Governing digital technology – how mature IT governance can help in digital transformation?

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Abstract
Due to its unique features, the focus of implementing digital technology in the business is no more to improve internal operations, but to expand internal dimensions, reach customers and external partners, improve affect services, integrate processes, disrupt markets and fundamentally change industries. Research results [16] suggest that integrated products, services, channels and processes address disruption, and it is not separate technology strategy, but unique digital strategies that incorporate the opportunities digital technologies presents. One of the objectives of this paper is to investigate how mature IT governance activities can affect adoption of digital technologies. As many researches argued about various mechanisms that can affect IT governance performance, we would like to discuss if research in governing digital technologies should follow similar path. In first section of paper we will explain distinguished and unique features of digital technologies and show some useful examples of their use in the business. In other sections we would like to contribute with case studies explaining how companies with more matured IT governance have different mechanisms in preparing to inevitable digital transformation. Our working hypothesis will be that companies with matured IT governance are more likely to engage in digital initiatives and have better starting point for digital transformation. Using case study approach we would investigate what mechanisms of (mature) IT governance might be useful in digitalization.

Key-Words: digital transformation, evolution of digital technologies, IT governance maturity, case study

1   Introduction

In last decades information technology (IT) has become increasingly important in supporting the business, enabling growth, achieving and sustaining competitive advantage. There are many evidences on crucial role of IT extending organization's strategy and objectives ([23], [24]) and aligning with the business to achieve organisational goals [14]. On the other hand, as IT was introduced some five decades ago, over last three decades the prevailing view of its use in business was mainly as a tool supporting many functional levels. While early IT implementations were clearly focused on automation of clerical and repetitive tasks, in today's highly competitive business environment, effective and innovative use of information technology (IT) has the potential to transform businesses and drive stakeholder value ([25], [13]). According to the recent study results [4], IT is quite to very important to delivery of the corporate strategy and vision, and the notion of IT governance ([4], [3], [18]) brings IT on board-level governance agenda. Valentine et. al ([22]) reported that 'in the digital economy, board's role is changing from members having a primarily financial and legal focus' to where IT governance is becoming an integral part of corporate governance ([23]).

Research in IT governance field is well documented ranging from crucial mechanisms [3], implementation in different industries ([5], [17], [15]), standards and regulations ([19], [20]) and IT governance adoption and maturity. Even the main research findings suggest that IT governance should be strategically focused, in many organizations it is still internally oriented and mainly contribute to operational efficiency. In this paper our working hypothesis will be that companies with matured IT governance are more likely to engage in digital initiatives and have better starting point for digital transformation. It is of our specific interest to investigate if companies with more mature IT governance are better prepared to digital transformation and to identify what mechanisms they use.

Previous researches ([3], [20]) revealed that in companies with mature IT governance CIOs (Chief Information Officers) are business oriented executives, CEO-CIO relationship is great, executive levels respect that IT and digital technologies should have strategic impact and support to digital initiatives come from top executive level. As digital technologies are externally oriented and focused on enhancing customer experiences and disruption of business models, it would be interesting to investigate if these principles interchange. Therefore, main idea of this paper is to explain how digital technologies might strategically affect the business, but also to investigate how subtle IT governance mechanisms might 'prepare' the company to digital transformation.

2 Literature review on digital technologies and useful examples of its use

During last decade the proliferation of digital technologies and improvements in information reach, communication, and connectivity, have made digital technologies key emerging technologies which can make fundamental impact on processes, business models and whole industries. In very short period of time, term 'digital' becomes very popular shifting usual vocabulary from IT to 'digital' technologies, IT strategy to 'digital' strategy, 'digital disruption' and similar. Coined by visionary researcher Don Tapscott in 1995 in a book called "The Digital Economy: Promise and Peril in the Age of Networked Intelligence" [21], digital economy refers to new business models, markets, goods and services, especially those based on digital technologies as a basic business infrastructure.

The concept of digital economy is based on integration and simultaneous application of different, independently developed and ready-to-use digital technologies. Bharadway [1] define digital technologies as combinations of information, computing, communication, and connectivity technologies and argue that exponential advancements in price/performance capability of computing, storage, bandwidth, and software applications are driving the next generation of digital technologies to be delivered through cloud computing. Therefore, digital technologies, as a subset of information technologies (IT), refers to set of digital resources (technologies, tools, applications and algorithms) which enable efficient discovery,

analysis, dissemination and usage of digital goods. If used simultaneously and integrated, mobile, social, cloud, big data, sensors – Internet of Things and other digital technologies have the ability to extract information form physical goods (data on sensors about condition of physical device), disseminate it quickly (transferring using mobile technologies), storing on cloud, analyze it instantly (using big data and advanced analytics), thus integrating products, services and processes, and making disrupting impact on established business models. The most important factor of digital economy is the ability to simultaneously use different digital technologies to fundamentally transform business strategies, business processes and firm capabilities create. Digital technologies come in many forms. Basically, there are two main groups of digital technologies:
(1) primary digital technologies and
(2) secondary digital technologies.
Primary digital technologies are established and matured technologies which are already in regular use in almost every business, such as: (1) mobile technologies, (2) social networks, (3) cloud computing, (4) big data and (5) sensors and Internet of Things (IoT). On the other hand, secondary digital technologies include the likes of additive manufacturing (3D printers), robotics, drones, wearable technologies, holograms, virtual and augmented reality, cognitive technologies (artificial intelligence), deep learning algorithms, facial and speech recognition and all other emerging technologies, which are to still to improve and evolve, but have a potential to be used in the business and everyday life.

Mobile technologies are essential in transferring data, communicating with customers and providing them with superb services and extraordinary experiences. Payments, banking transactions, insurance, commerce and many others are the examples of industries heavily affected by disruptive nature of mobile and other digital technologies. mPesa service launched by Vodafone allows people with no banking account (mainly in Africa) to deposit, withdraw and transfer money, as well as to pay for goods and services using only a mobile device. Oscar is the innovative digital service by which customers can use insurance services using their mobile phones. VolvoConnected enable enhanced customer experience in automotive industry using mobile phone as a communication channel. Another game changing scenario in finance industry is N26 bank which offers bank services although it has no physical bank offices. N26 is a

direct bank which provides free bank accounts to their clients through mobile application which can be downloaded in just 8 minutes, and is available to clients throughout the European Union.

Social networks are no longer just a medium for entertainment, but strong and serious communication platforms, widely used in business. Good example is Nike+, a business social network which used all primary digital technologies to connect millions of customers who are using Nike products. This digitalized service is extracting the data about sport (exercise) performance from computer chip-based sneakers (IoT technologies), disseminating it using mobile technologies to cloud computing environment where massive volume of data are being stored, enabling customers to engage and communicate, or to use robust big data analysis about their performance. This digital service was followed by NikeID (producing customized shoes) and newly (in November 2017) introduced NikeConnect (NBA fans can read NFC equipped t-shirt to use massive digital services on their mobile devices about NBA teams, cover pre- and post-game analysis, engage in communication with sport stars etc.). By smart use of various digital technologies and by integrating them into corporate strategy, it is possible to 'digitalise' products and offer superb customer service, which results in 'blurring' of physical and digital business model. Successful companies in digital economies follow these strategies in achieving digital maturity.

NIST [10] define cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Cloud computing enables flexible, reconfigurable, efficient, affordable and safe usage of almost unlimited digital capacities in terms of hardware, software, data and IT services. The main principle of cloud computing is to "pay what you use". To put it in other words, cloud computing enables companies to use different IT services with no capital investments, since all the services are available in cloud (e.g. hardware as service, software as service, etc.). Companies can store IT and digital resources using cloud computing services with prescribed and defined quality levels, governed by privacy and security issues.

Big data refers to advanced data analysis and quick knowledge discovery from the huge amount of different datasets (structured and unstructured data). This technology represents the analytical digital platform, represented by three Vs: volume, variety and velocity. Big data enables quick creation, storage and distribution of the new knowledge derived from the advanced data analysis. This kind of knowledge creation and distribution enables multiple business opportunities. For example, entertainment company Netflix stores all its content on cloud computing platforms, using secure, reliable and efficient cloud services, but also uses big data technology to monitor user preferences. Based on the collected data and extensive and advanced analysis about user preferences, they are able to recommend new content to their users with success rate of more than 70%. With smart use of digital technologies Netflix entirely digitalize their business and, with almost 100 million customers in around 130 countries worldwide, significantly improve their performance compared to previous physical business model.

Many companies are embedding sensors and Internet of Things (IoT) in their physical products making them smart and digitalized. We can find examples of such a digitalized resources in almost every industry [1]: Sony digitalized game consoles and televisions, Nest thermostats have real-time internet capabilities, Nike is extracting data from its products, GE include sensors in medical devices allowing doctors to remotely monitor patients, etc. GE, as one of the largest companies in the world employing around 305.000 employees, in 2012 started massive digital transformation with motto "The digital company. That's also an industrial company." They think of Industrial Internet as the convergence of industrial machines, data, and the Internet and in 2012 invested $1 billion to put sensors on gas turbines, jet engines, and other machines, connect them to the cloud, and analyze the resulting flow of data to identify ways to improve machine productivity and reliability. "An average midsize LNG facility sees five down days a year. That's $125 million to $150 million. For an offshore platform, it can be $7 million per day, including oil deferrals, and these assets are never down for a single day"[1]. In their physical business model they have also relied on sensors in GE machines for years. But, pre-Internet of Things

[1] According to Wining, L. (2016): GE's big bet on data and analytics, MIT Sloan Management Review, https://sloanreview.mit.edu/case-study/ge-big-bet-on-data-and-analytics/

(IoT) sensors were used to conduct real-time operational performance monitoring, such as displaying a pressure reading on a machine, not to collect data. A technician would often take a reading from a machine to check its performance and then input the data into information system to allow the whole company to learn from it. In their digital business model sensors and IoT are embedded in devices, they are able to send data over digital infrastructure, connecting machines via the cloud and using data analytics to help predict breakdowns and assess the machines' overall health. Pervasiveness and capabilities of digital technologies enable company to work in real-time with large volume of very useful data about their physical products (machines, jet engines, medical devices, pipelines etc.). 'The sheer volume of data that GE hoped to collect — 50 million data variables from 10 million sensors installed on its machines — would be many times more than most social and retail sites could ever generate. GE projected its revenue from software products would reach $15 billion by 2020 — three times its 2015 bookings'[2]. While software sales today are derived largely from traditional measurement and control offerings, GE expects that by 2020, most software revenue will come from its Predix software, a cloud-based platform for creating Industrial Internet applications, helping them make intelligent pipelines, jet engines, turbines, machines, devices, etc. Also, they are helping their customers to go through digital transformation: BP would outfit 650 of its thousands of oil wells with GE sensors as part of a pilot to test Predix. Each well will be outfitted with 20 to 30 sensors to measure pressure, temperature, and the like and will transmit 500,000 data points to the Predix cloud every 15 seconds. In that way GE successfully digitalized its business transforming the business model from manufacturer of devices and machines to provider of services with digitized business model.

3 Distinguished and unique features of digital technologies and framework for digital transformation

Although digital technologies are pervasive, accessible, even affordable, they have some unique and distinguished characteristics. Due to disrupting capacities and unique features digital technologies have transformed many business models and the

way people communicate, learn, live and work. Ross et al [16] revealed that the distinguishing feature of digital technologies is their accessibility. As these technologies are widely available and affordable to all companies, and many smart applications can be easily replicated or imitated, they can't offer sustained competitive advantage. But, digitally matured companies are trying to integrate existing business capabilities with new capabilities made possible by digital technologies, which is quite hard to replicate. This integration may took various forms: 1. creating unique, value-adding connections among companies products and services, 2. strengthening internal business capabilities, namely excelling operational efficiency, 3. enabling fast interactions with external environment (customers, partners) and 4. coordinating discrete events. It is the integration enabled by simultaneous use of different digital technologies, rather than useful implementation of single one that constitutes the basis for competition in digital economy.

Nylen and Holmstrom [11] stands on that point and argued that digital technologies expanded beyond internal dimensions, penetrating company's product and service offering [28]. They come to the conclusion that digital technologies have some unique features, such as:

1. digital technologies are flexible, easy to use and reconfigure – for example, entirely digitalized business model enable Tesla to change the car configuration in a single software update, Netflix is using flexible cloud computing services on a 'pay per use basis',
2. digital technologies have certain extent of unpredictability and fluidity, or a degree of generativity, which stands for 'technologies overall capacity to produce un-prompted change, driven by large, varied and uncoordinated audiences' [29] – for example, Apple new operating system will enable virtual reality and augmented reality possibilities which will be perfectly aligned with hardware capabilities, intensive use of 3D printers might disrupt many industries, the initial niche market of Airbnb was to provide service for meetings and events for which hotel space was sold out,
3. digital technologies constantly evolve toward higher processing capacity, lower cost and dramatic price-performance improvements.

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[2] Ibid.

Due to its unique features and accessibility, the focus of implementing digital technology is no more to improve internal operations, but to expand internal dimensions, reach customers and external partners, affect services, integrate processes, disrupt markets and fundamentally change industries. Digital transformation has become high priority on leadership agendas and recent researches [2] illustrates that nearly 90% of business leaders in the U.S. and U.K. expect IT and digital technologies to make an increasing strategic contribution to their overall business in the coming decade. Matt et. al [8] revealed the market-changing potential of digital technologies is often wider than products, business processes, sales channels or supply chains - entire business models are being fundamentally reshaped and frequently overturned. Kane et.al [6] concluded that digital transformation has reached a new stage in which digital technologies aren't limited to separate digital divisions, channel or functions but are used across organizations to support corporate strategies that address industry opportunities. Ross et. al [16] stand on that point suggesting that integrated products, services, channels and processes address disruption, and it is not separate technology strategy, but unique digital strategies that incorporate the opportunities digital technologies presents. Therefore digital strategy is defined as 'a business strategy inspired by capabilities of powerful, readily accessible digital technologies (like mobile, social, cloud, big data, IoT and other secondary technologies) intent on delivering unique, integrated business capabilities in ways that are responsive to constantly changing market conditions [16]. Digital strategies anticipate integration of various digital technologies and their external reach, so it is quite obvious that digital strategy should more far beyond than IT strategy. Bharadway [1] argued that 'even within this so-called alignment view, business strategy directed IT strategy'.

Previous analysis shows that there is a growing number of companies exploring and implementing new digital technologies into their business strategies, changing the whole business model and industry. In order to keep up with the latest technological improvements and to adapt to market and customer needs, many companies invest huge amount of money into research and development and lean towards digital transformation of their business models. Ross et al [16] reported that successful companies in the digital economy choose a focal point - customer engagement or digitized solutions - to guide investment decisions,

recognizing that the focus on the customer does not preclude the need to invest in an operational backbone and revealed four keys to successfully implementing a digital strategy:

1. companies should opt between two opportunities that are associated with digital disruption – customer engagement or digitized solutions,
2. operational excellence (powerful and integrated backbone IT systems) is essential for digital strategy execution and sustained success,
3. to facilitate agility, successful companies will rely on powerful digital services backbone, and
4. ongoing organizational redesign that includes structures, processes, roles, partnerships and skills is essential to execute a digital strategy.

Kane et al. [6] also stress out the importance of having a clear digital strategy and leaders willing to support the inventions and change, in order to carry out the successful digital transformation. At the same time 90% of CEOs anticipate their industries will be disrupted by digital trends, but just 44% say their organisations are preparing for the disruptions to come. Kane et.al [6] concluded that digitally maturing companies intentionally create effective digital culture (an expanded appetite for risk, rapid experimentation, collaboration, agility), they have heavy investments in talent and recruiting and developing leaders who excels at soft skills and their digital agenda is led from top. More mature digital businesses are focusing on integrating digital technologies, using coherent and clear digital strategy, while less mature digital businesses are focused on solving discrete business problems with individual digital technologies. Kane et al. [6] conclude that coherent strategy not technology drives digital transformation excelled in following principles, which will serve as the framework for this research:

- coherent and clear digital strategy drives digital maturity,
- scope and objectives power digital transformation strategy (less digitally mature organizations tend to focus on individual technologies and have strategies with limited focus),
- maturing digital organizations intentionally build skills and culture to realize the strategy,
- taking risks becomes a new cultural norm, failure is embarrassed as a prerequisite for

success, with experimenting and even improvising,
- digital agenda is led from the top.

4 Case study

In order to be able to answer to our working hypothesis we decided to conduct a case study analysis followed with a series of comprehensive and in-depth interviews with the key people involved in the evolving IT governance processes at four different companies over 5-year time period. The case study itself was used in separate research [20], but in this paper we will use some of the findings to investigate different issues associated with digital transformation. As Yin [27] defined, "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident", which sounds perfectly aligned with the approach used in this paper.

One of the objectives of this paper is to investigate how mature IT governance activities can affect adoption of digital technologies. As many researches argued about various mechanisms that can affect digital transformation and IT governance performance, we would like to question if research in governing digital technologies should follow similar path. In order to support our working hypothesis we will use case study approach to investigate if companies with more mature IT governance are better prepared to digital transformation and to analyze what mechanisms are useful in doing sos. The case companies for this research were selected based on theoretical sampling, in which the cases are selected such that they represent the problem of the study (Yin, 1994).

Also, following Kane et al. [6] we would like to reveal what are specific obstacles arising from insufficient IT governance in making companies ready for aligning digital technologies with the strategy initiatives. As IT governance initiatives are more internally focused, mainly with the objective to align with current business process, digital technologies are externally oriented, enabling excellent digital services and enhanced customer experience, while disrupting whole business model and changing organizational culture. Digital transformation needs mature and superb IT governance which help conduct business processes. This means that companies with less mature IT governance might not be a good 'candidate' for

digital transformation mechanisms which show that in governing digital technologies we should rely on different mechanisms, namely those associated with change in organizational culture and introducing different leadership style – more experimenting, risk taking attitude, investing in talents, etc.

'Firstly we have used purposeful sampling procedure to select companies for a case study. Essentially we started with a list of 15 companies and ended up with 4 we gained access to (two banks, two insurance companies)' [20]. Those companies sound as a perfect match for our research, because they operate in financial industry, heavily affected by digital disruption and have a strong need for digital transformation, and, on the other hand, they are at different level of IT governance mature.

The selected companies will be presented briefly:
- 'Company A - Banking is a medium-sized bank entirely owned by private investors, which despite previous financial crisis, improved their business by opening new branches, offering standard services of superior quality and introducing novel services (e.g. mobile banking).
- Company B - Banking is a medium-sized bank, a member of the international group, which invested less to the business network compared to bank A.
- Company C - Insurance is a medium-sized insurance company, entirely owned by private investors, with stable performance and continuous development in the offering of new services.
- Company D - Insurance is a large insurance company, a member of the international group, devoting special attention to the introduction of new technological solutions, improving business processes and quality and prompt claims payment' [20].

Secondly, we have developed research instrument for evaluating maturity IT governance during the longer period of time (5 years). 'Five components of IT governance were used to design questions that were the basis for in-depth, semi-structured interviews: Business / IT strategic alignment; IT value creation and delivery; IT risk management and value preservation; IT resource management; and Performance measurement in IT were used to construct questions which will reveal subtle IT governance mechanisms' [20]. In this paper we will use first two components (Business / IT strategic

alignment; IT value creation and delivery), as we find them best match for digital transformation framework and external focus of digital technologies.

'Thirdly, in order to increase reliability of the research, we followed a semi-structured case study protocol [27]. We have collected data from semi-structured interviews with the CIOs (Chief Information Officers) and top management members (CxOs) conducted each year over 5-year time period. In every company two interviews were conducted per year, resulting in total number of 40 interviews. Also, for every company, the interviews conducted with the CIOs and CxOs were analyzed in order to detect possible discrepancies, and if needed additional data was collected in order to gain in-depth understanding of crucial processes and IT practices. Based on the semi-structured interviews, two independent researchers estimated adoption level of each of IT governance components, which additionally supported reliability of research. Again, in case of discrepancies, additional data was collected' [20].

Business and IT strategic alignment

Table 1 shows the progress selected companies show in 5-year time period on strategically aligning IT with the business strategic objectives. It is notable that in 5 year period companies A and D reaches full alignment between IT and business (starting from no alignment at all) which means that business objectives were the result of strategic IT initiatives. In that sense me might argue these companies will be far better prepared to digital transformation challenges than other two, mainly due to the fact that they see the impact of technology on their businesses far beyond internal capabilities.

IT value creation and delivery
Table 2 presents how selected companies evolve in defining frameworks for creating value from IT, ranging from using IT to support automatized solutions and cost cutting, with no interest of business units to be involved in IT initiatives to gaining understanding and trust between CIO and business units. We can again note that companies A and D were better in using mechanisms for IT value creation and delivery, which make them fairly prepared for digital transformation.

Table 1: Mechanisms and measurement level for Business / IT strategic alignment

Industry	Banking										Insurance									
	A					B					C					D				
Years (2009-2013)	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
No clear alignment	✓					✓ c					✓ c					✓				
Weak alignment		✓ a					✓					✓	✓				✓			
Moderate alignment, trying to align IT to real business needs			✓ b					✓ b	✓ b					✓ b						
Strong alignment, IT closely involved in strategic planning				✓						✓ d					✓			✓	✓	
True alignment					✓															✓

a week alignment, but CIO regularly reports to CFO
b confirmed at executive level, CIO reports directly to CEO
c no alignment, top management finds ICT as a technology enabler
d regular alignment mechanisms and sessions, still week impact on business, CIO reports to CEO
Note: I-2009: II-2010; III-2011; IV; 2012; V-2013
Source: (Susa Vugec et. al, [20])

Table 2: Mechanisms and measurement level for IT value creation and delivery

Industry	Banking										Insurance									
	A					B					C					D				
Years (2009-2013)	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
No value or weak business value from IT initiatives	✓					✓					✓					✓	✓d			
IT supports cost cutting		✓					✓	✓	✓b			✓	✓	✓b						
KPIs for IT initiatives			✓							✓a					✓c			✓e		
Understanding between CIO and business units				✓															✓f	
Trust between CIO and business units					✓															✓g

a KPIs for ICT initiatives defined, mainly technologically based

b No interest of business units to be involved in ICT initiatives

c Technologically oriented KPIs for ICT initiatives

d Business process owners still not aware of ICT value creation potential, awareness sessions, education programs, change of ICT audit scope towards more business oriented

e IT value creation mechanisms defined (KPIs for crucial activities), ICT investment committee set up

f CIO involved in strategic planning, empowering business units to decide on IT investments

g CIO responsible for delivering value for business out of strategic ICT initiatives, specific KPIs defined

Note: I-2009: II-2010; III-2011; IV; 2012; V-2013

Source: (Susa Vugec et. al, [20])

5 Discussion

As we expected, improvements in IT governance maturity definitely did not happened over night, so we include longer time period in our research focus. When communicating with executives from both companies A and D we realized that they were committed to systematically raise business competencies of IT staff, especially CIO (Chief Information Officer), with the plan to promote him/her to higher executive level with responsibility for innovating business model (becoming more Chief Innovation Officer). Also, the focus of IT investments changed, from internal projects to external initiatives with broad impact on key value propositions. Other crucial facts in the changing the role of IT in business in the case of companies with matured IT governance were: mutually respectful CEO-CIO relationship, support for strategic IT initiatives comes from top, fostering technology strategic initiatives with more external than internal reach, facilitating flexible and modular IT infrastructure and slowly, but surely changed organizational culture toward experimenting with technology solutions, risk taking and talent management.

All these subtle IT governance mechanisms are quite essential for preparing organizations for digital transformation and in line with many research findings discussed in this paper ([6], [16], [1], [11]). As we took Kane et. al. [6] work as a framework for our research, we can conclude that ambitious digital strategy drives digital maturity (matured strategic IT/business alignment is making companies A and D ready for digital transformation), but to implement them, companies should rely on skillful employees (talent management, systematically raising people's competencies) and digital agenda should be led from very top. Also, from this research we can learn that flexible and modular, but efficient and operationally excellent IT infrastructure is essential in implementing digital strategies. As CEO of company A point out *"this company is trying to differentiate its business by offering innovative services in the market and in this sense has changed the role of IT and emerging digital technologies in business (from supporting routine business processes to fostering business*

model innovations)" (CEO Interview, 2013, [20]), it is obvious that this company is prepared for digital transformation agenda. Furthermore, as they employed Chief Digital Officer, in short future we expect company A to introduce some digital services (the project of introducing mobile banking – chat using Viber is in the pipeline).

In case of other two companies (B and C), we can confirm the issues we learn from discussion of previous research findings: when there is no top management support for IT initiatives and technology reach is limited to internal processes, we cannot expect such an environment to be ready for digital transformation challenges.

6 Conclusion

Contrary to mainly intrafirm or interfirm capabilities of IT, digital technologies are externally oriented. In this paper we gave the overview of digital technologies and explain key frameworks for using it in organizational environment. Analysis of research findings support our conclusion that unique features, accessibility and integrated possibilities of digital technologies make them very important factor in reshaping and disrupting usual business and restructuring entire industries. Governing digital technologies might be essential part of future business success and efficient and fast execution of digital strategies very important factor.

Following Kane et al. [6] framework for digital transformation we have investigated what are specific obstacles arising from insufficient IT governance in making companies ready for aligning digital technologies with the strategy initiatives. The main point of our research is that digital transformation needs mature and superb IT governance. This does not necessarily means that companies with less mature IT governance might not be a good 'candidate' for digital transformation mechanisms, but speed and pace of change might not be satisfactory. Our working hypothesis was that companies with matured IT governance are more likely to engage in digital initiatives and have better starting point for digital transformation. Using case study approach we have investigated what mechanisms of (mature) IT governance might be useful in digitalization. We came out with the conclusion that companies with more mature IT governance are better prepared to digital transformation, especially if they are using some subtle mechanisms such as:

- fully commitment to raise employees'

business and digital competencies (especially CIO – moving more toward Chief Innovation than Information Officer,
- changed focus of IT investment, from internal projects to external initiatives with broad impact on key value propositions,
- support for strategic IT initiatives comes from top with mutually respectful CEO-CIO relationship,
- facilitating flexible and modular IT infrastructure and
- slowly, but surely changed organizational culture toward experimenting with technology solutions, risk taking and talent management.

Even conducted on very limited sample, we can confirm that, to be prepared for digital transformation, companies should urgently work on improvements in IT governance. Our research suggest that, if companies would like to engage in digital transformation, it would be very useful to improve IT governance mechanisms, namely those associated with external focus of IT investments, top management support to digital agenda IT and facilitate flexible and modular digital infrastructure.

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