CHIEF INFORMATION OFFICER PROFILE AND INFORMATION TECHNOLOGY ROLE: A qualitative approach

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Abstract

This paper uses the Strategic Grid of Nolan and McFarlan (2005) to analyse the strategic importance of IT in the CIO profile. The relationship between the role of IT and the CIO profile is very clear. Nevertheless, there are signs that this relationship may evolve, to a lesser degree, in the opposite direction. That is, the CIO's profile influences the IT role due to elements such as credibility and internal networking.

Keywords: CIO Profile, Importance of IT, Competencies

Introduction

Some Brazilian companies have positioned their Chief Information Officer (CIO) as Chief Operations Officer (COO). Natura, a Brazilian market leader in the beauty care sector, gradually increased the authority of its CIO from management of information systems that supported operations to include management of sales, and then, in the last year, to management of operations. Alliar, one of the largest medical diagnostic companies in Brazil, also noted the central role of information in its business. Alliar´s CIO is also its COO. In these companies, information is an important part of product development, business operations and decision processes. Even in companies where the CIO keeps a more traditional and restricted area of authority, his/her role is changing because the role of IT within those areas is changing. New IT technologies, such as cloud computing, big data, analytics, machine learning, internet of things (IoT), augmented reality, mobile devices and advanced human-machine interfaces allow for new opportunities (and challenges) for companies. The importance, or at least the potential importance, of IT is increasing, especially because the impacts and uses of these technologies are not yet completely clear.

Therefore, investments in IT technologies, sometimes called industry 4.0, brings up an old discussion about the impact of IT investments on enterprise performance, proposed by Robert Solow at 1987, called the productivity paradox – “You can see the computer age everywhere but in productivity statistics”.

Brynjolfsson e Hitt (1998) did not find empirical evidence of a relationship between IT investments and company performance. One of the possible reasons for this lack of evidence was the existence of an intervenient element not considered in that research.

The concept of IT capability proposed by Bharadwaj (2000), is an application of the resource-based view (RBV) in IT management (Grant, 1991), which could explain how IT investments improve organizational performance (Bharadwaj, 2000; Santhanam & Hartono, 2003; Chakravarty, Grewal & Sambamurthy, 2013).
The CIO profile has been used as a proxy measure of the organization´s IT capability (Bharadwaj, 2000; Santhanam & Hartono, 2003). Although the literature about the CIO profile presents several lists of desired and necessary competences (Earl, 1996; Periasamy & Seow, 1998; Ravarini et al., 2003; Kitzis & Broadbent, 2005; Lane & Koronios, 2007), but they do not consider effects of the company's characteristics on the CIO profile. Other studies sought to analyse the impact of the organization´s characteristics on the CIO profile (Sojer et al., 2006; Peppard et al., 2011).
Using the Strategic Grid of Nolan and McFarlan (2005), this paper analyses the strategic importance of IT in the CIO profile. This grid was chosen because it is well known and used as the mediating component in several studies about IT management.

Literature Review

There are many studies about the CIO profile (Earl, 1996; Periasamy and Seow, 1998; Ravarini et al., 2003, KITZIS and BADYAD, 2005, LANE and KORONIOS, 2007; VREULS and JOIA, 2012). The differences among their results reflect the context in which each of these studies was developed. Since the 1990s, the perception of the role of IT in companies has changed due to the emergence and evolution of certain technologies that allow the revision of processes and the creation of new models of business. This evolution of the role of IT would be one of the elements behind the different lists of CIO competencies found in the literature in addition to specific objectives and methods. Table 1 shows the number of CIO competencies identified in different jobs.

TABLE 1 – CIO´s competence models (Source: elaborated by the authors)

Author	Number of CIO´s competence
Earl (1996)	10
Periasamy e Seow (1998)	5
Ravarini et al. (2003)	12
Kitzis e Broadbent (2005)	10
Lane e Koronios (2007)	14
Vreuls e Joia (2012)	7

Ravarini et al. (2003) said that the CIO's competencies are not equally important in IT and divided them into three groups: (i) competencies that have a major impact on all IT activities, (ii) competencies with a large impact on some IT activities, and (iii) competencies with less impact. It is reasonable to assume that the intensity of the impact of a competency on IT activities depends on the role of IT in the organization. This suggests the pertinence of contingency-competence models, such as those proposed by Sojer et al (2006) and Peppard et al (2011).
Sojer et al. (2006) used the Strategic Grid of Nolan and McFarlan (2005) to create a CIO typology. The Strategic Grid is based on two dimensions: (i) reliability of current applications and (ii) need for new applications. Each of these dimensions can assume two values: low or high (Figure 1). Similarly, in this model there are four CIO profiles suitable for each of the four Strategic Grid quadrants.
In the Support quadrant, the CIO's primary concern is support for and maintenance of existing IT infrastructure, and its performance is limited to IT operational issues.

Therefore, the authors use the term Information Systems Manager for the CIO profile in the Support quadrant.
In the Transition quadrant, organizations exist temporarily in this position for a medium or short term before moving to the Factory or Strategic quadrant. Because of this, the CIO position can often be filled by an external consultant when the organization is in the temporary Transition quadrant. Organization of the IT area and deployment of IT projects tend to be more relevant responsibilities here. Therefore, the authors use the term Cost Cutter or Project Manager for the CIO profile in the Transition quadrant.
In the Factory quadrant, the CIO is responsible for the reliable operation of the current applications in the organization. Although he uses IT in the execution of strategies, he is not involved in creating or reviewing the organization's strategy. Therefore, the authors use the term Chief Technology Officer (CTO) for the CIO profile in the Factory quadrant.
Finally, in the Strategic quadrant, the CIO engages in the use of IT in designing and reviewing the strategy and issues related to IT operational efficiency. Even though the CIO in the Strategic quadrant still has the responsibilities typical of those of the CIO in the Factory quadrant, creating and deploying applications with a strong strategic impact requires a different relationship between the Strategic quadrant CIO and members of the organization's board. The term Driver is used here because the CIO has an active role in building the company's strategy. Therefore, the authors found that only the term CIO would be adequate for the CIO profile in the Strategic quadrant.

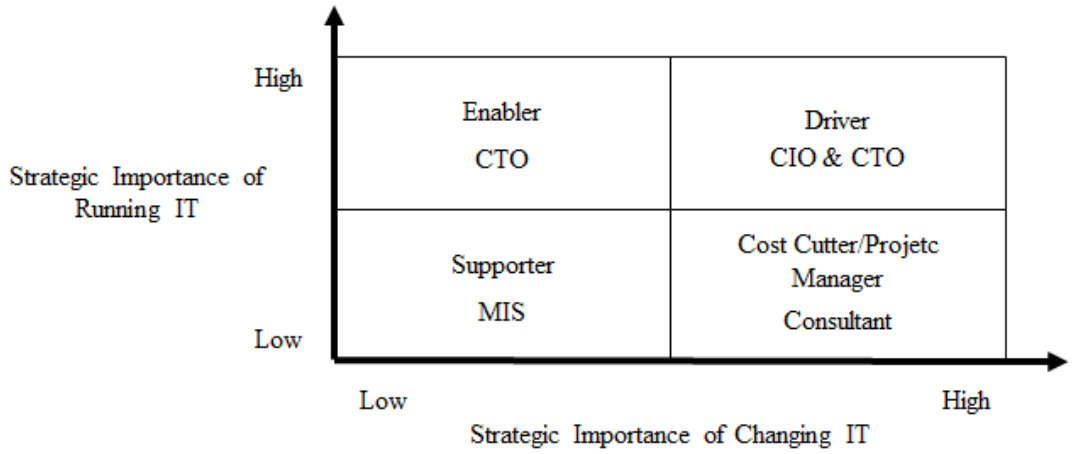

Figure 1 - CIO profile according to the Sojer model. Source: Sojer et al (2006)

Peppard et al (2011) also used two dimensions in their model: (i) the impact of IT on differentiation and (ii) the IT leadership and maturity capability of the organization. However, this model has two differences from the previous one. First, dimensions are not evaluated dichotomously - low or high - but in a continuum. Second, as shown in Figure 2, the two dimensions of this model, at least with respect to the CIO profile, are not independent; therefore, there is a maturity or evolution path of the CIO profile.

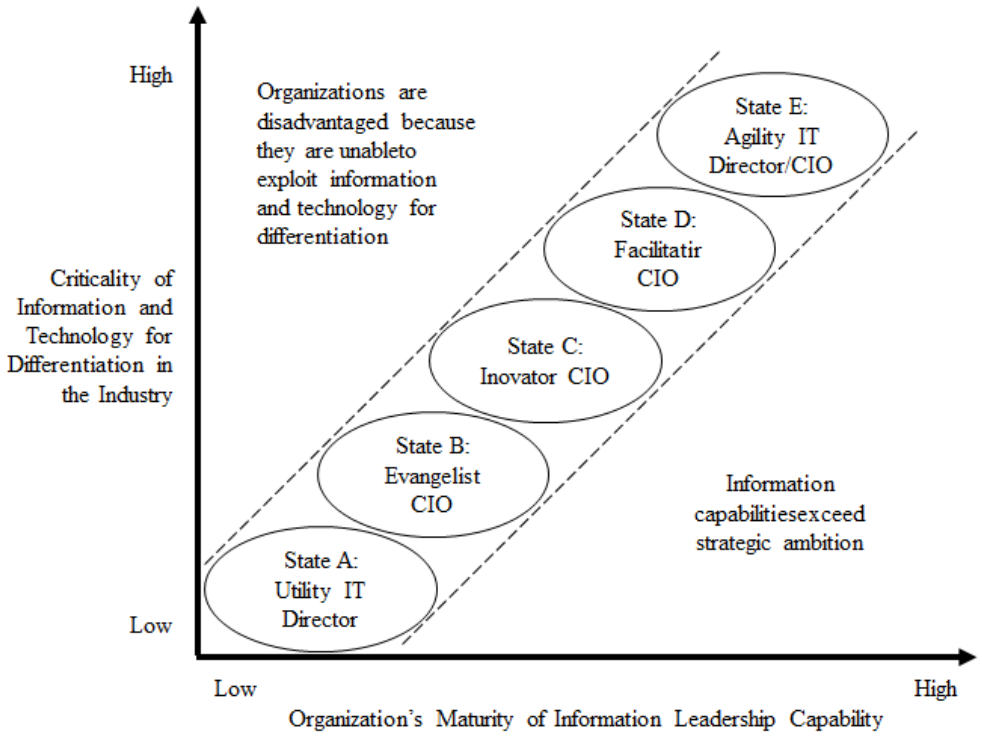

Figure 2 - CIO profile according to the Peppard model. Source: Peppard et al (2011)

Methodology

Case studies for three of the four quadrants of the Strategic Grid of Nolan and McFarlan were performed – Support, Factory and Strategic. The interview script was developed based on the CIO competencies found in the literature. The interviewed talked about the importance of certain competences and how they could be developed. The criteria for measuring the importance of each competency varied by each quadrant of the Strategic Grid of Nolan and McFarlan. A content analysis of the interviewee responses allowed for a construction of CIO archetypes for each of the companies' CIO profiles.

Need for IT reliability

Factory Quadrant Company B – Consumer Goods (Manufacturing + Forestry) CIO Experience Time: 15 years	Strategic Quadrant Company C – Telecommunications / High technology (air defence) / refrigeration equipment. CIO Experience Time: 20 years
Support Quadrant Company A – Manufacturing and services of electronic equipment CIO Experience Time: 8 years	Transition Quadrant

Need for new IT applications

Figure 3 - Profile of the cases studied

Findings

Company A is located in the Support quadrant of the grid, and its CIO is concerned about IT efficiency, where technical knowledge and approval at higher levels are of greater importance, as suggested by two quotes from the interview (see below). When asked what new technologies influence CIO performance, the CIO of Company A did not describe the impacts of any of them on the organization's strategy or processes. Regarding IT management, the CIO of Company A was focused on the internal operation of IT and compliance with financial goals established for its business area. The responsibilities of this CIO are consistent with the IT position of the company as described in the Support quadrant of the Strategic Grid of Nolan and McFarlan. The CIO profile of this quadrant was nominated as the efficient planner.

Company B is located in the Factory quadrant , and its CIO is devoted to showing how IT can contribute to various business areas within the company. Although the CIO of Company B seeks recognition and support from various business areas, the company is more oriented towards priorities than being consulted about them by top management. Here, the CIO of Company B sees IT as part of business processes and not just as a tool to support processes. He values the technical skills of the team more than his own and assumes a position of manager overseeing a pool of team competencies. This suggests that in their CIO position, managerial skills are more important than techniques. Concerning new technologies that can influence CIO performance, he has established links between each cited technology and business processes, exemplifying how each of them is contributing to the organization's competitiveness. This CIO wants to align IT with the organization's processes in order to make it more competitive. To do this, the CIO of Company B seeks to understand the company's business and align IT actions with the organization's strategy. To get the necessary support from the parties involved in key business areas, it treats new applications as improvements to business processes. This type of CIO was called the facilitator because his actions were focused on process improvement, but he was also called the evangelizer because he introduces new technologies based on the beneficial impacts that they could have on company competitiveness.

Company C is located in the Strategic quadrant, and its CIO devotes attention to business issues, including from an IT perspective, which is the area of responsibility for the Strategic quadrant. The CIO of Company C gets more involved in process design than just its support or automation. For this CIO, the role of IT goes beyond support and process improvement. It is part of the business, and its action can be the generator of transformations of the business itself. Technical knowledge is far less important than managerial and inter-relational skills.

This CIO, when asked about new technologies, said he divided them into two categories: infrastructure and system. This shows a higher degree of abstraction of the CIO’s view regarding the role of IT in the organization. The CIO profile of this quadrant was called the visionary.

In the Support quadrant, the CIO has a more technical profile that seeks to keep up-to-date on emerging technologies in order to be able to suggest their application when and if requested by the organization. He realizes that he must satisfy his immediate leadership and have a good relationship with business managers in order to obtain support for IT projects. His skills should enable him to meet IT goals. This CIO must be an efficient planner.

In the Factory quadrant, the CIO considers IT as a change agent and seeks to involve various business areas in IT planning and in the composition of the IT project portfolio. This CIO strives to identify ways to improve business processes and contribute to the organization's competitiveness; therefore, he analyses emerging technologies in light of

their possible applications within the organization. This CIO is a combination of evangelizer and facilitator.
In the Strategic quadrant, the CIO focuses on the business strategy rather than on the technical aspects of IT. His attention is focused on increasing competitiveness through IT, and his vision of emerging technologies is based on a conceptual model of business and IT. He considers IT as an element of the organization's strategy and that strategy building is developed through social processes among the CIO, internal company colleagues and external partners. This CIO is a visionary.

The results revealed some similarities with previous works (Laplante and Bain, 2005; Peppard et al; 2011; Sojer et al, 2006). The work of Sojer et al (2006), which also used the strategic grid of Nolan and McFarlan, is the one that bears the closest resemblance to the current study. The main difference is that the proposed typology is based more on the strategic implications of IT, minimizing aspects of operational efficiency. Sojer et al. (2006) did not do this. They considered the construction of the CIO profile typology in two dimensions - operational and strategic. The focus of the strategic grid, as its name implies, is the strategic role of IT, not the operational role.

Another aspect that deserves to be highlighted is that although CIOs show that there is consistency among the roles of IT as performed by the four CIOs according to quadrant profile, there are signs that CIO performance is capable of changing the role of IT within the organization. As the importance of IT grows in an organization, the CIO's focus on new technologies shifts from technical elements to the application of IT to business processes and its organizational impacts. The CIO's relationship with people within the organization also changes. He starts discussing applications and future IT projects with key players of various business areas in order to redesign the business processes (in the Factory quadrant) and the organizational strategy (in the Strategic quadrant). This suggests that the CIO profile, in addition to being affected by the role of IT, may also affect the role of IT within the organization, as the CIO’s professional performance creates expectations about the impacts that IT can generate. Thus, it would be reasonable to assume that the CIO can work in the direction of increasing the importance of IT, both for institutional reasons (increasing the organization's competitiveness) and for personal reasons (increasing the CIO’s organizational status). To do so, it is necessary to develop certain competencies and behaviours as integral to business processes and strategic vision. Changing the role of IT and the appropriate CIO profile strongly depends on the CEO's perception of IT's strategic potential in the organization. Thus, changing the role of IT means changing the CEO's perception of it. The CEO’s perception is affected by the results achieved in IT areas, the CIO´s conduct, the relationship between CIO and CEO, and the opinion of other members of top management. CIOs who wants to change the role of IT, and their own status, must have an agenda that considers these elements.

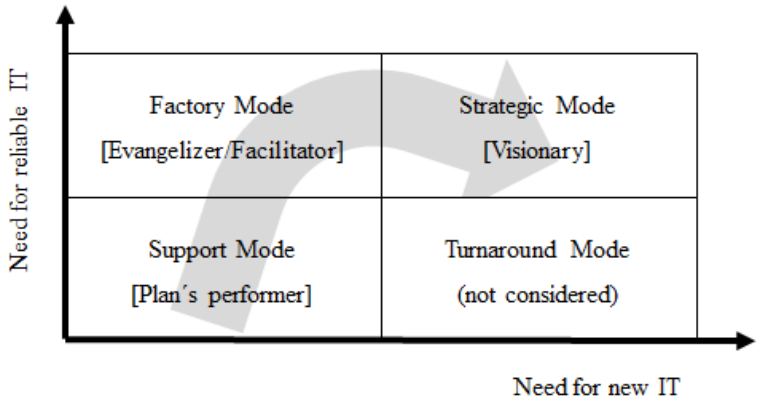

Figure 4 – CIO profile on IT Strategic Impact Grid

Thus, there is a two-way relationship between the CIO profile and the role of IT within the organization. The role of IT within the organization is also a result of the CIO's performance, which is dependent on its profile. Thus, the evolution of the CIO profile within the organization is one of the implications of improvement in strategic role of IT within the company.

Conclusion

The relationship between the role of IT and the CIO profile is very clear, as already noted by Sojer et al. (2006). Nevertheless, there are signs that this relationship may evolve, to a lesser degree, in the opposite direction. That is, the CIO's profile influences the IT role due to elements such as credibility and internal networking. These characteristics appear to stem from other skills grouped here under the label of delivery capability – leadership, communication capability, business knowledge, managerial knowledge, planning capability and knowledge of finance. The relationship between the CIO's profile and the role of IT is the conceptual contribution of this work. This result is also a practical contribution because it suggests a way for the CIO to act, providing a road map for changes in performance mode, in order for IT to become a more strategical component to the organization. When a person assumes a CIO´s position, he becomes responsible for a certain IT role that will require specific behaviours that are associated with certain competencies. The CIO can transform the role of IT within the organization through the development of certain skills, as shown Figure 1.

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