Information Management Capability as a Source of Sustained Competitive Advantage

Emergent Research Forum Papers

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Abstract

Information Management Capability (IMC) has proven to be an important resource for companies to obtain value in a changing competitive environment. New digital technologies have imposed some strategic challenges on organizations. Company investments to deal with these changes are constantly increasing. This paper seeks to contribute to management practice in this challenge, focusing efforts based on a proposal to obtain sustained competitive advantage (SCA) through IMC. Drawing on a resource-based view and its extensions (dynamic capabilities and complementarity), we developed a model that specifies the paths that enable IMC - in conjunction with other capabilities of the firm (integration, flexibility, reconfiguration, and agility) - to become a source of SCA. To evaluate this model, a study of multiple cases is being conducted, which will be followed by a test of the hypotheses using covariance-based structural equation modeling (CB-SEM) based on survey data. The preliminary results are presented at the end of this research-in-progress.

Keywords

Information management capability, sustained competitive advantage, organizational capabilities.

Introduction

The strategic impact of Information Technology (IT) resources is still a source of controversy in the literature on Information Systems (IS) (see Chae 2014; Luse and Mennecke 2014). It is a subject that continues to draw attention because of the changes in the competitive environment imposed by new digital technologies that generate new data, Big Data. The challenge of exploring these data has been treated by several authors as an opportunity to create strategic value for organizations (Brown et al., 2011; Chen and Storey 2012; Davenport et al. 2013; Johnson 2012; McAfee and Brynjolfsson 2012).

New digital technologies enable different forms of dynamic capabilities (Pavlou and El Sawy 2010). Therefore, it has become crucial to develop the organizational skills to extract strategic value from this extraordinary information flow (Bharadwaj et al. 2013; Demirkan and Delen 2013). As one of the capabilities to be developed, this study proposes to investigate information management capability (IMC) as a source of sustained competitive advantage (SCA). IMC influences company performance directly and indirectly (Carmichael et al. 2011; Mithas et al. 2011). So, the impact of IMC on strategic differentiation is also mediated by other organizational capabilities.

To pinpoint these capabilities, a systematic review of the literature was carried out. This search identified four capabilities (integration, reconfiguration, flexibility, and agility) related to the chosen strategic perspectives that could mediate the impact of IMC on the SCA of the company.
Through this study, we expect to contribute to the literature on IS by analyzing the capabilities from the theoretical perspectives on strategy and returning the focus on information management—to the detriment of the widely researched technology management. We also examine the role of IMC as a source of competitive advantage, the natural dependent variable of strategic capabilities.

From the viewpoint of organizations, even while immersed in data, 85 percent of them were unable to obtain a competitive advantage from these information sources in 2015 (Gartner 2013). We therefore intend to contribute to management practice with this research by proposing a model that links IMC with other organizational capabilities and will assist organizations that deploy digital strategy to focus efforts on obtaining SCA, thereby attaining value in this new informational environment.

This paper opens with the theoretical development of the research-in-progress. The hypotheses and research model are then proposed. Finally, the method and the preliminary results are demonstrated.

**Theory Development**

**Theoretical Perspectives on Competitive Advantage and IS**

The use of IS as a source of competitive advantage is best explained through the resource-based view (RBV) (Bharadwaj 2000; Wade and Hulland 2004). According to RBV, even firms in the same industry are heterogeneous in composition and in use of their resources and capabilities (Barney, 1991). Sustainable differentiation is possible when the possession of resources and development of capabilities creates value and also cannot be purchased or developed by other competitors. As pointed out by Mata et al. (1995), for IS studies, the focus of sustained competitive advantage based on IT should rely less on IT per se and more on the processes that organize and manage IT within the company.

As an extension of RBV, the dynamic capabilities perspective is an approach to understand strategic changes (Hefelt and Peteraf 2009). Actually, this theoretical perspective addresses the abilities of the company to respond to changes in the environment (Teece et al. 1997; Eiserhardt and Martin 2000; Winter 2003). Dynamic capabilities does not necessarily mean constant change but refers mainly to its potential to extend, modify, or create appropriate internal resources (Prieto and Easterby-Smith 2006).

The complementarity of resources is another extension of RBV that is used in this research. IS resources in particular act in conjunction with other resources of the company to provide strategic benefits. Therefore, "the research field of strategic IT is a rich source of evidence that can be used to illustrate the importance of the issue of complementarity of resources" (Wade and Hulland 2004, p. 123). Adegbesan (2009) suggests that the complementarity of resources provides more value than the sum of the value of resources appropriated individually.

**Systematic Review of the Literature on Dynamic Capabilities in IS**

Among the three theoretical perspectives with implications for this work, dynamic capabilities, as an extension of RBV, was shown to be the most appropriate as the central objective of this research. In order to identify the capabilities that would be able to provide SCA to organizations, we carried out a systematic review of the literature on IS to search for publications that discussed the theory of dynamic capabilities, based on the recommended guidelines in the Cochrane Handbook (COCHRANE 2013).

We performed a search in the database Web of Knowledge, entering in the search field "topic" the phrases, "dynamic capabilities" and "dynamic capability," on June 2, 2013. This search returned 1,381 papers. We used a set of eight journals considered by the Senior Scholars Consortium of the AIS (Association for Information Systems) as the main journals in the field of IS. This selection yielded 54 (fifty-four) works.

Based on the analysis of these papers, six organizational capabilities could be identified (agility, adaptability, integrability, responsiveness, reconfigurability, and visibility). We then discarded the dimensions responsiveness and visibility since there were no obvious relationships with the proposal of IMC for SCA. The other capabilities – agility, adaptability, integrability, and reconfigurability – were fleshed out for developing the model of this research.
**Information Management Capability**

Three studies have proposed different definitions for IMC. For Mithas et al. (2011), IMC is the ability to provide data and information to users at appropriate levels and with universal access as well as to adapt these levels in response to changing market needs and directions. In contrast, Carmichael et al. (2011) puts IMC as the ability of the organization to understand and use the technological, human, and organizational resources needed to manage both internal and external information. Phadtare (2011), however, defines IMC as the ability to coordinate informational resources and put them into productive use. Beginning with these three definitions, it was possible to identify five dimensions that make up IMC: people, distribution, access, infrastructure, and information architecture. Regarding theoretical perspectives, this construct was assessed in relation to the theoretical perspectives (RBV, Dynamic Capabilities, and Complementarity of Resources) and contributions of the works arising from the three definitions (Brinkhues et al, 2014). This analysis corroborated three of the four organizational capabilities identified in the previous section (integration, reconfiguration, and agility). After determining the capabilities in this systematic review, the following hypotheses were developed, and the research model is presented in Figure 1.

**Development of the Hypotheses**

**Information Management Capability and Integration Capability**

For Rai and Tang (2010), IT integration capability is a structural ability for the management of external resources. In the context of this project, these resources are information flows generated by new digital technologies. The integration of resources and processes has been identified as necessary to manage this flow (Manyika 2011; Demirkan and Delen 2012; Pospiech and Feldens, 2012). IMC, as defined by Mithas et al. (2011) and Carmichael et al. (2011), also includes the skills of accessing and distributing these resources. Thus, IMC affects the integration capability.

Working on IMC, based on the study by Mithas et al. (2011), Graupner and Mädche (2012) proposed a model where IMCs play a mediating role with IT integration capability, thus impacting other organizational capabilities. In this model, they also proposed that IMCs are directly impacted by IT integration capabilities. Therefore, we will not only investigate the impact of IMCs on IT integration capability but also the reverse impact, seeking to analyze the effect of complementarity.

\[ H1a - \text{Higher levels of IMCs increase the company's IT integration capability.} \]

\[ H1a - \text{Higher levels of IT integration capabilities increase IMC.} \]

**Integration Capability and Flexibility**

Rai and Tang (2010) found that IT integration capability has an impact on the flexibility of partnerships. Flexibility is also present in the IMC definitions through the need to adapt infrastructure so as to respond to market pressures and changes in direction (Mithas et al. 2011). Hence, the impact of the complementary effect between IT integration capability and IMCs will also be measured regarding the company’s flexibility.

\[ H2a - \text{Higher levels of IT integration capabilities increase the company's flexibility.} \]

\[ H2b - \text{Higher levels of IMCs increase the company's flexibility.} \]

**Integration Capability and Reconfiguration Capability**

Butler and Murphy (2008) analyzed integration as a dynamic capability that contributes to the transformation of resources. Accordingly, integration has a role to play in reconfiguration. If we consider the definition of Big Data by Davenport (2014) as a data set with characteristics that requires new configurations of resources and organizational processes for its exploration, then one would expect that the integration of these resources will contribute to this reconfiguration. In the third hypothesis, therefore, we seek to investigate the influence of IT integration capability on the reconfiguration capability of the company. The complementarity effect between IMC and integration capability will also will be studied. Since the theoretical propositions are supported by the assumptions from the dynamic capabilities perspective and are defined by the firm’s capabilities to integrate and reconfigure internal and external
competencies to respond to changes in the environment (Teece et al. 1997), we suggest that the impact of IMC on reconfiguration capability also be investigated.

**H3a - Higher levels of IT integration capabilities increase the company’s reconfiguration capability.**

**H3b - Higher levels of IMCs increase the company’s reconfiguration capability.**

![Research Model](image-url)

**Figure 1. Research Model**

**Flexibility and Agility**

The context of this research also requires such organizational capabilities as agility (Demirkan and Delen 2012; Santaferraro 2012; Howe 2008). Agility is "commonly used to describe firms that are able to adapt and have a good performance in rapidly changing environments" (Overby et al. 2006, p. 120). Harris and Hevner (2009) analyzed flexibility by employing the theory of dynamic capabilities and found that flexibility may be more necessary in initial conditions of uncertainty. In addition to the traditional controls, there is a need for new types of control. Tallon and Pinsonneult (2011) examined the moderating effect of IT flexibility on the agility of the company. The authors worked with the concepts of adaptability, which refers to the degree in which the infrastructure can support different IT needs, and scalability, which is the capability of IT to expand by adding or removing resources. Based on these properties, they concluded that flexibility has a positive effect on agility. In the same way and based on the proposed context, this study seeks to analyze the effects of flexibility on organizational agility.

**H4 - Higher levels of flexibility in the firm increase organizational agility.**

**Reconfiguration Capability and Agility**

New technologies that result in a new competitive environment require not only that organizations reconfigure themselves but that they also respond to these changes with agility. Reconfiguration also relates to changes in the environment and to the possibility of engaging re-combinations of resources for a better product-market match (Wei and Wang 2009). For Butler and Murphy (2008), reconfiguration refers the ability of IT professionals to adapt and use new technologies to compete as well as to adopt new routines.
The model by Huang et al. (2012) analyzes the process of how information management helps companies achieve agility with customers. They support the observation that "the information management capability is in fact a fundamental capability that enhances other organizational capabilities" (Mithas et al. 2011, p. 251). However, they show that to achieve agility, organizations should develop information management capabilities through a new configuration of the needed resources and skills. Just as with flexibility, one would expect to find a positive effect of the reconfiguration capability on organizational agility in this study. Based on these observations we propose hypothesis five:

**H5 - Higher levels of reconfiguration capabilities in the firm increase organizational agility.**

### Agility and Sustained Competitive Advantage

If the constant data flow that characterizes Big Data (Davenport et al. 2013) requires agility from organizations for the extraction of competitive value (Demirkan and Delen 2012; Santeftaro 2012; Howe 2008), then one would expect this agility, impacted by the previously identified capabilities, to be crucial to achieving a sustained competitive advantage. Roberts and Grover (2012) see agility as an organizational capability that can achieve a competitive advantage through actions in hyper-competitive and changing environments. For IMC to be a source of sustained competitive advantage and to influence the integration, flexibility, and reconfiguration capabilities, it is necessary that these have a positive impact on the agility of responses to the changes required by the context. The effect of agility to achieve a sustained competitive advantage is thus one of the hypotheses to be examined.

**H6 - Organizational agility positively influences the creation of a company’s sustained competitive advantage.**

### Methods

This research has been developed in two phases. Four Chief Information Officers (CIOs) from organizations that intensively use data made a preliminary evaluation of the research model. It is a study of multiple cases, from which the data collection is currently underway, in three organizations that are within the context of Digital Business Strategy. In each case, the respondents are executives in the fields of IT, business, and company strategy. In the end, nine executives from three companies will be interviewed. Three specialists validated the protocol of the case studies before initiating data collection. The interviews will be transcribed and analyzed by utilizing the content analysis technique (Bardin 1977). The final categories (related to the proposed variables of the model), intermediate (the dimensions detailed in Table 1), and initial categories (definitions) have been identified. The analysis is in progress, with the use of the qualitative analysis software MaxQDA®.

In the final step, the hypotheses will be tested using covariance-based structural equation modeling (CB-SEM) based on the survey data. The collection will be carried out in organizations that are inserted in the same digital context, in addition to the companies in the case studies. The respondents will once again be executives of the aforementioned areas. The IBM SPSS AMOS software will be used for analysis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Dimensions</th>
<th>References</th>
</tr>
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<tbody>
<tr>
<td>Information Management</td>
<td>The set of abilities that links people, architecture, infrastructure, access, and distribution of information to make organizational changes in response to the imposition of possible alterations in the internal and external organizational environment.</td>
<td>Infrastructure</td>
<td>Carmichael et al. (2011)</td>
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<tr>
<td>Capability</td>
<td></td>
<td>Distribution</td>
<td>Carmichael et al. (2011); Mithas et al. 2011; Pahdtare (2011)</td>
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<td></td>
<td></td>
<td>Architecture of Information</td>
<td>Carmichael et al. (2011); Mithas et al. (2011)</td>
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<td>Integration Capability</td>
<td>The capability of the firm reached by the promotion of the aligning process and to integrate the systems, data, and internal processes (Rai and Tang, 2010; Roberts and Grover 2012).</td>
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<tr>
<td>Information Input</td>
<td>Rai and Tang (2010); Roberts and Grover (2008)</td>
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<tr>
<td>Operations</td>
<td>Butler and Murphy (2008)</td>
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<tr>
<td>Flexibility</td>
<td>The firm’s capability that refers to the degree in which infrastructure can support different needs (Tallon and Pinsonneult 2011).</td>
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<td>Compatibility</td>
<td>Lee and Xia (2005); Tallon and Pinsonneult (2011)</td>
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<td>Modularity</td>
<td>Tallon and Pinsonneult (2011)</td>
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<tr>
<td>Connectivity</td>
<td>Lee and Xi (2005); Tallon and Pinsonneult (2011)</td>
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<tr>
<td>Process</td>
<td>Tallon and Pinsonneult (2011)</td>
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<tr>
<td>Architecture</td>
<td>Lee and Xia (2005)</td>
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<tr>
<td>Reconfiguration Capability</td>
<td>The reconfiguration capability is the capability to reconfigure resources with punctuality and efficiency, with the intention to implement a new configuration that corresponds to the new environment (Wei and Wang 2009).</td>
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<tr>
<td>Combination of New and Existing Resources</td>
<td>Wei and Wang (2009); Rai and Tang (2010)</td>
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<td>Compatibility with Market-Suppliers</td>
<td>Wei and Wang (2009)</td>
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<tr>
<td>Agility</td>
<td>Capability of the firms to adapt and perform well in environments that change rapidly (Overby et al. 2006).</td>
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<tr>
<td>Perception of Changes</td>
<td>Overby et al. (2006); Tallon and Pinsonneult (2011); Roberts and Grover (2012)</td>
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<tr>
<td>Response to Changes</td>
<td>Overby et al. (2006); Roberts and Grover (2012).</td>
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<tr>
<td>Anticipation</td>
<td>Roberts and Grover (2012)</td>
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<tr>
<td>Sustained Competitive Advantage</td>
<td>Sustained competitive advantage occurs when a value creation strategy is implemented, and that strategy is not simultatanously implemented or copied by any other current or potential competitor. (Barney 1991).</td>
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<tr>
<td>Value</td>
<td>Barney (1991); Mata et al. (1995)</td>
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<td>Heterogeneity</td>
<td>Barney (1991); Mata et al. (1995)</td>
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<td>Immobility</td>
<td>Barney (1991); Mata et al. (1995)</td>
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**Table 1. Definitions and Dimensions of the Variables**

Table 1 presents the definitions of each construct and the dimensions that will be observed in each variable. It also presents the references that determined the selection of each dimension.
Preliminary Results

The first interviews of the case studies reveal a consistent relationship among the variables proposed in the research model. The IT Superintendent of the Brazilian branch of one of the leading global financial services institutions pointed out: “The flexibility based on information management and their integration generates results that can be analyzed from many different angles. Understanding the needs of each area of the organization (...) the gains in agility (...) help the strategic positioning, providing analytical foundation and assertiveness to decisions.”

Finally, the first concluded result refers to the proposal of constructing a scale that meets the research requirements to measure IMC. Based on the Card Sorting results, the scale could be reduced from 20 items in five dimensions (people, distribution, access, infrastructure, and information architecture) to 10 items in three dimensions (distribution, infrastructure, and access), with the other two dimensions being absorbed by and permeating the three remaining ones. Subsequently, with the application of the 10-item scale to 97 executives, an indicator that showed a low factor loading was removed. For the final scale with nine items, a Cronbach’s Alpha of 0.904, a Composite Reliability of 0.920, and an Average Variance Extracted of 0.563 was observed.

REFERENCES


Huang, P. Y., Pan, S. L., Zuo, M. (2012). Being Responsive to Your Customer: Developing Customer Agility through In


