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The Role of Design Thinking for Achieving Leadership in the Digital Transformation of Business

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Abstract The implementation of the technologies of the fourth industrial revolution is widely discussed both in the scientific community and among business leaders. New digital technologies provide a real opportunity for companies to achieve leadership by changing their business model, focusing on customer experience, using big data technologies, increasing flexibility, and changing methods of managing their assets. Such disruptive changes require an understanding of the role of the organization's culture in the process of change and attention to it. However, technology alone cannot lead to the new business successes. People who use these technologies should be prepared to change regular business models and business processes in order to move to a new quality. Moreover, people quickly accept changes and participate in their implementation if they were involved in the process of developing these changes.

One of the most sought-after qualities in the era of the digital revolution is the creativity of thinking. Design thinking has occupied an important place in the practice of teaching in leading universities and business schools in the world. Thanks to this approach, a person gets the opportunity to overcome the accumulated stereotypes and patterns. Companies of various sizes and activities actively apply design thinking in the process of transforming their business. This paper identifies areas of application of design thinking in various areas of company management in the process of digital transformation in order to achieve leadership in business.

Keywords: design thinking, leadership, digital transformation, business

1 Introduction

The introduction of technologies of the fourth industrial revolution provides companies with new opportunities to increase their competitiveness. The following areas are usually identified for implementing changes: Resources and process, the Use of property, Operation, Inventory, Quality, Supply and demand, Time to market, Service and maintenance (Crnjac et al. 2017). New digital technologies allow you to reduce costs, increase the flexibility of the production process and service delivery, change approaches to asset management, and get deeper into the experience of your consumer (Frank et al. 2018; Anderl and Fleischer 2015).

The use of new tools is always initially considered within the framework of established technologies and business models. This was also the case with the first experiences of using Internet technologies for sales development. As information and communication technologies (ICTs) developed further, it became clear that these tools require changes in many business processes, as well as the business models themselves. So, the creation of the iPhone, in fact, opened a new era - the era of mobile business. Simple and convenient Internet access from a mobile phone has created conditions for the emergence of a new way of shopping. Shopping with a smartphone has become a daily reality. One of the most common business models has become multisided platforms that implement the principles of multisided markets (Sánchez-Cartas and León 2018). New digital companies see different ways of interacting with customers of goods and services, creating value, as well as their competitive advantages compared to companies in traditional industries. These differences are compounded by the speed of technology change and the emergence of new business models.

The penetration of software into almost all spheres of life of both companies and ordinary consumers has led to the formulation of new conditions for achieving success in business (Porter 2014). Such drastic and rapid changes in the internal and external environment of the company put forward new requirements for the level of competence of employees and managers. Of course, knowledge of information technologies and understanding of their new role in improving business efficiency plays an important role. But a radical transformation based on ICTs is only possible if the company's leaders have a clear vision of the new business model, as well as the new business processes that are necessary for its implementation (Bonakdar and Gassmann 2016; Frisendal 2012; Geissdoerfer et al. 2016). The company's management should organize joint work of employees of various

departments to transform the most important processes. At the same time, an important role is played by the development of creative skills among employees, the ability of management to use these skills to implement changes in the company and create appropriate motivation mechanisms. Leaders must lead the digital transformation and take responsibility for its progress and results.

One of the most popular tools for developing creative skills of employees and providing teamwork for creating innovative solutions in recent years is the method of design thinking (Brown 2009; Liedtka and Ogilvie 2011). This approach is taught in leading universities and business schools and is adopted by companies of different industries and sizes (Plattner et. al. 2015). Design thinking is a process that focuses on examining the user's everyday experience to identify problems that serve as the basis for formulating the task of improving an existing or creating a new product. The design process itself is based on an iterative spiral model and involves creating prototypes to test them with users. Experiments and prototyping allow, on the one hand, to better understand the real problems of users, and on the other – to create a product that solves them. Design thinking is aimed at combining the desired from the human point of view, the technologically possible and the economically justified. To organize work using the design thinking approach, it is necessary to form multidisciplinary teams from different departments and specializations, apply the process and methods of design thinking, and organize a convenient flexible workspace that helps to stimulate the creative process (Brown 2009; Liedtka and Ogilvie 2011). The need to create multi-disciplinary teams is because most problems are complex in nature. In this case, teams are formed from T-shaped personalities. The vertical axis reflects a person's skills in a field in which they are professionals. The horizontal axis reflects skills that allow you to cross the boundaries of individual professions, have knowledge and skills in related areas, and have teamwork skills. The search for T-shaped professionals within organizations and the development of cross-functional skills among employees are part of talent management programs that are in demand during the company's transformation. In the World Economic Forum report, the impact of the fourth industrial revolution on the labor market is reflected in the obsolescence of some skills and the growing need for others. Along with the growing demand for digital skills, there is also a growing need for "human" skills, such as creativity, originality and initiative, critical thinking, analysis, complex problem solving, idea generation, and emotional intelligence, since they are not expected to be automated in the near future (The Future of Jobs 2018). This is a question of thinking differently, thinking in a more creative and interdisciplinary way. It will be shown that design thinking is in demand when conducting digital transformation of companies in different areas and at different stages of this process.

2. Changing products and business models in the digital transformation

An important area of the organization's digital transformation is changing its products. In this case, the concepts of Time to market, Data-driven design to value, and others can be used (Crnjac et al. 2017). There is a significant link between new products and the company's success. It is generally recognized that one of the most important strategies of competition is. To implement the differentiation strategy, which creates additional value for the customer, the company must implement innovative solutions when creating products and customer service. The need to create new innovative products is associated with increased competition in the super-connected world, shortening the cycle of creating new products, facilitating the process of copying products from other manufacturers (Stickdorn et al. 2018). Design thinking methods are traditionally used when developing new products (Brown 2009; Liedtka and Ogilvie 2011). Services are becoming more important for any business as more products are sold as services (Stickdorn et al. 2018). For example, in order to increase their mobility, the user's interest shifts from purchasing a car as a product to using car sharing services. This leads to an increase in the role and importance of service design. Design thinking methods and tools are a necessary part of the process of creating services, especially digital services (Stickdorn et al. 2018; Pfannstiel and Rasche 2019; Del Giorgio Solfa 2018). For a long time considered conservative in nature, banks around the world are actively using the design service to meet the changing habits of people. Moreover, this approach is becoming more common when creating public services. In the UK, a standard for the development of digital services has been approved, which requires the use of an iterative design process that includes the study of the user's experience of the service, the development of a prototype and its sequential testing (Digital Service Standard 2019). Design thinking has helped redesign business processes in Australian Taxation Office (Terrey 2012).

The globalization of markets, the acceleration of innovation, and the ubiquitous penetration of digitalization lead companies to work not only to update their products, but also to rethink their business models. Innovations in business modeling are related to the transition from one business model to another in existing companies, the transformation of the business model after mergers and acquisitions, as well as the creation of completely new business models in startups (Geissdoerfer et al. 2016). Developing a new business model requires detailed analysis of information about the company's external and internal environments. The principles and approaches of design thinking can be applied to the analysis of business information, as Frisendal (2012) shows in his book. At the same time, design thinking helps to understand how the company's business works, and to rethink this business model accordingly. One of the reasons why design thinking is necessary in this case is that this approach works best in a

situation where there are "wicked problems" – problems that are ill-defined. The traditional sequential engineering (waterfall) approach works well when goals, requirements, and limitations are clearly defined. But in real business, this situation is rare. In contrast, designers use an iterative approach to find the best solution for a specific situation. Frisendal (2012) describes the application of design thinking in conjunction with the concept mapping methodology. The use of this technique is extremely important as a visualization tool. Visual visualization helps you find problems faster and provides a better view of new business model solutions during brainstorming sessions. At the same time, concept mapping allows you to incorporate new concepts into existing conceptual structures in the process of business analysis and modeling. Consistent application of concept mapping and design thinking for business modeling can create new business value (Frisendal 2012).

Bonakdar and Gassmann (2016) describe another approach for applying design thinking in developing innovative business models. In their research, they found that 90% of all innovative business models over the past 50 years were based on 55 templates. Based on these studies, Bonakdar and Gassmann created the Business Model Navigator, which firms can use to systematically update their business model. The Business Model Navigator methodology is based on the consistent application of design thinking and includes four stages of improving the business model: initiation, ideation, integration, and implementation. Bonakdar and Gassmann (2016) contrast the creative design thinking process with the traditional strategic approach to the process of updating the company's business model, which includes the stages of analysis, planning, and forecasting. The prepared business model is subject to a full-scale launch, which can show its viability or lead to undesirable consequences. In contrast, design thinking is based on an iterative process of finding insights, designing, building a solution, testing, training, redesigning, slow start-up, and subsequent scaling (Bonakdar and Gassmann 2016). The authors emphasize that their experience in executing projects with leading companies proves that creative, intuitive, human-oriented, prototype-driven, and iterative design thinking approach adds significant value when creating radically new business models. Describing in detail all stages of the Business Model Navigator methodology, Bonakdar and Gassmann (2016) emphasize that the entire process is built on teamwork, the important role of leaders, and the need to form an innovative culture of the organization.

In the context of globalization, the "limits of growth" formulated in well-known reports to the Club of Rome are becoming more and more obvious. This leads to an increase in demand for the formation of fundamentally new business models for sustainable development of firms. This direction of development corresponds to two main directions of future innovation management: innovation management for environmental sustainability and digital innovation (Hecker and Huber 2017). Sustainable development is seen as a new source of competitive advantages, and the implementation of the principles of sustainability in the business model fixes them in the company's strategy. Developing business models for sustainable development for a specific company is a creative process that makes it relevant to use design thinking methods (Geissdoerfer et al. 2016).

Ingle (2013) examines the application of design thinking methods in the practice of entrepreneurs and small business companies. A separate Chapter of Ingle's book is called "Designing a Business Strategy. Get Down to Business". She states that traditional strategy planning tools are no longer sufficient. Developing a strategic plan to maintain the viability and sustainability of a business in a rapidly changing market requires design thinking. Regardless of the size of the company, the business strategy reflects decisions about markets, products and services and creates the basis for the organization's culture. For the strategy of entrepreneurs and small businesses to be dynamic and effective, it is necessary to apply the principles of design thinking in its development. Many digital startups come in the form of small companies with big ambitions. In order to survive in the first period of their life, when assets and investments are minimal, they need a truly innovative strategy focused on the client's experience. Many of them use design thinking quite reasonably in their practice (Brown 2009; Ingle 2013). Most SMEs around the world simply copy products and business models from their competitors. They lack the resources and knowledge to develop innovative products and services. Facebook, Instagram and Airbnb also started out as small companies. All business schools and incubators now tell us that the founders of these companies have studied the experience of their users more deeply, found important insights and thus managed to turn into digital giants.

3. The role of leadership and management in digital transformation

Exploring the role of leadership in implementing the radical organizational changes that accompany digital transformation, as well as various leadership styles, Sow and Aborbie (2018) found that leadership plays a crucial role in implementing such large-scale organizational changes. At the same time, they state that it was not possible to identify a specific leadership style that would have an optimal positive impact. The leaders themselves point to an important link between the change management strategy and the organizational culture of companies. The results of the study confirm the need to train employees to gain new knowledge and create conditions for the development of creativity and innovation. It is important that the organization's leaders can effectively adapt to changes, maintain a diverse organizational culture, have the patience and tools to withstand failures and other problems during the implementation phase, and provide the trust and support of employees to more effectively perceive changes (Sow and Aborbie 2018).

Even though business is increasingly becoming digital, companies employ people and are managed by people as well. Business doesn't change by itself. People need to evolve and change what they do and how they work. Digital transformation of an organization can be difficult if the focus is primarily on technological change and the need for strategic management of the organizational culture during change is overlooked. The purpose of the study by the consulting company Prophet (Durham et al. 2019) was to identify which factors related to the organization's culture contribute to the beginning and support transformation and growth. According to the authors of the study, organizational culture is one of the most important intangible assets that companies need to stimulate growth - along with brand, intellectual property, and R&D. The study involved 400 company leaders from the USA, UK, Germany and China who are reorganizing and working in different industries. Two-thirds of companies are undergoing digital transformation, while the rest focus on business elements such as new products, rebranding, user experience, and others.

The authors presented a human-oriented transformation model consisting of four elements: DNA, BODY, MIND и SOUL (Durham et al. 2019). In the process of transforming an organization, all these elements must be transformed – they must be reinterpreted and rebuilt. The study identified two categories of change catalysts: Fundamentals, which are necessary for implementing change, and Accelerators, which are hidden drivers that can accelerate change. Fundamentals include six main principles, among which the following have the most weight:

- Developed training to re-skill existing talent and/or identified the skills, capabilities, and roles needed
- Developed a clear roadmap
- Clarified which leaders would lead and/or aligned top leaders to role model changes (Durham et al. 2019).

Highlighting the retraining program as the most important component of change confirms the importance of implementing a strategy for finding and promoting talent to make effective changes today. Digital transformation roadmaps usually focus on a two-to three-year rolling schedule and reflect key aspects such as data, technology, employee capabilities, and customer experience. They should be created at several levels and be available to all employees. Figuring out which leaders are leading the transformation and how the company's top managers feel about the changes being made is the next fundamental lever of transformation. Leadership and talent should be clearly linked to the areas where transformation will be most beneficial. Employees should know who is responsible and expect initiatives and changes. This can only happen if senior management clearly and clearly fulfills their role as advocates of change. To speed up the transformation process, you need to change your decision-making procedures and business behavior habits. Managers must clearly show that in the course of radical changes, everyone has the right to make mistakes. The ability to not be afraid to make a mistake is one of the most important parts of the culture of design thinking. In these conditions, such approaches as design thinking and flexible working methods are in demand. o support and accelerate the process of organizational transformation, companies create dynamic transformation management offices (TMO). The modern TMO is a cross-functional team that contributes "a way of working and a state of mind". These divisions eliminate barriers to change, models open working and a new way of doing business (Durham et al. 2019).

Traditionally, the introduction of new ICTs and the reorganization of business processes is hindered by the functional principle of specialization of departments and employees, which has existed since the beginning of the 20th century. Templates and traditional approaches for doing work and doing business are taught in colleges and business schools. It is especially difficult to overcome these patterns when they have helped to achieve success for a certain period (Gharajedaghi 2011). But the world is changing, the business is changing, and what was important for success before will not necessarily bring new victories. Developing creative thinking skills helps companies create new business processes and rethink the role of ICTs for their implementation in the company's practice. Innovation is traditionally met with resistance most employees. To overcome this obstacle, it is important to involve as many people as possible in the digital transformation process from the very beginning. On the one hand, it helps to attract more diverse ideas, and on the other – creates a sense of implication in the changes (Gharajedaghi 2011). To implement these changes, the company's leaders must themselves have creative thinking, as well as use approaches that have shown their effectiveness for using the creative potential of employees and developing teamwork skills to use them for the benefit of the company.

Managing the organizational transformation of manufacturing SME companies has its own specifics. To organize the process of digital transformation of SME in Germany, the VDMA Industrie 4.0 Implementation Guideline (Anderl and Fleischer 2015) was developed. The guideline contains tools and procedures that small manufacturing companies can use to prepare their own digital transformation strategy based on their knowledge of their strengths and own experience. The process of preparing a transformation strategy consists of five stages: preparation, analysis and creativity, evaluation and implementation of the developed business models. The organizational basis of the digital transformation process is the creation of its own design workshop within the organization that plans to use Industry 4.0 technologies. As a result of such seminars, companies will be able to build innovative business models using creative technologies. To implement this business model in the company's business practices, working groups should also develop a step-by-step roadmap in accordance with the

recommendations contained in the guide. The text of this guide does not explicitly mention design thinking, but the description of the entire process, as well as individual phases, including the creative phase, fully corresponds to the conditions when it is appropriate to use the methods of design thinking. The traditional description of the design thinking process includes phases of empathy, focus, ideation, prototyping, and testing. For effective work using the design thinking method, it is recommended to create multi-disciplinary teams, whose members have both highly specialized competencies and teamwork skills. Visualization techniques help design thinkers work productively. The Industry 4.0 Guideline describes the process of preparing and conducting seminars with similar recommendations. Thus, working groups for internal seminars should consist of representatives of various departments and areas of specialization. The guide contains visual templates "Products" and "Production", which help to specify the processes of analysis and generation of ideas. Design thinking is focused primarily on people, their experience of using the product and service. The Industry 4.0 Guideline repeatedly mentions the importance of evaluating how new solutions will help customers and how they will be valued by customers.

4. Results and discussion

Analysis of publications on the topic of digital transformation of companies shows an increase in the use of design thinking and approaches based on it. Not all publications use the term "design thinking" (see Table 1 that follows). But when publications describe the process of finding innovative solutions in the course of organizational changes, indicate the need to form multidisciplinary teams, and emphasize the role of creative thinking, we can conclude that the characteristics that are inherent in design thinking are given. This methodology is answer to the challenges of interdependency and complexity of modern world. Gharajedaghi (2011) wrote that any professional whose task is to create, to dissolve problems, to choose, and to synthesize is involved with design thinking.

Table 1. The use of design thinking methods in various areas of management in the process of digital transformation

Direction of management	Role of design thinking	References
Developing a digital company's business model	Understanding the process of creating value for the consumer Creating new digital business models Visual representation of all components of the business model	Bonakdar and Gassmann 2018 Frisendal 2012 Geissdoerfer et al. 2016 Durham et al. 2019
New product development	Iterative product development process Creating multidisciplinary teams to develop products and services Application of Service Design methods for designing services The transition from questionnaires to the analysis of user experience and its user interaction with the product	Stickdorn 2018 Miettinen et al. 2012 Pfannstiel and Rasche 2019 Digital Service Standard n/d Terrey 2012
The transformation of the organizational culture	Leaders should strive to think creatively Involving the maximum number of employees in the process of change to attract more diverse ideas and to create a sense of implication Everyone has the right to make mistakes, both leaders and employees New decision-making procedures and business habits Search and stimulation of talents	Gharajedaghi 2011 Durham et al. 2019 Sow and Aborbie 2018
Organizational aspects of the digital transformation process	Organization of multidisciplinary teams Creation of specialized units to support and accelerate transformations - dynamic transformation management offices (TMO)	Bonakdar and Gassmann 2016 Durham et al. 2019 Anderl and Fleischer 2015
Small and medium enterprises	Forms of organizing the implementation of transformation projects in SME	Ingle 2013 Anderl and Fleischer 2015
The program of retraining of personnel	The development of creative skills among employees Formation of T-shaped professionals Team Building Skills	Durham et al. 2019 Sow and Aborbie 2018

Source: Own results

Evaluating the increased interest in design thinking and the widespread use of this approach in the practice of organizational transformation of companies, Gharajedaghi (2011) calls design thinking one of the foundations of system thinking. And so, design can be used as a means of communication between different disciplines. The common practice of using analytical tools to help you choose the best alternative will only lead to a repetition of the same known model, a single solution, since the underlying assumptions that determine the generation of alternatives remain unchanged. Design thinking, in contrast to this approach, involves complex assumptions. It represents a qualitative change that includes the concept of beauty and desirability. Thus, design leads to the identification of new sets of alternatives and goals, and the search for more desirable opportunities for the future (Gharajedaghi 2011). Thanks to these properties, design thinking has become one of the most popular approaches for organizing the digital transformation of companies in order to achieve business leadership.

Research in this direction should be continued, which will complement this table, as well as expand and clarify the understanding of the role of design thinking during digital transformation of companies.

5. Conclusions

Overall, one can see that business development is increasingly based on digital technologies. The development of digitalization processes has radically changed the world. People's lifestyles and habits are changing. They buy goods and services in a new way and use them in a different way. Digital companies do not just throw their catalogs in the mailboxes of potential buyers, but invade a person's personal space, monitor all their movements and decisions. In these conditions, the replication of traditional approaches to business, to the organization of the company's work, to the relationship between employees leaves little space for innovation.

Digital transformation requires drastic changes and the search for new solutions in all areas of management. At the same time, companies must remain stable, generate revenue and make a profit in the face of constant external changes. In such circumstances, the approach created by designers has become widespread in the management of transformable companies, since designers always deal directly with users, as well as with poorly formulated design tasks. As the analyzed publications show, achieving leadership in digital business requires efforts and attention in all aspects of organization management: creating new products, new business models, and new organizational culture.

Acknowledgments

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