

Strategic Agility of an Incumbent Firm and Chief Digital Officer in the Face of Digital Innovation: A Microfoundation Approach

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Abstract—In today’s business environment, strategic agility is critical for large firms, as it enables continuous adjustment of the firm’s strategic direction, promoting value creation. In this context, some firms have decided to immerse employees in external startups to accelerate their digital initiatives. The greater flexibility of this startup thus enables it to imagine innovative digital products and services. This paper proposes that the skills/competencies of the parent firm’s Chief Digital Officer (CDO) – the executive who oversees the startup’s digital initiatives – positively influence the firm’s strategic agility. Drawing on the dynamic capabilities approach and microeconomic foundations, the model aims to provide a new perspective on the CDO’s contribution when large companies create external startups to meet the digital transformation challenges.

Keywords-strategic agility; microfoundations; Chief Digital Officer (CDO); startup; digital innovation and transformation.

I. INTRODUCTION

In today’s competitive, volatile, and uncertain business environments, digital transformation has become a crucial strategic priority for large firms [1]. Digital technologies, such as multi-sided platforms, mobile applications, big data analytics, Internet of Things (IoT), and artificial intelligence are generating fundamentally new business opportunities, fostering digital innovations with distinctive characteristics [2][3], with the potential to disrupt traditional businesses [1].

To meet the digital transformation challenges and accelerate their digitalization via continuous and sustainable innovation [4], large firms have built innovation capabilities in digital technologies by connecting with startup ecosystems [5]. These global firms have adopted a variety of strategies: intrapreneurship, setting up startup incubators/accelerators, open innovation, investments and equity ownership, and startup acquisitions [6]. Recently, a new innovation strategy, called *excubation*, has been adopted by these firms in the face of startups, which aims to have some employees work outside the company in an accelerator, to explore innovation ideas in a limited time frame [7][8]. Startup excubation aims to create a new entity, independent from the parent company, in the form of a startup focused on digital innovations [7] and is considered as a powerful growth driver [8].

The steering of digital innovation initiatives led by this startup is generally entrusted to an executive and member of

the firm’s Top Management Team (TMT). In large firms, the choice of this executive is dictated by the nature and scope of the digital innovation strategy, its relationship to corporate strategy [9], and the value and skills/competencies that this manager brings [10][11]. The management of the startup’s innovations can be entrusted to one of the firm’s executives, whose choice may depend on the firm’s digital strategy. If the strategy is focused on technology, this executive could be the Chief Information Officer (CIO) or the Chief Technology Officer (CTO) ; if the digital strategy is focused on data management, it could be the Chief Data Officer (CDO) ; if the focus is on company-wide innovation, it could be the Chief Innovation Officer (CINO) or the CDO, who oversees the firm’s digital innovation and transformation. Typically, the CDO leads the excubated startup, while the startup’s ability to successfully develop and bring digital innovations to market reflects the incumbent firm’s strategic agility [12].

In these large firms, the CDO is involved in the digital innovation management process [13][14]. Since the position emerged in the 2000s, practitioners and IS researchers have studied the CDO phenomenon [13][14]. Prior studies have identified the impacts of CDO skills and competencies on the digital transformation of traditional firms [15][16] by studying different types of CDO roles [13]-[16], desirable skills [17], the nature of digital leadership [18], and dimensions of CDO leadership [14]. The firm expects the CDO, through their distinctive skills, to positively influence the startup’s ability to successfully commercialize digital innovations, reflecting a form of strategic agility of the firm.

Strategic agility has been identified as a key success factor for companies [19][20]. Strategic agility represents the company’s ability to constantly adjust its strategic axes to changing and uncertain environments to deploy innovative methods of value creation [19]. Through a combination of dynamic capabilities (strategic sensitivity, resource fluidity and collective commitment) [19][20], strategic agility refers to the ability to act quickly to anticipate change and seize opportunities. It is critical for traditional firms driving their digital transformation, due to the rapid and unpredictable disruptions associated with digital technologies [21].

Yet, despite the useful results of these studies, it remains unclear why it is relevant to focus on the impact of CDO skills and competencies when it comes to the successful commercialization of digital innovations carried by large firms. One reason is that these studies provide a fragmented

picture of the CDO, with the impact of the CDO being studied only through a few aspects, such as types of roles [15]-[17], the personal, professional, business, and technical competencies targeted [18], or the organizational design of the CDO role [14]. Moreover, few studies have focussed on how or under what conditions individual factors (microfoundations) contribute to or support the go-to-market routines of digital innovations that, in turn, lead to strategic agility for firms that have created an excubated startup to address the challenges of their digital transformation [22]. This contrasts with large companies that have chosen more traditional ways of managing innovation. For example, the CDO who drives innovation in the excubated startup must enrich their skills/competencies to succeed in this mission, as strategic agility is more necessary in this context than when the firm has adopted traditional innovation management.

Drawing on the microfoundations perspective [23][24] and the dynamic capabilities approach [25][26], we seek to investigate the individual microfoundations of the CDO responsible for digital innovation of an excubated startup of a large firm and the relationship with the strategic agility of that firm. Our objective is to offer a theoretical perspective to better understand the microfoundations of strategic agility of pre-digital firms. The research question addressed is: *How do the skills of the CDO (individual microfoundations) influence the strategic agility of an incumbent firm, when it has chosen to create an excubated startup to successfully introduce digital innovations to the market?*

The rest of this paper is organized as follows. In Section II, we discuss the theories that are mobilized by conducting a literature review to develop our model. In Section III, we present the model and proposals. In Section IV, we discuss the contributions and implications for theory and practice, identify limitations and avenues for future research.

II. THEORETICAL BACKGROUND

In this section, we review the literature upon which our conceptual model relies, i.e., literature on the creation of excubated startups by incumbent firms, on the CDO's roles and distinctive skills in large companies, as well as on strategic agility through the microfoundation approach.

A. Creation of Excubated Startups by Incumbent Firms

In order to seize the business opportunities brought about by digital transformation, several large firms whose success was built during the pre-digital economy [1], have decided to create external startups focused on digital innovations, in order to compete with the leaders in their industry [7][8].

This *excubation* strategy aims to create a new entity, autonomous and independent from the parent company, in the form of a startup dedicated to the development and commercialization of digital innovations [8]. According to Géméto et al. [8], excubation “*consists in immersing the employees of large companies in external startup accelerators in order to explore new business opportunities. Situated between intrapreneurship and open innovation, excubation offers rich lessons on the conditions necessary for large companies to succeed in their innovations but also to transform themselves into more agile organizations*”. It

aims to offer a more effective alternative to traditional approaches to innovation management [7][8], such as the development of internal innovation capabilities with intrapreneurship; cooperation with open innovation models [27] or partnership programs via incubators or accelerators, external or internal labs; minority investments in startups, partnerships or via investment funds; and the acquisition of majority stakes, the buyout, or the acquisition of startups [7].

However, these approaches have several limitations [28]. First, intrapreneurial projects do not always succeed, due to the lack of managers' entrepreneurial mindset designated by the large firm and turned intrapreneurs, limited by the internal constraints and the organizational culture of the company that deprive them of agility. The use of external entrepreneurs recruited to lead these intrapreneurial projects is not much more successful than with internal managers, for the same reasons, they find it difficult to adapt to the constraints of large firms and suffer from a lack of support from the TMT [4]. Second, collaborative approaches based on open innovation and partnerships between large firms and startups are limited by divergent or hardly compatible strategies, goals, interests, and cultures. Several studies have examined startups that view such collaboration as mere window dressing, allowing large firms to communicate their ability to innovate and their agility, rather than leveraging cooperation and making it a powerful engine of growth [5][6]. Moreover, incubators, accelerators, labs/fablabs, may suffer from a lack of critical size and real resources to ensure their development [6]. Furthermore, the “corporate ventures” investment approach [5][6] is difficult to implement, as it requires investing large sums of money to obtain a 15% to 20% stake in startups without having control over them, which limits their growth potential. Finally, the process of buying or acquiring successful startups requires significant investments, even more so for technology startups, as well the integration of the startup's managers and teams into the company's structure and culture remains problematic [5].

As a result, excubation, allows employees of a large firm to work outside the firm in an external startup accelerator to explore an innovation opportunity [7]. Excubation aims to address the limitations of usual approaches by combining the strength of the large company with the organizational agility of the startup [8]. For large corporations that have adopted excubation, the benefits are numerous [8]. Examples include better alignment between the firm innovation goals and the startup's ability to develop and commercialize innovations, the startup's vocation to act as a growth engine for the parent company [5], the operational speed made possible by a team mastering rapid development methods, while freeing itself from the constraints and administrative procedures of the parent company, in order to grow faster [29].

More specifically, the excubation of startups has at least two benefits for a large firm. The first is that the firm's CDO, whose additional mission is to oversee the startup's digital innovation projects, should have a positive influence on the success of the projects, especially because of their skills [30].

The second benefit is the company's increased strategic agility, not only because of the startup's flexible structure,

but above all, because of the startup's superior ability to develop and commercialize digital innovations [12].

B. CDO's Roles and Distinctive Skills in Large Companies

In order to drive digital transformation, large firms have created a dedicated role within their TMT and appointed a Chief Digital Officer [13][32]. Since the mid-2000s, the widespread presence and growing influence of the CDO role has been an interesting phenomenon studied by researchers and practitioners alike [13]-[16][31][32]. These studies suggest that the decision to create a CDO position stems from the strategic nature of digital transformation, the urgency to drive it, and the need for coordination with other functions to define and deploy a digital strategy [21][31].

A review of the CDO literature (e.g., [13][14]) shows that the presence of the CDO in the strategy and operations of large firms can be explained in particular by the CDO's impact on firm performance [18]. This impact can take many forms: it can be positive tactical and operational outcomes related to maintaining or increasing the firm's innovation capabilities, improving customer engagement via big data analytics, or recognizing the strategic nature of the CDO role beyond expected responsibilities [16][31]. In contrast, other work suggests that the CDO role may be temporary ([14], p. 16), because it could disappear or merge with other roles.

This focus on the CDO emphasizes the importance of identifying and developing the skills/competencies expected of the role. Several recent studies have proposed such skills and competencies, which have subsequently allowed for the elaboration of CDO role typologies and the characterization of the requirements and limitations of each type of CDO role [13][14]. This article also aims to explain the conditions for the emergence or antecedents of the presence of the CDO role, and the skills required to meet digital challenges [15].

The following are some examples of prior studies. Haffke et al. [13] identified four CDO roles: the *digital innovator*, who innovates on strategies and customer experience; the *digitization coordinator*, who manages transformation and monitors change initiatives; the *digital advocate*, who communicates change across business functions to facilitate cooperation; and the *digital evangelist*, who promotes the need for and benefits of digital transformation. In the same vein, Singh and Hess [14] identify three roles (*entrepreneur*, *digital evangelist*, *coordinator*) and five competencies (IT competency, change management skills, inspiration skills, digital pioneering skills, resilience). Tumbas et al [15][16] identify digital capabilities of successful CDOs, which are combinations of skills (digital innovation, data analytics, customer engagement) and three profiles of CDOs: *digital accelerator*, *digital marketer*, and *digital harmonizer*, each profile focusing on one of the digital capabilities. Finally, Tahvanainen and Luoma [17] identify four categories and 28 competencies (personal, professional, business, and technical competencies) and compare them to those of IT leaders. This study identified the CDO as also a *business developer* and *change agent*.

C. Strategic Agility through the Microfoundation Approach

Strategic agility is the ability of a firm to continuously adapt to changing contexts [19][20]. Work on strategic agility has been done in various streams of research [24], such as strategy, management, IS, innovation management, digital entrepreneurship, and among practitioners.

On the other hand, the dynamic capabilities perspective [23] [24] emphasizes how firms dynamically reconfigure their resources to generate new capabilities and respond to unpredictable changes in their environment. Teece [33] defines three dynamic capabilities: *sensing* capability, which aims to identify opportunities and threats; *seizing* capability, which aims to seize opportunities; *reconfiguring* capability, which aims to maintain competitiveness by enhancing, combining, and reconfiguring firm assets. Prior studies have used dynamic capabilities to inform the notion of agility, explaining the extent and speed with which firms perform reconfiguration of their resources [33][34]. Strategic agility is considered a meta-capability, a combination of capabilities [19][20][22]. Doz and Kosonen [19][20] posited that strategic agility is formed by three dimensions: *strategic sensitivity*, *resource fluidity*, and *collective commitment*.

However, despite the usefulness of these studies, the mechanisms at individual level by which a firm's strategic agility manifests itself have yet to be clarified. In particular, studies on innovation management, digital entrepreneurship, and startup creation by pre-digital firms [5]-[8] show that microfoundations emanating from the behaviors and skills of key individuals in startups are not well understood, because their contributions are aggregated to the organizational level of analysis and thus invisible [23]. It is therefore not possible to identify individual contributions. Microfoundations reflect individual actions that shape strategy and organization [24]. Teece [33] defines "*the microfoundations of dynamic capabilities – the distinct skills, processes, procedures, organizational structures, decision rules, and disciplines – which undergird enterprise-level sensing, seizing, and reconfiguring capacities are difficult to develop and deploy*" ([33], p. 1319). By focusing on microfoundations, we believe that the firm strategic agility lies on individuals, processes, and interactions, as well as context and structures to function [34]. As a result, studying agility beyond the organizational level of analysis should improve our understanding. In their review of the agility literature, Tallon et al [35] state that early conceptualizations of agility focused on the adaptation of the organization to the environment, meaning that the evolution of the organization depends on its ability to adapt to changes in its environment. The authors note that previous work on agility has focused on the organization as a unit of analysis, and little on individual factors, which would explain the challenge of identifying individual contribution.

III. THEORY DEVELOPMENT AND PROPOSITIONS

We mobilize the microfoundations perspective with the aim of advancing research on the strategic agility of large traditional firms. Our position is that the microfoundations allow us to extend our understanding of corporate strategic agility (macro-level phenomenon) with mechanisms that operate at a micro-level (individual microfoundations). More precisely, we mobilize Coleman's framework [36] to study

the microfoundations of strategic agility. Indeed, Coleman suggested that a macro-level phenomenon (here, the strategic agility of large firms) can be explained by the aggregation of the actions of an individual actor (the firm’s CDO). These actions, in turn, are determined by specific conditions related to the individual and are only slightly influenced by macro-level variables [36].

In what follows, we posit that these individual action conditions are represented by the CDO’s skills. In line with Coleman’s framework (“boat”) [36], these conditions act as determinants of the microfoundations of strategic agility. Our model considers the actors of the startup’s ecosystem, who interact through the CDO’s skills (microfoundations), thus stimulating the firm’s strategic agility [31][32]. Fig. 1 gives an overview of our model which we describe in this section.

A. CDO’s Skills/Competencies and Strategic Agility

We theorize the relationship of the CDO, who drives the digital innovations of the excubated startup, through their skills/competencies, with the firm’s strategic agility, which is represented by the startup’s excubation. As mentioned in our literature review, the common thread of these studies lies in the distinctiveness of the CDO’s skill/competencies. When large firms drive their digital transformation in a changing environment, the key skills of the CDO most decisive for success are those that contribute to the achievement of the role’s main objectives [21][30][32], which can be broken down into three categories.

The first objective of the CDO is to develop and successfully implement the *digital strategy*, which may result from merging the firm’s business strategy with the IT strategy [3][21]. It should be noted that, depending on the digital goals set, the responsibility for driving the digital strategy may be assumed – in whole or in part – by a senior executive in the TMT other than the CDO. Indeed, the CIO could oversee the digital strategy if it is focused on the business value of technologies and their uses. It could be the CTO, if the focus is on IT infrastructure or platforms, the CINO, if the focus is on technological innovations, or the Chief Data Officer, if the focus is on data management. The Chief Marketing Officer (CMO) may also be a candidate if the digital strategy is focused on improving the customer engagement and experience [11]. Choosing the right senior executive to lead the company’s digital strategy depends on the value and skills/competencies they can bring [10][17].

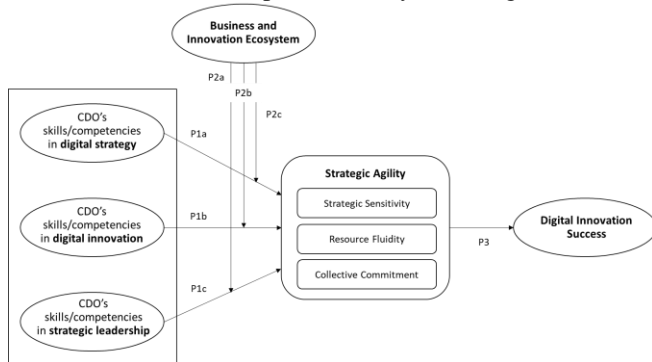


Figure 1. Proposed conceptual model.

The second objective of the CDO touches on the design, development, and commercialization of the startup’s digital innovations, recognizing the nature of *digital innovation*, conceptualized as “the creation of (and consequent change in) market offerings, business processes, or models that result from the use of digital technology” ([3], p. 224).

Finally, the third objective is related to the CDO’s ability to provide *strategic leadership*. The CDO’s strategic leadership can be defined as the ability to convince internal decision makers and employees of the need to digitally transform and to demonstrate the benefits that will come from that transformation [14]. The literature on CDOs, like that on TMT, emphasizes the bottom-up nature of the managers’ interactions with the line manager – in the case of the CDO, this is the CEO or COO in a large firm – and the top-down nature with the supervised teams – in the case of the CDO, these teams include the excubated startup’s digital innovation management team [31][32]. As such, we posit that the unique CDO skills/competencies that can positively influence strategic agility focus on digital strategy direction, digital innovation management, and strategic leadership. The preceding discussion leads us to the following proposals:

P1a-1c: The CDO (a) digital strategy, (b) digital innovation, and (c) strategic leadership skills are positively associated with the firm’s strategic agility.

B. The Moderating Effect of the Innovation Ecosystem

We theorize the relationship between the actors of the startup’s business and innovation ecosystem and the CDO. To succeed, the CDO must maintain a close relationship with the ecosystem’s actors in which the startup is immersed. The concept of business ecosystems was introduced in the 1990s by Moore [27][29] and refers to business networks that are formed beyond territorial limits, since cooperation between firms is on an international scale. The ecosystem refers to actors (organizations, firms, startups, universities, investors, resources, etc.) that interact to promote innovation.

Consequently, the CDO’s responsibility is broadened: drawing on the CDO skills in digital strategy, digital innovation, and strategic leadership, they are led to play a role as facilitator between the firm, the excubated startup, and its ecosystem [7][8]. This relationship is essential, as the startup’s ability to successfully design, prototype, develop, and commercialize digital innovations depends on the quality of its interactions with its ecosystem [27]. To the extent that the CDO plays a facilitating role with the ecosystem actors, it follows that the ecosystem exerts a positive influence on the relationship between the CDO represented by the three core skills/competencies and the firm strategic agility. The preceding discussion leads us to the following proposals:

P2a-2c: The ecosystem in which the startup is immersed has a positive moderating effect on the relationship between (a) the CDO digital strategy skills and strategic agility; (b) the CDO digital innovation skills and strategic agility; and (c) the CDO strategic leadership skills and strategic agility.

C. Strategic Agility and Digital Innovation Success

We theorize the relationship between the firm’s strategic agility and the digital innovation go-to-market success. Like

Doz and Kosonen [19][20], we conceptualize strategic agility along three dimensions (strategic sensitivity, resource fluidity, and collective commitment) and show that each dimension promotes innovation market success.

First, strategic sensitivity allows the firm to obtain useful information from its environment, detect opportunities and internal constraints according to strategic priorities, market, and competitive conditions [19]. Via strategic sensitivity, the firm is aware of capabilities, technologies, and processes useful for designing, developing, and launching innovations. By increasing its strategic sensitivity, the firm will identify unmet market needs and changes in its environment, which generates favorable conditions for developing and launching innovations [19][20]. Thus, we posit that strategic sensitivity exerts a positive impact on the successful commercialization of the excubated startup's innovations.

Second, resource fluidity, another dimension of strategic agility, supports effective management of the innovation portfolio. The ability to allocate and reallocate resources is critical to the development of innovations. When resource fluidity increases, internal processes become more flexible and easily modified [19]. As resources (financial, human, technological, etc.) become more mobile within the firm, greater flexibility is achieved, allowing for reorganization or redeployment of resources, and supporting strategic goals, such as driving digital transformation or managing a portfolio of innovations. Resource fluidity plays a key role in facilitating the process by which the group reassesses its innovation portfolio. Resource (re)allocation leads the firm to revise its cost and revenue structure, including that of the innovation portfolio, to reflect changing priorities [20]. Thus, we posit that resource fluidity exerts a positive influence on the market success of innovations managed by the startup.

Finally, collective commitment, refers to the managerial commitment of the company, which fosters organizational adaptation in the face of rapid and unexpected changes in the environment. Studies on dynamic capabilities suggest that when a new opportunity is perceived, management decisions must be made quickly to take advantage of that opportunity [19]. These collective management decisions are essential for internal changes aimed at innovation management processes [19]. Obtaining a collective commitment from the TMT, and in particular from the CDO, plays a central role in resolving conflicts and allows delicate situations to be resolved. As a result, we posit that collective commitment positively influences the success of bringing innovations managed by the startup to market. This leads us to the following proposal:

P3: Strategic agility (i.e., strategic sensitivity, resource fluidity, collective commitment) is positively associated with the success of digital innovations managed by the startup excubated by a large incumbent firm.

IV. DISCUSSION AND CONCLUSION

Digital transformation is causing radical changes in the way large firms do business. To stay in the race, some of them decide to excubate a startup, i.e., to create an external startup, involving its ecosystem and allocating resources to build a portfolio of innovations to bring them successfully to market. The CDO, who oversees the digital innovations of

the excubated startup, plays a key role as his/her distinctive skills positively influence the firm strategic agility.

We propose a model of this phenomenon in which three types of CDO skills/competencies (in digital strategy, digital innovation, and strategic leadership) are microfoundations of strategic agility (strategic sensitivity, resource fluidity, and collective commitment). As well, strategic agility mediates the relationship between the CDO skills and the innovation go-to-market success. And we postulate that the ecosystem, which is critical to the growth of the startup, moderates the relationship between CDO skills and strategic agility.

We believe that this paper makes four contributions. First, we contribute to the study of microfoundations by conceptualizing the impact of the CDO skills (individual microfoundations) responsible for the digital innovations of an excubated startup on the strategic agility of a large firm leading a digital transformation. This contribution adds to the literature on the microfoundations of strategic agility [34], of large firms in the context of digital transformation. Second, by positing that the ecosystem in which the excubated startup is embedded plays moderating roles along microfoundations and dimensions of strategic agility, we emphasize the place of the ecosystem in the growth of startups. Third, we add insights to digital transformation research, in particular, on the relationship between dynamic capabilities and digital transformation [21]. We study the phenomenon from the perspective of CDOs involved in digital innovation. Prior studies have taken this approach to explain other digital transformation outcomes, such as the determinants of CDO performance [32] but neglecting strategic agility. Fourth, from a practical perspective, our model should be of interest to CDOs managing an innovation portfolio, as it highlights a new contribution of CDOs to innovation management.

We are aware that our model has limitations. First, it has only scratched the surface of the relation between strategic agility and microfoundations. A growing body of work focuses on the microfoundations of strategy [34], suggesting that researchers are looking at individual factors to explain phenomena at a more micro level. Second, we only included the skills/competencies of CDOs that reflect the goals of the role. More specific work needs to be done to identify a more general set of expected CDO skills in digital innovation.

Furthermore, our model provides a partial understanding of the CDO's role regarding digital innovation. Therefore, our model did not explore other themes related to the skills of the CDO, such as digital culture, strategic use of IT, firm's dynamic capabilities during a digital transformation, etc. We encourage future research into these relationships, which will provide more specific explanations of the role of the CDO. In addition, we chose the excubation approach, as it represents a strong trend among large firms [7]. Finally, as our objective was exclusively to develop a conceptual model, we chose not to test the model. The model could be tested by operationalizing the CDO's skills/competencies [17] through interviews with CDOs from different industries, following for example the approach taken by [14][15], who conducted semi-structured and exploratory interviews. We encourage future research to test and extend this model to clarify the impact of the CDO's role on digital innovation.

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