Project Management in Digital Disruption: Emergence of Digital Project Management Office

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Abstract

This review paper has been prepared to provide an overview of multidisciplinary research that combines recent findings in the fields that support digital transformation development. The potential impact of digital technologies on organizational performance is the leverage that enables changes in common elements of organizational design; such are strategy, structure, processes, or workforce. According to reports by various authors, choosing an approach to digital transformation potentially includes an emphasis on strategy, processes, a structural approach, a project approach, and other performances. Such transformation is often performed through a portfolio of interrelated projects that change the organization. Most contemporary organizations establish a project management office (PMO) as an organizational entity responsible for implementing digital transformation initiatives. In this article, PMO is highlighted as an element of organizational design that promises success in meeting the demands of digital transformation initiatives, such as digital agility or innovation project management, by introducing new digital competencies into its professional domains. Such extensions of PMO domain expertise may lead to the transformation of "traditional" PMOs into digital PMOs. The paper analyses the cases of application of structural elements of digital PMO and their characteristics in three Croatian companies.

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Introduction

Digital transformation (DT) as a social, business, organizational and technological phenomenon is multidimensional and has many implications for organizations seeking to implement it. By implementing various emerging information and communication technologies in business, such as artificial intelligence, big data analysis, IoT, cloud computing, etc., organizations are simultaneously establishing digital strategies (Bharadwaj et al., 2013; Matt et al., 2015), developing new business models (Berman, 2012), (Schallmo et al., 2017), changing their culture and structure (Fabac, 2021; Fuchs et al., 2019; Hartl & Hess, 2017).

Compared to the existing business models and standard business processes, DT and its disruptive nature affect organizations. Organisations must be more agile, innovative, and ready to change radically. DT implies many aspects of change, but this paper will focus on developing DT through a project model and prerequisites of organizational entities in design responsible for implementing changes.

Although other perspectives and approaches are cited in the literature, DT, as a radical organizational transformation, is usually implemented as a group of related projects, programs, or a portfolio of corporate projects. According to recent research, most organizations have an established project management function through the PMO – a project management office (Project Management Institute, 2017), especially when aligning with strategic objectives (Project Management Institute, 2013).

As an element of organizational structure and design, PMO is also an essential entity of organizational project management (Monique Aubry et al., 2007). The role of PMO in contemporary organizations has been researched by many scholars (Monique Aubry & Lavoie-Tremblay, 2017), (Müller et al., 2013), (Darling & Whitty, 2016) or (B. P. Hobbs & Aubry, 2010), to name a few. The relationship between DT and the role of PMO during implementation has not been researched so far, at least not directly. The initial assumption is that DT influences organizational design and, consequently, PMO design. Additionally, PMO can play a crucial role in the success of a digital transformation venture.

This paper considers what needs to be done to make the organizational PMO cope with the requirements of DT, i.e., how to make PMO more "digital". A survey was conducted in selected Croatian companies to gain insight into the relationship between DT and PMO.

Previous research

Digital Transformation

Various digital transformation perspectives have attracted scholars' attention for more than a decade: strategic, organizational, social, managerial, educational, etc. Although DT affects various levels of the presence and upcoming future, starting from the whole society to the story of the individuals, the primary focus to serve the purpose of this paper will be DT at the level of an organization, business, or public.

DT as a strategy represents a paradigm shift from the traditional approach of having separate business and IT strategies. Some scholars addressed the subject of DT strategy (Bharadwaj et al., 2013), (Matt et al., 2015) or (Kane et al., 2015), paving the path for successive research in the area.

DT as a phenomenon requiring a multidisciplinary approach was researched by scholars like Vial (2019) and Verhoef et al. (2021), proposing a future research agenda on DT. Both the former and the latter sources suggested the introduction of organizational design concepts into the research agenda of DT. As an example of well-known organizational design concepts, McKinsey's 7s models can be used for this

paper. One of its key components respects employees' skills, which are then related to the capabilities and competencies of the organization. Vial (2019) sees dynamic capabilities as one of the elements of the research plan, while Verhoef et al. (2021) introduce the organizational structure as a constituent element of the plan. The latter proposes ways of coping with the demands of DT by considering aspects of the organizational structure having separate business units, agile organizational forms, and digital functional areas (Verhoef et al., 2021).

Some scholars like Fabac argue that "major organizational changes are traditionally seen through design changes, so by analogy, effects of DT can be expected in the domain of (organizational - auth. note) design" (Fabac, 2021).

The data about digital transformation initiatives that are always astonishing is that, according to research by McKinsey, as many as 70 percent of "large-scale complex change programs do not reach the set goals" (Bucy et al., 2016). Other sources state several reasons why digital transformation projects and programs fail (Westerman & Davenport, 2018; Zobell, 2018).

Following all the above, in the continuation of the paper, we analyze three key research topics: a) possible approaches to the development and implementation of digital transformation; b) organizational design that can support the requirements of DT, and c) project management as a discipline that explores methods, models and structures that enable the implementation of DT in different perspectives.

Approaches to the Development and Implementation of Digital Transformation

Some authors discuss digital transformation as a process (Verina & Titko, 2019; Vial, 2019; Zaoui & Souissi, 2020). Such classification is justified by organizational changes (transformation) and, to some extent, from the perspective of defining specific DT processes. Thus, in his paper, Ulas (2019) suggests the existence of adaptation processes for the circumstances of DT development where the adjustment of organizational institutional and operational systems is performed concerning new businesses marked by digitalization. According to Sousa and Rocha (2019), learning processes and innovative activities are the dominant processes in digital transformation.

However, one should keep in mind the limitation of the paradigm: "DT as a process" due to the analogy of business processes where, according to the repetitive nature of these processes, the principles dominate that they run faster, cheaper, with fewer errors, with the possibility of customization. These principles are not the key to the success of the digital transformation process. The definition of business processes in terms of precise inputs, linear and logical sequence of activities, defined tasks, and predictable results (Bulletpoint, 1996) supports the view of activity architecture and subprocesses for the process view on digital transformation, not enough.

Digital transformation as a *structural change* is discussed in (Hess et al., 2016), (Bilgeri et al., 2017), (Fuchs et al., 2019), (Fountaine et al., 2019), and others. Successful implementation of DT requires a structural change, and appropriate organizational units should be identified as old or new "pillars" for DT development. The positioning of structural interventions concerning the DT strategy was discussed by Hess et al. (2016), formulating strategic questions where the characteristic answers are the impetus for the outcomes of digital transformation efforts in the analyzed cases. Ackermann (2020) proposes the establishment of the so-called Digital Initiative Transformation Office to support digitization, especially during the COVID-19 pandemic, where this organizational unit would support all digital initiatives, from an idea to establishment.

The approach to the development of *digital transformation through a project perspective* has good predispositions that follow from the basic definition of the project that it is a unique set of activities intended to achieve a defined result, with a specified start and end date, and with designed resource allocation, according to (Bowen, 2002). A project in an organization is an exception just as much as it is an undertaking of digital transformation. The traditional design methodology (waterfall model) is not entirely satisfactory for dynamic and uncertain organizational endeavors such as digital transformation, and many authors suggest the application of agile methods for DT projects (Bendor-Samuel, 2019), (Gurusamy et al., 2016), (Ackermann, 2020). The agile framework for DT projects includes an iterative development approach (Scrum sprints, etc.), delivery after a short time, frequent testing and feedback, and daily review of user needs.

The partial approaches to DT listed here are preferably combined and harmonized in practice but should be subordinated to a digital transformation strategy. The rationality of organization management dictates the need to formulate a strategy that will engage digital resources and, through DT, lead the organization towards new ways of creating value, digitized products and services, and ultimately better performance. The need to emphasize the importance and priority of strategy is evident from research conducted by Kane et al. (2015), where the authors put strategy ahead of technology in the mission of driving DT initiatives. The problem of DT strategy is also indicated by the research of MIT & Deloitte (Kane et al., 2016), which showed that only 43% of respondents agree with the statement that employees in the organization have sufficient knowledge and skills to execute a digital strategy.

Organizational Design and Organizational Project Management

Organizational design has been the subject of academic research for a few decades. The two most common organizational design models are Galbraith's Star (Galbraith, 2014) and McKinsey's 7s model (Lowell, 2008). The former includes five elements of the organizational design and their relationships, while the latter consists of seven components and their associations (Strategy, Structure, Style, Staff, Skills, Shared Values, and Systems).

Organizational design and project management are aligned disciplines for project-based organizations. The topic of project-based organization design has been researched recently by Miterev et al. (Miterev et al., 2017). Findings in the study of the latter source, carried out on academic project management literature, show that elements of organizational design based on Galbraith's Star model were "…addressed to a greater or lesser extent. However, no paper discussed the holistic design of project-based organization" (Miterev et al., 2017)

To establish consistent relationships between organizational design and project management, organizational project management as one new research area has been developed.

Organizational project management (OPM) is a function of an organization's research area. It is defined as "…a new sphere of management where dynamic structures in the firm are articulated to implement corporate objectives through projects to maximize value" (Monique Aubry et al., 2007).

OPM addresses organizational design as dynamic structures responsible for facilitating the changes in an organization. There are two concepts of corporate design explicitly addressed by OPM; a contingency theory as a possible theoretical perspective discussed in the research of Müller et al. (2019) and Aubry and Lavoie-Tremblay (2017), and dynamic capabilities, drawing from the resource-based theory of organizational design. The former comes from the standpoint that the "contingency

theory of organizational design starts from the fact that the effectiveness of a particular design solution depends on the specific situation in which the organization finds itself." (Fabac, 2017). The latter is "…the antecedent organizational and strategic routines by which managers alter their resource base to generate new value-creating strategies" (Eisenhardt et al., 2000). Davies further explained dynamic capabilities in organizational project management as the concept "applied to identify how firms deploy multiple projects for existing customers and launch innovative projects to develop new technologies and create new markets" (Davies et al., 2008).

The perspective of dynamic capabilities was researched in information systems projects portfolio management by Daniel et al. (2014), considering the capability of successfully leading, managing, and executing IT projects as dynamic capabilities. A similar approach can be seen in the research paper by Killen and Hunt (2010)), where the dynamic capabilities perspective draws on organizational learning theory. Both perspectives are concurrent with the demands of DT; such are needs for innovation in strategy, business models and processes, changes in corporate culture, organizational structure, etc., as elements of organizational design.

One can view OPM as a function within an organization's organizational structure. According to research by Project Management Institute (PMI) as a professional organization, over 70% of companies participating in the research have their project management function organized through the project management office (PMO) as an organizational entity (Project Management Institute, 2017).

PMO as an organizational entity covering OPM's function within an organization and its relationship with the corporate design was covered in papers of scholars like Aubry and Lavoie-Tremblay (2018) (2017), drawing on theories of organizational design like contingency theory.

Project Management Office and Its Role in Contemporary Organizations

PMO, as an organizational entity responsible for leading, managing, and executing projects, programs, or portfolios of projects, covers various organizational forms. Aubry et al. (2013) recognize the following types of PMO: a) Organizational Unit PMO/Business Unit PMO/Divisional PMO/Departmental PMO, b) Project-Specific PMO/Project Office/Program Office, c) Project Support/Services/Controls Office d) Enterprise/Organization-wide/Strategic/Corporate/Portfolio/Global PMO and e) Center of Excellence/Center of Competency. Müller et al. (2013) categorize PMO according to relational typology as servicing, controlling, and partnering. Desouza and Evaristo (2006) proposed an approach of classifying PMOs according to knowledge archetypes as a) supporters, b) information managers, c) knowledge managers, and d) coaches. The first falls into the administrative dimension of PMO typology, while the other three fall into a knowledge-intensive category. Monteiro et al. performed thorough research of PMO's academic literature in scientific databases like Web of Science, Scopus, Science Direct, etc., and came up with twelve different typologies of PMO (Monteiro et al., 2016).

Unlike the proposed typologies and categorizations in the previous paragraph, Hill (2004) starts from the standpoint that PMOs can eventually evolve into a more mature organizational form. It means scenarios of developing through different stages, from the project office as the most immature form to the center of excellence as the most mature one.

A study by Hobbs et al. (2008) based on the analysis of eleven organizational transformations shows that PMO was considered a part of innovation efforts. Artto et al. (2011) discussed the integrative role of PMO in front-end innovation, building on

theories of management control, organizational design, and front-end innovation in academic literature.

Although PMOs, as an organizational entities in principle, last more than the projects they are responsible for, they are far from being considered stable organizational structures, so they are constantly exposed to tensions to change (Monique Aubry, 2015; Bredillet et al., 2018). These tensions or demands to change may come from the fact that PMOs failed to justify their purpose, given existing circumstances, or just because of the ever-changing nature of the business organization, as explained in contributions by (Darling et al., 2016) or (Schibi, 2013).

The digital transformation paradigm places new demands on project management competencies to control and manage the implementation of organizational changes (Hornstein, 2015). As the most common organizational form of corporate project management, PMOs in contemporary firms are faced with additional demands on the development of organizational learning and knowledge management (Pemsel et al., 2013), especially in the domain of cross-project learning and improvement (Julian, 2008), as a prerequisite for continuous innovation (Artto et al., 2011) and sustainable development (Gemünden et al., 2018) and building a new value (Hurt et al., 2009).

PMOs play a significant role in project success (Ward & Daniel, 2013), and implementation of the organizational strategy (Project Management Institute, 2013) is considered an organizational imperative in strategic initiative management (Keenan et al., 2013). Although a direct relationship between DT and PMO design in academic literature has not been observed, professional community members are addressing this topic (Workfront, 2018).

Each of the topics mentioned above that represent additional demands on PMOs in the case of transformational projects implies a further aspect of PMO design, and that is how to assess or quantify the contribution of PMO. This contribution can take place in each domain concerning how to evaluate the contribution of PMO in strategy implementation, innovation, organizational learning, and organizational change.

To sum up, there are domains of PMO expertise that are getting greater importance in the design of the PMO when faced with the demands of DT's projects and programs, but also, some domains are not seen in the "traditional" design of PMO. These domains of expertise support the following areas:

- Implementation of digital strategy
- Introduction and improvement of organizational agility
- Innovation management, and consequently, innovation project management
- Knowledge management and organizational learning
- Organizational change management.

Research Gap and Research Questions

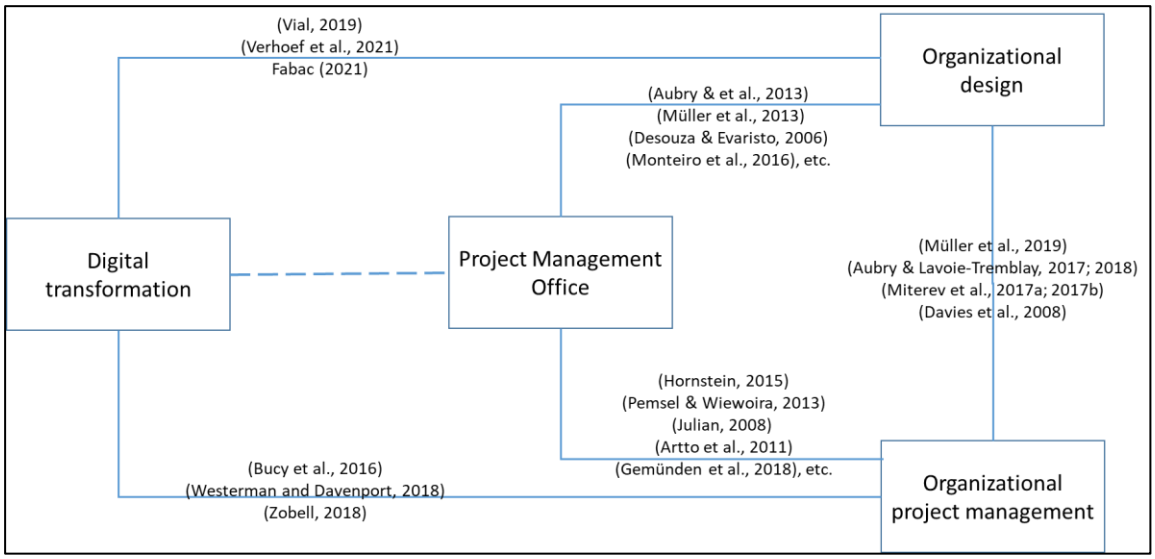
As the previous paragraph shows, available academic sources have discussed relationships between DT, organizational design, and OPM. Relationships between organizational design and PMO and OPM and PMO have been covered by scholarly sources, as illustrated in Figure 1. On the other hand, the direct relationship between DT and PMO design has not been observed.

Furthermore, existing project management frameworks, part of PMO's domain of expertise (Aubry et al., 2013), are considered inadequate to support transformational projects (Cha et al., 2018). For successfully managing and executing DT projects and programs, they need to incorporate additional competencies like innovation

management, organizational change, organizational learning, digital strategy implementation, and organizational agility. Therefore, a new or revisited model of PMO competencies should be proposed, drawing on the contributions of (Müller et al., 2019), (Monique et al., 2017), and (Miterev et al., 2017).

There is a possible research gap concerning PMO design since DT introduces some new elements in the model of organizational design (digital strategy and agile organizational structures, e.g.), and PMO is a valuable structural entity responsible for implementing DT projects.

Figure 1.
Relationships between DT, organizational design, OPM, and PMO in academic literature



Source: Author´s work

Possible changes in PMO's domains of expertise and extensions in competencies due to demands of DT affect the design of the PMO as a part of an overall organization regardless of the model or organizational design applied, e.g., Galbraith's star model (Galbraith, 2014) or McKinsey's 7s model(Lowell, 2008).

To frame the exploration of this relationship, we proposed the following research question:

- RQ1: What are the design features of a PMO that could successfully meet the requirements of DT projects?

To answer the research question, we choose an approach of preliminary qualitative research carried out on a sample of four Croatian companies.

Methodology

The theoretical framework of this research covers areas where qualitative methodological approaches prevail, given that epistemologically, there is no objective reality in organizational design and project management. However, it is constructed through different perspectives and interpretations.

Considering the above, the case study method was selected as the primary method used in this research. The suitability of a case study as a research method is here seen as justified because research is seeking answers to research questions starting primarily with "Why" and "How" on an actual set of events over which the researcher has no control (Yin, 2018). The case study method is also considered a

suitable method in this paper because the research is multidisciplinary, combining topics from digital transformation, organizational design, and organizational project management, where existing theories may appear insufficient to explain the observed phenomenon (Eisenhardt, 1989). The subject matter of the research is complex, with a potentially large number of variables and relationships, and the available number of cases is relatively small for quantitative research design.

A data collection strategy in the research was based on interviews with key stakeholders like directors of PMOs or other employees having an insight into digital transformation projects and PMOs' structure, roles, responsibilities, and performance. As a preparation for the interviews, a list of questions and topics to be discussed with interviewees was designed. This list includes but is not limited to the following issues:

- The dominant type of digital transformation and rationale for such a decision
- The roles a PMO plays in digital transformation projects
- Digital technologies used when implementing DT
- Fundamental PMO knowledge and skills required for successful implementation of DT
- Project management approaches used in a project DT
- Significant obstacles and risks in DT projects.
- DT project performance compared to projects before DT
- innovations in PMO's work due to the implementational demands of DT - PMO's self-perception of being more digital than before DT implementation

The interviews were carried out in four Croatian companies in April and May 2022.

Results

For this preliminary research, interviewed representatives of three organizations answered relevant questions. Table 1 presents certain demographic information about the involved organizations, while the results of the performed case studies are elaborated below the table.

Table 1
General information about PMOs involved in research

	Case A	Case B	Case C	Case D
Industry sector	IT	Banking	Banking	Telecom
Position	PMO director	Head of PMO	Head of PMO	PMO Director
PMO size	9	13	4	19
Type of DT	Cultural/organizational	Business model(s)	Business process(es)	Cultural/ organizational

Source: Author´s work

Case A – An IT Organization

The organization in case study A is a small to medium-sized information technology enterprise with an established reputation as a proven vendor of geospatial software solutions and solutions for the public sector and administration, supporting the digital transformation of its customers. PMO counts nine employees, including the PMO director. As most of the company's business processes are digitalized, the company has chosen the organizational/cultural type of digital transformation of its business, focused primarily on customer and sustainable value proposition.

PMO sees itself as a key player in the organization's digital transformation in digital agility and a knowledge broker in knowledge creation and distribution processes throughout the organization. Among the more traditional domains of PMO's expertise,

the PMO is entrusted with the central point for the governance of project management processes, standards and methodologies, and projects and organizational performance measurements based on key processor indicators.

Digital transformation projects led or monitored by PMO staff include emerging technologies like mobile and cloud computing, social networks, and big data. With the critical knowledge and skills in digital transformation projects, PMO finds strategic and operational planning and strategy implementation, knowledge of methods and techniques of project management, and communication and motivational skills.

Although PMO promotes digital agility and one of its "digital" domains of expertise, projects are led using traditional or hybrid project management methodologies. As the most interfering factors for successfully implementing DT, PMO sees a lack of leadership, a shortage of talent in the market, and resistance to change.

Case B – A business Bank 1

This organization is one of the five largest business banks in the Croatian market. However, all of the bank's key business processes are supported by IT solutions. The bank implements and runs projects with strategic targets to develop or further improve the digital channels of its business operations. These activities align with digital transformation focused on business model transformation, which researchers often cite.

PMO counts 12 employees plus the Head of PMO. The PMO is a part of the organizational unit and a crucial player in implementing digital strategy and related change management. Such organizational structure also allows PMOs to contribute to digital strategy definition and shaping.

The bank has used emerging digital technologies like AI, mobile, and cloud computing in some DT projects. The following domains of expertise have been recognized as where PMO plays a critical role: strategic and operational planning, governance of project management processes, standards and methodologies, communication and motivational skills and techniques, leadership, and knowledge about the business area transformed in projects of DT. The latter enables PMO and its members to help project sponsors and owners to facilitate disruption and maximize benefit, i.e., value to all stakeholders.

The bank uses its DT project hybrid approach in project management approaches. In the initial introduction of the hybrid system, the so-called "incremental waterfall" approach was combined with rolling-wave planning. The waterfall approach carried out each delivery of the project. Still, the project did not have distinctive phases defined by the waterfall (to do all the analysis first, then all development and testing at the whole project level). To elaborate more on this approach, the head of PMO stated: "To be more agile, the bank changed its SDLC approach and supported the agile approach through project management methodology. However, since, as a bank, we deal with a lot of regulatory projects, so we opted for a hybrid approach because we believe we need a project plan with a longer planning horizon (a pure agile approach has a short planning horizon) and risk management and the implementation of individual deliverables are done agilely within the given framework. Still, at any time, the expected end of the project, risks, challenges, and the impact on the budget can be assessed."

When faced with the challenges and obstacles of the DT project, PMO is challenged with overwhelming regulatory demands cutting the capacity for business activities development, lack of project-applied leadership at the project owner's side, and resistance to change.

Case C – A Business Bank 2

This case involves another Croatian business bank, one of the ten largest business banks on the Croatian market. The bank chose digital transformation focused on business process transformation as its dominant change model. Namely, the bank considers transforming its business processes as a prerequisite to focusing on transforming its business model(s).

PMO counts four employees. PMOs should play critical roles in DT projects by implementing a digital strategy, fostering and improving organizational agility, and managing organizational knowledge. Like in the case of B, PMO perceives that it plays a crucial role in strategic and operational planning, governance of project management processes, standards and methodologies, communication and motivational skills and techniques, and leadership. Unlike the other two cases, this PMO considers its knowledge of the potential of digital technologies as crucial for the successful implementation of DT.

Emerging digital technologies used in DT projects of the bank involved mobile computing and other technologies related to development operations and business process management.

Unlike the previous cases, the organization, in this case, practices both an agile and hybrid approach to project management. However, like the two other organizations, PMO sees a lack of leadership and resistance to change as two significant obstacles to implementing a digital strategy, i.e., projects related to DT.

Case D – A telecom company

This organization is one of the largest telecom companies in the Croatian market. Similar to case A, as most of the company's business processes are digitalized, the company opted for the organizational/cultural digital transformation focused primarily on customers and a sustainable value proposition. The PMO director stated that digital transformation had been predominantly manifested by agile transformation to elaborate on the latter.

PMO counts 19 employees. PMO perceives itself as one of its organizational entities supporting its agile transformation.

Emerging technologies in the company's projects involve an almost complete spectrum of digital technologies: artificial intelligence, mobile and cloud computing, social networks, big data, and the internet of things.

Like case B, PMO sees its vital expertise in the governance of project management processes, standards and methodologies, and communication and motivational skills and techniques. Furthermore, like in cases B and C, the organization, in this case, practices a hybrid approach to project management. Unlike in other organizations, PMO perceives a lack of expert knowledge as a significant obstacle to implementing a digital strategy, i.e., projects related to DT.

Discussion

This preliminary research was considered a pilot project of a broader study that would investigate other elements of PMO design adequate to meet the needs of a digital transformation. The conducted research points to certain conclusions regarding the research question: What are the design features of PMO that could successfully meet the requirements of DT projects? The findings are presented and explained below.

PMO design changes

DT is an organizational transformation that implies that all components of organizational design are subject to change (structure, processes, strategy, resources, capabilities, competencies, activities, and organizational culture; for example, the McKinsey model). PMO, as an administrative unit, a structure responsible for managing the project part of the organization, is also subject to change due to the requirements of DT. The more radical the DT, the more changes can be expected in the design of the PMO.

In addition to the PMO design factors we have listed, some authors, such as (Hardy et al., 2001), emphasize several responsibilities of the PMO unit that need to be designed regarding project management standards and successful project execution, and strategic level tasks.

DT can be considered a case of change, an example of PMO transformation driven by external and organizational drivers or events (Aubry et al., 2010). Given this research, it is essential to note that organizations with multiple PMO innovations (Case C, Table 2) also observed more benefits from PMO transformation than other companies. In addition to emphasizing agility in a broader organizational spectrum, Company C in DT projects seeks to develop innovations in project management, apply new technologies, and provide support for strategic DT projects. From the perspective of general knowledge about the successes of the DT venture, the statements of the respondents of Company C about PMO support in the implementation of the digital strategy are essential. The findings of many papers suggest that one of the critical elements for the success of the digital transformation is developing and implementing an appropriate digital strategy (Sebastian et al., 2017), (Kane et al., 2015).

The chosen type of DT is different for each studied organization (Table 2). This fact may assume different demands on PMO's design, visible from each PMO's crucial roles in an affiliated organization. It is in line with the contingency theory of organizational design.

Knowledge and Agility

Given the critical roles of the PMO organizational unit, the need for competencies in implementing (DT) strategy, establishing digital agility, and knowledge management should be noted. Essential knowledge and skills of PMO staff regarding support for digital transformation include strategic and operational planning, PM methodologies, communication, and motivational skills. PMO managers emphasize the topics of strategy, planning, and agility, which are prerequisites for the success of organizations while going through digital transformation, as stated in (Kane et al., 2015) (Mikalef et al., 2016), (Gurusamy et al., 2016).

Surprisingly, the current perception does not emphasize the knowledge of technology among PMO staff as critical knowledge for the successful implementation of DT. Hartl and Hess (2017) rank openness towards change, agility, innovation, and willingness to learn among the key values of organizational culture with an impact on the success of DT.

Although all four observed PMOs have implemented the agile approach in managing projects as organizational innovation, only case C organization perceived significant benefits in a shorter project life cycle, lower costs and project outcomes. Unlike the other three cases, PMO in case C also introduced some other innovations, resulting in a better perception of itself as a more digital PMO.

Table 2
Factors affecting PMO design in the cases covered for DT initiatives

	Case A	Case B	Case C	Case D
Type of DT and experience with DT technologies	Cultural/ organizational Mobile computing, cloud computing, social networks, big data	Business model(s) AI, mobile computing, cloud computing	Business process(es) Mobile computing, BPM, robotic process automation	Cultural/ organizational AI, mobile computing, cloud computing, social networks, big data, IoT
Key PMO roles	Implementing digital agility Knowledge management	Implementing DT strategy Change management Contributing to DT strategy definition	Implementing DT strategy Implementing digital agility Knowledge management	Agile transformation of the company
Fundamental PMO staff knowledge and skills	Strategic and operational planning PM standards and methodologies Communication and motivational skills	Strategic and operational planning PM standards and methodologies Communication and motivational skills Leadership Knowledge about the business domain	Strategic and operational planning PM standards and methodologies Knowledge of digital technologies Communication and motivational skills Leadership	PM standards and methodologies Communication and motivational skills
Project mgmt. approach	Traditional Hybrid	Hybrid	Hybrid Agile	Hybrid
Main obstacles in DT strategy implementation	Lack of leadership Resistance to change Staff shortage	Lack of leadership Resistance to change Regulatory demands	Lack of leadership Resistance to change	Staff shortage
Performance assessment in DT projects vs. "regular" /"traditional" projects	No significant change	No significant change	Somewhat more successful	No significant change
Innovations in PMO's work due to DT	Introduction of an agile/hybrid approach Improving control and coordination between project managers and projects	Agile PM	Agile PM and agile org. forms/structures Innovation PM Digital strategy implementation Use of digital technologies in organizational transformation Management support on strategic DT projects	Agile PM
DT caused PMO to be more "digital."	Neither agree nor disagree.	Agree to some extent	Agree to a large extent	Agree to some extent

Source: Author´s work

There was an overlap between the companies' declarations regarding the distinguishing attributes: critical roles of the PMO, the knowledge and skills of the staff,

and the approach to managing significant obstacles during the management of the DT project. Such overlapping findings in all three cases may conclude that some competencies, i.e., domains of expertise affecting the design of PMO, are invariant regardless of the type of DT.

Digital PMO

Exploring the impact of digital transformation on project management, Kozarkiewicz (2020) identifies the most prominent aspects: data, IT tools and systems, communication, agile methodology, customer orientation, and process optimization. Examining Croatian companies through the case study, we found out that when it comes to innovation in the work of PMOs due to DT, the PMO units in A and C companies have gone through a significant transformation by introducing more innovation in their activities, as listed in Table 2.

That, in turn, resulted in a better perception of PMO being more digital (in the case of C). In the research, the representative of company A did not see any improvement in project performance in DT projects compared to traditional projects. It should be noted that conventional projects with selected organizations relate mainly to implementing segments of the information system, its maintenance, and the like.

Specific is the discovery regarding Company D, where all that has been said results in an impression of the PMO's internal perception that it became "somewhat more digital." The Director of PMO (Case D) stated: "Digital transformation has been largely manifested by agile transformation, i.e., introducing agile approaches to delivering value to customers. Digital technologies are inherent in the company's business, so I would not single it out as a part of the digital transformation, but as business as usual."

However, the selected sample of Croatian companies, as the studied cases suggest, indicates the need to develop further the additional competencies in the case of DT projects that will enable the PMO to cope with the demands of digital transformation.

The success of the PMO in implementing DT initiatives

When invited to assess the results of DT projects compared to the traditional projects, the interviewee of Case A did not observe any significant improvement in the PMO performance in terms of project duration, costs, or outcomes. However, there was some innovation in PMO's work due to the demands of DT, such as the introduction of an agile and hybrid approach to running DT projects, which in turn resulted in better control and coordination between project managers and other stakeholders.

The interviewee of company B did not see any significant change in DT project duration, costs, or outcomes when comparing DT and other projects. The agile project management approach was recognized as the primary innovation in PMO's work. Having all this said about case B, the interviewee considered that PMO eventually became more digitalized.

As specified in Case C, their performance perception of the DT projects compared to the other projects was better than in the previous two cases regarding the shorter project life cycle, lower costs and better outcomes.

Given the reports of previous research on low performance in the implementation of digital transformation (Bucy et al., 2016), (Libert et al., 2016), the overall assessment in the surveyed companies that their success in DT projects is not weaker than in other projects is encouraging. Namely, such an assessment focuses on the PMO units of the structure as good support for digital transformation initiatives in general.

In conclusion, regarding the effect of innovation transformations according to the form of digital PMO unit, we return to the example of organization C, which, in parallel

with multiple innovations, records the more incredible benefits from PMO transformation compared to other companies. To distinguish whether this is an isolated example or a rule applicable to a more significant population of PMOs, more extensive research should be conducted on the many cases studied and the tremendous amount of data collected.

The main barriers to implementing the DT strategy identified in our cases are a lack of leadership and resistance to change. This statement is consistent with globally known findings discussed in research papers such as Svahn et al., 2017, Deloitte, 2020, and Sutcliff et al., 2019.

The limitations of this research should be mentioned here as well. Namely, although this research is a multiple case study, only several available cases may appear insufficient for the analytical generalization needed to build a theory from case study research (Yin, 2018), (Eisenhardt, 1989). Furthermore, being qualitative and based on the case study method, this research can be considered preliminary research because of the small number of variables used. New research should include additional variables to help researchers describe and better understand the organizational context in which PMOs operate.

Concluding Remarks

The choice of approach in developing and implementing digital transformation is not unequivocal, and experiences are different. Through theoretical analysis, the treatment that prefers the application of project management and special organizational units such as PMO has its advantages. It turns out that, in practice, its acceptance is growing.

Digital transformation as a radical organizational change demands changes in the design of PMO as a corporate entity, i.e., the most common organizational structure responsible for managing projects, programs, or portfolios. PMO design has become a topic of interest to adequately support DT efforts by successfully executing its project and programs. By conducting multiple case studies of Croatian companies that have PMOs and implement digital transformation projects, we learned that the knowledge of methodologies and a hybrid project management approach, the implementation of DT strategy, and communication and motivational skills are essential. Croatian companies with PMO entities in digital transformation efforts feel well-known obstacles regarding the DT strategy - lack of leadership and resistance to change. These findings also provide guidelines for answering the research question on the design features of a PMO that could successfully meet the requirements of DT projects.

Preliminary research for this paper showed the need to explore further the relationship between demands of digital transformation and the appropriate design of PMO, primarily in the domain of dynamic capabilities, i.e., domains of expertise. Developing new competencies related to digital projects should enable the PMO structural unit to be transformed into a DPMO - digital project management office.

Extensions of the research carried out for this paper may have theoretical contributions, primarily in organizational project management, developing the further theory of project-based organizations with the focus on PMO as organizational structure assuming a significant role in transformational projects and programs or portfolios. Additionally, practical contributions of further research may be reflected in developing a methodological framework for PMO transformation as a part of overall organizational transformation, such as DT.

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