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Project Management of the Future - Exploit the Potential of Megatrends and Digitalization

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Abstract

The paper is a call for project performers of the future to train their sensitivity for the emerging of megatrends, to recognize their potential and to use the opportunities they offer for the further development of project management. This theoretical study applies as method the systematic literature review to show how megatrends and digital transformation impact the discipline and how their potential can be utilized for its progress. Project management cannot withdraw from influence of the megatrends. The degree of their impact on the project management processes may differ, but they constitute the framework which supports the formation of reliable predictions regarding the direction in which this discipline is moving.

Keywords: project management, digitalization, megatrends, future.

Article Classification: Literature review

1 Introduction

This theoretical study emphasizes the significance of megatrends and digitalization in the future development of project management. Based on a systematic literature review the study analyses the impacts of digital transformation on and reveals the changes of the discipline in the future. The topic is relevant since the society is facing a continuous increase of projectification grade.

In nearly all operational functions work is performed within and with help of projects. This applies as well to Information Technology, to product and research development, supply chain, production, as to general management. Projects are established in non-profit organizations and in the public administration (Weßels et al., 2014). One cannot imagine any sector of the economy and public life without projects.

The “Deutsche Gesellschaft für Projektmanagement” (German society for Project Management [GPM]) commissioned 2021 a study to systematically investigate the projectification in all areas of the German society (GPM, 2021). This phenomenon can be described as the fusion between project and organizational transformation.

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The study identified digitalization, growing complexity and need for innovation as key drivers for expanding of projectification (GPM, 2021). Digital transformation and organizational change are driven forward by projects, so that a boost for project management is to be expected in the next five to ten years. The increasing product and project complexity implies a growing importance of project management, as a result of the increasing volume of and added value creation through projects.

In the context of digitization project managers and teams are confronted with a better understanding of how to deal with new technologies, business models, organizational forms, ways of communication and cooperation to become capable of acting as individuals and as companies in the digital transformation. From a holistic perspective successful management of complex projects goes beyond methods, tools, and techniques. Controlling complexity in the project environment requires from project managers the ability to solve and mitigate conflicts, to motivate teams, ensure availability of required resources to complete tasks, and to satisfy the stakeholders.

Organizations are in the midst of the digital transformation, driven by projects, and are simultaneously designers of the digitization.

2 Material and methods

The research object of the study is project management as a discipline, explored from the perspectives of emerging megatrends and progress of digitalization.

The methodology of the systematic literature review has been selected because it provides a process for identifying and critically appraising relevant research data for this paper. It aims to identify most empirical evidence that matches with the pre-defined search criteria to answer the research questions (Snyder, 2019).

The systematic literature review has been performed according to an iterative process of four sequential phases: data collection, selection, evaluation and synthesis (integration in the own research).

The reporting of the review has been guided in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis [PRISMA] Statement (Page et al., 2021).

The review of the scientific literature focussed on the concepts of project management and digital transformation in combination with megatrends, outlined insights on the current state of the art, indicated trends of further research and guided to interpretations of the research material. The search concentrated on peer-reviewed, scientific publications between 2017 and 2022, limited to articles, books, book chapters, standards, conference papers and studies, in English and German.

In the scientific source selection Google Scholar has been set as the starting point for the research. Databases selected by the online library of the Comenius University and mostly used for management studies have been taken in consideration as further sources for gathering scientific research data. The repositories for scientific articles, studies and research results of the Project Management Institute, the International Project Management Association and the Association for Project Management have been identified as valuable data sources. Websites of groups and organizations which cover topics of, and websites of journals and blogs dedicated to megatrends and digital transformation have been revised. The scientific data bases which demonstrated to be comprehensive in terms of publications have been selected: ScienceDirect, JSTOR, SpringerLink and Google Scholar.

3 Results

3.1 The influence of megatrends on future project management

Megatrends are a core element of the futurology because they affect all levels of society and consequently influence companies, institutions and individuals. The megatrend system constitutes the foundation of work for the Institute for Future [Zukunftsinstitut] in Frankfurt/Main, Germany (Zukunftsinstitut, 2021). Researchers identified twelve megatrends and described the key features and criteria for identification, definition, and differentiation from other trends.

Main characteristics of megatrends are: duration, ubiquity, globality, and complexity. They last several decades and impact all areas of society, economy, the political system, media, consumption, and the way people live together.

Megatrends are global, they emerge not everywhere simultaneously, but sooner or later can be observed universally. Megatrends do not act in isolation, they influence and reinforce mutually effects. Their interactions generate their dynamic forces and changing qualities. The Institute for Future identified following megatrends which will shape the society: gender shift, globalization, health, connectivity, individualization, mobility, new-work, neo-ecology, safety, urbanization, silver society and knowledge culture (Zukunftsinstitut, 2021).

The phenomenon of globalization has been reflected already since the last two decades. It enabled the realization of multi-national projects through an increasingly free exchange of ideas, knowledge, and experience on the level from a worldwide placed team members to larger project manager communities. The disappearance of geographical boarder will lead to a project management of the future which understands diversity of cultures and perspectives as a productive area with a common horizon of expertise.

Globalization, the beneficial exchange of information and practical capabilities would not be possible without connectivity, the basic pattern which describes the social and economic transformation of the current century, the networking society based on the digital infrastructure. Globalization is continuously contributing to the expansion of connectivity. Project management and teams become independent of space and time. Projects processing becomes more efficient, so that several customer wishes can be fulfilled and turnover is generated in shorter time.

In the future not only team members of the same projects are connected, but projects of different types, sizes, and complexity grades. Synergies are generated to enable an efficient and quick realization of projects. These ways of collaboration are encouraged by the concept of new-work. The boundaries between life and work dissolve, meaningfulness of work is slipping into the foreground. New-work structures characterized by remote work and collaboration spread in the organizations. Teams become progressively empowered, individuals see themselves more and more as problem solvers instead of orders receivers and executers. From this perspective it can be predicted that agile and hybrid approaches will dominate the project management environment and replace more and more the traditional, waterfall methodology. This tendency could jeopardize the role of the future project manager. Since teams become increasingly independent and self-responsible, project managers turn out to be obsolete. Their core responsibilities will move in a direction beyond a singular project toward to project networks with overall coordinating and financial controlling functions.

The megatrend silver society describes the manifold effects of the demographic change of word population getting older. Sustainable companies rely on mixed-age teams and management structures. Instead of investing too much time in the competition for

young talent, it is important to stimulate bright minds in the ranks of senior employees, to further qualify and keep them in the company through innovative employment models. In addition to the lifelong learning component, the entire working environment has to be appropriate, including health-promoting components (Zukunftsinstitut, 2021).

Frontiers of gender and age disappear, diversity of teams will help projects to achieve positive results in shorter time, since wide range of expertise and cognitions from lessons learned are available in higher density compared to homogeneously structured teams. The megatrend health has a positive effect on project teams. Employees remain longer productive and failures in project work will be less frequent.

A large future potential for project management lies in the knowledge culture. Fuelled by the megatrend of connectivity the knowledge of the world and the way to deal with information are changing. Education is becoming more digital. Cooperative and decentralised structures for knowledge generation are spreading, and the understanding about knowledge, its creation and dissemination, is improving continuously. Open, available knowledge and free creativity impacts everyday working life. Creativity cannot be forced and needs freedom - both in the company and in school education. A new understanding of creativity, playfulness and open knowledge could lead to different, better results and innovations in the management of projects. (Zukunftsinstitut, 2021). Critical thinking and the correct handling of complexity are becoming increasingly important in the project work. Research in the field of project management will become more accessible for daily project work, the collaboration between practitioners and academia on this field will become normality.

In the future project management education is no longer conceivable without digitalisation. Digital literacy is needed, access to digital services and devices and the ability to use them must be guaranteed and taught by the companies to all. Living and working in connectivity and instant information flow requires data, technological and human literacy, the ability to handle with and understand the tides of information in order to use them in a beneficial way. To function in a social environment students and practitioners should cultivate their human side. Human literacy is teaching them the human aspects of work, encouraging innate strengths, preparing students to compete in an environment where smart machines collaborate along with human professionals. A “life-long-learning” mindset will support them to cope with the changes (Aoun, 2017).

The megatrend of individualisation is driven by the increase in personal freedom of choice and individual self-determination. The importance of new communities is growing, which will give individualisation a new face in the future. Project teams of the future come together and cooperate independently of time and place, a strong “we” culture emerges, characterised by professional cooperation in the sense of achieving the project goals.

The megatrend of mobility in a new dimension of using a large range of infrastructure offers will support merging of teams in case meetings on personal level are required. Despite the unlimited possibilities to connect virtually, personal come together will continue to stimulate the work in and between projects.

A potential to exploit is the increasing heterogeneity regarding age and gender, which represents an enrichment for the performance of the project team.

The Corona crisis has clearly shown that projects can be executed differently and project management as a method can be performed exclusively with virtual teams localized in different corner of the world, working remote from home. Globalization and worldwide connectivity will facilitate to set-up teams with expert knowledge on specific scientific or economic areas.

Schoper et al. claimed already in 2017 that “there are more than 1500 papers that deal with the observable fact that tasks are increasingly carried out in the form of projects and less as “ordinary” line work” (Schoper et al., 2017). According to the authors by providing empirical evidence to the general assumption of the increasing projectification of the society underlines the importance of project work and calls out for future research in project management with the objective to improve project performance.

With increasing of projectification the position of project management and its professionals in the organization will continue to reinforce, project organization replace gradually matrix and hierarchical structures. Connectivity, performance in virtual teams to ensure project success is only possible with an expanded and functional digital infrastructure.

3.2 Project management and digital transformation

Digital transformation stands as a generic term to describe the expanding use of networked, web-based, and automated technologies in the society. It is frequently associated with the descriptive concepts of Industry 4.0 and fourth industrial revolution, whereby different meanings are behind them.

Industry 4.0 refers to “a marketing term that is also used in science communication and stands for a “Project of the future” (according to the high-tech strategy website) of the German federal government. The so-called fourth industrial revolution to which the number refers is characterized by individualisation (even in the series production) or hybridization of products (coupling of production and service) and the integration of customers and business partners in business and value-added processes” (Bendel, 2021).

The first industrial revolution which covered the second half of the eighteenth and first half of the nineteenth century was characterised by the introduction of industrial machines and ushered in mechanical production. In the late nineteenth until the early twentieth century the second industrial revolution made mass production possible, encouraged by the beginning of electricity and the assembly line. The third industrial revolution began in the 1960s and is usually called the computer or digital revolution. It was triggered by the development of semiconductors, mainframe and personal computing and Internet. The world is now in the middle of a fourth industrial revolution that began at the turn of this century and builds on the digital revolution (Schwab, 2017).

For Industry 4.0 is Internet the core technology. It refers to the intelligent networking of machines and processes for industry with the help of information and communication technology. Digitalizing production is achieving a new level of quality with global networking across corporate and national borders. Machine-to-machine, as well as human-to-machine communication, manufacturing facilities that are becoming ever more intelligent, artificial intelligence are proclaiming the new era of the fourth industrial revolution (Federal Ministry of Economic Affairs and Energy, Federal Ministry of Education and Research, 2021).

The industrial revolution might be seen as a huge complex, multi-national and transdisciplinary project, with the goal of process digitization and networking. To manage the complexity project management goes beyond of focussing to control the rigid “magic triangle” of scope, time, budget. Artificial intelligence (AI) and machine learning is able to realize connections between data and would make possible resource allocation in real time. Virtual assistants in form of chatbots will be helpful aides for project teams.

Robot Process Automation (RPA) automates processes, already practiced in the different industry sectors, can be applied in project management for the execution of

repetitive and standardized tasks done by humans, to handle data, or even to read e-mails in order to increase efficiency and speed (SAS Institute Incorporated, 2021).

Cloud and edge computing will continue to influence the way of work in projects. A continuously increasing data volume is made available for project managers and their teams accessed via Internet by only using a smartphone. Creative collaborative tools made teams possible to come together on a virtual board and continue their project work on daily basis.

Blockchain, Internet of Things (IoT), virtual, augmented, and mixed reality could be used to simulate project execution, to facilitate planning, monitoring and control.

Pajares et al. describe the main features of projects of the fourth industrial revolution focusing on those that could affect the management style when managing these kinds of projects (Pajares et al., 2017). They refer to them as Internet of Things (IoT) projects which can involve different technologies. According to their point of view technological revolution is caused by the maturity of several technologies and its empowerment by means of connectivity.

The phenomenon of the significant reduction of product life cycles in the last decades makes time as one of the most important factors in project management, according to Pajares et al., probably more important than cost and scope. Project teams should be used to work under time pressure. A strong competition exists between companies to launch new products and to be the first on the market becomes priority over reduction of costs to develop new products or versions of a product. Project success will be associated with the market success of a new product or service rather with producing deliverables measured by the requirements of the “magic triangle” of scope, time, and costs. The projects 4.0 generate new knowledge that will be further used in new projects and for business development and have a strong innovative component. To succeed in projects, innovation, knowledge, and project management should be interlocked.

In the new competitive environment project performers have to exhibit professional competencies to deal with complexity, shortened durations and to work in decentralized environments, like open innovation or network collaboration. The project management of the future means grappling with projects that have to adapt and innovate to keep pace with increasingly complex, fast changing, and uncertain conditions. The project management community is continuously facing challenges and, at the same time new opportunities for improving and consolidating their professional competencies (Pajares et al., 2017).

In a report published in 2017 ARUP dealt with the evolution of the project management until 2045 focused on construction projects. The “Future of Project Management” considers emerging trends and drivers, combines best practices and visual thinking to imagine the future through the eyes of its clients and creates a roadmap for future research and academic. The ARUP concept, which could be extended to a wider scale of project types in different environments, predicts that social responsibility of individuals and companies to act in the best interest of their ecosystem will continue to grow in importance, so that by 2025 it becomes a dedicated chapter of the Project Management Body of Knowledge (PMBoK) of the Project Management Institute. It can also be predicted that the project management institutions will continue to consolidate their position and develop their standards in accordance with the global technological, economic, and social changes. The project management profession will continue to grow in importance and consolidate its position in the society. The project management institutions have the possibility to encourage research in the field of project management, enable and promote the collaboration between industry and academia.

The ARUP report argues that even in a future where professionals across the world have been gradually replaced by increasingly capable systems, core elements of project management will provide the human combination of leadership, experts integration, empathy, and ethical behaviour (ARUP, 2017). Beyond technical and methodological skills of project experts behavioural characteristics, emotional and social intelligence will be required increasingly in the recruitment.

Analysing project management in terms of influences specific to the fourth industrial revolution, projectification of the society, digitalization, virtualization, coping with complexity, trans-nationalization and professionalization, Simion et al. defined a new stage in the development of the discipline as Project Management 4.0 (Simion et al., 2018). They developed three definitions of this concept: as a project management specific to the fourth industrial revolution, as a fourth stage of project management evolution and as a set of project planning and execution processes using technological tools specific to the fourth industrial revolution. They argue that seven key components of project management are mostly affected by elements specific to the fourth industrial revolution: cost, time, quality, team, communication, risk, and procurement.

Project management 4.0 will take advantage of real-time monitoring and real-time cost progress indicators in the execution, elaboration of progress reports and quality control of deliverables will be automated, which facilitates time saving. The communication processes in and between projects will be accelerated, connectivity is increasing and removing physical and personal interchange of information. Communication between human and machine, as well as machine and machine will be deployed in the execution process. Simulation of the execution enables forecast and identification of risks, which are evaluated using techniques based on using large volumes of data from other projects.

Virtual platforms will be used to share and publish knowledge, lessons learned and best practices in several project subject areas. Regarding team collaboration and work, the use of virtual teams will be generalized, gamification will be applied for development of human resources and collective intelligence will facilitate problem solving and efficient management of projects (Simion et al., 2018).

The downside of teams virtualization is the decreasing of social interaction between project members. Automation and increasing connectivity may spare time of individuals, which can be invested in creativity, knowledge accumulation and potential expansion. Virtual environments enable cooperation beyond borders and use of collective intelligence to solve issues in short time. But the human aspect of the teamwork will continuously fade. The daily work loses human connection, inspiration triggered by a personal conversation between colleagues, motivation fired by positive feedback from superiors or peers, praise for a good job and the joy of coming together to celebrate successes as results of good performance.

A large-scale study performed by KPMG in collaboration with the Australian Institute of Project Management [AIPM] and the International Project Management Association [IPMA] with over five hundred participants from fifty-seven countries shows that the future of project management is anchored more in the strategic orientation than in the methodical handling of projects. The methods of project management are progressively being used to overcome an increasing number of business challenges. This demonstrates the essentiality of project delivery for modern organizations as a tool to implement strategic changes and increase profitability.

The study shows that sixty-three percent of the companies surveyed carry out projects with essential change management skills. This is in line with the finding that thirty percent of companies believe that their change management skills are very

effective. Change management competence is rated as particularly important skill for project managers in the future, followed by communication and interpersonal competencies. The future of the project management is “as a connected facilitator of change and return of investment” (KPMG; Australian Institute for Project Management, International Project Management Institution, 2019).

Project performers have to sharpen their skills toward strategic and interpersonal competencies. According to the study organizations have to double down their commitment to project and program management, to critical governance activities like risk identification and handling to obtain a return on investment, to invest in new technologies such as collaboration tools and artificial intelligence, which is pioneering for faster and more effective project management (KPMG; Australian Institute for Project Management, International Project Management Association, 2019).

Ribeiro, Amaral and Barros assert that the technological breakthroughs of the Industry 4.0 will trigger significant changes of the project manager regarding their soft and hard skills. The significant changes regarding the skills of the Industry 4.0 project managers will focus on the way of communicating, the speed and capacity of work and basic knowledge. Specialized project managers related to different elements of Industry 4.0 have to enhance their technical, methodological, social and personal skills. Technical competencies concern process understanding and state-of-the-art knowledge, methodical refers to creativity, decision-making, conflict and issue solving, entrepreneurial thinking, analytical skills. The social area comprises teamwork, intercultural skills, ability to transfer knowledge, motivating, coaching, networking ability, whereas personal competencies refer to flexibility, willingness to learn, tolerance of ambiguity, adaptability, pragmatism, sustainable mindset, compliance, and positivity. The existence of more behavioural and soft skills is associated with the project manager 4.0 profile, compared to the traditional project manager profile (Ribeiro et al., 2021).

4 Discussion: towards a digital project management

How project management will line up in the future delivers an explanation of the VUCA meaning. The term “VUCA” became indispensable in the language of the present management world. It is the acronym for Volatility, Uncertainty, Complexity and Ambiguity. Originally it was first used by two course participants of the United States Army War College, Lawrence and Steck, in their study regarding contemporary management theories in 1991 and concluded that “No one can accurately predict what tomorrow will bring. We do know that volatility, uncertainty, complexity, and ambiguity will define our future work environment” (Lawrence and Stack, 1991). This was the birth of a term which moved two decades later into the business world and is used almost inflationary to deliver a holistic description of the environment in which the society is located, impacting the way of its handling, decision-making and interaction between its systems.

VUCA combines four distinct types of challenges that demand four distinct types of response. The description by Bennett and Lemoine of these four elements can be transferred to project management, so that an approach for the future of the discipline can be derived.

They describe volatility as an unexpected challenge of an unknown duration, which is not essentially hard to understand since knowledge about it is available. In case of uncertainty the basic cause of the event is known, but a lack of information exists. Complexity is compared with a situation with many interconnected variables, with partially available information, or which can be predicted. But the volume or nature of it

can overwhelm the process. Ambiguity means that causal relationships are completely unclear, no precedents are available, organizations are dealing with “unknown unknowns” (Bennett and Lemoine, 2014). Based on these characteristics the project management in the future needs to re-organize, build-up specialists and resources focussing on their special needs dictated by the nature of their business. Organization will invest in buying talents, if required build stockpile inventory, collect, interpret, and share information. To cope with ambiguity the project management of the future is experimental. To understand cause and effect, hypothesis have to be constructed and tested, experiments will be designed, so that lessons learned should be applied broadly.

With the continuous review and renewal of knowledge the learning methods needs to be re-assessed too and modernized to enable people to build competencies and offer new ways of learning. The project management of the future is characterized by the utilization of automated methods and techniques supported by innovative, continuous evolving tools, which will facilitate and accelerate the daily project work. For this the discipline needs to retain a high degree of flexibility and connect traditional methods with the comprehension of new markets, deep knowledge about products and services of its own companies, how they are used by their customers.

The digital transformation is essentially emerging through a succession of technological innovations, which are becoming gradually more established in organizations and society. Then again digital transformation is accomplished through projects, further indication for the growing volume of projects in the future and consequently for an increasing demand on project management professionals. Hereby play project managers and their teams a meaningful role in managing the challenges of the digital transformation in the sense of meeting project goals. Project goals are not only reduced to profit realization, which remains one major purpose to ensure long-term survival of organizations, they concentrate on sustainability and responsibility for the impact of their projects on the society.

Project management is developing from a process- to a principle-oriented discipline, aiming to create values for organizations and society at whole. It becomes an instrument to contribute to a more sustainable society.

Project managers have to deal with resource diversity and create balanced teams integrating native and new knowledge. Emphasis will be on open mindsets and cognitive capacities. As artificial intelligence and robotics conquer more and more the organizations, leadership becomes more a collaborative process. In this new dynamic leadership and project management overlap, relationship and emotional intelligence become essential for project leaders since they facilitate motivation, engagement, and passion for the project within the organization (Bolick, 2019).

Digital transformation triggers projectification of society and vice versa. Further effects of these interrelated phenomena are the increasing demand of qualified project professionals and the transformation of their competencies required to meet objectives of projects. Further research is required on the transformation of the roles in project management under the influence of megatrends and digitalization regarding required future competencies and didactical approaches to acquire knowledge and build-up skills.

Project management cannot withdraw from influence of the megatrends. The degree of their impact on the project management processes may differ, but they constitute the framework which supports the formation of reliable predictions regarding the direction in which this discipline is moving.

A potential to exploit are the increasing heterogeneity regarding age and gender, which represents an enrichment for the performance of the project team, silver society, health, and knowledge culture. Fuelled by the megatrend of connectivity, the knowledge

of the world and the way to deal with information are changing. Virtual environments enable cooperation beyond borders and use of collective intelligence to solve issues in short time but diminish the human aspect of the teamwork.

Project teams should be sensitized for the emerging of megatrends, recognize their potential and the chances they offer to use them for the further development of the discipline.

Projects will continue to represent the way to transform innovative ideas into endeavours put into practice, or to experience and test the feasibility of theories with support of project management. Project success will be associated with the market success of a new product or service. The project management of the future means dealing with projects that have to innovate in order to deal with increasingly complex, fast changing and uncertain conditions and focussing on change management.

The future project management is aware of disruptive technologies, understands the potentialities of new technologies and is capable to think ahead and act proactively to produce added value for the organizations, since automation including artificial intelligence, machine learning, robotics, Internet of Things, impacts increasingly the work environment. Project performers of the future know their organizations, are aware of their strategic objectives and the orientation of the projects and are able to perceive and deal with the fast occurring changes. Leadership qualities, solid business judgment and pragmatic handling of uncertainties complete the necessary requirements for a successful project team of the future.

Project management is developing from a rational, strictly process-oriented, focussed on delivering in time and budget to a principle-oriented approach focussed on providing values for the society at whole.

The study is limited due to its theoretical approach. Further research is required to explore potentials of megatrends and digitalization for project management in practice.

Research around future competencies of project practitioners and educational approaches to acquire knowledge and skills would help practitioners and organizations to find appropriate ways to cultivate their capabilities for the future. Intensifying collaboration between academia and industry would foster research and practical application of the results in project management.

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