IT DYNAMIC CAPABILITY DEVELOPMENT IN THE CONTEXT OF DATA GENESIS CAPABILITY

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Abstract

Dynamic Capabilities are often considered as the factor justifying the different degrees of success of organizations in turbulent environment. However Dynamic Capability development remains a difficult issue to research, with a paucity of work directly addressing this question, despite its importance. The explanation of the development of Dynamic Capabilities would give organizations the instruments to rationally improve their chance of success and to more likely sustain their competitive advantage.

We contribute to the emerging literature on Information Technology (IT) Dynamic Capability development by proposing a research framework grounded in the three sources of Dynamic Capabilities: organizational processes, firm history and firm's assets. Our model takes into consideration also the moderating role played by environmental turbulence on Dynamic Capability development and on process performance.

In this contribution we lay the theoretical and methodological groundwork and we foresee the test of the model using Data Genesis (DG) capability as the context. DG is the Dynamic Capability of (1) choosing IT to generate and capture data in digital form, (2) integrating the technology in the appropriate business processes, and (3) managing the digital data so produced.

Keywords: IT capability, Dynamic Capability, capability development, Data Genesis.

1 INTRODUCTION

Dynamic Capabilities are often considered as the factor justifying the different degrees of success of organizations in turbulent environment (Pavlou & El Sawy, 2006; Rai, Patnayakuni, & Seth, 2006; Zollo & Winter, 2002). However Dynamic Capabilities remain an unclear and troubling research construct: "The exact nature of Dynamic Capabilities is not well understood, and there is the argument that the concept is both vague and tautological: Dynamic Capabilities are the things that enable organizations to sustain competitive advantage, but we can only infer these when looking at apparently successful organizations over sustained period of time" (Prieto & Easterby-Smith, 2006). On the opposite, proponents of Dynamic Capability reject this criticism (Banker, Bardhan, Hsihui, & Shu, 2006; Eisenhardt & Martin, 2000).

Nevertheless, if their inference seems possible only when Dynamic Capabilities have been successfully employed; their origin and their development over time become a difficult issue to research. Testament to the difficulty associated with research on the emergence and development of Dynamic Capabilities is the paucity of research directly addressing this question.

Research in this area is clearly important and the explanation of the emergence and development of Dynamic Capabilities would give organizations the instruments to rationally improve their chance of success and to durably sustain their competitive advantage.

In this article we seek to contribute to the emerging literature on Information Technology (IT) Dynamic Capability development.

The embryonic research on this subject proposes different theories and models of Dynamic Capabilities development (Montealegre, 2002; Pavlou & El Sawy, 2006; Tanriverdi, 2005; Teece, Pisano, & Shuen, 1997; Zollo & Winter, 2002), but an attempt to integrate these different propositions into a comprehensive testable research model of Dynamic Capabilities development is missing.

This paper is organized as follows: §2 introduces the theoretical framework, which is based on the resource-based view theory, and formally defines the Data Genesis (DG) Dynamic Capability construct. §3 summarizes the literature on Dynamic Capability development. §4 describes the research model, its variables and hypotheses. §5 presents the research methodology and §6 concludes this research in progress highlighting the future directions and achievements.

2   THEORETICAL FRAMEWORK

2.1   Resource-based view

The resource-based view has been largely introduced in Information Systems research to theoretically ground studies on competitive advantage and its sustainability at the firm level (Wade & Hulland, 2004). This perspective highlights the importance of the firm's internal resources for the evaluation of the firm's competitive advantage (Eisenhardt & Martin, 2000).

Resources are the "assets and capabilities that are available and useful in detecting and responding to market opportunities or threats" (Wade & Hulland, 2004). More specifically, "assets are defined as anything the firm can use in its processes for creating, producing, and/or offering its products to the market, whereas capabilities are repeatable patterns of actions in the use of assets to create, produce, and/or offer products to the market" (Sanchez, Heene, & Thomas, 1996; Wade & Hulland, 2004).

The resources that are valuable and rare temporary provide the competitive advantage. The extent to which these resources are also inimitable, immobile and not substitutable between firms explains the sustainability over time of the competitive advantage (Barney, 1991).

The attention paid by this perspective to the internal resources of the firm has the weakness of excluding the socio-economic environment outside the firm. In fact, the environmental conditions could change and make the firm's resources far less valuable. Hence the resource-based view has been extended to better explain firm performance in turbulent environments (Eisenhardt & Martin, 2000).

2.2 Dynamic Capabilities

In turbulent environments, organisations need to constantly match or create market changes and Dynamic Capabilities allow the firm's to accomplish those changes. Dynamic Capabilities are "the firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change" (Eisenhardt & Martin, 2000).

So whether capabilities are the processes that use assets to create, produce, and/or offer products to a market (Sanchez, Heene, & Thomas, 1996; Wade & Hulland, 2004), Dynamic Capabilities have in addition the potential (Prieto & Easterby-Smith, 2006) to create, to evolve and to recombine internal existing resources to adapt to turbulent environments (Teece, Pisano, & Shuen, 1997).

This adaptability is especially required in fast-paced technological environments (Banker, Bardhan, Hsihui, & Shu, 2006; Teece, Pisano, & Shuen, 1997; Zahra, Sapienza, & Davidsson, 2006), as it has been demonstrated that adaptability can lead to improved customer value (Sambamurthy, Bharadwaj, & Grover, 2003; Wheeler, 2002).

Hence, in today's competitive environment characterized by increasing IT intensity (McAfee & Brynjolfsson, 2008) organizations should be capable of integrating new or established IT to match or create market changes. A number of Dynamic Capabilities have been documented in the literature. In this study we focus on an emerging Dynamic Capability, Data Genesis (DG) (Piccoli & Watson, 2008).

2.3 Data Genesis as a Dynamic Capability

We define Data Genesis capability as the three-fold process of:
- Choosing Information Technology (IT) (Wheeler, 2002; Williams, 2003) to generate and capture data in digital form. Such IT may be emerging IT (Wheeler, 2002): a new technology not commercially viable (e.g., multi-touch displays). Otherwise, such IT may be enabling IT (Wheeler, 2002): an established technology used in an innovative application by the firm (e.g., RFID in gaming chips to track table play);
- Integrating the IT in the appropriate business processes;
- Managing the digital data so produced.

Note that the DG capability is concerned with the generation and management of the data, not with its actual use in, for example, analytical processes. In other words, DG is a prerequisite to being able to compete on analytics and outcome should be measured with a consistent ability to generate data in digital form.

Exemplars of DG capability are emerging, such as Harrah's corporation: this company systematically integrates IT, such as computerized slot machines or RFID chips, to gain valuable digital data on customers' behaviour at the Harrah's casinos and it exploits these pieces of data to profile and reward customers (DeLong & Vijayaraghavan, 2003; Piccoli & Watson, 2008). Note that the *generation* of the data in the above example pertains to DG capability while the *exploitation* is within the scope of other capabilities (e.g., data analysis).

2.3.1 Data Genesis as an Information Technology capability

IT is the enabler of the DG capability as IT allows for the creation of digital data. Therefore, the capability to manage IT and information are vital dimensions of DG capability.

IT capability is the multi-dimensional and enterprise-wide capability to leverage IT (Bharadwaj, Sambamurthy, & Zmud, 1999). The recognition by the firm's IT personnel of the potential of emerging/enabling IT to generate and capture digital data and the good relationships between IT personnel and line management in integrating such IT within appropriate business processes is critical. The lack of IT capability would make unclear the choice of the IT to integrate and would cause the eventual IT integration ineffective. By consequence, digital data would not be accessible or would be of poor quality, impeding any effective use (Culnan, 1983; O'Reilly, 1982; Zimmer, Henry, & Butler, 2007).

Harrah's IT managers and customer service managers realized very early on that a modern slot machine is a digital computer and they worked together to develop a customer relationship management information system which collect over time digital data on the customers' behaviours at slot machines (DeLong & Vijayaraghavan, 2003; Piccoli & Watson, 2008).

The concept of Information capability is rooted in Information Theory (Shannon & Warren, 1949) and Information Capability is proposed as the capacity of accessing and disseminating (Mathews & Healy, 2007), or applying and managing (Yoon, 2005), or processing (Lin, 2005) information.
DG capability thus enables the firm to manage digital data and therefore take advantage of its ability to generate the data in digital form at its inception as described earlier. Conversely, the inability to manage digital data would negate the value of data capture and integration.
Harrah's corporation preferred digital data on guest preferences and transactions coming from slot machines than the unstructured information coming from customer service staff. The same firm processes the collected customer data, from slot machines, to profile gamblers and it disseminates these profiles, throughout the different casinos (DeLong & Vijayaraghavan, 2003; Piccoli & Watson, 2008).

3 DYNAMIC CAPABILITY DEVELOPMENT

The relevance of DG capability in fast-paced IT environments motivates its choice as the empirical Dynamic Capability on which we build the model of Dynamic Capability development.

If several studies have investigated Dynamic Capabilities and their effects on business performance, there is not an equivalent attention to the antecedents of Dynamic Capabilities, i.e. the factors that explain their development (Montealegre, 2002; Pavlou & El Sawy, 2006; Tanriverdi, 2005; Teece, Pisano, & Shuen, 1997; Zahra, Sapienza, & Davidsson, 2006; Zollo & Winter, 2002). By the consequence, we propose an integrative research model of Dynamic Capability development.

Our starting point to understanding the development of Data Genesis Capability are the three sources of Dynamic Capabilities development in rapid technological change environments (Teece, Pisano, & Shuen, 1997):
- The organizational processes of coordination, integration, learning and reconfiguration.
- The firm's assets, which define the firm-specific strategic position,
- The firm history, which accounts for the path dependent nature of capabilities

Leveraging these theoretical sources of Dynamic Capabilities, a first case study empirically highlighted the set of actions to develop capabilities (Montealegre, 2002). The organizational processes of coordination, integration, learning and reconfiguration emerged as important in capability development. By contrast, the firm's assets and the firm history played a marginal supporting role.

Others have theorized that the learning mechanisms would be the main independent variable influencing the development of the Dynamic Capabilities (Zollo & Winter, 2002). Hence theoretically, learning would be the main organizational process for the development of Dynamic Capabilities. The other organizational processes of coordination, integration and reconfiguration, as well as the firm's assets and history have been neglected.

In 2005, firm's assets and organisational processes were combined in a model of Dynamic Capability development (Tanriverdi, 2005). In particular capability development depended on the IT infrastructure and IT management processes. IT infrastructure is one kind of firm's assets, while IT management processes are a portion of the organisational processes of coordination, integration, learning and reconfiguration. Nevertheless, this integration in one single model of Dynamic Capability development of these two different sources of Dynamic Capability still excluded firm history as the third source of Dynamic Capability.

An additional theoretical contribution reaffirmed the role of the organizational processes and of the environmental turbulence in the dynamic capability development (Zahra, Sapienza, & Davidsson, 2006). The processes of coordination, selection and combination were proposed as the main organizational processes that enable the firm to build dynamic capabilities. The theoretical model proposed also that the environmental turbulence decreases the relative performance of the existing capabilities and hence stimulates the development of new dynamic capabilities in replacement of the obsolescing ones. The others sources of dynamic capabilities, as such firm history and firm's assets, had no impact on dynamic capability development.

The last work proposes and measures the impact of IT leveraging competence on the development of Dynamic Capabilities (Pavlou & El Sawy, 2006). IT leveraging competence is proposed as the only independent variable, is conceived as the ability to effectively use IT functionalities and it can be classified among the firm's assets. The other firm's assets and the firm history were excluded from this study. On the contrary, the organizational processes of coordination, integration, learning and reconfiguration played the role of mediators between IT leveraging competence and Dynamic Capabilities. Finally, the environmental turbulence moderated the relationships between all these variables.

In conclusion, the lack of a comprehensive research model including all the three kind of sources of Dynamic Capability appears as the main research gap on the subject of Dynamic Capability development. Therefore, our main contribution is the design of a model which combines the three sources of Dynamic Capabilities in a comprehensive research model of Dynamic Capability development.

4   RESEARCH MODEL

Our research model integrates and organizes previous literature around the three-fold classification of the sources of Dynamic Capabilities: organizational processes, firm's assets and firm history (Teece, Pisano, & Shuen, 1997). We posit that these processes are responsible for the emergence of DG capability. The outcome variables, Digital Data Quality and Digital Data Accessibility, dependent on DG capability and the variable Environmental Turbulence moderates some relationships. The specification of our hypothesized relationships completes the presentation of the variables (Figure 1).

4.1   Organizational Processes

The Organizational Processes of Sensing, Learning, Coordinating, and Integrating play a pivotal role in developing Dynamic Capabilities when the opportunity or need arise (Kogut & Zander, 1996; Maritan, 2007; Pavlou & El Sawy, 2006; Zahra, Sapienza, & Davidsson, 2006). These Organizational Processes can reconfigure ineffective capabilities and shape more promising ones that better match the environment, better, faster, and cheaper than the competition (Eisenhardt & Martin, 2000).

In particular, Sensing, Learning, Coordinating, and Integrating are the first order constructs of the formative model of the Organizational Processes and Reconfigurability is its second order construct (Pavlou & El Sawy, 2006), as it is through the reconfiguration of existing capabilities that new Dynamic Capabilities develop. So:

H1: the effectiveness of the Organizational Processes has a positive and direct impact on DG capability.

4.2 Firm's assets

Different kind of assets can positively influence the possibility to develop new capabilities: technological assets, complementary assets, financial assets, reputational assets, structural assets, institutional assets, market structure assets (Teece, Pisano, & Shuen, 1997). IT assets are a two-fold category composed of : IT Infrastructure and Information Repositories (King, Grover, & Hufnagel, 1989; Piccoli & Ives, 2005).

IT Infrastructure is "the base foundation of the IT portfolio (including both technical and human assets), shared through the firm in the form of reliable services" (Broadbent, Weill, & St. Clair, 1999) or functionalities (Fink & Neumann, 2007; Pavlou & El Sawy, 2006; Zhu & Kraemer, 2005). The IT Infrastructure varies in reach, and range (Piccoli & Ives, 2005). The reach of the IT Infrastructure measures the extent of the connectivity both within and outside of the firm, while the range of the IT Infrastructure sizes the scope of services that it can support. As reach and range of the IT Infrastructure increase, the IT Infrastructure ability to support capability development increases as well. The reach and range of the existing IT Infrastructure influence the possibility and cost of IT integration for gaining valuable digital data hence impacting on the development of DG capability.

The second category of IT assets gathers the Information Repositories. An Information Repository is "a collection of logically related data, organized in a structured form, that is accessible and usable for decision-making purposes" (Piccoli & Ives, 2005). As capabilities relying on organized data need Information Repositories to develop (Piccoli & Ives, 2005), also DG capability needs Information Repositories to develop. Given that DG capability includes the use and management of digital data, DG capability needs Information Repositories to organize and access the gained digital data. A lack of Information Repositories would restrain the organization in data availability and by consequence impeding the development of DG capability.

Finally, IT Infrastructure and Information Repositories are subjected to asset stock accumulation dynamics (Piccoli & Ives, 2005): the IT Infrastructure and the Information Repositories can be accumulated by the organization into IT asset stock over time. The reach and the range of IT Infrastructure as well as the volume of Information Repositories can increase, extending the pre-existing IT asset stock. This IT asset stock accumulation influences, in general, Dynamic Capability development as well as DG capability in particular. An extended stock of IT assets facilitates the development of DG capability. Therefore, we respectively hypothesise that:

H2: the stock of IT Infrastructure has a positive and direct impact on DG capability.

H3: the stock of Information Repositories has a positive and direct impact on DG capability.

4.3 Firm history

Firm history explains the existing firm's position and the same time it influences the firm's opportunities ahead, framing the path dependencies of organizations (Teece, Pisano, & Shuen, 1997). Present capabilities depend on previous ones and they constrain new ones, because learning tend to be local and related to existing processes (Teece, Pisano, & Shuen, 1997; Zahra, Sapienza, & Davidsson, 2006).

By consequence, the development of DG capability depends on existing Dynamic Capabilities closely related to DG: IT capability and Information capability. The existing IT capability, i.e. the capability to leverage IT, facilitates the development of the DG capability, in choosing and integrating IT to capture digital data. The existing Information capability, i.e. the capability to identify, collect,

organize, and disseminate information, facilitates the development of DG capability, in managing the produced digital data. So, we hypothesize that:

H4: IT capability has a positive and direct impact on DG capability.

H5: Information capability has a positive and direct impact on DG capability.

4.4   Digital Data Quality and Digital Data Accessibility

The Resource-based View describes capabilities as strategic firm resources and it foresees a direct relationship between Dynamic Capabilities and the firm's process performance (Ray, Barney, & Muhanna, 2004; Ray, Muhanna, & Barney, 2005; Zahra, Sapienza, & Davidsson, 2006). However the process outperformance by one firm in competing environments does not automatically imply any firm's sustained competitive advantage due to the several mediating and moderating variables interposing between process outperformance and firm's sustainable competitive advantage.

Consistently with this theory, DG capability should have a direct relationship with the quality and accessibility of the digital data. The use in, for example, analytical processes of the gained digital data will depend on their quality and accessibility (Culnan, 1983; O'Reilly, 1982; Zimmer, Henry, & Butler, 2007).

Information accessibility is the extent to which an individual perceives that any particular source is available for use (Zimmer, Henry, & Butler, 2007). Information quality refers the quality of the information retrieved from an information system (DeLone & McLean, 1992).

Information accessibility is the most important driver for information source selection for use, with people consistently choosing and using lower-quality sources that are more accessible over higher-quality sources that are less accessible (Culnan, 1983; O'Reilly, 1982; Zimmer, Henry, & Butler, 2007). Nevertheless, Information Quality is important because when sources are equally accessible, individuals will consistently choose and use sources that are perceived of higher quality (Hirsch & Dinkelacker, 2004; O'Reilly, 1982).

Harrah's corporation appreciates the quality and accessibility of the collected data on customers at the slot machines. Basing on the quality and accessibility of the accumulated transactional data from past guests, Harrah's can quickly and accurately estimate a customer's future value within minutes of the player joining the program. This enables the casino to start treating the customer according to his or her future value rather than having to wait for observed play before starting to provide rewards (Piccoli & Watson, 2008).

Consequently, the hypothesis we propose is that:

H6: the DG capability has a positive and direct impact on Digital Data Quality.

H7: the DG capability has a positive and direct impact on Digital Data Accessibility.

4.5   Environmental Turbulence

Environmental Turbulence describes the general conditions of uncertainty and/or unpredictability caused by the changes in customer preferences and technology developments (Mendelson & Pillai, 1998). Customer preferences' turbulence causes unpredictability in market demand, while, technology development's turbulence causes uncertainty regarding new technological breakthroughs.

In turbulent environments, organisations need to constantly match or create market changes and Dynamic Capabilities allow the firm's to accomplish those changes. On one hand, Environmental Turbulence stimulates the reconfiguration of existing capabilities, increasing the possibility that the Organizational Processes of Sensing, Learning, Coordinating, and Integrating develop new valuable capabilities (Sambamurthy, Bharadwaj, & Grover, 2003; Zahra, Sapienza, & Davidsson, 2006). On the

other hand, Environmental Turbulence weakens the process performances depending on the existing Dynamic Capabilities (Teece, Pisano, & Shuen, 1997). So, we propose that Environmental Turbulence moderates the relationship between Organizational Processes, Information Quality and Information Accessibility in opposite ways:

H8: Environmental Turbulence positively moderates (i.e. reinforced) the relationship between Organizational Processes and DG capability.

H9: Environmental Turbulence negatively moderates (i.e. attenuates) the relationship between DG capability and Digital Data Quality.

H10: Environmental Turbulence negatively moderates (i.e. attenuates) the relationship between DG capability and Digital Data Accessibility.
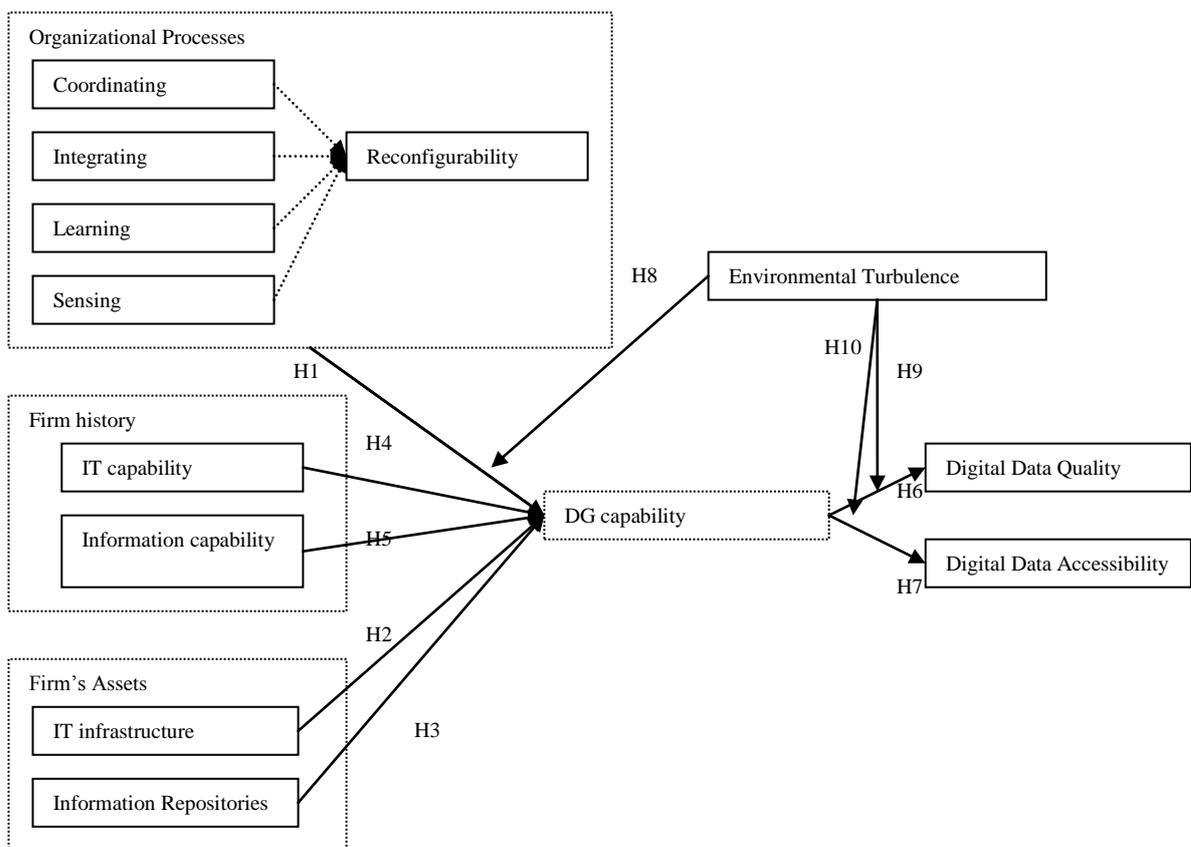

Figure 1 The research model

5   RESEARCH METHODOLOGY

We are now engage in the data collection phase of this research in order to test the model through a double Configurational-Structural approach (voluntarily omitted reference). Firstly, we will test our theory-based structural model, through Structural Equation Modelling (SEM). Secondly, we will cluster the empirical data sample, in order to identify the different organizational configurations. Finally, we will test the configuration-based structural model, through SEM.

A questionnaire-based survey will be the main source of empirical data on a sample of key informants in different organizations. The target population is hospitals, as they are data intensive organisations and DG capability could advance the medical care standards (Piccoli & Watson, 2008). 200 responses from distinct organisations are pursuit to assure a convenient sample size due to the 134 measured items on the 20 constructs (with 10 items for the most complex construct).

The key informants will be IT managers and line managers in order to reduce common method bias (Straub, Boudreau, & Gefen, 2004). IT managers are likely to be the most informed about IT assets and capabilities and they are assumed to have a good understanding of the organisational processes. Line managers are likely to be the most informed about organisational processes and they are assumed to have a good understanding of the IT assets and capabilities. A formal check will assess the IT managers' understanding of the organisational processes and the line managers' understanding of the IT assets and capabilities (Pavlou & El Sawy, 2006), using a cut-off point of 5 out of 7.

Existing measurement scales operationalize all the constructs of the model.
- Firm history – IT capability. The IT capability measurement scale will include the Technical Capability, Behavioral Capability and Business Capability dimensions of IT Personnel Capability construct (Bhatt & Grover, 2005)
- Firm history – Information capability. The Information capability construct will be measured using the Information capability measurement scale (Lee & Lee, 2004) with its three dimensions: Information use, Information management, Information behaviors and values.
- Organizational Processes – Sensing. The effectiveness in sensing the environment will be reflected by market orientation measurement scale (Kholi & Jaworski, 1990; Pavlou & El Sawy, 2006).
- Organizational Processes – Learning. Effectiveness in learning will be measured by absorptive capacity measurement scale (Cohen & Levinthal, 1990; Pavlou & El Sawy, 2006).
- Organizational Processes – Coordinating. Effectiveness in coordinating will be evaluated by coordination capability measurement scale (Malone & Crowston, 1994; Pavlou & El Sawy, 2006).
- Organizational Processes – Integrating. Effectiveness in integrating will be estimated by collective mind measurement scale (Pavlou & El Sawy, 2006; Weick & Roberts, 1993).
- Organizational Processes – Reconfigurability. Reconfigurability will be formed by the previous Sensing, Learning, Coordinating, Integrating constructs, plus, for validation purposes, two indicator items which will capture the overall degree of the effectiveness of the Organizational Processes (Pavlou & El Sawy, 2006).
- Firm's Assets – IT Infrastructure. The IT infrastructure measurement scale will adopt the IT infrastructure Capability (Fink & Neumann, 2007)
- Firm's Assets – Information Repository. The Information Repository construct will be reflected by the unified Knowledge Document Repository and Data Repository scales (Freeze & Kulkarni, 2005).
- DG Capability. The DG capability scale will include:
  o Choosing New Emerging/Enabling Technologies construct (Wheeler, 2002; Williams, 2003), to measure the ability to choose emerging/enabling IT to gain valuable digital data.
  o IT Business process integration category of the IT Capability construct (Bharadwaj, Sambamurthy, & Zmud, 1999), to measure the ability to integrate in the business processes such IT.
  o Information Management dimension of the Information capability measurement scale (Lee & Lee, 2004), to measure the ability to manage digital data.
- Digital Data Quality. The Digital Data Quality construct will be measured through the Information Quality measurement scale (Zimmer, Henry, & Butler, 2007)
- Digital Data Accessibility. The Digital Data Accessibility construct will be assessed by the Information Accessibility measurement scale (Zimmer, Henry, & Butler, 2007)
- Environmental Turbulence. The measurement of Environmental Turbulence construct will be based on the Turbulent Environment scale (Pavlou & El Sawy, 2006).

A set of Control Variables complements the measurement scale of the main constructs of the model. Several factors that have been previously shown to be related to Dynamic Capability development will be measured, so that their effects on Data Genesis Capability development will be controlled:

- The functional role of the respondents: management versus non-management positions (Fink & Neumann, 2007).
- The size of the organization through the number of employees (Bhatt & Grover, 2005; Fink & Neumann, 2007).
- The size of the IT department through the number of IT personnel (van der Heijden, 2000)
- The seniority of the respondents among senior, mid-level or junior managers (Fink & Neumann, 2007).

6 CONCLUSION AND FUTURE RESEARCH

Dynamic Capabilities are often considered as the factor justifying the different degrees of success of organizations in turbulent environment. However Dynamic Capabilities development remains partially unexplained. The explanation of the development of Dynamic Capabilities would give organizations the instruments to rationally improve their processes and increase indirectly their chances of success.

We contribute to the emerging literature on IT Dynamic Capability development by proposing and testing a research model on DG: the Dynamic Capability of (1) choosing IT to generate and capture data in digital form, (2) integrating the technology in the appropriate business processes, and (3) managing the digital data so produced.

This research in progress foresees the test of the research model on DG capability before the conference attendance in order to present some preliminary results at that time. Finally, future research includes the validation of the model in others organisations and for other Dynamic Capabilities in order to generalize the findings.

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