where promising business ideas that are not suitable for the existing business can be developed and tested. The purpose of corporate incubators to overcome the parent´s concentration on optimizing existing products and to contribute to the parents focus on corporate entrepreneurship (ITG 5) are indicators for a lack of non-core implementation capabilities in a traditional IT organization. Hence, *hypothesis H8* is: *A corporate incubator is better suited to implement new non-core business products and services than a traditional IT organization.*

Companies know their own business and tend to optimize the existing structures and processes focusing on efficiency. The main task is to refine existing products and services instead of developing radical innovations (ITG 2). Additionally companies are not well suited to implement competence-displacing technologies because their organizational structures are focused on efficiency and not ability to change (ITG 4). Also the IT organization focuses on supporting the business and traditionally it´s strategy is aligned to the business strategy. Furthermore, a change for products and services origins in the business strategy and thus the IT has limited possibilities to start their own projects. The organization is business driven, when the IT gets new projects from the business organization and the business is responsible for the corresponding budget. The role of IT becomes more important and therefore the resources for own projects increases but for a digital business strategy it is often important to not just develop a new technology but a whole new business model. *Hypothesis H9* tries to evaluate to what degree companies still are business driven and follow a top-down approach for new projects: *Traditional IT organizations are more business driven.*

Companies establish incubators to invest in opportunities that arise inside their firm and could become additional sources of growth (BI 11). Overall the new ventures of corporate incubators shall contribute to the long-term competitiveness of the parent firm (BI 14). The implementation of a digital business strategy is to keep pace with the competition or even to generate a competitive advantage by first establishing a new business model. The potential revenue growth with new business ideas and the requirement of corporate incubators to work profitable seems to be a key goal for companies to launch a corporate incubator. This leads to *hypothesis H10: Corporate incubators support initiatives that have high potential for revenue growth.*

Traditional IT focuses on efficiency and reliability to gain competitive advantages from cost reduction in a stable placid market environment (ITG 16). Additionally organizations with ineffective IT governance suffer from increased complexity and risk, a lack of agility and inefficient IT project management (ITG 8). The market environment is changing due to new customer requirements because of new possibilities with mobile devices or the internet. In this changing environment agility is important to quickly adapt to new customer needs. Companies who have focused on cost reduction now face challenges to implement the required agility, whereas incubators are able to help small firms to develop quickly into competitive businesses with a focus on fast time-to-market because the new firms do not have to first alter their structures and technologies (BI 19). Therefore *hypothesis H11* is: *New ventures in incubators implement new products and services faster than traditional IT Organizations.*

The implementation of a federal IT governance model leads to a significant cost reduction, enhances R&D, improves time-to-market for new products and therefore supports profit growth (ITG 14). Successfully implementing a federal IT governance with fitting standardized IT systems has multiple effects for the organization. The centralized systems cause significant cost reduction due to cheaper maintenance and elimination of duplicate IT developments. Additionally it enhances the research and development as well as improving the time-to-market due to less technical restrictions at business unit level. Once the structure of a company has changed the established IT organization can faster react to changes and overcome the primary focus on cost reduction. Thus, *hypothesis H12* is: *IT Organizations try to speed up their time to market by implementing federal IT Governance.*

As firms become larger, they become more bureaucratic, leading to slower reactions to changes in market conditions and substantial efforts are required to alter the direction of the firm (ITG 3). This causes complications in organizations because actions taken at business unit level affect the organizational level, and vice versa (ITG 17). Especially in a centralized IT model changing a single system is a key challenge due to the coordination of changes in various other systems (ITG 19). The implementation of a new product or service in a large company confronts the project team with additional challenges besides the actual implementation. The team has to consider many stakeholders in the organization to conduct requirements engineering and in a matrix organizational structure there might be delays due to limited resources and changing team members (ITG 21). The organizational structures in large firms necessary to control and steer the company according to their corporate goals therefore slows the project implementation down. New ventures in business incubators do not face those challenges due to their small team size. Additionally they do not have many stakeholders because

their firm has just one or just a few products which they have to build first. The only stakeholders are the potential customers and their own requirements. So new ventures do not have to consider hierarchical structures or limited resources in terms of employees, but can focus on the product implementation. Ventures in an incubator also get support with many aspects of founding a new venture due to the incubators focus on time-to-market (BI 19). Overall the different structures and dependencies favor the new ventures and lead to *hypothesis H13*: *New ventures do not face additional challenges resulting from large teams and hierarchical organization.*

Organizations need to focus on both standardization and innovation, and in the process have adopted a federal IT Governance model (15). Unfortunately IT organizations face challenges in standardizing their systems, cut IT costs, and align the IT organization with business strategies, while simultaneously acknowledging the decentralized business divisions across different countries (ITG 13). The challenges in standardizing their systems can tie up resources, consume time and money while limiting responsiveness (ITG 18). About standardization in the context of digital products and services Bharadwaj et al. (2013) wrote: "extending the range and reach of digital business strategy beyond tight supply chains with partners in traditional industries to loosely coupled dynamic ecosystems that are still in emergence is a far more complex undertaking. This requires rethinking how to standardize IT infrastructures and the business processes around them, and it also requires a digital agility to respond to rapidly changing ecosystem conditions". This outlines the importance of standardized IT in organizations. ITG 13 shows a trend in standardizing IT systems during the early 2000s and by rethinking standardization to build loosely coupled ecosystems companies might experience their present standardization as a disadvantage. The present systems restrict agility and provide organizations with a constraint changing products because the IT organization is too slow to react to change (ITG 20). Hence, *hypothesis H14*: *Standardization of IT infrastructures and business processes tie up resources, restrict agility and slow down strategy implementation.*

Companies establish incubators to invest in opportunities that arise inside their firm and could become additional sources of growth (BI 11). The company internal entrepreneurs who then realize the opportunities have the competence to manage the development of the technology and growth of the venture because of their working experience in the incubator´s parent (BI 18). In the case of a market incubator the knowledge about existing products and services as well as the customers of the incubator´s parent is essential to build a non-core technology that, if successful, will increase the demand of the parent´s core technology and products (BI 5). Overall studies about the incubators performance found that corporate incubators meet set objectives as they create high returns for the parent company due to reasonable sales growth rates, launch of new products and patent generation (Barbero et al., 2012, BI 20). Incubators are launched to generate sources of growths for the parent company, which in recent years often meant to implement a digital business strategy. In companies in recent years growth comes from introducing digital business models instead of adding another feature or new technology to existing business models (ITG 7). In the early 2000s growth came from implementing IT governance for a rational return on investment due to reliable, fast and secured IT solutions (ITG 11) and especially the implementation of a federal IT governance model to support profit growth by gaining significant cost reduction and improved time-to-market for

new products (ITG 14). Summarizing the focus on growth drives the launching of corporate incubators as well as changes in the existing IT organization which leads to *hypothesis H15: Company´s growth is the main reason behind corporate incubators and the traditional IT organization.*

Corporation's management is not well suited to determine the direction for innovative technologies (ITG 6). In contrast entrepreneurial and managerial experiences of incubators staff enables them to better evaluate a new emerging technology (BI 8). New technologies and "trends" arise very fast and it is difficult for managers to determine whether a technology is important for their future business. Nokia for example missed to develop their own smartphones and lost a lot market share because they started developing smartphones too late. The management of large enterprises faces challenges in determining the value of an emerging technology due to a lack of technological knowledge. The role of IT growth in companies but the top management often comes from other more traditional disciplines. Incubators staff on the other hand often tried to found a start-up themselves and has a good overview about technological trends. These competencies are required to select new ventures by determining the strategic fit and validate the entrepreneur´s skills to establish a new business. An overview about technological developments and experiences with the development of emerging technologies are essential skills to recognize the potential of new technologies. Therefore, *hypothesis H16* is: *Incubator´s management is better suited to recognize the potential of new technologies than corporate management.*

Incubators present the parent organization with the opportunity to take in innovative technology, fresh ideas and competent new employees (BI 9). To attract young talented employees is challenging for firms, because they are in great demand in the IT industry and competitors offer a variety of services to attract them as well. An incubator offers young entrepreneurs the opportunity to start their own business in a supportive environment. When the incubation succeeds and the new business idea is still fitting into the parent´s strategy the venture can be integrated into one of the firms operating divisions (BI 16). This offers the entrepreneurs a safer working environment due to financial safety and the parent firm a new business idea and young employees capable to establish and maintain new business ideas. The incubation program therefore serves as an approach to come in contact with potential employees who prove their value for the company by establishing their own business, which they also bring into the incubator´s parent. The recruiting goal to get talented employees and be more attractive than competitors leads to *hypothesis H17*: *Companies try to attract young talented new employees with their corporate incubators.*

As IT becomes a critical element of business strategies and core operating processes, there is a need for greater involvement of the board of directors in implementing a digital business strategy (ITG 9). Additionally the IT steering committee as a tool for IT governance, serves as a high-level executive team, comprised of representatives from various divisions or functions within the organization, with the main function of linking its IT strategy and business strategy (ITG 10). A digital business strategy requires the fusion of business and IT strategy and demands the company´s business to also fusion the corresponding structures and processes. This change is a task for the entire organization and requires support of the top management to emphasis the need to change and enable the IT to change its role from a service provider for

the business to an equal partner in the firm. Thus hypothesis H18 is about the awareness for change among company´s top management: *Implementing a digital business strategy in an IT organization requires Top-Management involvement.*

The next chapter will use the found hypothesis to develop a questionnaire for interviewing company employees with the goal to evaluate the hypotheses.

4.2 Questionnaire development

A questionnaire was developed according to the developed hypotheses with a total of 24 questions. The questionnaire was used to interview employees from established IT organizations and organizations associated supporting start-ups like corporate incubators. Each hypothesis was formulated into a generic question. The questions are generic because the same questionnaire is for employees in established IT organizations and corporate incubators. With those questions it is possible to characterize corporate incubators and IT organizations and evaluate the importance of the digitalization in practice.

The questionnaire is shown in the appendix in chapter 8.1 and begins with an introductory part with four general questions to obtain eligibility criteria for evaluating the participants. The second part has 16 statements about organizations developed based on the hypotheses, of which 14 are ranked with a Likert scale and two are open questions. For every statement with a Likert scale a reason field for the ranking decision is given. The Likert scale has the options to “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree” and “strongly agree” to the statements. The third part has one question about the organization the interview partner works in or the company which launched the incubator. The second question is the interview partner’s opinion about the importance of the digital strategy for the competitive advantage of their company. In total the questionnaire has 24 questions and is anonym. The author of this thesis knows the interviewees but the questionnaire does not have questions about any personal identifiable information.

The Likert scale is used to allow the individual to express how much they agree or disagree with the statements. Respondents is offered a choice of five pre-coded responses with the neutral point of neither agree nor disagree (Likert, 1932). The scale allows a quick ranking of the statements and therefore more statements in the questionnaire.

The statements in the questionnaire follow the underlying hypothesis, for example H5 “Traditional IT Organizations are too slow to implement a digital business strategy” is generalized to statement Q5 “The organization is too slow to implement a digital business strategy”. In some cases the assumptions about either IT governance or business incubators are generalized for both organizations. For example H13 “New ventures do not face additional challenges resulting from large teams and hierarchical organization” is developed to the statement Q11 “Large teams and hierarchical structures negatively affect the strategy implementation”. With that statement the impact of large teams and hierarchical structures on new ventures and teams in companies can be distinguished and in case of “strong disagrees” from incubator employees H13 can be rejected. Additionally the impact of the team setup can be evaluated for IT organizations as additional characteristics. A presentation and discussion of the results will be done in chapter 5, where all statements will be covered in detail.

The two open questions in the second part are for H11 “New ventures in incubators implement new products and services faster than traditional IT Organizations” and H12 “IT Organizations try to speed up their time to market by implementing federal IT Governance”. These hypothesis are evaluated with open questions and not a Likert scale to get an estimation about the implementation duration and used approaches to speed up the time to market. Therefore, H11 will be evaluated with question Q17 “What is the average time to market for a new busi-

ness idea" by comparing the average time to market for new business ideas of IT organizations on the one hand and start-ups on the other hand. H13 leads to question Q18 "How does the organization try to speed up the time to market" and tries to identify common initiatives that companies and incubators do to speed up their product delivery. With the possible answers the actuality of federal IT governance projects and other approaches can be identified.

In the next chapter the results of the interviews will be presented and discussed.

5 Results and discussion

This chapter presents the results from the conducted interviews to evaluate the formulated hypotheses of chapter 4. The goal of this chapter is to approve or reject the developed hypotheses based on the interview partners' ratings. The interviews used the questionnaire shown in chapter 8.1 which used the generalized statements illustrated in Table 6. The underlying hypothesis to each question and the characteristics related to each hypothesis as developed in chapter 3 and chapter 4 are for an overview in chapter 8.2.1 and chapter 8.2.2.

ID	Statement/ Question	Hypothesis
Q 1	Mainly the strategic fit of the new business idea influences the decision for a new project/venture.	H 1
Q 2	A company benefits more from an extended service portfolio than from refining existing services.	H 2
Q 3	Entrepreneurial orientation benefits the speed to the market for new products and services.	H 3
Q 4	Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the company.	H 4
Q 5	The organization is too slow to implement a digital business strategy.	H 5
Q 6	The company´s overall workload and shortness of staff affects the time to market for new products and services.	H 6
Q 7	Building new capabilities for business ideas outside the company's primary business is challenging.	H 7
Q 8	The organization is suited to implement new non-core business products and services.	H 8
Q 9	The decision for new projects/ventures is business-driven.	H 9
Q 10	Mainly the potential revenue growth of the new business idea influences the decision for a new project/venture.	H 10
Q 11	Large teams and hierarchical structures negatively affect the strategy implementation.	H 13
Q 12	The standardization of IT infrastructures and business processes negatively affects the strategy implementation.	H 14
Q 13	The organization´s main purpose is to increase the company´s growth.	H 15

Q 14	The company´s management is suited to recognize the potential of new technologies.	H 16
Q 15	Recruiting of young talented people is one driver of the organization.	H 17
Q 16	The implementation of a digital business strategy requires the company´s Top-Management involvement.	H 18
Q 17	What is the average time to market for a new business idea?	H 11
Q 18	How does the organization try to speed up the time to market?	H 12

Table 6: General statements for the questionnaire

Before discussing the results for each statement the interviewees will be anonymously introduced to allow a better explanation of their ratings. In total eight interviews were conducted. Four employees related to a larger company and therefore working in traditional IT governance have been interviewed. Four employees not related to a traditional company where interviewed. Those four employees were from a wide range of companies associated with start-ups. Table 7 gives an overview about the interview partners for evaluating the hypotheses. The ID will be used to link reasons regarding the rating of certain questions to persons and to

ID	Industry	Position	Working experience	Employees
G1	Logistics	System Architect	25 years	25.000 (300 in IT)
G2	Banking	Head of IT Control & Coordination	25 years	1.050 (100 in IT)
G3	Retail	Head of IT Strategy & Architecture	10 years	60.000 (1000 in IT)
G4	Banking	Head of IT	15+ years	2.500 (1300 in IT)
I1	Business Angel	Founder	13 years	5
I2	Incubator	Chief Executive Officer	15 years	120
I3	Venture Capitalist	Head of Germany	10 years	200/ 80 Investors
I4	Incubator	Head of Business Development Department	5 years	700

Table 7: Interviewees

compare statements of different interviewees. Also the industries will be used to identify rating differences related to them.

The results of the ratings are illustrated in Figure 7 and give an overview about differences and similarities between IT governance and business incubators. Following the results for each statement will be presented and discussed. For that purpose the average and sometimes the individual ratings as well as the reasons will be outlined. Due to the small amount of interviewees the Likert scale is analyzed with the average ratings instead of the median or mode. The reasons were not mandatory which can lead to no individual reasoning in some cases. Afterwards the answers of the concluding questions are presented and the combined findings are discussed.

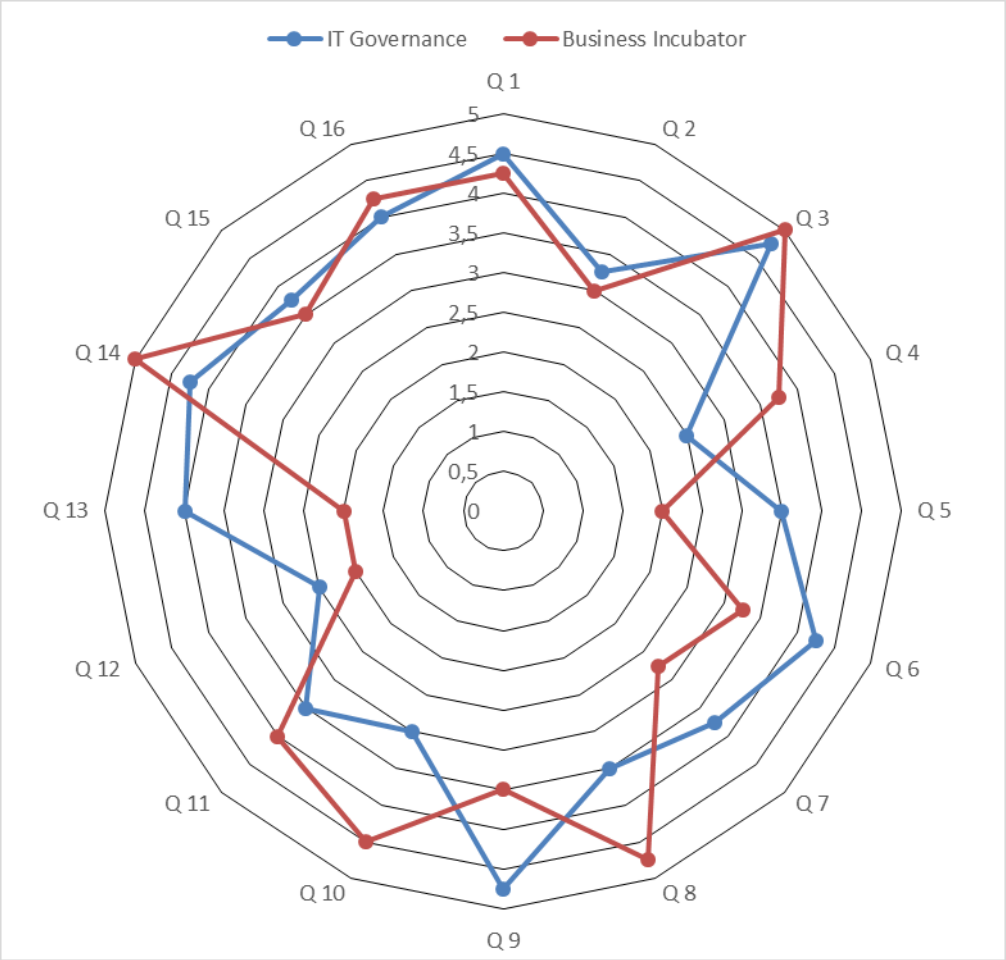

Figure 7: Overview Questionnaire Results

5.1 Questionnaire ratings and results

Statement Q1: Mainly the strategic fit of the new business idea influences the decision for a new project/venture.

The IT governance employees rated the statement Q1 in average with 4.5 points on the proposed Likert scale, with ratings between “agree” and “strongly agree”. The average consists

of three “strongly agree” ratings and one “neither agree nor disagree” rating. G3 neither agreed nor disagreed because he made a distinction between day-to-day business, where innovation does not have to come from their corporate strategy, and a planned digital transformation strategy focusing on specific areas where it is more likely to use innovations related to the existing strategy than from other sources. In contrast G2 strongly agreed and stated that the IT innovations have to fit to the corporate strategy and that for bigger innovations even the marketing department has to approve the initiatives. Additionally G1 confirmed that they are following a top-down approach where new projects are initialized solely based on the corporate strategy. This also means that mostly the business departments and not the IT department propose new projects. Consequently the IT departments in the companies of G1 and G2 have a traditional role as the service provider for required logistics and banking services.

The incubator employees rated the statement Q1 in average with 4.25 points which means they “agree” to the statement. The rating consists of one “neither agree nor disagree”, one “agree” and two “strongly agree” ratings. I1 neither agreed nor disagreed and explained that the start-up team is more important than the strategic fit. As a business angel they try to connect a good team with a promising business idea with investors. The business idea is presented to appropriate investors, who most likely have an interest in the team and business idea. Due to that it is also important that the employees of the business angel understand the business environment of the start-up because otherwise they cannot find an appropriate investor and help the team to develop a fitting product for a promising market. Overall the team and its members are more important for I1 to accept an applied venture than their business model. Nonetheless is the business model later important to find an investor. I3 agreed because they mainly invest in digital businesses they understand but sometimes they invest in digital ventures to develop initial business know-how for future prospects. I2 strongly agreed and stated that one of their selection criteria is the strategic fit into a promising high-tech market. I4 strongly agreed because their parent has defined the strategic purpose to engage in innovative digital ventures when they founded the incubator. They founded the incubator because the incubator´s staff is better suited to decide which new ventures are worth supporting and therefore I4 has the sole responsibility evaluating potential new start-ups.

The strategic fit for the decision of new projects or new ventures is important for both companies and incubators. In G1´s company new projects are introduced solely top-down from the corporate strategy and I4 as an incubator employee has a strategic purpose to consider in the selection process. G3 also has a strategy but innovations can come from internal IT initiatives as well as resulting from the strategy. I3 does investments to build know-how in new business environments for the future. The form of strategy consideration differs for both types of organizations. In traditional companies the strategy is used to derive new projects whereas for incubators and similar organizations the strategic fit is one aspect used in evaluating applying start-ups. Overall the strategy always plays a role in the decision for new projects and ventures and therefore *hypothesis 1* “Corporate incubators select new ventures according to the strategic fit of the new business idea” can be approved for traditional companies and incubators.

Statement Q2: A company benefits more from an extended service portfolio than from refining existing services.

The IT governance employees rated the statement Q2 with an average of 3.25 points which constitutes a "neither agree nor disagree". The answers ranged from one "disagree" and one "neither agree nor disagree" rating to two "agree" ratings. G4 disagreed because according to him it is nonetheless important to develop the existing business as a basis for extended services. His opinion is in line with the rating of G1 who neither agreed nor disagreed because it is essential in the logistics business to build a basis in the business to customer, or B2C, market to gain market shares and then mainly extend the service portfolio by offering diversified products and services. Interesting in the logistics industry is that their digital business strategy mainly covers the B2C market where the interviewee's company has lesser capabilities than in the business to business, or B2B market. So they mainly try to gain more market shares in the B2C market with their digital business strategy. G2 who agreed with the statement, explained that they still refine existing products but that their revenue growth is mainly caused by new products and services. G3 also agreed and said that in the retail business the market is saturated and therefore different to other industries. In the retail business existing features are expected from the customer and they require new features with more possibilities to buy products and bring the retailer growing revenue.

The incubator employees rated the statement Q2 in average with 3 points which means "neither agree nor disagree". The average consists of four "neither agree nor disagree" ratings. I1 explained that it depends on the businesses´ market and goal, I2 said it depends on the environment, I3 sees differences for industry and product and I4 outlined that existing products have the advantage of a known market whereas new products might have more potential. So all four interviewees would decide depending on the particularities of each case whether refining an existing product or building new products is more suitable.

Both groups of interviewees neither agreed nor disagreed with the statement Q2. The IT governance employee's answers to the statement were more diverse than the incubator employee´s. The banking employees rated the statement with 2 and 4, so one disagreed and one agreed, which notably does not show a clear consensus in the same industry. G2 who agreed explained that the proportion of revenue they make with new products compared to the revenue they make with existing products is growing. G4 disagreed because he sees refining the existing business as very reasonable. The different ratings among the banking employees could be caused by the fact that G2 works in a traditional bank with point of sales and G4 works in a bank solely operating online. G3 who works in the retail industry agreed to the statement because their business changes quickly and therefore often requires new products to gain a competitive advantage. Overall *hypothesis 2* "A company benefits more from an extended service portfolio than from refining existing services" has to be rejected because the interviewees neither agreed nor disagreed with the statement.

Statement Q3: Entrepreneurial orientation benefits the speed to the market for new products and services.

The IT governance employees rated the statement Q3 with an average of 4.75 points which means they "strongly agree". The rating consists of three "strongly agree" ratings and one

"agree" rating. G1 strongly agreed and explained that in logistics all competitors try to gain market shares and recruit points-of-sales as small package services. Those contracted points-of-sales then can be used for innovative products to increase the market share. To quickly gain market share the time to market is important, as the recruiting process of points-of-sales requires products and services that convince the shop owners to cooperate with G1´s Company and not a competitor. G1 emphasized that an entrepreneurial orientation is essential to achieve a fast speed to the market. G2 strongly agreed and stated that the entrepreneurial orientation exists in their management and even caused a change in how they accept new projects. The acceptance of a proposed project does not require the support of all members of the top management but just a majority among them. This enables more projects and therefore more innovations. G3 who also strongly agreed, highlighted the importance of entrepreneurial orientation on an operational level. All employees have to think entrepreneurially to be open for new projects and changes, because otherwise the management would have to convince them of the strategic shifts associated with a digital strategy. Convincing the employees is very time consuming and would strongly slow down the implementation of the strategy. G4 agreed to the statement and did not explain why he gave the rating.

The incubator employees rated the statement Q3 on average with 5 points which means that they "strongly agree" to the statement. The ratings were concurrent without much reasoning. I2 explained that the entrepreneurial orientation is one selection criteria for evaluating the team and I3 mentioned that it is difficult for traditional companies to build a convenient digital business strategy. Additionally I3 said that they cooperate with many companies to offer them the opportunity of outsourcing their digital initiatives and overcome challenges with their strategies.

Regarding this statement the interview partners were in agreement about the importance of entrepreneurial orientation. Nonetheless, one crucial difference should be pointed out in the justification given by G1 and I3. G1 said regarding statement Q7 that outsourcing innovative activities is no option because the innovations will become the core business in the future. On the other hand I3 explained that they cooperate with many firms to help them outsource their digital initiatives. As mentioned from I3 outsourcing digital initiatives can be a consequence of not building a convenient digital business strategy. To outsource IT functions in order to overcome ineffective IT governance and poor overall firm performance was also researched by Ali and Green (2012) and is formulated in IT governance characteristic 12. If outsourcing is a sign of poor firm performance this raises the question to which degree using a corporate incubator is necessary due to problems within the incubator´s parent. Challenges within traditional companies are the objective of following statements and are further discussed in the overall discussion at the end of this chapter to combine the results and analyze interdependencies between traditional companies and incubators. Overall *hypothesis 3* "There is a positive relationship between entrepreneurial orientation and speed to the market" can be confirmed. The evaluation raises questions in the context of digital business strategies regarding interdependencies between internal and external IT organizations.

Statement Q4: Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the company.

The IT governance employees rated the statement Q4 with an average of 2.5 points, which consists of ratings from "strongly disagree" to "agree". G1 who strongly disagreed explained that innovations do not influence the drop rate of packages for their mail drivers. The drop rate is the factor of packages per customer. In the B2B market every business gets many packages, whereas in the B2C market often every customer just gets one package. Therefore, innovations can increase the revenue but to be disruptive they would need to change the drop rate. Q4 disagreed with the statement due to the fact that the banking institute only operates via the internet and therefore is used to new technologies. G3 neither agreed nor disagreed because he stated that the organization holds on to its history and is not used to alter their ways of doing business. On the other hand in terms of technology the company is used to disruptive technologies since the e-commerce boom. G2 agreed with the statement and admitted that the employees are still focused on the existing business and need further convincing of the new digital strategy.

The incubator employees rated the statement Q4 in average with 3.75 points which means they "agreed" to the statement. The average consists of one "strongly disagree", one "agree" and two "strongly agree" statements. I1 strongly disagreed because the focus of the business angel is on the social need the start-ups are targeting. For example a newspaper serves the demand for information. Additionally the business angel mostly contacts investors who do not face disruptiveness. I4 agreed and explained that employees and the management in their parent are not interested in disruptive technologies because the new technology targets a very small market in the beginning and it is therefore very difficult to start corresponding projects. One purpose of the incubator is to offer an organizational structure to test those disruptive technologies. I3 strongly agreed and stated that they see a requirement to separate disruptive technologies from a company's internal organization and give the internal entrepreneur additional incentives for successfully developing new business ideas.

The ratings of this statement show a difference between IT governance employees, who neither agreed nor disagreed, and incubator employees, who overall agreed. I3 and I4 even reasoned their rating with the fact that cooperating companies of the venture capitalist and the incubator´s parent are not interested in disruptive technologies and that it is therefore necessary to separate disruptive technologies from the traditional organization. This fits to BI characteristic 12 which states that "incubators protect new ventures with disruptive technologies from prevailing and prevenient conditions in existing product divisions" and this was one characteristic that led to statement Q4. Overall hypothesis 4 "Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the established IT organization" can be approved for incubators and similar organizations and can neither be approved nor rejected for traditional companies.

Statement Q5: The organization is too slow to implement a digital business strategy.

The IT governance employees rated the statement Q5 with an average of 3.5 points. The rating consists of three "agree" and one "disagree" rating, which means that the mode of the rating shows a tendency towards agree. G1 who disagreed explained that the biggest problem is

not constituted by the internal barriers in the organization, but lies in recruitment of required programmers. Also G1 admitted problems in prioritizing the existing resources to projects. G2 agreed because of their known and accepted history which leads to slower reaction capabilities. G3 agreed in being sometimes slower and sometimes faster than the market, but with a tendency towards being slower than expected. Finally, G4 accepted that they will be slower than start-ups in establishing new business ideas and therefore invest in more mature business ideas. It is worth mentioning that G2 and G4 as banking employees know and accepted that they are too slow to compete with start-ups.

The incubator employees rated the statement Q5 on average with 2 points. The rating consists of two "strongly disagree", one "disagree" and one "agree" statement. I3 strongly disagreed because start-ups and separated organizations are fast enough to implement new digital projects and services. I3 also mentioned that traditional companies mainly have challenges due to their existing organizational structures. I2 disagreed and explained that the competition for start-ups is very high and that speed is critical for every start-up to survive. Therefore start-ups might be slower than some competitors but often fast enough to gain market shares and challenge traditional companies.

IT governance employees on average neither agreed nor disagreed to the statement but three out of four interview partners agreed. So if the mode of the ratings is considered they agreed to the statement. Two of the agreeing interviewees work in the banking industry, which is according to their statements too slow to compete with start-ups. For statement Q11 they also explained that they are slowed down by strong regulations which makes it impossible to compete with smaller businesses which are free of these regulations. The interview partners from incubators explained that start-ups are sometimes too slow to compete among each other but are faster compared to internal IT organizations. Overall out of a start-up perspective the *hypothesis 5* "Traditional IT Organizations are too slow to implement a digital business strategy" has to be rejected.

Statement Q6: The company´s overall workload and shortness of staff affects the time to market for new products and services.

The IT governance employees rated the statement Q6 with an average of 4.25 points and therefore agreed to the statement. The average consists of two "strongly agree", one "agree" and one "neither agree nor disagree" rating. G3 neither agreed nor disagreed and described that they are under a lot of pressure from the customers and therefore building new organizational structures to avoid potential shortness of staff and isolate innovative projects from the workload in the company. The implemented products or features are then later integrated into the existing organization. G2 argued that besides shortness of staff, the budget for projects is not available or low and therefore strongly agrees to the statement. This reason is interesting because it fits to the role of IT as a service provider in the interviewee's company, which has to ask for budget regarding their own innovations. G1 also strongly agreed and already explained the problems in recruiting necessary programmers for statement Q5.

The incubator employees rated the statement Q6 on average with 3.25 points, which means they neither agreed nor disagreed. The average consists of two "disagree", one "agree" and one "strongly agree" rating. I1 disagreed and explained that they just have five employees but

they focus on self-organizing teams. I4 disagreed and stated that their corporate incubator has enough employees to staff new projects. He further explained that their parent faces challenges regarding their time to market not due to overall workload and shortness of staff but because of established and regulated processes. I3 agreed but said that digital products have a faster time to market because of an online distribution which requires less implementation time and is therefore less affected by high overall workload. I2 strongly agreed in terms of challenges for the growth of start-ups explaining that recruiting new employees is a huge challenge for start-ups in a growth stage.

The company´s overall workload and shortness of staff has a negative effect on the time to market in traditional companies. In companies additionally an appropriate budget for the project can affect the time to market for new products and services. In incubators the rating especially differs between the business incubator and the corporate incubator. While the corporate incubator has no problems in getting their projects staffed, start-ups in the business incubator face challenges in recruiting new employees to grow. Overall from an incubator´s perspective *hypothesis 6* "Corporate incubators are not suited to promote internal initiatives for the digital business strategy implementation if the incubator´s parent does not enable employees to join the incubator." can neither be approved nor rejected but for traditional companies the hypothesis can be supported.

Statement Q7: Building new capabilities for business ideas outside the company's primary business is challenging.

The IT governance employees rated the statement Q7 with an average of 3.75 points. The average consists of one "disagree", two "agree" and one "strongly agree" rating and therefore shows a tendency of agreement with the statement. G3 who disagreed explained that in their decentralized IT departments building non-core capabilities works quite well because the IT employees are closer to the customer and better understand their requirements. G1 agreed and stated that they get many projects for example for mobile application development which they have to do themselves despite a lack of experience. G1 also emphasized the importance of implementing innovations in the internal IT department to build the capabilities in their organization. G4 agreed to the statement because there will always be a learning curve regarding new capabilities. G4 mentioned independent from the statement that there is a tradeoff between time and quality and said that he sees the digitalization with a focus on time instead of quality which led to a higher failure tolerance when building new capabilities. G2 strongly agreed and admitted that the employees often want to optimize the existing products which he already explained for statement Q4 which makes developing new capabilities difficult.

The incubator employees rated the statement Q7 on average with 2.75 points which means they neither agreed nor disagreed. The average consists of one "strongly disagree", one "disagree" and two "agree" ratings. I3 strongly disagreed because the business model of a start-up changes in the first year and the start-up team is good at adapting their business to other markets and circumstances. I1 disagreed because being a business angel, they are interested in new business areas they do not know. They need to understand the business idea the start-up has but if they find the team and idea convenient they are able to support them like every other start-up. I4 agreed and explained that it is essential to have a supporter in the top manage-

ment of the incubator´s parent that allows the incubator to build capabilities outside the company´s primary business. I2 agreed and rated the statement based on the incubator´s staff competences. I2 said they need to understand the business model but cannot be more experienced with the core assets of the business model than the start-up team itself. Additionally I2 explained that it is part of the daily business of an incubator to understand and evaluate new business models.

The incubator employees neither agreed nor disagreed to the statement but a difference between business incubators, business angels and investors became clear. The incubator employees both agreed to the statement but out of different perspectives. I4 representing a corporate incubator outlined the importance of a supporter in the parent firm while I2 outlined the challenges with a new business area as a daily task of incubator employees. The IT governance employees agreed to the statement and explained that it is often a challenge to alter a company to build new products and services with new technologies. Also G4 outlined that there is a focus in fast time to market for new products instead of products with high quality. Overall from an incubator perspective hypothesis 7 "The corporate incubator might face challenges to support new ventures with business ideas outside the parent company´s primary business" can neither be approved nor rejected but the generic statement Q7 can be accepted for traditional companies.

Statement Q8: The organization is suited to implement new non-core business products and services.

The IT governance employees rated the statement Q8 with an average of 3.5 points which is between "neither agree nor disagree" and "agree". The average consists of one "disagree", one "neither agree nor disagree", one "agree" and one "strongly agree" rating. G4 disagreed by saying they would only implement new non-core products on the basis of a cooperation. G2 neither agreed nor disagreed because it depends on the non-core business capability and the underlying technologies. In some areas there might be competencies in the company but not in every possible area. G3 agreed and like for Q7 explained that the decentral IT departments have the project responsibility and are supported by the central IT. Interesting is the tendency of the employees in the banking industry who rated with "disagree" and "neither agree nor disagree" whereas employees in the retail and logistics industry "agreed" or even "strongly agreed".

The incubator employees rated the statement Q8 on average with 4.75 points which means they strongly agreed to the statement. The average consists of one "agree" and three "strongly agree" ratings. I2 who agreed to the statement referred to Q7 where I2 argued that learning new business models is a core task for an incubator employee. Regarding statement Q9 this means that the employees are suited to adapt to new business models and are able to support start-ups implementing corresponding products and services. I1, I3 and I4 strongly agreed to the statement without further reasoning.

Incubator employees see themselves suited to support start-ups in implementing new non-core business products. IT governance employees neither agreed nor disagreed to the statement and overall rated the statement lower as the incubator employees. *Hypothesis 8* stating that "A corporate incubator is better suited to implement new non-core business products and services

than a traditional IT organization", can be accepted because of the higher rating and agreement of incubator employees compared to the ratings of company employees.

Statement Q9: The decision for new projects/ventures is business-driven.

The IT governance employees rated the statement Q9 with an average of 4.75 points which means the interviewees "strongly agree" to the statement. The rating consists of three times "strongly agree" and one "agree" rating. G4 agreed but stated that there are exceptions where new projects are proposed by the operational employees and not a top-down strategy. G1 strongly agreed and mentioned that technology-driven new projects would have less business value. G2 explained that the IT has to request their yearly budget like every other department in the company. The allocation of budget is business driven and is based upon estimated operational and project costs in the department. G3 stated that the business and IT employees prepare new projects together but the business department decides if a project is valuable enough for implementation. Overall the IT governance employees agreed that there was a top-down approach in their companies. Interesting to mention is that decisions about profitable projects are made by the business side independently from the key aspects of the new projects which could justify a decision based on technological instead of business value aspects.

The incubator employees rated the statement Q9 in average with 3.5 points which means they neither agreed nor disagreed. The average consists of one "strongly disagree", two "agree" and one "strongly agree" rating. I1 strongly disagreed and explained that his decision is based on the team and not on the business model. I3 agreed because in a joint venture the company decides in a business-driven way which start-ups are chosen. I4 agreed and stated that they have reached a company size that requires them to operate profitably and on their own. I2 strongly agreed and explained that the start-up itself needs to operate in a business-driven way while building their company to make reasonable decisions.

IT governance employees strongly agree to the statement while incubator employees neither agreed nor disagreed. The strongly disagree among the incubator interviewees led to the average of 3.5 while the median is 4. Due to the small amount of interviewees the Likert scale is analyzed with the average ratings instead of the median. Nonetheless, the average of 3.5 and the median of 4 show that every business is to some extent business-driven. I4 for example explained the need to operate profitably and follow the goals of their parent company but I4 also mentioned for Q1 that they operate very independently and decide themselves which start-ups they support. This is a difference to for example G3 where the business solely decides which new projects are implemented. Overall independent of using the average or median for the incubator ratings, the IT governance employees strongly agreed to the statement and therefore the results show support for *hypothesis 9* "Traditional IT organizations are more business driven".

Statement Q10: Mainly the potential revenue growth of the new business idea influences the decision for a new project/venture.

The IT governance employees rated the statement Q10 with an average of 3 which means "neither agree nor disagree". The rating consists of one "agree", one "disagree" and two "neither agree nor disagree" ratings. G1 explained his disagreement with their main goal to gain

market shares at the moment which is very expensive and does not primarily serve the revenue growth, which mean that the decision for a new project is mainly influenced by the potential market share growth instead of revenue growth. G3 neither agreed nor disagreed because projects are launched to test some innovations and to build up capabilities. Also they want to create a culture which is open for innovation and therefore evaluate new business ideas under various aspects. Additionally G4 stated that they initialize projects for features that belong to an overall concept and that some of those might not contribute to the revenue growth. Nonetheless the concept shall increase the revenue, but on a project level the potential revenue growth is not the main driver for a decision. G2 agreed to the statement because they initialized two classifications for projects. If a project is seen as an opportunity for a new business idea the revenue is not important in the first years of development. Otherwise the potential revenue growth is the key factor for the decision.

The incubator employees rated the statement Q10 in average with 4.5 points which means they agreed to the statement. The average consists of two "agree" and two "strongly agree" ratings. I1 agreed and explained that they would evaluate the market to estimate the potential revenue. For those estimations it is important to know the market and customers´ willingness to pay for the proposed product. I4 agreed and also said that it is difficult to estimate the revenue potential.

The IT governance employees neither agreed nor disagreed to the statement because in larger companies some projects are not made out of a revenue growth purpose. For example G1 disagreed with the statement because they are introducing new products to gain market shares in the B2C business. Out of an incubator perspective where the ventures try to create new sustainable businesses it is essential for the incubator´s staff to support new business models with revenue potential. Hence, *hypothesis 10* "Corporate incubators support initiatives that have high potential for revenue growth" can be approved based on the incubator and related organization´s ratings.

Statement Q11: Large teams and hierarchical structures negatively affect the strategy implementation.

The IT governance employees rated the statement Q11 with an average of 3.5 points which is between "neither agree nor disagree" and "agree". The average consists of ratings from "disagree" to "strongly agree". G4 disagrees and explains that the management drives a lot of innovation but they are slowed down by many regulatory requirements in the banking industry. This further explains the rating for Q5 where G4 said that their company cannot be faster than start-ups because new ventures do not have to follow the strict regulations. G3 neither agreed nor disagreed because the implementation responsibility is delegated to self-organized teams that have the empowerment to implement a new business idea on their own. This fits to the approach of giving the implementation responsibility to decentralized IT departments as discussed for Q6 and Q8. The teams are closer to the customer and local stakeholders and are empowered and supported by the central IT organization to realize convenient new business ideas. G2 agreed and explained that there are dissonances regarding the strategy implementation. This originates in the explained resistance against innovation by the operational employees explained for Q4.

The incubator employees rated the statement Q11 in average with 4 points which means they agreed to the statement. The average consists of one "neither agree nor disagree", two "agree" and one "strongly agree" ratings. I2 neither agreed nor disagreed because in the early stages of a business there is no hierarchical structure but in the growing phase of the new venture it is necessary and then slows the start-up down. I1 agreed because start-ups have problems in structuring themselves due to their inexperience in structuring a business. I3 strongly agreed to the statement and explained that it is difficult to balance the required structure and size of a new company.

Hypothesis 13 "New ventures do not face additional challenges resulting from large teams and hierarchical organization" conflicts with the results in which incubator employees stated that there occur challenges in certain phases of the start-ups. Therefore, *hypothesis 13* has to be rejected. The diversified opinions of IT governance employees about this statement and the connections to other statements reveals the consequences of complex hierarchical structure on the strategy implementation. On the one hand this fits to the opinion of the company independent investor I3 that companies mainly are slowed down by organizational challenges when implementing their digital business strategy as stated for Q5. On the other hand banking employees explained that they are slowed down by strong regulations which dictate some processes and structures and they therefore accepted to be slower than start-ups. As a consequence the industrial environment of traditional companies seems to have an essential effect on the implementation of digital business strategies.

Statement Q12: The standardization of IT infrastructures and business processes negatively affects the strategy implementation.

The IT governance employees rated the statement Q12 with an average of 2.5 points which is between "disagree" and "neither agree nor disagree". The average consists of ratings from "strongly disagree" to "agree". Q3 who strongly disagreed said that a good standardization positively affects the agility to implement new business ideas. Furthermore, standardization is the basis for implementing a digital business strategy because otherwise the IT infrastructure and business processes slow the implementation down due to their complexity. G4 disagreed and does not see a negative effect of successful standardization on their strategy implementation. G2 neither agreed nor disagreed and explained the importance to find the balance of standardizing IT and processes to sufficiently use economies of scale but also to enable innovation. Finally, G1 agreed and mentioned that the top management wants standardization but does not find the optimal degree of bureaucracy in the company´s business processes.

The incubator employees rated the statement Q12 in average with 2 points which means they disagree to the statement. The average consists of two "strongly disagree", one "disagree" and one "agree" statement. I1 and I2 strongly disagreed because in their opinion standardized IT infrastructure and core business processes build the basis for agility. I3 disagreed and explained that in the beginning new ventures do not have the time to standardize their infrastructure and business processes but that it is important to later use standards as a basis for new features. I4 agreed because in their business the standards of their parent company do not to support their new business ideas. They are too inflexible because they are built to handle constant capacity utilization for example in a just-in-time production. Digital products and ser-

vices have in I4´s opinion a strongly varying capacity utilization and are often changed and extended which does not fit to the constant utilization the existing infrastructure is designed for. Nonetheless they try to build standardized IT infrastructures within the incubator as a basis for their projects, which takes time and therefore has a negative effect on the strategy implementation.

As the results show standardization is seen as the basis for agility in some companies and as restriction to agility in other cases. Standards that serve regulatory purposes or the connection of two different companies for a production chain can have a negative effect on the strategy implementation. Standardization of IT and processes that does not follow outside regulatory or interface purposes is seen as essential to build a basis to quickly develop new products and services. Overall company and incubator employees see IT infrastructure and processes built to serve a development purpose as an essential part of a successful strategy implementation and therefore *hypothesis 14* "Standardization of IT infrastructures and business processes tie up resources restrict agility and slow down strategy implementation" has to be rejected. Nonetheless it is important to notice that the statement for existing standards like in the incubator´s parent of I4 the hypothesis seems acceptable, but companies know that and build new infrastructure for their digital business strategies.

Statement Q13: The organization´s main purpose is to increase the company´s growth.

The IT governance employees rated the statement Q13 with an average of 4 points which means they "agreed" to the statement. The average consists of one "neither agree nor disagree", two "agree" and one "strongly agree" rating. G3 who neither agreed nor disagreed explained that the main purpose is to ensure the daily business and to build new capabilities for the company's growth. G2 agreed and stated that the main purpose is to support the business and increase the company´s growth by reducing the IT cost. The main purpose of cost reduction contributes to the traditional role of IT in G2´s Company. G4 agreed and G1 even strongly agreed but both gave no further reason for their rating.

The incubator employees rated the statement Q13 in average with 2 points and therefore disagreed with the statement. The average consists of three "strongly disagree" and one "strongly agree" rating. I1 strongly disagreed because the goal and vision behind the company is to build an ecosystem which enables the business angel to help entrepreneurs to start their own business. I2 strongly disagreed because the main purpose is value creation and to reasonably use the existing resources of the incubator. I3 strongly disagreed because for them as venture capitalists the main goal is to generate a good return on investment for their stakeholders. I4 strongly agreed because as a corporate incubator they want to increase their parent company´s growth.

While the company employees agreed to the statement the incubator employees in average disagreed because their main purpose is not increasing the company´s growth. The business angel, business incubator and venture capitalist seem to be satisfied with their company´s size and therefore do not consider new ventures as opportunities to grow. They want to economically manage their assets to generate profit but not to grow. These three companies are the smallest three organizations interviewed and seem to have another focus on their businesses. Considering just the company employees and the corporate incubator the average rating is

4.2. Among those interview partners just G3 did not agree to the statement because their main purpose is to ensure the daily business and after that to build new capabilities that increase the company´s growth. *Hypothesis 15* "New ventures in incubators do not face additional challenges resulting from large teams and hierarchical organization" focuses on the latter group of described interview partners and therefore can be approved.

Statement Q14: The company´s management is suited to recognize the potential of new technologies.

The IT governance employees rated the statement Q14 with an average of 4.25 points which means they "agreed" to the statement. The average consists of one "neither agree nor disagree", one "agree" and two "strongly agree" ratings. G2 neither agreed nor disagreed because the top management relies on recommendations and ideas from outside their business, which could be interpreted to mean that they mainly try to keep pace with the competition and implement similar new business ideas. G4 agreed and outlined that new technologies are often proposed by some managers who have the technical background to recognize their potential. G3 strongly agreed because their management sponsors and tries a lot of potentially promising technologies and believes that a digital transformation requires new technologies and business ideas.

The incubator employees rated the statement Q14 in average with 5 points and therefore strongly agreed to the statement. All interviewees strongly agreed because it is their daily business to recognize the potential of new technologies and new business models.

Managers in traditional organizations see themselves capable of recognizing the potential of new technologies while G2 rated the ability of the company´s management as dependent on many ideas and trends from outside the business. It seems that there is a mismatch between self-estimated and realistic ability to recognize the potential of new technologies among managers. As it is the daily business of incubators, business angels and venture capitalist to evaluate the business models of new ventures they need to recognize potential new technologies and services and therefore *hypothesis 16* "Incubator´s management is better suited to recognize the potential of new technologies than corporate management" can be approved.

Statement Q15: Recruiting of young talented people is one driver of the organization.

The IT governance employees rated the statement Q15 with an average of 3.75 points which means they "agreed" to the statement. The average consists of one "disagree", one "neither agree nor disagree", and two "strongly agree" ratings. G4 who disagreed said that recruiting complements the strategy but the motivation behind their digital business strategy is creating business opportunities and not attracting students. G2 strongly agreed which fits to the challenge of convincing their employees of new topics what would become easier with young people that better understand the current challenges of the digital world. G3 also strongly agreed and believes that the "digital natives" understand the working environment is a key component to consider an offered position. Additionally G3 explained that they build and offer young talented people a good working environment that is attractive for graduates.

The incubator employees rated the statement Q15 in average with 3.5 points which means they neither agreed nor disagreed to the statement. The average consists of one "strongly disagree", one "neither agree nor disagree" and two "strongly agree" ratings. I1 strongly disagreed because they do not recruit people for themselves and support entrepreneurs in the early stages where recruiting is not a goal. I3 neither agreed nor disagreed because they just hire around two new employees per year in the entire company. Nonetheless they would hire feasible entrepreneurs from investments but that would be a side effect. I2 strongly agreed because it is essential to get talented people for start-ups and the incubator itself. I4 strongly agreed and explained that they initially acquired some companies to faster built know-how and get young talented people. Due to the acquisitions they are now known on the market and young talented people apply for a position in the corporate incubator.

The incubator employees both strongly agreed to the statement as recruiting is important for the new ventures as well as the incubator themselves. The IT governance employees agreed to the statement because it is important to hire people that know digital business models and understand the digital market. For the business angel and the venture capitalist recruiting is no primary goal and they do not primarily support start-ups in hiring new people. Overall the interview partners associated with start-ups neither agreed nor disagreed to the importance of recruiting young people to implement a digital business strategy and therefore *hypothesis 17* "Companies try to attract young talented new employees with their corporate incubators" can neither be approved nor rejected. Solely considering the incubator´s ratings lends to support the hypothesis.

Statement Q16: The implementation of a digital business strategy requires the company´s Top-Management involvement.

The IT governance employees rated the statement Q16 with an average of 4 points which means they "agreed" to the statement. The average consists of one "disagree", one "agree" and two "strongly agree" ratings. G1 disagreed and explained that after the management set the scope and agreed to the budget for a project the implementation should be done without the top management involvement to reduce the number of involved stakeholders. G3 agreed and said that the top management needs to delegate and control projects during the whole lifecycle. G2 and G3 strongly agreed and due to the strong business-driven character of their companies top management involvement is essential for strategically important projects. Interesting is the fact that G1 who is not in the top management disagreed and the other interviewees agreed as they are in their company´s management.

The incubator employees rated the statement Q16 in average with 4.25 points which means that they agreed to the statement. The average consists of one "neither agree nor disagree", one "agree" and two "strongly agree" ratings. I1 neither agreed nor disagreed because the top management should control and support a self-organized team which implements the digital business strategy. I2 and I4 strongly agreed because it is important to have strong supporters on all hierarchical levels and especially in the top management that prioritize the implementation without too much time-consuming coordination among the management.

Except for G1 and I1 all interview partners agreed to the statement. G1 disagreed because the implementation should be done without the top management but it is likely that G1 meant the

implementation of concrete software development projects. I1 neither agreed nor disagreed similarly to G1 because the management should control self-organized teams. Overall the interview partners agreed to the statement Q16 and therefore *hypothesis 18* "Implementing a digital business strategy in an IT organization requires Top-Management involvement" can be approved.

Question Q17: What is the average time to market for a new business idea?

The answers of IT governance employees ranged from four weeks for a new feature to four years for a complex new business idea. G1 estimated two years for a market ready and scalable product. G2 said two years until a new idea is further developed and implemented. G2 also said that the time to further develop the idea takes the most time. G3 answered three to six month and G4 named the range from four weeks to four years. G4 estimated that a first pilot for a new business idea could be developed within three months without being market ready.

The answers of incubator employees ranged from six to twelve months. I3 estimated that it takes the start-ups three months to implement a new business idea. I4 estimated one month for a customer ready pilot to test the business idea. To get a sellable product I4 said it would take six to twelve month. For a market ready product of a new business idea I1, I2 also estimated six to twelve months implementation time.

The interview partners had problems in estimating the average time to market for a new business idea and roughly guessed the average times for their companies. Therefore the times are used for a first general statement about differences regarding time to market between start-ups and traditional IT organizations. Overall the interviewees estimated 6-12 months' time to market for start-ups and around 24 months for traditional companies. G3 in the retail industry estimated 3-6 months for their company which might be a difference due to the industry environment. Nonetheless seem start-ups to have a faster time to market than traditional companies and therefore show support for *hypothesis 11* "New ventures in incubators implement new products and services faster than traditional IT Organization". For a better evaluation of this hypothesis concrete projects in companies and start-ups should be analyzed.

Question Q18: How does the organization try to speed up the time to market?

Generally all IT governance employees agreed with the importance of entrepreneurial orientation for statement Q3 but gave very diverse answers how their organizations try to improve the speed to the market. G1 explained they build small non-bureaucratic teams to overcome the hierarchical structures which negatively affect the implementation as G1 strongly agreed to in statement Q11. G2 said they try lean management and agile software development. G3 also mentioned agile software development and an overall iterative approach. G4 stated for his rating of Q7 that he sees a focus of the digitalization on fast time instead of quality, which led them to accepting errors in fast developed solutions. G4 also mentioned agile software development which fits to the increased error tolerance. Additionally G4 relies on cooperation with business partners to faster develop digital products and services.

Incubators, business angels and venture capitalists support start-ups to build a sustainable new business. The venture capital company I3 works for invests in start-ups and provides financial support. Additionally they use their network to connect start-ups with software engineers or sales representatives. I1 as founder of a business angel supports start-ups in a very early stage to define their value proposition to customers, distinguish a promising market and find a fitting product. I2 supports external entrepreneurs which often are from a university with an initial business model and few knowledge outside their core business. For example they help start-ups with contracts and accounting to speed up the time to market because then entrepreneurs are not burdened with those administrative business functions. In the corporate incubator of I4 they use agile software development to speed up the time to market. Additionally they avoid changing team members during projects.

Overall agile software development in the IT management is seen as a promising way to speed up the time to market instead of altering the IT governance. G1 talked about small non-bureaucratic departments and G3 explained their approach to empower small self-organized teams as a way to speed up the time to market. I4 explained that their parent is too slow to implement the digital business strategy and that they founded the incubator to speed up the implementation and testing of new digital business models. Summarized hypothesis 12 “IT Organizations try to speed up their time to market by implementing federal IT Governance” has to be rejected because companies try to speed up their time to market for new products and services not by altering the IT governance but by building teams or organizations that are able to operate outside the governance structures and using agile software development.

Concluding Questions

At the end of the questionnaire the interviewees were asked how many projects their organization currently implements or new ventures they are supporting. Table x illustrates the answers. The IT governance employees have ten to 65 projects. G1 said they have 65 projects in total running at the moment which have all more or less to do with digital technologies. G2 simply said 12 projects originating from their digital business strategy. G3 revealed that all projects are digital without saying the actual amount of running projects. G4 said they run 10 innovative projects which include research and development projects in certain topics. The incubators and related organizations are supporting ten to 60 start-ups. I1 invested in two and is currently supporting eight start-ups. I2´s incubator has the goal to incubate 30 ventures each year. The venture capitalist of I3 invested in 60 start-ups worldwide. I4 as a corporate incubator supports 30 to 50 internal and external start-ups. Overall there are many activities in all interviewed organizations associated to digital products and services with varying projects and start-ups due to the different organizational sizes. Moreover, all projects or new business ideas have some sort of digital aspect and therefore require a digital business strategy. This underlines the importance of approaches to implement a digital business strategy and to understand the challenges for companies, incubators, investors, start-ups and project teams.

Interview Partner	Projects or supported start-ups
G1	65 projects

G2	12 projects
G3	No concrete answer
G4	10 projects
I1	10 start-ups
I2	Goal to support 30 start-ups each year
I3	60 start-ups worldwide
I4	30 to 50 start-ups

Table 8: Current projects of interview partners

The last question of the questionnaire was the subjective assessment of the interviewee on how important the digital strategy for the competitive advantage of their company is. G1 stated that the digital innovations are important but are just different packaging for existing products. Furthermore, the products are as important as an innovative supply chain for the long term competitiveness of his company. G2 said the digital strategy is very important for their business but not the absolute priority. Similarly to G1 the existing products and their improvement are important as well. G3 explained that in the retail industry the digital strategy is the key factor for the completive advantage because their customers are changing and a retailer has to cope with those changes to stay in business. G4 mentioned that they are currently learning that an IT strategy is valid for one year. They used to define an IT strategy for three years but after one year they have to alter it extensively. The digital strategy is very important and they adapted the strategy definition process to cycles of one year and considering different implementation approaches like mobile first. Mobile first is a development in enterprise application development (Wagner & Giles, 2015) and means that they want to implement their products first for mobile devices and then for desktop computers.

I1 thinks that without digital products and services no company will survive in the future and that a convenient digital strategy is essential for the competitiveness. I2 also attests digital products a crucial factor for success in every industry. I3 said that the digitalization is a trend in Germany at the moment but for them as an international investor it has been relevant for 15 years with varying new technologies and business models. I4 defined the corporate incubator as the digital strategy implementation for their parent. For the parent the incubator and the implementation of their digital strategy is central to build B2C systems which integrate many products the parent already offers enriched with software to become the center of an digital ecosystem. Overall all interview partners see the implementation of a digital business strategy as an important factor for competitiveness in Germany. Nonetheless the degree of importance varies between crucial and not absolute first priority. For the incubator employees' digitalization seems crucial whereas the company employees see it as very important but not the first strategic priority.

The results of this chapter are illustrated in the appendix 8.2.3 as an overview over approved and rejected hypotheses. The next chapter uses the results to characterize traditional IT organizations and incubators as well as related organizations in terms of digital business strategies. Additionally it will outline some independencies between traditional and incubator organizations to highlight trends derived from the interviews.

5.2 Overall discussion of the results

The interviews with employees from traditional companies showed that some companies are too slow to implement a digital business strategy and lose market shares. One factor which slows companies down is their complex organizational structures. For example in the banking industry the processes and systems are often subject to strict formalities. This makes building new digital capabilities challenging because the integration in regulated processes and IT systems takes time and effort. Nonetheless the development of digital products and services is an important strategic goal of traditional companies to keep pace with competitors.

Interesting is that the companies seem to be in different stages on digitalizing their products and services. In the retail industry digital sales have been present for more than 20 years and they are used to changed business models and have a faster time to market for new products and services. In the logistics industry there is competition about B2C market share. The competition forces logistics companies to first build unprofitable products and services to attract customers and establish themselves in the market. They see digital as a modern package for the already existing products and services. In the banking industry digital products and services alter the points-of-sales centric business models. It already started when online banking was demanded by more and more customers and now many customers want to handle all their banking activities not just from their desktop computers at home but also from their mobile devices. Moreover, established banks are challenged by start-ups that offer similar products and services but develop considerably quicker because they do not have to consider the same regulations. Therefore the banks start to accept that they are not fast enough to compete with small companies and focus on more mature digital business ideas. Furthermore, they seem to have a focus on their online platforms to offer all services for mobile and desktop devices.

All industries have in common that new projects are mostly originating in an overall corporate strategy and the business departments are in charge and not the IT departments. This also leads to slower implementation times as the different departments have to discuss the requirements with many stakeholders. Additionally it is possible to focus on new digital business models or on altering existing business models to use modern technologies. All firms said that they extend existing services and refine existing services and therefore focus on both possibilities digital technologies are offering. As there is a technological change in industries and companies it is interesting that the business departments in companies mainly decide and demand how the IT departments use those new technologies. At least for new business models enabled by new technologies the organization could become IT driven. This would give the responsibility of a successful project to the team that implements the core part of the business model. An organization should therefore support business and IT driven innovations depending on where the new business idea comes from and whether the main innovation is related to business or technology. Unfortunately traditional firms have to first change their structures and processes to equate the business with IT departments. Furthermore, federal

organized companies could give the responsibility of projects to their decentralized business units because they are closer to their customer and empower small decentralized teams to implement the projects. This will lead to a faster time to market due to requirements engineering with less stakeholders, better understanding of the customer´s needs and a self-driven instead of business-driven implementation. To ensure self-driven teams they have to consist of cross-functional teams with IT and business members. For their empowerment it is important that the central business unit supports decentral teams without slowing them down. Overall traditional companies define and altering their businesses to adapt to digital business strategies but are too slow in the implementation due to regulations and their business-driven structures in a technological change.

The interviews with employees from incubators, a business angel and a venture capitalist revealed that their daily business is to recognize the potential of new technologies and are therefore better suited to evaluate new business ideas than managers in traditional companies. Especially the corporate incubator and the venture capitalist in joint-ventures with traditional firms experience internal barriers against disruptive initiatives. One goal of the corporate incubator and the venture capitalist is to offer companies the opportunity to test disruptive business models in a separate organizational environment. Thus they are able to build new capabilities and have the opportunity to evaluate whether the new business model can replace an existing product. The supported start-ups quickly implement new products and services and are able to adapt their business model to more promising markets. The agility comes from small teams and no hierarchical structures in the early stages of a new venture. Nonetheless new companies struggle with building hierarchical structures when they are growing. Most entrepreneurs have no or just few experiences in organizing a running business and have challenges structuring themselves. Furthermore, they have problems with their IT infrastructure when their business grows. In the beginning of their business there is no time to standardize IT infrastructure and business processes because a fast time to market is more essential. When the company grows they need to standardize their IT and core processes to maintain their agility. Growing start-ups seem to face similar challenges as traditional companies regarding hierarchical structures and complex IT systems.

Overall corporate incubators enable internal or external entrepreneurs to quickly build a new venture and test a promising business model. Additionally the incubator´s employees are suited to distinguish between promising and not promising business models based on the start-up team, the targeted market and the used technology. All interview partners solely support ventures with digital aspects in their business model and therefore confirm similarly to the traditional companies the importance of digital business strategy implementation in all industries.

Between traditional IT organizations, incubators and venture capitalists some interdependencies exist. On the one hand all interview partners acknowledged that entrepreneurial orientation is important but have problems in introducing an entrepreneurial mindset to their employees on the other hand. For example in a traditional bank the management knows the importance of new digital products and services while they have to convince their staff to prefer developing new services instead of refining existing ones. Additionally many large companies know they are slower than start-ups due to their complex structures or regulations. These problems in their organization lead them to outsource the implementation of a digital business

strategy to corporate incubators or to seek help from venture capitalists. They therefore outsource their innovation and do not build related competencies in their organization. Start-ups and internal entrepreneurs eventually apply to the corporate incubator and test new business models. The risk of too few applying start-ups and internal entrepreneurs might limit the desired strategy implementation. Furthermore, the parent company´s management gave the power to control the implementation to the incubator´s management and limited their intervention options.

Moreover, traditional companies often have a high workload and shortness of staff which will negatively affect the amount of applying internal entrepreneurs. Enabling employees to join the incubator and test new business models would give the company more control because they could give one of their employees a new business idea and a team to test it in the incubator. To ensure this empowerment, which is similar to the already explained decentralized teams in the retail company, the parent would have to alter their internal organization who they originally wanted to overcome with launching an incubator. So outsourcing the strategy implementation can help to implement a digital business strategy like in the presented corporate incubator but does not help to overcome insufficient performance within the incubator's parent.

Overall establishing corporate incubators or cooperation with venture capitalists to overcome bad internal performance will not solve this problem but transfer the responsibility for potential failures to another party. Companies establish an organizational environment that they are able to control but which is not subject to their own governance restrictions. They could however start changing their governance to enable internal conditions resembling a start-up for project teams like in the company of G3 or build a business incubator to support one specific company-wide topic of innovation like in the corporate incubator of I4. When a company empowers internal teams or launches a corporate incubator it has to enable self-organized and self-responsible entrepreneurs to join a cross-functional team or an incubator by adapting their governance structures. Finally, without a fitting organizational structure there cannot be a sufficient digital business implementation. The digital transformation seems to be an organizational change which explains the importance and risks all interviewees link to the current because it reveals fundamental organizational problems in companies that are hard to overcome.

6 Conclusion, Limitations and Future Work

6.1 Summary

Figure 8 illustrates and summarizes the research process and the results of the different steps. In step one a literature review were conducted to find definitions for IT organization, IT governance, business incubators and corporate incubators. In step two the results from the literature review were used to develop 41 characteristics out of the 78 found articles. From the 41 characteristics 21 are about IT governance and 20 are about corporate incubators. In the third step the characteristics were used to develop 18 hypotheses about the digital implementation capabilities of internal and external IT organizations. In the fourth step a questionnaire with

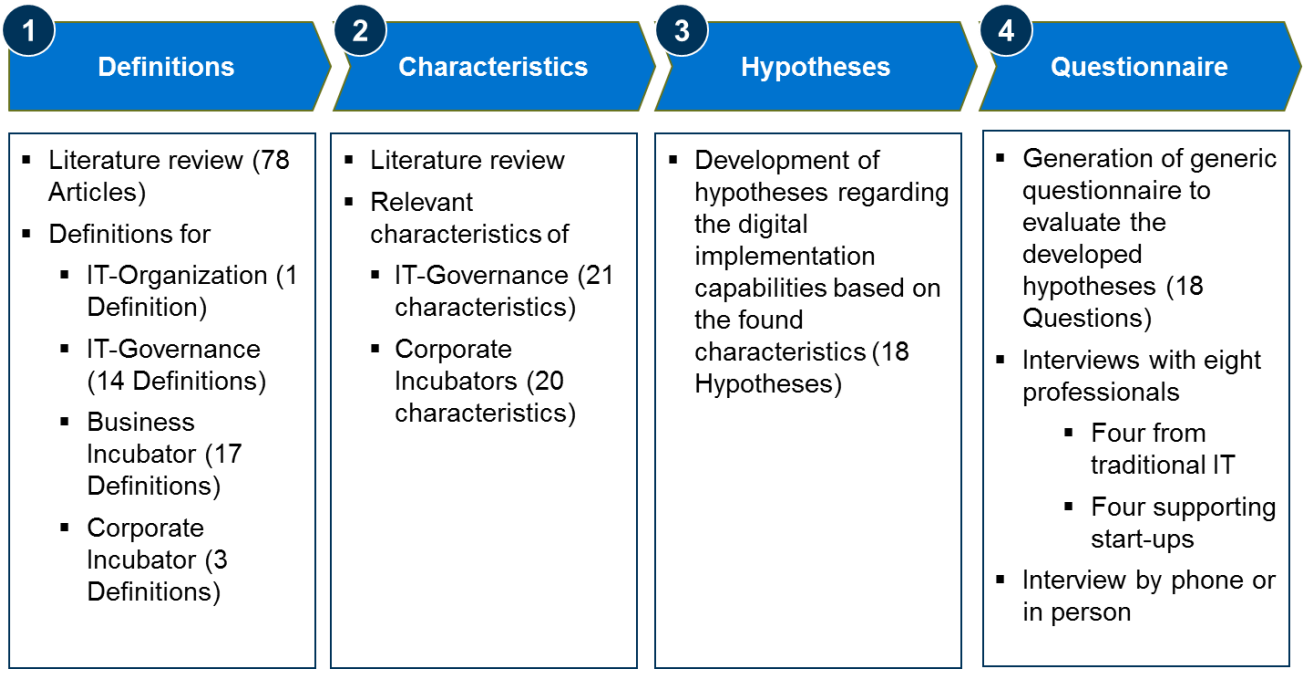

Figure 8: Research process summary

18 questions was used to evaluate the developed hypotheses. In interviews with eight professionals eleven out of 18 hypothesis could be supported. Form the eight interview partners four are from internal and four are from external IT organizations. The interviews were conducted by phone or in person to ask about reasons behind answers.

The supported hypotheses give first answers to the research question "How to implement new products and services from a digital business strategy". When implementing within an internal IT organizations it is important to consider that they might be too slow to compete with the market (H5) and are more business driven (H9). Implementing new products and services using an external IT organization the new business ideas need to fit to the strategy (H1), the incubator´s parent has to enables employees to join the incubator (H6) and the business model needs potential for high revenue growth (H10). Both organizations have in common that an entrepreneurial orientation of the entrepreneurs and employees is important for the speed to the market (H3), company´s growth is the main reason behind corporate incubators and the IT organization (H15) and the implementation requires top-management involvement (H18). Differences between both organizations are that incubators are better suited to implement new non-core products and services (H8), incubator´s management is better suited to recognize the

potential of new technologies (H16) and new ventures in incubators implement new products and services faster (H11).

Additionally the thesis found the need for small empowered teams that are outside the traditional governance and therefore have a faster time to market and enable companies to quickly test innovative products and services. After successfully testing a new business model, start-ups as well as cross functional internal project teams will nonetheless face challenges with hierarchical structures and standardized IT infrastructure which will slow them down similar to traditional companies. Companies can either internally implement a digital business strategy or outsource the task to a corporate incubator. Independently from the taken approach companies have to alter their internal structures to enable self-organized and self-responsible entrepreneurs to join a cross-functional team or an incubator. About the applicability of one approach or another, the conducted interviews showed that for example banks have strong regulations which slow down their processes and limit the options to alter their governance structure which would suggest to use incubators in the banking industry. Another approach explained by one interviewee was to implement mature business ideas tested from competitors instead of strongly investing in testing themselves. An example for the applicability of empowered internal teams are companies that have to change their businesses periodically as it has been the case in the retail industry. It would not be productive for them to launch a corporate incubator because trends like e-commerce or smartphones disruptively change their business model and therefore have to become a competence inside the company.

Furthermore, the interviews showed that the digitalization affects every industry but this manifests itself in different maturity stages in the digital transformation. For example in the logistics industry the digital market is yet to be shared and every company tries to establish themselves as one of the leaders in the market. Therefore, those companies invest in getting market shares and not to directly increase their revenue. In the retail industry the digitalization is more mature and new products and service are supposed to contribute by generating increased revenue or a competitive advantage. Finally, due to the fundamental changes it is important that the top management of companies is involved in the strategy implementation. Only the top managers have the resources to alter the existing governance and empower cross-functional teams or launch an incubator.

6.2 Limitations

This thesis has some limitations because it tried to representatively characterize two areas of research on a strategic level. Due to the strategic focus and the small but profound interviews some results can only hold as a first attempt to understand the impacts of digital business strategies in companies. The interviewed “incubator” employees are from two incubators, a business angel and a venture capitalist. The interview partners provided a good overview about the business of supporting start-ups and could all contribute to the hypothesis evaluation. Nonetheless this thesis focused on corporate incubators and had only one interview partner working in one. This influenced for example the evaluation of statement 13 “The organization´s main purpose is to increase the company´s growth” because the corporate incubator and traditional companies agreed to the statement while others disagreed. Therefore, the hypothesis can be supported but needs further research with more corporate incubators. Furthermore, the differences between business angel, incubators and investor affected the rating

of statement 7 “Building new capabilities for business ideas outside the company’s primary business is challenging” because the incubators agreed while the others disagreed to the statement. All agreed that understanding new business ideas is their daily business but rated their ability to build capabilities differently. The incubators agreed because they support start-ups in a different way than business angel and investor which requires a more profound understanding of the business and therefore better capabilities. Those differences give a good overview about the business models of incubators, business angels and venture capitalists but prevented in some cases a clear evaluation.

One limitation arose due to the used Likert scale because the interview partners could have tried to portray themselves or their organization in a light that they believe the examiner or society to consider more favorable than their true beliefs. This phenomenon is called “social desirability responding” (Robinson et al. 1991) and has to be considered when further using the results. Also there might exist more differences between industries in the maturity or approaches taken in the digital transformation that were not revealed in this thesis.

6.3 Future Research

The conducted interviews serve the purpose of creating an initial understanding of the effects of digital business strategies on companies. An online survey which refines the presented hypothesis in this master´s thesis would be the next scientific step to gain more reliable data and further insights into the effects of digitalization. More data could for example clarify whether the average or mode rating for statement 5 “The organization is too slow to implement a digital business strategy” is correct. In case of statement 5 the average suggested neither agreement nor disagreement while the mode rating suggested an agreement to the statement.

As mentioned earlier the digitalization changes every industry but is in different stages and has different impacts. For example in the retail industry digital technologies have been affecting them for the last two decades and the current new technologies are only the next step. In the banking industry the changes are more fundamental and banks are at an early stage to adapt their whole organization to the new requirements. For future research it would be interesting to define the different stages of digitalization and to correlate them with industries. More specifically a case study about a banking institute could reveal how they try overcome challenges due to strong regulations and complex legacy systems.

The ratings of business angel, investor and incubators also suggest differences between them which affected some ratings and the evaluation of hypotheses. Future research could on the one hand define the differences between companies associated with supporting start-ups. On the other hand interviews with solely corporate incubators could be used to reevaluate the presented hypotheses.

The interdependencies between internal IT governance and successful strategy implementation should be further researched to more clearly define the necessary prerequisites to the internal or external realization of a digital business strategy. This research could then give companies a guideline what to consider when investing in digital business models. Moreover, it could provide companies with concrete steps for a successful implementation. One possible

suggestion for companies could be to give cross-functional teams the implementation responsibility and empower them to develop independently.

While some hypothesis need further responses with for example an online survey, others could be analyzed more deeply by conducting a case study. The following statements seem interesting for a case study due to their ratings:

- Q3: Entrepreneurial orientation benefits the speed to the market for new products and services.
- Q4: Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the company.
- Q12: The standardization of IT infrastructures and business processes negatively affects the strategy implementation.

Case studies could for example show how companies try to increase the entrepreneurial orientation or explain the benefits on the time to market in a successful case. For disruptive technologies a case study with a corporate incubator could explain the barriers the initiative would have faced internal of the company and how the technology is nurtured and tested within the incubator. Furthermore, it could show a successful technology which is introduced into the operational division of the company after successful incubation. Finally, a case study could exemplify the importance of well standardized software as basis for the strategy implementation.

Lastly further research in combination with industry specifics should elaborate when it is better to implement a digital business strategy with an internal team and when it is more advisable to choose a corporate incubator. For instance, the results of this thesis point to the suggestion that in a strongly regulated environment like the banking industry an incubator is more likely to succeed because the unchangeable regulations slow down the implementation.

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8 Appendix

8.1 Questionnaire

How to implement new products and services of a digital business strategy?

Depending on weather you are in an IT-Organization or a Business Incubator, „Company“ refers to either the company you are working for or the incubators parent, respectively. “Organization” means your working environment, so either the IT-Organization or the Business Incubator, respectively.	
What position do you have in your organization?	
How many years of working experience do you have in the area of practice?	
In which industry does your company mainly operate?	
How many employees does the Organization have?	

For each of the questions below, circle the response that best characterizes how you feel about the statement, where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree Nor Disagree, 4 = Agree and 5 = Strongly Agree.

		Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
Q 1	Mainly the strategic fit of the new business idea influences the decision for a new project/venture.	1	2	3	4	5
Reason:						
Q 2	A company benefits more from an extended service portfolio than from refining existing services.	1	2	3	4	5

Reason:						
Q 3	Entrepreneurial orientation benefits the speed to the market for new products and services.	1	2	3	4	5
Reason:						
Q 4	Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the company.	1	2	3	4	5
Reason:						
Q 5	The organization is too slow to implement a digital business strategy.	1	2	3	4	5
Reason:						
Q 6	The company´s overall workload and shortness of staff affects the time to market for new products and services.	1	2	3	4	5
Reason:						
Q 7	Building new capabilities for business ideas outside the company's primary business is challenging.	1	2	3	4	5
Reason:						
Q 8	The organization is suited to implement new non-core business products and services.	1	2	3	4	5
Reason:						
Q 9	The decision for new projects/ventures is business-driven.	1	2	3	4	5
Reason:						

Q 10	Mainly the potential revenue growth of the new business idea influences the decision for a new project/venture.	1	2	3	4	5
Reason:						
Q 11	Large teams and hierarchical structures negatively affect the strategy implementation.	1	2	3	4	5
Reason:						
Q 12	The standardization of IT infrastructures and business processes negatively affects the strategy implementation.	1	2	3	4	5
Reason:						
Q 13	The organization´s main purpose is to increase the company´s growth.	1	2	3	4	5
Reason:						
Q 14	The company´s management is suited to recognize the potential of new technologies.	1	2	3	4	5
Reason:						
Q 15	Recruiting of young talented people is one driver of the organization.	1	2	3	4	5
Reason:						
Q 16	The implementation of a digital business strategy requires the company´s Top-Management involvement.	1	2	3	4	5
Reason:						

Q 17	What is the average time to market for a new business idea (in months)?	
Q 18	How does the organization try to speed up the time to market?	

How many projects related to digital products and services is your organization currently implementing?	
How important is in your opinion the digital strategy for the competitive advantage of your company?	

Figure 9: Questionnaire

8.2 Characteristics, Hypothesis and Statements Overview

8.2.1 Overview Characteristics

The literature used to derive the characteristics is explained in chapter 3.

ID	Characteristic
BI 1	The corporate incubator acts as a knowledge hub where good ideas can be nurtured and from which innovative knowledge is transferred into the incubators parent.
BI 2	Corporate Incubators want to achieve profits from their involvement in new ventures by extending the possible services offered to clients.
BI 3	Corporate Incubators help to develop new business ideas based on research done in the incubators parent but are outside their core business.
BI 4	Incubators offer shared office space, shared support services, professional business support and networking connections as key values to new ventures.
BI 5	Market incubators focus on non-core technologies that, if successful, will increase the demand for the parent's core technology and products.
BI 6	Companies establish incubators to leverage entrepreneurship from their employees.
BI 7	There is an effect between offered services, industry and attracted ventures.
BI 8	Entrepreneurial and managerial experiences as well as good connections to the incubators parent resources are important capabilities for the incubators staff.
BI 9	Incubators present the parent organization with the opportunity to take in innovative technology, fresh ideas and competent new employees.
BI 10	Corporate Incubators help to grow their parent companies´ technology ecosystem.
BI 11	Companies establish incubators to invest in opportunities that arise inside their firm and could become additional sources of growth.
BI 12	Corporate incubators protect new ventures with disruptive technologies from prevailing and prevenient conditions in existing product divisions.
BI 13	New ventures in incubators cost a considerable amount of money, take at least five years before they generate some sales and maybe build a niche market.
BI 14	The new ventures of corporate incubators are supposed to contribute to the long-term competitiveness of the parent firm.

BI 15	Selection criteria's for new ventures are potential disruptiveness, high revenue potential and strategic alignment to the parent's long-term corporate strategy.
BI 16	After incubation ventures with strategic value to the parent firm can be integrated into one of the firm´s operating divisions, while those that are no longer strategically relevant can be spun out with a minority stake.
BI 17	Integrating successful incubated ventures back into operating divisions is challenging due to resistance of these divisions against new technologies not invented within them.
BI 18	Company internal entrepreneurs have the competence to manage the development of the technology and growth of the venture.
BI 19	Incubators are motivated to help new ventures to develop quickly into competitive businesses with a focus on fast time-to-market.
BI 20	Corporate incubators do meet set objectives as they create high returns for the parent company due to reasonable sales growth rates, launch of new products and patent generation.
ITG 1	Larger companies are less innovative than small companies because their business and IT structures are more complex.
ITG 2	Large established firms tend towards modifying and refining their existing products and processes, rather than developing radical innovations.
ITG 3	As firms become larger, they become more bureaucratic, leading to slower reactions to changes in market conditions and substantial efforts are required to alter the direction of the firm.
ITG 4	Implementing competence-displacing technologies targeting new customer groups with different sets of preferences or utility functions than existing customers prove to be challenging for established firms.
ITG 5	Established firms turn towards corporate entrepreneurship because of internal resistance to change and inertial forces preventing the generation of novelty.
ITG 6	Corporation´s management is not well suited to determine the direction for innovative technologies.
ITG 7	More growth comes from introducing digital business models than of adding another feature or new technology to existing business models.
ITG 8	Organizations with ineffective IT governance suffer from increased complexity and risk, a lack of agility and inefficient IT project management.

ITG 9	As IT becomes a critical element of business strategies and core operating processes, there is a need for greater involvement of the board of directors in implementing a digital business strategy
ITG 10	The IT steering committee serves as a high-level executive team, comprised of representatives from various divisions or functions within the organization, with the main function of linking its IT strategy and business strategy.
ITG 11	IT governance improves the IT performance and organizations then benefit from reliable, fast and secure IT solutions as well as a rational return on investment.
ITG 12	Ineffective IT Governance and poor overall firm performance lead organizations to outsource their IT function.
ITG 13	IT Organizations face challenges in standardize their systems, cut IT costs, and align the IT organization with business strategies, while simultaneously acknowledging the decentralized business divisions across different countries.
ITG 14	The implementation of a federal IT Governance model leads to a significant cost reduction, enhances R&D, improves time-to-market for new products and therefore supports profit growth.
ITG 15	Organizations need to focus on both standardization and innovation, and in the process have adopted a federal IT Governance model.
ITG 16	Traditional IT focuses on efficiency and reliability to gain competitive advantages from cost reduction in a stable placid market environment.
ITG 17	Complications arise in organizations because actions taken at the business unit level affect the organizational level, and vice versa.
ITG 18	Poorly architected IT systems tie up resources, consuming time and money while limiting responsiveness. Also Investing in the wrong IT infrastructure and systems may limit flexibility and constrain an organization's range of responses.
ITG 19	In centralized IT models changing a single system is a key challenge due to the coordination of changes in various other systems.
ITG 20	In traditional IT information systems provide an organization with a constraint changing products because the IT organization is too slow to react to change.
ITG 21	Limited availability of resources and changing team members in a matrix organizational structure delay project implementation.

Table 9: Characteristics

8.2.2 Overview Hypotheses

ID	Hypothesis	Characteristic(s)
H 1	Corporate incubators select new ventures according to the strategic fit of the new business idea.	BI 15, BI 16
H 2	A company benefits more from an extended service portfolio than from refining existing services.	BI 2, BI 5, BI 10, BI 14, BI 17, ITG 2
H 3	There is a positive relationship between entrepreneurial orientation and speed to the market.	BI 19, (Clausen & Korneliussen, 2012)
H 4	Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the established IT organization.	BI12, BI 17, ITG 2, ITG 5
H 5	Traditional IT Organizations are too slow to implement a digital business strategy.	ITG 1, ITG 3, ITG 4, ITG 20, ITG 21
H 6	Corporate incubators are not suited to promote internal initiatives for the digital business strategy implementation when the incubators parent does not enable employees to join the incubator.	BI 6, ITG 21
H 7	The corporate incubator might face challenges to support new ventures with business ideas outside the parent company´s primary business	BI 7, BI 8
H 8	A corporate incubator is better suited to implement new non-core business products and services than a traditional IT organization.	BI 3, ITG 2
H 9	Traditional IT organizations are more business driven.	ITG 2, ITG 4
H 10	Corporate incubators support initiatives that have high potential for revenue growth.	BI 11, BI 14
H 11	New ventures in incubators implement new products and services faster than traditional IT Organizations.	BI 19, ITG 8, ITG16
H 12	IT Organizations try to speed up their time to market by implementing federal IT Governance.	ITG 14
H 13	New ventures in incubators do not face additional challenges resulting from large teams and hierarchical organization.	ITG 3, ITG 17, ITG 19, ITG 21, BI 19
H 14	Standardization of IT infrastructures and business processes tie up resources, restrict agility and slow down strategy implementation.	ITG 13, ITG 15, ITG 18, ITG 20, (Bharadwaj et al., 2013)
H 15	Company´s growth is the main reason behind corporate incubators and	BI 5, BI 11, BI 18, BI

	the traditional IT organization.	20, ITG 7, ITG 11, ITG 14
H 16	Incubator´s management is better suited to recognize the potential of new technologies than corporate management.	BI 8, ITG 6
H 17	Companies try to attract young talented new employees with their corporate incubators.	BI 9, BI 16
H 18	Implementing a digital business strategy in an IT organization requires Top-Management involvement.	ITG 9, ITG 10

Table 10: Hypotheses

8.2.3 Overview Interview Results

The content in the "Ratings" column means "A" for they agreed or strongly agreed to the statement, "NN" for neither agreed nor disagreed and "D" for disagreed or strongly disagreed. If IT governance and business incubator employees rated differently the rating before the slash represents the governance and the rating after the slash represent the incubator employee´s average rating. The content in the "Result for Hypothesis" column means "A" for according to the answers of the conducted interview the hypothesis can be approved, "NN" the hypothesis can neither be approved nor rejected and "R" the hypothesis has to be rejected.

ID	Question	Hypothesis	Ratings	Result for Hypothesis
Q 1	Mainly the strategic fit of the new business idea influences the decision for a new project/venture.	H 1	A	A
Q 2	A company benefits more from an extended service portfolio than from refining existing services.	H 2	NN	NN
Q 3	Entrepreneurial orientation benefits the speed to the market for new products and services.	H 3	A	A
Q 4	Digital initiatives face, due to their potential disruptiveness, huge internal barriers in the company.	H 4	NN/A	NN
Q 5	The organization is too slow to implement a digital business strategy.	H 5	NN/D	NN
Q 6	The company´s overall workload and shortness of staff affects the time to market for new products and services.	H 6	A/NN	A
Q 7	Building new capabilities for business ideas outside the company's primary business is challenging.	H 7	A/NN	NN
Q 8	The organization is suited to implement new non-core business products and services.	H 8	NN/A	A
Q 9	The decision for new projects/ventures is business-driven.	H 9	A/NN	A
Q 10	Mainly the potential revenue growth of the new business idea influences the decision for a new project/venture.	H 10	NN/A	A
Q 11	Large teams and hierarchical structures negatively affect the strategy implementation.	H 13	NN/A	R
Q 12	The standardization of IT infrastructures and business processes negatively affects the strategy implementation.	H 14	NN/D	R

Q 13	The organization´s main purpose is to increase the company´s growth.	H 15	A/D	A
Q 14	The company´s management is suited to recognize the potential of new technologies.	H 16	A	A
Q 15	Recruiting of young talented people is one driver of the organization.	H 17	A/NN	A
Q 16	The implementation of a digital business strategy requires the company´s Top-Management involvement.	H 18	A	A
Q 17	What is the average time to market for a new business idea?	H 11		A
Q 18	How does the organization try to speed up the time to market?	H 12		R

Table 11: Interview Results