Strategy for managing project front-end of digital transformation – a case for a multidimensional and creative conceptualization

Jean-Bosco Ntakirutimana
UQO
ntaj06@uqo.ca

Dragos Vieru
TELUQ University
dragos.vieru@teluq.ca

Hamed Motaghi
UQO
motaghi.hamed@uqo.ca

Abstract

In any human undertakings, success requires a sound strategy. Based on a narrative review, this conceptual paper discusses the concept of strategy, its manifestations in digital transformation, and a strategy for managing project front-end activities in this change process. Concretely, based on the underlying rationale, we highlight the multidimensional nature of strategy first and then its various manifestations in digital transformation. Finally, we present a strategy for managing project front-end activities in this process, some relevant tools, and techniques in addition to a metaphor meant to creatively generate supplemental insights into this strategy. Overall, this essay contributes to knowledge in information systems by enhancing two types of theory in this area, namely, the theory for analyzing and theory for design and action.

Keywords: Project front-end, digital transformation, strategy, open action strategy, closed action strategy.

1. Introduction

"*To be of any help, a building needs a solid foundation, so does any project.*" – Authors

Regardless of the type of industry, organizations seek to improve performance through the balance of effectiveness, and efficiency in their operations (Kerzner, 2013), and to this end, they opt for certain strategies. So, whether explicitly stated, all kinds of undertakings including digital transformation (DT) - the object of this essay – rely on strategies (Johnson et al., 2020; Casadesus-Masanell & Ricart, 2010).

Digital transformation strategy features among sufficiently researched subjects (Blackburn et al., 2021; Kane et al., 2019; Moore et al., 2017; Vial, 2019), but there is still a room for improvement in terms of concept refinement. Whether in scholarship or common parlance, strategy is largely presented as just a plan to guide action despite its multifaceted nature, and this needs addressing for the purpose of rigor in concept dimensionality (Podsakoff et al., 2016).

So, what is strategy? According to Mintzberg (1987a), a strategy is a managerial instrument for coordinating a collective action based on an underlying logic shared by people in an organization. Furthermore, he conceives it as a multidimensional concept, and distinguishes strategy as plan, strategy as ploy, strategy as pattern, strategy as position and strategy as perspective (Mintzberg, 1987a).

According to Stevens and Burley (2004), *''The first few plays of the game determine the outcome''*. In project context, this resonates with the association between the effective management of project front-end (PFE) i.e., the project conceptual phase and project success, regardless of the type of project (Morris, 2013; Samset, 2010; Samset & Volden, 2016). In healthcare digital transformation – one of our research domains – systematic literature reviews reveal a scarcity of knowledge about the management of PFE (Marques & Ferreira, 2020; Stephanie & Sharma, 2020; Kraus et al., 2021) despite the importance of project conception. Currently, we are exploring the management of PFE in healthcare digital transformation and our preliminary findings such as the average technology end user knowing little about PFE activities and their non-involvement in these activities show the importance of discussing strategy for PFE management.

Regarding the management of project front-end activities, Kock et al. (2015) propose a dual strategy with the potential to help effectively manage various types of projects including digital transformation undertakings. This strategy comprises two complementary strategies, namely, the open and closed action strategies. The open action strategy consists of mindsets, behaviors, and conditions that promote creativity. As to the closed action strategy, it relates to mechanisms that an organization put in place to control processes (Kock et al., 2015).

Sometimes, ideas need to be expressed in different ways to enhance the understanding of phenomena, and imagery, in the forms of analogies or metaphors, effectively serves this purpose (Cornelissen & Durand, 2014; Morgan, 1998). So, in this work, we propose a metaphor corresponding to the open and closed action strategies. Still regarding the management of project front-end, some tools and techniques have been proposed (Cooper, 2008; Gassmann & Schweitzer, 2014; Samset, 2010) and in this essay, we present them

URI: https://hdl.handle.net/10125/103320
978-0-9981331-6-4

into two categories, depending on their role in creativity or project control.

In sum, based on a narrative review of literature (Paré et al., 2015) on strategy, this essay aims at advancing information systems in three ways: first, by illustrating various manifestations of digital transformation strategy; second, by discussing the management of project front-end in digital transformation with focus on the importance of organizational ambidexterity and a corresponding metaphor; finally, by mapping some tools and techniques relevant to this project phase based on their role in organizational ambidexterity.

The remaining part of this paper comprises five sections and proceeds as follows: first, project front-end, and digital transformation, second, strategy, third, digital transformation strategy, then, strategy for managing project front-end in digital transformation, and finally, conclusions.

2. Project front-end and digital transformation

This section presents basic ideas about project front-end in general context, and digital transformation, two central topics in this work.

2.1. About project front-end

In this section, we first introduce the project front-end, and its main characteristics, then its structure, some tools, and techniques used in this project phase.

2.1.1. Project front-end and its main characteristics. What is project front-end, and what are its key characteristics? Project front-end is the first phase of any project comprising a series of activities, the generation of project concepts first, then their assessment to determine which one passes the "money gate'' i.e., the critical stage at which the best concept is selected, then funded for development in the project implementation phase (Alam, 2006; Berghaus & Back, 2016; Gassmann & Schweitzer, 2014; Kim & Wilemon, 2002). More explicitly, it is a project phase situated between the expression of an idea about a need/opportunity and its translation into an operational concept i.e., the possibility of a tangible solution in different forms of innovation i.e., product, service, process, and business model innovation. Regardless of the type of project, project front-end is characterized by a high level of uncertainty (Kim & Wilemon, 2002; Samset & Volden, 2016), and as such it requires a qualitative, informal, and approximative approach, centered on learning, creativity, experimenting, and information flow rather than a quantitative, formal, and precise approach (Berghaus & Back, 2016; Kim & Wilemon, 2002; Stevens & Burley, 2004).

2.1.2. Project front-end's structure, tools, and techniques. Regarding the structure of project front-end, it varies depending on the form of innovation (Crossan & Apaydin, 2010) concerned i.e., product innovation (Cooper, 1988, 2008; Morris, 2013), service innovation (Alam, 2006), process innovation (Simms et al., 2021) and business model innovation (Gassmann & Schweitzer, 2014). For clarity purpose, this essay is based on Cooper's (1988) work on the management of the project front-end of product innovation with its three stages i.e., concept generation, concept assessment, and concept definition.

- *Concept generation*

Concept generation is a project front-end stage from the time a person expresses an idea about a need/requirement or opportunity to the time at which a sketchy description of the desired technical solution or project concept has been created, the purpose of a such description being to create room for alternative concepts (Cooper, 1988; Murphy & Kumar, 1997; Samset, 2010).

Once these concepts have been generated, the next step consists in screening them with techniques such as scorecards to weed out the obvious losers, based on two categories of criteria i.e., *"must criteria" /"must-haves"* and *"should criteria" /"attractive attributes"* (Cooper, 1988, 2008; von Leipzig et al., 2017). *"Must criteria"* qualify a project concept for further consideration, and include criteria related to the strategic alignment of a concept and the results of financial indexes such as the cost/benefit ratio. As to "*should criteria*", they correspond to desirable attributes in a project concept (Cooper, 1988; Gassmann & Schweitzer, 2014; Samset, 2010; von Leipzig et al., 2017).

Regarding the generation and screening of project concepts, they rely on a variety of tools and techniques. Concept generation can be achieved through brainstorming, brainwriting, cross-industry analogical thinking, focus group workshops, systems analysis, customer input, prize competitions for ideas among workers and customers, meeting with industry experts, industry reports, business model navigators, business process modelling, and business model cards (Cooper, 1988; Gassmann & Schweitzer, 2014; Kerzner, 2013; Murphy & Kumar, 1997; Samset, 2010). As to concept screening, it can be done with different techniques including cost/benefit analysis, and scorecards (Gassmann & Schweitzer, 2014; Samset, 2010).

- *Concept assessment*

Once a concept screening has been concluded, project concepts enter the next stage of project

conception whose purpose is to further analyze them to determine project feasibility based on two criteria, namely, concept organizational fit and concept attractiveness. Concept organizational fit consists of the alignment of a project concept with the strategy of an organization and its technical capabilities to successfully develop it (Cooper, 1988; Gassmann & Schweitzer, 2014; Murphy & Kumar, 1997; Samset, 2010). As to concept attractiveness, in the context of profit-driven projects, it is associated with the notion of market attractiveness characterized by a high level of need, a large size, growth and low competition (Cooper, 1988). In addition to its relevance in profit-driven projects, this concept - market attractiveness – can also inform the assessment of utility by highlighting the level of need and the number of intended project beneficiaries

As to relevant tools and techniques at this project front-end stage, they include SWOT analysis (analysis of strengths and weaknesses of an organization and opportunities and threats found in its environment), project logical framework (Project LogFrame), project strategy and strategic frame requirements, uncertainty mapping, financial reward/risk analysis, and SBAR (Situation, Background, Assessment, Recommendation) (Cooper, 2008; De Villiers, 2017; Samset, 2010).

- *Concept definition*

Once project concepts have demonstrated their organizational fit and attractiveness, they enter the last stage of project front-end whose purpose is to select the best one. This is achieved through the following four stages. First, the collection of additional details on the requirements of the intended end users. Second, the refinement of a project concept. Third, the test of a project concept. Finally, the evaluation of competing concepts.

Details on the requirements of the intended end users constitute key inputs to the design of a solution and this shows the importance for a project team to collect them (Cooper, 1988; Daneva et al., 2013; Gassmann & Schweitzer, 2014; Morris, 2013).

As to the refinement of a project concept, it consists in improving the design of a solution, and this is achieved by translating *user stories* i.e., the requirements of the intended end users into *delivery stories* i.e., functional, and non-functional specifications of a solution, with technical implications, effort estimation and associated risk (Daneva et al., 2013; Morris, 2013).

Regarding the test of a project concept, it is done by first presenting the proposed solution to the intended end users, then eliciting feedback from them afterward to know the level of their satisfaction with a project concept (Cooper, 1988; Gassmann & Schweitzer, 2014; Morris, 2013). This can be achieved by various means including written descriptions, sketches, slide show, prototyping in product innovation and experiments at bench, lab, and full-scale production in process innovation (Cooper, 1988; Gassmann & Schweitzer, 2014; Morris, 2013; Murphy & Kumar, 1997; Simms et al., 2021). This feedback helps a project team to know chances of solution acceptance as well as any aspects of the solution requiring improvement.

In relation to concept refinement and testing, *Lean Startup* constitutes an effective approach to product innovation. It is founded on *build-measure-learn*, an iterative process that enables entrepreneurs to create products that stand a good chance to meet the expectations of their potential customers. This approach comprises three stages. First, the creation of *minimum viable products* (MVPs) i.e., products with minimal features. Second, arranging for the use of MVPs by potential customers whose feedback on their experience with the product assists in validating the project concept. And finally, the refinement of the concept and the creation of the final product based on the feedback from those customers (Lorenzo et al.,2018; Popowska & Nalepa, 2015).

Finally, the evaluation of competing concepts aims at selecting the winning concept - the one deserving funding for development - by comparing alternative concepts based on the integrated results of their evaluation at various stages (Cooper, 1988, 2008). To realize this activity, an organization can use a variety of tools and techniques including cost analysis, profitability/utility appraisal, risk analysis, progress analysis (Samset, 2010) and a behaviorally informed decision architecture of a firm (BIDAF), a set of principles meant to ensure unbiased decision making (Sibony et al., 2017).

2.2. About digital transformation

In this section, we present key notions of digital transformation, namely, its definition, digital culture, digital maturity, and its signs.

2.2.1. Defining digital transformation. Digital transformation is the introduction of digital technologies into a business to improve organizational aspects such as customer experience, business process, and business models through increased efficiency and effectiveness in data storage and transmission (Ritter & Pedersen, 2020; Westerman et al., 2014).

2.2.2. Digital culture. What is digital culture? Digital culture is a term for people's behaviors, underlying assumptions, and artifacts that determine the adaptability of an organization to digital trends in its

environment (Kane et al., 2019). Digital culture manifests itself in six areas of the organizational life. First, the organization's agility in response to technological changes in its environment. Second, the organization's attitude toward risk. Third, the organization's decision-making process. Fourth, the organization's leadership structure. Then, workers' perspective on work-life relationship. And finally, the organization's work style.

2.2.3. Digital maturity. What is digital maturity? Digital maturity is the ability of an organization to continually adapt to technological changes in its environment (Kane et al., 2019; Luftman & Kempaiah, 2007). Based on their multi-year and large-scale surveys, Kane et al. distinguish four types of organizations based on their digital maturity - early, developing, maturing and digitally mature organizations. From an empirical perspective, organizations fall into the first three categories, the last category i.e., the *mature organizations* category being like a moving goalpost, an unattainable stage due to constant changes in digital environment (Kane et al., 2019). Therefore, the authors find more appropriate to use the term *maturing organizations* rather than mature organizations when referring to those considered as most advanced in digital transformation journey (Kane et al., 2019).

As a key distinctive trait of early, and digitally developing organizations, they noticeably differ from those digitally maturing in terms of approach to digital transformation. Early and developing organizations push digital transformation in a top-down fashion through a managerial approach or technology provision. As to maturing organizations, they rather pull digital transformation by creating conducive conditions for the desired organizational change (Kane et al., 2019). This view of digital transformation as an organizational change process is shared by von Leipzig et al. viewing people's unwillingness to change as a major obstacle to successful digital transformation, and a culture of innovation and digital thinking as a key success factor in this process (von Leipzig et al., 2017).

2.2.4. Signs of digital maturity. As aforementioned, digital culture constitutes a key driver of digital maturity and for this reason the six areas in which digital culture manifests itself can be used to assess the digital maturity of an organization. So, regarding the organization's agility in response to technological changes in its environment, digital maturity is associated with organization's nimbleness rather than slow move. Concerning the organization's attitude toward risk, digital maturity is associated with encouragement of risk-taking/exploration rather than caution. With respect to the organization's decision-making process, digital maturity is associated with a data-driven decision making rather than reliance on intuition. Regarding the organization's leadership structure, digital maturity is associated with a distributed rather than hierarchical leadership. Concerning workers' viewpoint on work-life relationship, digital maturity is associated with people who believe they live to work not the other way around, Finally, regarding the organization's work style, digital maturity is associated with collaborative work rather work in silos (Kane et al., 2019).

3. Strategy

As above mentioned, strategy tends to be presented in a reductionist fashion and a cursory review of this notion shows two conceptual categories, a unidimensional and multidimensional perspectives with most of publications falling into the first. In this category, strategy is just a deliberate plan, ideally contingent, meant to guide an organization in its endeavors to achieve a particular goal (Casadesus-Masanell & Ricart, 2010; Meriam-Webster, n.d.; Mintzberg & Westley, 2001; Woodford et al., 2003). From the same perspective, Miles, and Snow (2003) distinguish prospector, defender, analyzer, and reactor as four types of strategy consisting of planned activities. Furthermore, Porter (2008) defines strategy as a plan and a set of actions undertaken by an organization to achieve competitiveness based on its strengths determined by the following five forces that shape industry competition: rivalry among existing competitors, threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitute products or services.

From a multidimensional perspective, Johnson et al. underline the importance for organizations to consider strategy from a multidisciplinary perspective and define it as a *long-term direction of an organization* – a concept with three dimensions, the long term, strategic direction, and organization (Johnson et al., 2020). By long term, they mean the importance for organizations to contemplate strategy not only from the short-term perspective but to also to adopt a long-term viewpoint. In relation to direction, strategies follow a long-term direction, emerging from a coherent pattern of action. Finally, in this definition, organization refers to an entity with people, resources, and relationships both internally and externally requiring proper management on the part of the entity concerned (Johnson et al., 2020).

Still from a multidimensional perspective, strategy is seen as a concept generally rooted in stability and consistency in the functioning of an organization, manifested in collective perceptions and coordinated actions due to perspectives shared among its members

(Mintzberg, 1987a, 1987b). He views strategy as a notion with five dimensions and distinguishes strategy as plan, strategy as pattern, strategy as ploy, strategy as position and strategy as perspective. *Strategy as plan* is a managerial instrument serving as a roadmap for achieving organizational goals. As to *strategy as pattern*, it is a term for collective perceptions and actions founded on a coherent pattern of actions that has emerged over time and founded in lessons learned from experimentations in an organization. As to *strategy as ploy*, it refers to

a collection of feints or empty threats used by an organization to outsmart its competitors. *Strategy as position* is the behavior of an organization driven by its position in the market. Finally, *strategy as perspective* refers to mental frames that influence first, the perceptions of an organization about how the world works, then its actions due to shared worldviews among its members (Mintzberg, 1987a). Regarding the theoretical grounding of these five variants, Mintzberg and Lampel link them to the following 10 schools of strategy formation: the cognitive, the configuration, the cultural, the design, the entrepreneurial, the environmental, the learning, the planning, the positioning, and the power school (Mintzberg & Lampel, 1999). Mintzberg's conception of strategy with its five dimensions seems more elaborate and powerful due to its use of analogy, and for this reason, it is what we have chosen as our conceptual framework in the next section. In sum, strategy has been described in different ways, and based on this cumulative tradition, we define it as *a high-order and multifactor choice of actions, ideally contingent, to which an organization commits to achieve a particular goal.*

4. Digital transformation strategy

In this section, we first discuss how the conception of strategy for digital transformation has evolved during the last two decades, then how this strategy manifests itself in different organizations.

4.1. Evolution in the conception of digital transformation strategy

According to Bharadwaj et al. (2013), at the turn of the 21st century, the business world witnessed breakthroughs in all kinds of digital technologies with a paradigm shift in considering the role of IT as a result. This shift consisted in viewing IT as having a more strategic role in shaping business scope contrary to the traditional conception in which it was a mere support capability for business processes, a function subordinate to business strategy (Bharadwaj et al., 2013). Since then, IT strategy and business strategy have been considered as equal functions and their fusion engendered the concept of digital business strategy (DBS) (Berghaus, 2016; Bharadwaj et al., 2013; Brown & Nancy, 2019; Matt et al., 2015; Vial, 2019).

4.2. Manifestations of digital transformation strategy

As aforementioned, literature does not sufficiently reflect all the acceptations of the term strategy and in this essay, we are attempting to address this issue by presenting the variants of strategy found in digital transformation undertakings based on a five-dimension taxonomy of strategy proposed by Mintzberg (1987a).

Digital transformation strategy has been researched with different methods such as systematic literature reviews (Brown & Brown, 2019; Hanelt et al., 2021; Vial, 2019), large-scale surveys (Blackburn et al., 2021; Kane et al., 2019; Moore et al., 2017) and others (Matt et al., 2015). In all these publications digital transformation strategy is often described as an organization's roadmap for introducing technologies along with the acquisition and development of digital talent. This conception of strategy corresponds to *strategy as plan* (Mintzberg, 1987a).

Sometimes, digital transformation strategy emerges from lessons learned during small experiments (Blackburn et al., 2021; Kane et al., 2019; Moore et al., 2017). This strategy corresponds to *strategy as pattern* (Mintzberg, 1987a).

As another instantiation of strategy, Janssen et al. report on a government-owned digital transformation undertaking upon which project leaders successfully embarked technology intended users by framing the project concept in a way that made it look more attractive than it actually was (Janssen et al., 2015). Concretely, these leaders used strategic cost underestimation as a stratagem to sell the project (Samset, 2010; Samset & Volden, 2016) to businesses by presenting it as a single button that was going to deliver benefits without costs on their side. The deceit worked but backfired later when, with the discovery of project hidden costs, businesspeople realized the extent to which they had been fooled and began to resist the project. This project leaders' strategy represents *strategy as ploy* (Mintzberg, 1987a).

Still regarding the multifaceted nature of strategy, Hung, Chen, and Wang associate hospital size with digital maturity due to the correlation between the size of an organization with the availability of slack resources and digital talent. This makes it possible for big hospitals to make additional revenue out of smaller hospitals by acting as their solution providers in IT (Hung et al., 2014). Such behavior reflects *strategy as position* (Mintzberg, 1987a).

Finally, Moore et al., Kane et al., and Blackburn et al. view a strong digital culture i.e., mindsets and behaviors conducive to digital transformation as a key factor of digital maturity (Blackburn et al., 2021; Kane et al., 2019; Moore et al., 2017). This aligns with *strategy as perspective* (Mintzberg, 1987a).

5. Strategy for managing project front-end in digital transformation and relevant imagery

In this section, we first present a general strategy for managing project front-end activities that we deem applicable to digital transformation, then a metaphor with a potential to generate supplemental insights into the management of these activities.

5.1. Strategy for managing project front-end in digital transformation

"*The art of managing the fuzzy front end of an innovation project is not the art of dictating what everyone has to do at what time. Nor is it the art of letting chaos reign*" (Gassmann & Schweitzer, 2014). In general, organizations aim to create value for different parties (stakeholders/shareholders), and to this end, they strive to balance effectiveness and efficiency in their businesses (Johnson et al., 2020). In their essay on strategy for managing project front-end activities, Kock et al. also underline the importance for organizations to balance effectiveness and efficiency in this project phase and to this end, propose two complementary strategies, that is, the open and closed action strategies. (Kock et al., 2015).

The *open action strategy* is a strategy that promotes innovation through activities that encourage creativity or generation of ideas such as organizing creativity workshops, creating opportunities for employees to exchange with experts in their domains and providing them with resources necessary to the realization of their own projects (Kock et al., 2015).

Regarding the *closed action strategy*, it relates to a process control and formalization of project front-end activities i.e., the use of predetermined rules and procedures to ensure the generation and selection of project ideas aligned with the organization's innovation strategy (Kock et al., 2015).

As mentioned in our introduction, little is known about the management of project front-end in digital transformation despite its impact on project outcome, and in this work, we discuss a strategy that could help organizations in this area. Concretely, we believe organizations could improve the outcome of their digital transformation projects by balancing creativity and project control with the open and closed action strategies, respectively (Kock et al., 2015). To this end, we indicate some tools, and techniques that can be used in the project front-end of digital transformation as well as the strategy with which they are associated - the open or closed action strategy (Table 1).

5.2. Relevant imagery in strategy for managing project front-end in digital transformation

As aforementioned, the use of imagery is known for enhancing the understanding subjects through a vivid description of phenomena that, in turn, generates supplemental insights into the subjects of interest (Cornelissen & Durand, 2014; Morgan, 1998). Therefore, in this section, we propose a metaphor that corresponds to the strategy for the project front-end discussed in previous lines – the open action and closed action strategies. The metaphor in question is "*Managing project front-end activities as walking a pet*." This metaphor is founded on the parallels that we have identified between managing project front-end activities and walking a pet. By a pet, we refer to a variety of domestic animals, mainly dogs, and center on two ways dog owners walk their pets i.e., "*Pet off-leash strategy*" and "*Pet on-leash strategy"*, the former corresponding to the open action strategy, and the latter to the closed action strategy.

Regarding the "*Pet off-leash strategy*" phrase, it refers to dog owners allowing their pets to walk without the hindrance of a leash and engage in what they naturally enjoy, i.e., running and exploring their environment (Stregowski, 2019) with the promotion of sociability, physical health, and mental stimulation as a result (RSPCA, 2019). This imagery corresponds to the open action strategy for managing project front-end activities in which an organization promotes innovation by granting its employees work autonomy and providing them with resources necessary to the exploration and experimentation of innovative ideas (Kock et al., 2015).

As to the "*Pet on-leash strategy*" phrase, it conveys the idea of all kinds of measures taken by dog owners to prevent risks such as injury or loss that can materialize when pets are permitted to engage in solo exploratory missions far from their owners (Drake Center for Veterinary Care, 2020). People own pets for several reasons including companionship (Wilson, 2020), so they must ensure their safety to keep enjoying this benefit. In the organizational context, this imagery corresponds to the closed action strategy for managing project front-end activities and relates to the importance for an organization to set boundaries within which all exploratory activities are to be conducted to ensure they remain aligned with its innovation strategy.

Project front-end structure (stages)	**Tools/techniques for managing project front-end in digital transformation**	**Strategy for managing project front-end in digital transformation**	
		***"Pet off-leash strategy"* (Open action strategy)**	***"Pet on-leash strategy"* (Closed action strategy)**
Concept generation	- Benefit/cost analysis	x	
	- Brainstorming	x	
	- Brainwriting	x	
	- Business model cards	x	
	- Focus groups	x	
	- Prize competitions for ideas	x	
	- Systems analysis	x	
	- Business process modelling		x
	- Scorecards		x
Concept assessment	- Financial reward/risk analysis	x	
	- Project LogFrame	x	
	- Proof of concept	x	
	- SWOT analysis	x	
	- Uncertainty mapping	x	
	- Project strategy and strategic frame requirements		x
	- SBAR		x
	- Scorecards		x
Concept definition	- Collecting *user stories*	x	
	- Eliciting feedback on the presented concept	x	
	- Profitability/utility appraisal	x	
	- BIDAF		x
	- Creating *delivery stories*		x
	- Prototyping		x
	- Scorecards		x

Table 1. Project front-end of digital transformation – structure, tools/techniques, and strategy

6. Conclusions

Regardless of the type of business, strategy impacts organizational performance, and through this essay we have contributed to knowledge on digital transformation strategy. In general, strategy tends to be portrayed as just a deliberate plan of actions made by an organization based on the assumption of data reliability. Through this essay, building on Mintzberg (1987a), we hope to have contributed to knowledge on digital transformation strategy by presenting it as a multidimensional concept varying based on the underlying rationale i.e., factors that drive strategy formulation. Explicitly, we have highlighted the following five facets of strategy. First, strategy as a choice of actions driven by a strong faith in one's data, a common phenomenon in structured contexts i.e., predictable business environments where organizations succeed through data-driven decision making. To some extent, organizations plan their digital transformation based on data and with reference to the taxonomy of strategy that we have adopted in this work, such a choice of actions corresponds to *strategy as plan*. Second, some organizations believe and invest in learning and their digital transformation is based on lessons learned from their experience. This strategic choice instantiates *strategy as pattern*. Third, some organizations believe in and resort to all kinds of stratagems i.e., empty threats, feints, deceit, and this has materialized in some digital transformation projects. Such a choice of actions corresponds to *strategy as ploy*. Fourth, some big organizations capitalize on their strengths in digital capabilities to gain profits from smaller industry players and this strategic choice corresponds to *strategy as position*. Finally, in some entities, a strong organizational culture i.e., the centrality of shared worldviews among organization's members is widely recognized and a strong digital culture promoted to accelerate digital maturity. This strategic choice represents *strategy as perspective*. To sum up, we have portrayed digital transformation strategy in all its manifestations, and this addresses the concern for concept dimensionality (Podsakoff et al., 2016).

Regarding digital transformation strategy, we have briefly presented the evolution in its conception with obvious implications for organizations. Precisely, at the turn of the 21st century, considered as the beginning of the digital era, the concept of digital business strategy (BDS) with its view of digital technologies' potential to shape business scope began to be recognized. This constituted a departure from the perspective of information technology (IT) strategy in which these technologies were till then considered as just capabilities to support established business processes (Bharadwaj et al., 2013, Berghaus, 2016, Vial, 2019).

Concerning our focal subject - the management of project front-end in digital transformation - we have highlighted the relevance of a dual strategy rooted in organizational ambidexterity i.e., the idea that business success depends on the ability of an organization to balance exploitative and exploratory activities (Andriopoulos, & Lewis, 2009; Birkinshaw et al., 2016). In relation to this strategy, we have proposed some tools and techniques and their purpose in addition to a metaphor meant to enhance its understanding.

This paper is based on a narrative review and presents some limitations due to the selective nature of this literature review method. As to its relevance, it could advance knowledge on information systems by contributing to theory for analyzing i.e., a descriptive theory regarding a phenomenon and theory for design and action i.e., a theory that indicates how to do something (Gregor, 2006).

References

Alam, I. (2006). Removing the fuzziness from the fuzzy front-end of service innovations through customer interactions. *Industrial Marketing Management*, *35*(4), 468-480.

Andriopoulos, C., & Lewis, M. W. (2009). Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. *Organization science*, *20*(4), 696-717.

Berghaus, S., & Back, A. (2016). The Fuzzy Front-End of Digital Transformation: Three Perspectives on the Formulation of Organizational Change Strategies. *BLED eConference*.

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. V. (2013). Digital business strategy: toward a next generation of insights. *MIS quarterly*, 471-482.

Birkinshaw, J., Zimmermann, A., & Raisch, S. (2016). How do firms adapt to discontinuous change? Bridging the dynamic capabilities and ambidexterity perspectives. *California Management Review*, *58*(4), 36-58.

Blackburn, S., Galvin, J., LaBerge, L., & Williams, E. (2021). Strategy for a digital world. *McKinsey Quarterly*.

Brown, N., & Brown, I. (2019). From digital business strategy to digital transformation-How: A systematic literature review. *Proceedings of the South African Institute of Computer Scientists and Information Technologists 2019*, 1-8.

Casadesus-Masanell, R., & Ricart, J. E. (2010). From strategy to business models and onto tactics. *Long Range Planning*, *43*(2-3), 195-215.

Cooper, R. G. (1988). Predevelopment activities determine new product success. *Industrial Marketing Management*, *17*(3), 237-247.

Cooper, R. G. (2008). Perspective: The stage-gate® idea-to-launch process—update, what's new, and nexgen systems. *Journal of Product Innovation Management*, *25*(3), 213-232.

Cornelissen, J. P., & Durand, R. (2014). Moving Forward: Developing Theoretical Contributions in Management Studies. *Journal of Management Studies*, *51*(6), 995-1022. https://doi.org/10.1111/joms.12078

Crossan, M. M., & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*, *47*(6), 1154-1191.

Daneva, M., Van Der Veen, E., Amrit, C., Ghaisas, S., Sikkel, K., Kumar, R., Ajmeri, N., Ramteerthkar, U., & Wieringa, R. (2013). Agile requirements prioritization in large-scale outsourced system projects: An empirical study. *Journal of systems and software*, *86*(5), 1333-1353.

De Villiers, M. (2017). Military reporting technique boosts project management. Retrieved April 25, 2022 from. https://www.itweb.co.za/content/x4r1ly7R8bqpmdae

Drake Center for Veterinary Care (2020). *10 Smart Reasons for Keeping Your Dog on a Leash*. https://www.thedrakecenter.com/services/dogs/blog/10-smart-reasons-keeping-your-dog-leash

Gassmann, O., & Schweitzer, F. (2014). *Management of the fuzzy front end of innovation*. Springer. https://doi.org/10.1007/978-3-319-01056-4

Gregor, S. (2006). The nature of theory in information systems. *Mis Quarterly*, 611-642.

Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, *58*(5), 1159-1197.

Hung, S.-Y., Chen, C., & Wang, K.-H. (2014). Critical success factors for the implementation of integrated healthcare information systems projects: An organizational fit perspective. *Communications of the Association for Information Systems*, *34*(1), 39.

Janssen, M., Van Der Voort, H., & van Veenstra, A. F. (2015). Failure of large transformation projects from the viewpoint of complex adaptive systems: Management principles for dealing with project dynamics. *Information Systems Frontiers*, *17*(1), 15-29.

Johnson, G., Whittington, R., Regnér, P., Angwin, D., & Scholes, K. (2020). *Exploring strategy*. Pearson UK.

Kane, G. C., Phillips, A. N., Copulsky, J. R., & Andrus, G. R. (2019). *The technology fallacy : how people are the real key to digital transformation*. The MIT Press.

Kerzner, H. (2013). *Project management : a systems approach to planning, scheduling, and controlling* (11th ed.). Wiley.

Kim, J., & Wilemon, D. (2002). Focusing the fuzzy front–end in new product development. *R&D Management*, *32*(4), 269-279.

Kock, A., Heising, W., & Gemünden, H. G. (2015). How Ideation Portfolio Management Influences Front-End Success. *Journal of Product Innovation Management*, *32*(4), 539-555. https://doi.org/10.1111/jpim.12217

Kraus, S., Schiavone, F., Pluzhnikova, A., & Invernizzi, A. C. (2021). DT in healthcare: Analyzing the current state-of-research. *Journal of Business Research*, *123*, 557-567.

Lorenzo, O., Kawalek, P., & Wharton, L. (2018). *Entrepreneurship, Innovation, and technology: A guide to core models and tools*. Routledge.

Luftman, J., & Kempaiah, R. (2007). An Update on Business-IT Alignment:" A Line" Has Been Drawn. *MIS Quarterly Executive*, *6*(3).

Marques, I. C., & Ferreira, J. J. (2020). DT in the area of health: Systematic review of 45 years of evolution. *Health and Technology*, *10*(3), 575-586.

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & information systems engineering*, *57*(5), 339-343.

Merriam-Webster. (n.d.). Strategy. *In Merriam-Webster.com dictionary*. Retrieved September 22, 2022, from https://www.merriam-webster.com/dictionary/strategy

Miles, R. E., & Snow, C. C. (2003). *Organizational strategy, structure, and process*. Stanford University Press. http://www.books24x7.com/marc.asp?bookid=7347

Mintzberg, H. (1987a). The strategy concept I: Five Ps for strategy. *California management review*, *30*(1), 11-24.

Mintzberg, H. (1987b). The Strategy Concept II: Another Look at Why Organizations Need Strategies. *California management review*, *30*(1), 25-32. https://doi.org/10.2307/41165264

Mintzberg, H., & Lampel, J. (1999). Reflecting on the strategy process. *MIT Sloan Management Review*, *40*(3), 21.

Mintzberg, H., & Westley, F. (2001). Decision Making: It's Not What You Think. *MIT Sloan Management Review*, *42*(Part 3), 89-94.

Moore, R., Narsalay, R., Seedat, Y., Sen, A., & Chen, J. Y.-J. (2017). Combine and conquer: Unlocking the power of digital industry X. 0.

Morgan, G. (1998). *Images of organization: The executive edition*. Thousand Oaks, CA.

Morris, P. W. G. (2013). *Reconstructing project management*. John Wiley & Sons Ltd.

Murphy, S. A., & Kumar, V. (1997). The front end of new product development: a Canadian survey. *R&D Management*, *27*(1), 5-15.

OSPCA. (2020). *Loose leash walking: Making "walk time" enjoyable for both you and your dog*. Retrieved May 5, 2022 from https://ontariospca.ca/blog/loose-leash-walking-making-walk-time-enjoyable-for-both-you-and-your-dog/

Paré, G., Trudel, M. C., Jaana, M., & Kitsiou, S. (2015). Synthesizing information systems knowledge: A typology of literature reviews. *Information & Management*, *52*(2), 183-199.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2016). Recommendations for Creating Better Concept Definitions in the Organizational, Behavioral, and Social Sciences. *Organizational Research Methods*, *19*(2), 159-203. https://doi.org/10.1177/1094428115624965

Popowska, M., & Nalepa, P. (2015). Lean Startup as a New Way of Managing Technology Ventures Illustrated by the Example of Wlcome App. *Studia i materiały* (2/2015 (19)), 7-21.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard business review*, *86*(1), 25-40.

Ritter, T., & Pedersen, C. L. (2020). Digitization capability and the digitalization of business models in business-to-business firms: Past, present, and future. *Industrial Marketing Management*, *86*, 180-190. https://doi.org/https://doi.org/10.1016/j.indmarman.2019.11.019

RSPCA. (2019). *What should I know before taking my dog to an 'off-leash' park?* Retrieved April 20, 2022 from https://kb.rspca.org.au/knowledge-base/what-should-i-know-before-taking-my-dog-to-an-off-leash-park/

Samset, K. (2010). *Early project appraisal : making the initial choices*. Palgrave Macmillan.

Samset, K., & Volden, G. H. (2016). Front-end definition of projects: Ten paradoxes and some reflections regarding project management and project governance. *International Journal of Project Management*, *34*(2), 297-313. https://doi.org/10.1016/j.ijproman.2015.01.014

Sibony, O., Lovallo, D., & Powell, T. C. (2017). Behavioral strategy and the strategic decision architecture of the firm. *California management review*, *59*(3), 5-21.

Simms, C., Frishammar, J., & Ford, N. (2021). The front end in radical process innovation projects: Sources of knowledge problems and coping mechanisms. *Technovation*, *105*, 102214. https://doi.org/https://doi.org/10.1016/j.technovation.2020.102214

Stephanie, L., & Sharma, R. S. (2020). Digital health eco-systems: An epochal review of practice-oriented research. *International Journal of Information Management*, *53*. doi:10.1016/j.ijinfomgt.2019.10.017

Stevens, G. A., & Burley, J. (2004). Piloting the rocket of radical innovation. *IEEE Engineering Management Review*, *32*(3), 111-122.

Stregowski, J. (2019). How to train your dog to be off the leash. *The Spruce Pets*. https://www.thesprucepets.com/off-leash-dogs-4064591

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118-144.

von Leipzig, T., Gamp, M., Manz, D., Schöttle, K., Ohlhausen, P., Oosthuizen, G., Palm, D., & von Leipzig, K. (2017). Initialising customer-orientated digital transformation in enterprises. *Procedia Manufacturing*, *8*, 517-524.

Westerman, G., Bonnet, D., & McAfee, A. (2014). The nine elements of digital transformation. *MIT Sloan Management Review*, *55*(3), 1-6.

Wilson, M. (2020). 15 reasons why having a pet is good for you and your family. *Insider*. https://www.insider.com/reasons-why-having-a-pet-is-good-for-you

Woodford, K., Guy, J., Gillard, P., Harley, A., Glennon, D., & (2003). *Cambridge Advanced Learner's Dictionary*.