"And Then a Miracle Occurs …" - Engaging the challenge of operationalizing theories of success in digital transformation

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ABSTRACT

Digital transformation programs do not have an enviable track record of success. The technical potential of digital technologies is seemingly limitless but it must be grounded in a clear understanding of how the firm creates fundamental values.

While there are significant differences between startup firms with no existing business infrastructure and well-established firms seeking to leverage benefits from applying digital technologies to existing operations, both rely on an underlying theory of success. In the case of a completely new business, a built-in approach to integrating digital technology with the basic theory of success is appropriate. For existing businesses with business models in place, the integration could result in a bolted-on approach. This has some unique challenges, not least in relation to employee resistance and acceptance.

Digital leadership is about building a shared theory of success for digital business transformation. Developing management flight simulators (MFS) helps to surface assumptions and beliefs about current business model behavior and aims to enhance learning about the consequences of changing the logic of the business model.
Systems thinking and modeling provides a powerful approach to developing dynamic business models for operationalizing and communicating the utilization of innovative digital technology.

Keywords: Digital Transformation, Digitalization, Wicked Problem, Business Model, Theory of Success, Systems Thinking, Management Flight Simulator, Digital Leadership.

1. INTRODUCTION – THEY KNOW NOT WHAT THEY DO (OR HOW TO DO IT)

All ideas for new products, markets, innovations and organizations arise from an idea in the mind(s) of people who are interested in developing them. Regardless of the origin of the ideas, if they are seen as having potential, then the next step will be to develop the means to achieve the desired objectives. When managers plan, they anticipate what may happen in the future in order to decide what to do in the present. At this stage, the idea becomes more structured, taking the form of a business model and plans for implementation. As the humorous cartoon in Figure 1 illustrates, there is often a gap between the initial ideation and enthusiastic activity and the realization of desired results.

This gap is generally filled by the 'business plan' or model (see [1]). Teece [2] describes business models as being either implicit or explicit architectures that a business enterprise employs to create value. It is the managers' hypothesis regarding how the firm can be organized and operated to meet customers' expectations and demands, at a profit. Thus, business models can be interpreted as cognitive schemas. They are the implicit cognitive structures that emerge from the mental models held by the managers in the organization [3].

Then a miracle occurs…
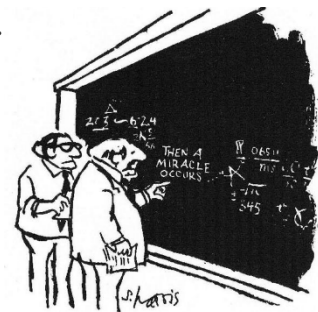
«*I think you should be more explicit here in step two.*»
Fig. 1: "Then a Miracle Occurs" (modified from [4])

In digital business transformation management, a business model is often used as the blueprint for how a firm might conduct business by implementing digital technologies. In this way it translates strategic issues into goals and actions and specifies how the conceptual model is converted into a viable operational form.

Digital transformation programs and business models changes due to innovative information technologies are particularly complex and uncertain. Accordingly, the analysis and understanding of the business model is crucial in maximizing the utilization of new technology and understanding its consequences.

There are a variety of approaches used to develop and analyze business models. The most recently used one is the business model canvas [5]. This tool provides a business model framework by addressing nine building blocks: key partners, key resources, key activities, value proposition, customer relationships, channels, customer segments, cost structure, and revenue streams.

Aside from the advantages of standardizing the development of a business model and supporting better communicating of the business idea and its operationalization, the business model canvas is weak on explaining the causal relationships between the involved elements and their dynamics over time ([6], [7]). In particular, when addressing the issue of how strategic changes such as digital transformation programs will affect an established business the business model canvas is limited due to its static perspective.

Systems thinking is both a philosophy and a methodology for understanding the behavior of complex dynamic systems, of which business organizations are an important exemplar [8]. Furthermore, complex and adapting systems make learning about them difficult and consequently ordinary decision-making becomes fraught with problems. In particular, in the case of managing business transformations, decision-makers usually do not have the time to wait and see if their interventions are going to work well, and then readjust accordingly. Systems thinking and modeling offer a set of tools that support communications and engagement with stakeholders as well as processes for learning and designing actions within these complex systems.

2. PROBLEM STATEMENT - WHY DO SO MANY WELL-INTENTIONED DIGITAL TRANSFORMATION EFFORTS GO ASTRAY

Digital transformation challenges are far from technical (routine) challenges. Research has shown that many organizations have trouble in readily transforming their activities and structures to take advantage of new information technologies effectively [9].

Despite the proliferation of digital transformation initiatives, most executives recognize that their organizations are not adequately prepared. Nearly 90% of respondents to a 2015 global survey of executives and managers, conducted by MIT Sloan Management Review and Deloit [10], agreed with the statement "*[d]igital technologies have the potential to fundamentally transform the way people in their organization work.*" However, at the same time, only 44% of this group of respondents indicated that their organizations are adequately prepared, as they know their business and are able "*to conceptualize how digital technologies can impact current business processes/models*". 44% of this group indicated that businesses lack the "*willingness to experiment and take risks*".

Transforming an existing business model with the help of innovative information technologies is far from a routine task. Some key challenges to digital transformation management are:
- Developing digital strategies are often based on incomplete, fuzzy, or ambiguous data;
- Because of uncertainty and time delays in the real world, it is difficult to link investment in digital transformation programs to real world outcomes;
- It's difficult to create buy-in among key stakeholders due to diverse interests and perspectives, agendas and perspectives, and languages; and
- People do not have a shared definition (that is a common understanding) of a digital organization.

Consequently, most digital transformation initiatives are complex challenges. The distinction between routine and complex challenge, can also be related to Rittel and Webber's [11] typology of 'tame' (routine) and 'wicked' (complex) problems. A 'tame problem' may be complicated but there is a known solution/routine to follow in order to resolve it. Thus, it is resolvable through unilinear acts and it is likely to have occurred before. Tame problems are akin to puzzles – for which there is always an answer and therefore formal analysis is a sufficient approach to problem solving – simply apply a proven approach properly and the best solution will naturally emerge. Various digital transformation management frameworks have been developed to provide appropriate processes to successfully manage digital business transformation endeavors.

Conversely, a complex challenge is a situation without an established set of standard process about how to solve the problem. Horst Rittel coined the term "wicked problems" to describe "*... that class of problems which are ill-formulated, where the information is confusing, where there are many decision makers and clients with conflicting values, and where the ramifications in the whole system are confusing*" ([12], p. B141) Digital transformation initiatives that enable the organization to enter completely new competitive environments are 'wicked problems.' They are more complex, rather than just complicated – that is, they cannot be removed from their environment, solved, and returned without affecting the environment.

The essence of the digital transformation challenge was well captured by Schön [13]: "*In the swampy lowland, messy, confusing problems defy technical solution. The irony of this situation is that the problems of the high ground tend to be relatively unimportant to individuals or society at large, however great their technical interest may be, while in the swamp lie the problems of greatest human concern*." The quotation highlights a fundamental feature of organizations. They are comprised of tightly inter-related systems that must operate harmoniously for proper performance. In this system, making changes to one subsystem (the technical) will also affect the other subsystem (the social). Digital transformations have

significant implications for both subsystems with the consequences of "going digital" becoming apparent only after some time delay and in unexpected areas of the firm or its environment [14].

Three ways an organization can react include generating unintended consequences, demonstrating counterintuitive behaviors, and pushback, or policy resistance, from key stakeholders ([15], [8]). One potential explanation for these dysfunctions can be found in the perspectives that the people in charge have on the system and their understanding of how it functions, that is their theory of success [16]. The cognitive organizing structures that decision-makers rely upon, known as mental models, are the collection of assumptions, routines, and networks of causal relations that describes how a system operates. Consequently, the quality of transformation road map planning and decision-making depends on the adequacy of the mental models – their theory of success - in the problem context.

While there is no foolproof method for avoiding the undesirable reactions to change, one effective antidote to relying on a linear routine framework (which is what most digital transformation frameworks are based on) is to adopt a feedback systems [17] view of the digital transformation initiative. This is an effective alternative perspective that enables managers to recognize the importance of relationships between and among organizational stakeholders and to identify the interaction dynamics of actions, results, and reactions in a closed loop system.

3. MODELING FOR LEARNING - MAKING THEORIES OF SUCCESS EXPLICIT

Embarking on a strategy that involves digital transformation introduces significant uncertainties for many organizations. The degree of digital transformation has a broad range of consequences. At one level, digital transformation can result in incremental initiatives that affect organizational efficiency (digitization, according to [18]), but which requires no significant changes to the core business model. At the other end of the spectrum, digital transformation (digitalization, according to [19]) can enable the organization to enter completely new competitive environments. In this case, efficacy is a key organizational attribute and the business model must be resistant to a wide range of influences. These new competitive conditions present the organization with a strategic wicked problem [20]. Therefore, the strategic focus of the firm's business model must emphasize learning, rather than optimization. It is under these conditions that business models serve as powerful learning tools.

When the business model is operationalized using system dynamics tools, it becomes the basis for a type of simulation model called a management flight simulator (MFS). Flight simulators are employed in a wide range of complex training situations, the best known being pilot

training and plant operations. Flight simulators provide training in routine operations, but are perhaps most effective in supporting decision making in 'real-time' emergency situations. MFS simulations of complex operational and strategic issues in businesses and other organizations have a long history in systems thinking and modeling [21].

A management flight simulator (MFS) is a virtual world [22], or a learning laboratory, that is ideal in applications where real-life experimentation is unethical or otherwise impractical. A flight simulator permits the exploration of both short- and long-term consequences of strategic plans under controlled conditions. Through applying the system dynamics methodology, MFS promote understanding of the underlying feedback structures that generate complex dynamic organizational behavior. When experimentation is too costly, unethical or just plain impossible, when the (un-)intended consequences of the decisions are difficult to track over time or place, when multiple stakeholders have different perceptions about the issue, which is the case for almost all digital business transformation initiatives, simulation becomes the main - perhaps the only - way decision-makers can discover how complex systems work and where high leverage points may lie.

At the core of the virtual world is the firm's theory of success in the strategic environment. The process of developing the MFS is also an explication of the firm's operational business model. This is the missing step in Figure 1. The learning component is strengthened through the group effort needed to construct the simulator. Key in this process is surfacing assumptions and beliefs that underpin the theory of success, specifying the positive feedback loops that generate growth and, crucially, identifying the negative feedback loops. The latter are important in identifying the situations where insufficient strategic resources (financial, human, service infrastructure, and knowledge, for example) can place limits on the growth engine (see [23]). These simulators make it possible to identify and test leverage points in the business model, support high quality managerial dialogue about strategic initiatives, and introduces a structured, experimental and evidence-based approach to strategy development and implementation.

4. DISCUSSION – LEADING DIGITAL TRANSFORMATIONS IS ABOUT BUILDING SHARED THEORIES OF SUCCESS

Implementing business models based on systems thinking principles and methods has two important advantages over traditional implementation.

The first is that the business model explicitly represents the organization's managerial understanding of how things are done, in essence their theory of success as to how value is created in a digital environment. Digital technology-driven transformation can increase the firm's potential for organizational growth and development. At the same time, it presents managers with significant

organizational risks. Externally, it affects the organization's strategic position in its industry; internally, it influences the nature of the relationships both between individuals as well as between organizational units.

The second benefit is that the business model explicitly incorporates the dynamic relationships among the primary value-creating components. The causal loop methodology captures the overall feedback relationships and identifies the nature of the growth engine (see [8], chapter 10 for a comprehensive discussion of various growth engines). Growth is generated by reinforcing feedback loops. Balancing, or negative, feedback loops define constraints on the system that may limit the growth potential. Taken together, a systems-based model identifies both opportunities and limitations for growth, as well as providing a means to study how to overcome them.

Business transformation management in complex dynamic organizational systems that are undergoing digitalization is a difficult environment in which to learning about decision-makers reactions to introduced changes (like new digital service offerings). They usually do not have the time to wait and see if their interventions are going to work well, and then readjust accordingly. Furthermore, disruptive information technologies impose significant challenges both on the organizations' internal processes as well as on their relationships with their customers and business partners. Consequently, the decision to "go digital" requires managers to develop perspectives that have the requisite variety to cope with these challenges. The feedback systems approach is a powerful means for managers to develop and communicate business models that include those aspects of digitalization that affects their firm's theory of success.

The Uber case ([24], [16]) illustrates how a feedback systems approach can be applied to understanding how digital transformation affects both the business model and the established business environment. Uber is a child of the extreme forms of new organizations that digital technologies can enable. Started in 2009, Uber has become a contentious competitor in the traditional taxi industry in cities around the world. Enabled by smartphone technology, Uber's radically different business model has dramatically increased both consumer efficiency and company revenues. The result is one of largest point-to-point transportation networks in the world. Technology plays the central role in providing consumers with 'me-here-now' logistics services that drives the efficiency gains.

One of Uber's core challenges is that it must manage satisfaction on both sides of a two-sided market (riders and drivers). At the same time, as its business model seeks to address future customer needs and relationships, it is also outpacing many of the laws that regulate the taxi industry [24]. Uber's business model reveals that the company relies on a set of feedback loops that reinforce the power of the system from one side of the market to the other, thereby creating a growth engine. The central component of this growth engine is known as a 'get-big-fast' (GBF) strategy [25]. However, regardless of how compelling their service is, there are also a number of limiting feedback loops in Uber's GBF strategy.

Modeling Uber's theory of success in applying a GBF strategy enables decision-makers to identify and investigate the potential side effects of digital transformation. The model captures the interplay of powerful reinforcing feedbacks that drive Uber's rapid growth and their interaction with constraints arising from the behavioral changes of major stakeholders, potential decline of the customer base resulting from limited availability of capital, and delays in deploying the capabilities and competencies needed to provide an attractive Uber app. Thus, decision-makers understand better the interdependencies of socio-technical changes and how balancing feedback loops can limit growth through, for example, service erosion.

Driving digital business transformation is a delicate balancing act between the fundamental changes in business due to advanced technologies and disruptive business models on the one hand, and developing infrastructures required to serve changing customer demands, keeping customers attracted, as well as managing the resulting frictions with the established environment on the other.

5. SUMMARY AND CONCLUSION

Digital leadership is about building shared theories of success. In moving beyond slogans about interconnectedness and systems and overcoming organizational dysfunction, however, we need to develop specific approaches and tools to foster our systems thinking and modelling capabilities. Building a shared theory of success is effective when the decision-makers are able to engage people in what Schön ([26] in [22]) called "*reflective conversation with the situation*."

Management flight simulators aim to enhance learning about the intended and unintended consequences of a digital strategy. The purpose of developing and running MFS is to gain a deeper understanding and insights into why the business model behave the way it does, and how changing the logic of the business affects its internal and external environments and vice versa. Building a MFS should help the participants make their theory of success explicit, test their mental models and assumptions about the behavior of the new business model, and discover inconsistencies and blind spots in the digital strategy and the resulting transformation roadmap.

This article has presented the challenges we face in moving to the next level of digital transformation management – meeting complex challenges requires learning "new ways of thinking." This demands an increased capacity to build and apply a systemic understanding of the nature of the systems we are trying

to improve. Systems thinking provides a process, a set of thinking skills and technologies that can improve our ability to develop that systemic understanding.

Systems thinking and modeling is a powerful tool for supporting the explication of mental models and understanding the consequences of these models in the real world. However, simply having a powerful and flexible language is in itself not sufficient to assure that the process will have a successful outcome. Framing the digital business transformation challenge as a wicked problem shifts our focus from being solution-oriented to becoming learning and process-oriented. Wicked problems have no 'solutions' in the sense of a result being right or wrong. Instead, we are more concerned with the process of working together with others to craft a business model that enables working effectively towards a vision of the future that incorporates an improvement over the current situation.

Ultimately, an organization's ability to succeed in an increasingly complex environment will depend on its ability to learn - about itself, the market, its competitors, the utilization of new technologies, and its place in the larger natural and social environment. Systems thinking and modeling provide a powerful approach for representing and operationalizing the mental models that strategic decision-makers bring to the table.

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