

CAN INFORMATION TECHNOLOGY BE A SOURCE OF COMPETITIVE ADVANTAGE?

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ABSTRACT: *It is still difficult to judge the effect of IT on business performance and competitiveness. Many scholars has sought to contribute by showing the impact of IT on firm performance, and emphasized its potential in creating a sustainable competitive advantage. A brief overview of the literature indicates that many perspectives have emerged, mainly due to different understandings and uses of approaches, methodologies and terminologies. This paper attempts to ascertain if IT can be a source of competitive advantage. We argue that IT can be a source of competitive advantage just like any other resource/capability can be. We suggest that the first step in further research is to clarify the terminology since it represents the foundation for building a coherent framework and the second is to look from the practitioner's point of view to ensure greater understanding and usefulness for practitioners.*

Keywords: *information technology, competitive advantage, firm performance, resource-based theory*

JEL classification: M15, M10, L20

1 INTRODUCTION

Let us begin with the question *Can information technology (IT) be a source of competitive advantage (CA)?* Evidently, the answer depends on the perspective we are taking. The possibility that IT can contribute to firm performance and help to gain a sustainable competitive advantage (SCA) has received a great deal of attention in recent years. Some scholars claim IT can be a source of competitive advantage and its impact can be either direct or indirect (e.g. Duh et al., 2006, Neirotti and Paolucci, 2007), others suggest IT cannot be a source of competitive advantage since it does not fulfill the requirements of the competitive advantage concept (e.g. Carr, 2005), finally, some even argue that IT has a negative impact on firm performance and thus on the created competitive advantage (e.g. Warner, 1987). Although a range of studies has been conducted, they show mixed and inconclusive findings. In line with Tippins and Sohi (2003), we argue that studies have not adequately captured and measured the effect of IT.

Many of us will recall Nicholas Carr's seminal and somehow provocative article *IT Does Not Matter* from 2003. His inquiry into whether IT has strategic value raised significant

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interest, although it has also met with indignation from scholars and practitioners according to their numerical responses. Carr's seminal paper addresses the question of why IT has lost its strategic importance despite its growing power and ubiquity. He refers to findings that show a negative relationship between IT spending and firm performance, and quoted the views of practitioners such as Larry Ellison, the CEO of Oracle Corporation, "That most firms spend too much on IT and get very little in return". Carr concluded his perspective by appealing to management to think twice before committing to overhasty IT investments.

Nowadays, many firms are under pressure to demonstrate and justify the business value of IT since it still presents one of the major investments in a firm's life. IT vendors, on one side, are faced with the rapid development of technology and demand for their quick adaptation and implementation while, on the other, they have difficulties explaining the business value of constant investments in IT, especially to management that expects immediate results and a fast return on the investment. Such highly positive and short-term outcomes rarely happen since the implementation of IT and its effects are frequently indirect. Moreover, the mere purchase of IT will not resolve problems or radically change the strategy. Investments in IT usually require additional inputs (and costs), for instance in human resources, and these extra costs and efforts usually create doubts about the (short-term) profitability of IT. Today's firms have to find ways to become quicker than their competitors.

One area that has tried to help firms operate successfully in a dynamic environment is the field of strategic management. Strategic management research has incorporated many perspectives to address current issues, such as the concept of sustainable competitive advantage. The main premise of (sustainable) competitive advantage is a firm's unique market position that enables it to earn returns above the average for the industry (Porter, 1985). Competitive advantage grows fundamentally out of the value a firm is able to create; naturally, the value can only be generated if a firm possesses and exploits heterogeneous and immobile resources. Of course, not all firm resources hold the potential for a sustainable competitive advantage (Barney and Clark, 2007) but those with the potential can contribute to a superior firm performance if that potential is realized. In that light, we further discuss whether IT as a source can contribute to competitive advantage. The role of IT and its ability to add economic value and create sustainable competitive advantage has been widely discussed in the last two decades (e.g. Barney, 1991; Clemons, 1986, 1991). Indeed, scholars and practitioners have shown great interest in understanding how IT can help create a competitive advantage (Bhatt and Grover, 2005).

However, a brief overview of the main research shows that there is no clear agreement about the strategic value of IT for creating a competitive advantage. Consequently, the purpose of this paper is to categorize selected literature in which IT can or cannot be a source of competitive advantage. We apply the integrative approach to systematic reviewing (Petticrew and Roberts, 2006; Victor, 2008). In order to minimize bias in systematic reviews, we follow the methodology that has been developed by Cochrane Collaboration (Higgins and Green, 2011). The paper is organized in two sections. In the first section,

we formalize the concept of competitive advantage and the resource-based theory (RBV) as a tool for exploring the value of IT, and outline the results of our literature review. To improve the clarity of readability we break the review question down into sub-questions that follow logically from the research question. In the second section, we present additional discussions and conclusions, including appeal to scholars for further progress and clarification in this area.

2 THEORETICAL FOUNDATIONS

2.1 What is it meant by IT?

The role and value of IT has been the subject of much research in the last few years. The focus of earlier studies involved exploring the relationship between IT investments and productivity, later known by the term “productivity paradox”. Several researches did not reveal any strong connection. Moreover, some scholars were greatly disappointed with the appropriateness of methods and measures used for assessing productivity (Brynjolfsson, 2003). More recent research demonstrates some progress in showing positive and stronger relationships. Also, some approaches for measuring productivity have been improved, such as Data Envelopment Analysis (DEA) (Cooper et al., 2011) which was also extended on the empirical level (e.g. Sigala, 2004).

Naturally, the value of IT has become undisputed at the macro level, yet at the micro level the question of whether IT can provide benefits to firm performance remains unsettled (Bhatt and Grover, 2005; Brynjolfsson and Hitt, 2000). In order to offer a credible answer to the central question *Can IT be a source of competitive advantage?* the first step is to explain what is meant by the term IT. Orlikowski and Gash (1992) explain IT as “any form of computer-based information system including mainframe and microcomputer applications” (p. 2). Tansey et al. (2001) and Kudybo et al. (2002) define IT as a set of technology that creates, saves, acquires, transmits, reconfigures, analyzes and communicates data and information. They understand hardware, software and telecommunications as its key components. Carr (2003, 2004) characterizes IT as fuzzy, which is understandable since an overview of terminology shows that scholars and practitioners understand and use the subject differently. Perhaps the different terminologies and understandings related to IT are the main reason for the negative feedback Carr’s seminal paper received. Carr (2004) responded to the criticism and emphasized that the subject of his paper was only IT as technology – the software and hardware used to store, process and transport information in digital form. He added that his understanding of IT did not encompass the information that flows through the technology or the people using this technology. An overview of recent literature and its comprehension of IT did not bring any progress in its clarification. For instance, Turban et al. (2008) explain IT from a narrow and a broad point of view. Narrowly, they explain it in the context of software and hardware, database, networks and other electronic equipment. They understand IT as part of the information system (IS), although they point out that the literature is unclear about the distinction between them. Moreover, we even find both terms being used interchange-

ably. According to that, Wade and Hulland (2004) suggest that RBV is the right tool to help distinguish between IT and IS since IT is resource-based, while the IS involves a combination of resources and capabilities that allows its productive exploitation. Turning back to the interpretation of IT, from a broader perspective Turban et al. (2008) define it on the level of the firm as a set of IT systems, IT users and IT management. Hence, they do not explicitly distinguish between technology (IT) and system (IS). Evidently, the terminology is fragmented and this lack of clarity has led to a state where the literature is diverse in nature and rich in findings. These circumstances have not allowed the building of a consistent framework for the deeper investigation and empirical testing of IT value, as we shall see further on.

2.2 What has IT to do with competitive advantage?

Generally speaking, there is no doubt that IT is a backbone of today's society. It has reshaped our way of living and working and become embedded in every sphere of our lives. The use of IT radically changes business operations and reshapes products and services themselves. Carr (2003) shows how IT power and presence have expanded through the last few decades. In 1965 less than 5% of capital expenditures were made on IT. That proportion rose to 15% in the early 1980s mainly because of the introduction of the personal computer, it then grew to 30% in the early 1990s and by the end of the decade the share was 50%. Based on these facts, he concluded that businesses have significantly overspent on IT. Brown and Hagel (2003) were some of the first to respond to Carr's article. They argue that Carr's intention was not to claim that IT does not matter, but that his main assertion was that IT is diminishing as a source of a differentiation strategy. Moreover, IT truly does matter because of its indirect impacts. In line with Carr, Brown and Hagel have doubts about the actual positive influence of IT on firm performance. In his later article "*The end of corporate computing*" (2005), Carr argues that IT cannot be a source of competitive advantage because it is available to everyone. IT as a source allows broad application, it is becoming ever cheaper (Bhatt and Grover, 2005) and highly replicable. But IT is also essential, firms cannot work without it, the world so to speak cannot spin without it, naturally, as Tippins and Sohi argue (2003), the adoption and integration of IT have become a competitive necessity.

Scholars and practitioners agree that the central focus and challenge in the field of business economics is how to attain and sustain a competitive advantage. Current research shows that the average period in which firms are able to sustain a competitive advantage has decreased over time (Wiggins and Ruefli, 2005). Competitive advantage is a firm's unique market position that enables it to earn returns above the average for the industry. It results from the value a firm is able to create for its customers that they are willing to pay for, and which exceeds the firm's costs of creating it (Porter, 1985). The main premise of the concept is not new, as Schumpeter (1942) recognized that firms need to continuously renew themselves if they want to survive. There are two basic types of competitive advantage: cost leadership and differentiation (Porter, 1985). Looking at those two types, we can suggest that IT may be a source of competitive advantage since it primarily helps

cut costs and create differentiation but when considering the fundamentals of the competitive advantage concept, the subject becomes more complex and creation of stand-points more difficult.

Many scholars from strategic and organization management theory have tried to explain the concept of competitive advantage (e.g. Porter, 1985; Rumel et al., 1991) and show how to build, achieve and sustain it. Consequently, many ideas and perspective have emerged, for instance the resource-based view (RBV) (Barney, 1991), the core competence (Prahalad and Hamel, 1990), the knowledge-based view (KBV) (Grant, 1996), the dynamic capabilities view (DCV) as the latest (Teece et al., 1997), along with a range of nomenclatures such as assets, resources, routines, competences, capabilities etc., yet the issue is being addressed similarly. In their review of the literature, Kraaijenbrink et al. (2010) show that the RBV is one of the most cited and influential perspectives in strategic management theory. It has also been increasingly used by researchers in information management, especially when explaining the relationship between IT and firm performance.

2.3 Why is the resource-based view a useful tool for exploring the value of IT?

Building on the contributions of Penrose (1959) and Rubin (1973), Wernerfelt (1984) created the research agenda for resource-based studies. His remark that resources and products are two sides of the same coin (Wernerfelt, 1984, p. 171) is widely accepted. He pointed out that a firm can earn an above-normal return by identifying and acquiring resources that are critical to markets and are, hence, strategic. In line with the RBV, strategic resources are crucial components of sustainable competitive advantage. The RBV became a useful tool for exploring the value of IT and its relationship to firm performance and competitive advantage and thus many scholars have recognized the value of RBV in IT research. One can consider the work of Clemons and Row (1991) as the first contribution to use RBV in explaining the effects of IT on firm performance, although the study of IT as a source of competitive advantage already began in the 1980s (e.g. McFarlan, 1984). However, in that period the focus was oriented to exploring the importance of IT's potential to alter strategic and industry structure variables (e.g. Clemons, 1986) while, later on, scholars instead started to explore the impact of IT on firm productivity and overall performance. Brynjolsson and Hitt (1996) were one of the first to conduct a groundbreaking study of the impact of IT investments on productivity and total output showing a positive impact, although in that regard they stated that, "IT investments are necessary to maintain competitive parity but not able to gain competitive advantage" (p. 139).

Despite some prominent scholars not seeing any point in constantly trying to confirm IT as a source of competitive advantage, others have directed all their efforts at exploring that relationship. As mentioned, the majority of them use the RBV as a convenient tool for their research. In using the RBV, they see the firm as a unique bundle of resources on which the firm's strategy is based (Fahy, 1996). Developing and nurturing the "right"

resources depends on their classification in terms of recognizing their strategic value. One of the major classifications of resources distinguishes tangible and intangible ones (Michalisin et al., 1997).

Tangible are physical assets or resources, for example technology, computers etc. Such resources are not rare, are usually easily accessed and purchasable in the open market. They are often easy to imitate, although if they are the subject of transmission between firms they can represent synergy. Nevertheless, in line with the RBV prescription only intangible resources can be sources of competitive advantage since they fulfill the basic attributes of being rare, valuable, non-substitutable, and imperfectly imitable (Barney, 1991, 1997). Michalisin et al. (1997) argue that intangible resources can indeed be dominant determinants of competitive advantage because of their characteristics and their influence on tangible resources through their development and exploitation. According to the wide range of classifications and understandings of IT, it is hard to draw a strict line and call IT a tangible or intangible resource. The general agreement is that IT is a resource, but there are some doubts about IT being a strategic resource. Consequently, if it is a strategic resource then it has to have a positive impact on firm performance and, thus, contribute to the desired competitive position. Looking from the RBV, only resources that are strategic can be sources of competitive advantage. Edith Penrose (1959) was one of the first to recognize the value of resources by creating competitive advantage. She ascertained a firm as a community of productive resources, although the question of what are productive resources remains unsettled.

2.4 How does the resource-based view help to explain the IT-firm performance - competitive advantage relationship?

Lawson and Samson (2001) explain that resources are strategic when they possess some specific characteristics, for example they are not easily imitated by competitors. Some scholars argue that IT resources such as hardware or software cannot be a source of competitive advantage since they can be copied easily. For instance, Clemons and Row (1991) suggest that resources related to IT cannot *per se* be sources of competitive advantage. They point out that IT can lead to a sustainable competitive advantage when used to leverage differences in strategic resources. Strategic resources can create differences among firms and predict the competitive outcome of IT. They understand strategic resources as those resources that represent a significant proportion of the firm's investments pool and are not freely available in a competitive market. However, on the other side, studies have shown that firms with the largest investments in IT rarely achieve the best financial results (Carr, 2003, 2004). Carr (2003) argues that the economic and strategic IT impact comes from the continual innovation of IT. He ascertains that many firms have gained important advantages through the innovative use and exploration of IT. For instance, eBay's Internet auctions are a typical example of how the innovative use of IT can fundamentally change not just the firm itself but the whole industry. We agree with Carr's view that the IT investment pool is not conditional on a firm's revenues, and that the simple possession of IT will not improve strategic and other firm goals. Making some

progress in the field, some scholars suggest we should focus on (IT) capabilities, which can really be a source of competitive advantage. The concept of capabilities was primarily developed to ensure that a unique set of capabilities cannot be easily duplicated. IT capabilities as superior ones must be sustainable over time; however, being sustainable does not mean that the advantages will last forever. As Barney (1991) explains, it only implies that being sustainable can represent a barrier to competitors and an advantage for firms until competed away by the duplication efforts of their competitors. Evidently, the literature is inconsistent in the terminology of IT as an asset, a resource or a capability, what sort of resources or capability is it, and so on. Giving the right answer depends on what we understand by the term IT. If we interpret IT as a resource, how do we differentiate ordinary resources from strategic resources, and what makes a resource truly strategic? Moreover, IT can also be seen as a bundle of resources, not merely just a single resource. Ross et al. (1996) recognized the composition of three IT resources: (1) human resources; (2) technology base; and (3) relationships between IT and business management that can lead to expected business value. They do not explicitly distinguish resources and capabilities, although, as can be understood, they consider both issues.

Bharadwaj (2000) distinguish capabilities from resources and explain, "IT capabilities are abilities that mobilize and deploy IT resources in combination with other resources and capabilities" (p. 171). She adopts Grant's classification (1991) and arranges IT resources in three classes: (1) IT infrastructure, (2) human IT resources; and (3) intangible IT resources such as knowledge or customer orientation. In her research, she found that the combination and synergy of IT resources and other resources enables the creation of superior capabilities related to IT that can be a source of competitive advantage. From the internal point of view, superior performance depends on the quality of the "fit" among the firm's strategic orientation and its physical, human, and organizational resources (Miles and Snow, 1978; Slater et al., 2006). From the external point of view, Bharadwaj et al. (1993) understand it as a result of possessing something special and hard to imitate that allows a firm to outperform its competitors, while Fahy (2000, p. 100) demonstrated superior performance as market, sales and financial performance not explicitly related to competitors. Going back to Bharadwaj's research, she found that firms which possess superior IT capabilities have a significantly better performance than firms that do not possess and exploit superior IT capabilities. She compared the financial performance of each of the firms rated as key and most successful in the IT industry to another firm of similar size. Later on, Santhaman and Hartono (2003) expressed some doubts about Bharadwaj's research approach (e.g. using a single benchmark approach), although they extended her study and made similar suggestion related to the positive relationship between IT capability and firm performance. Similarly, on the concept of capabilities Zhang and Lado (2001) show how the use of IT systems can foster and facilitate the development and deployment of firm capabilities. They classify capabilities in three groups: input-based capabilities; transformation-based capabilities; and output-based capabilities as potential sources of sustainable competitive advantage.

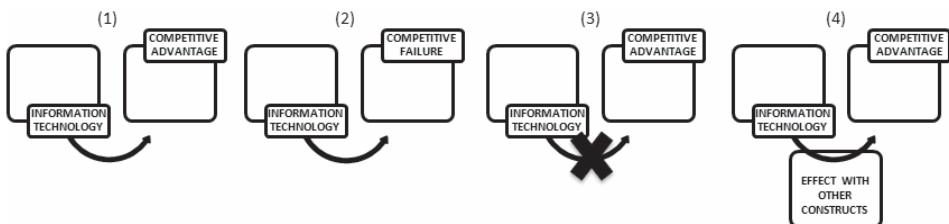
Tippins and Sohi (2003) also draw their perspective from RBV literature. They argue that IT can only be a source of competitive advantage if firms understand and develop

IT as IT capabilities. To achieve IT capability, they ascertain that three dimensions: (1) IT knowledge; (2) IT operations (e.g. methods, skills, processes); and (3) IT objects (e.g. hardware, software, IT personnel) are required and necessary components of IT capability for creating a competitive position. These three components represent co-specialized resources. In their research, the results show that these resources have an indirect impact on firm performance. Specifically, they show that organizational learning is a mediator between IT capability and firm performance. These findings are consistent with previous findings of Powell and Dent-Micaleff (1997) that show how can IT enhances IT performance through and only when it is used to leverage pre-existing, complementary human and business resources.

2.5 What is the relation between IT-firm performance and competitive advantage?

In the last decade many scholars were trying to develop the idea of IT as a source of competitive advantage have been focusing on IT capabilities as a source of competitive advantage (e.g. Bharadway, 2000; Dehning and Stratopoulos, 2003; Mata et al., 1995; Ray et al., 2004; Santhanam and Hartono, 2003). Wade and Hulland (2004) provide a review of research conducted between 1988 and 2000 that relates IT to firm performance and/or competitive advantage. They found out that there is diversity in results and little agreement of the strategic value of IT, even among similar studies. Their overview indicates on four different relationships: (1) IT has a direct and positive effect on firm performance/competitive advantage; (2) IT has a direct and negative effect on firm performance/competitive advantage; (3) there is no connection and no effect between IT and firm performance/competitive advantage; and (4) IT has a contingent effect on firm performance/competitive advantage (Figure 1). Most research indicates a positive impact of IT on firm performance and competitive advantage, either directly (e.g. Bharadway, 2000) or indirectly (e.g. Clemons and Row, 1991). However, some other research shows no relationship between IT and firm performance and competitive advantage (e.g. Venkatraman and Zaheer, 1990) or even a negative relationship (e.g. Warner, 1987). Some research has been inconclusive, such as that by Powell and Dent-Micaleff (1997) that reveals a direct negative linkage between IT and firm performance but an indirect positive impact of IT on firm performance.

Fig. 1: Relationships between IT and competitive advantage



Current research has not shown any progress in uncovering the relationships between IT and performance. For instance, Duh et al. (2006) and Merono-Cerdan and Soho-Acous-

ta (2007) suggest a direct and positive relationship, Santhaman and Hartono (2003) and Neirrotti and Paolucci (2007) show an indirect/contingent and positive relationship, Martinsons and Leung (2002) and Huang and Liu (2005) were unable to show any significant relationship or link between IT and firm performance, whereas Chen (2000) even show that the relationship is elusive. As Tippins and Sohi (2003) ascertain, most of the literature indicates that IT has been examined as a stand-alone resource. For instance, Duh et al. (2006) explore the extent of IT applications and find a significant direct effect on firm performance. Merono-Cerdan and Soho-Acosta (2007) study the extent of the Internet use showing a positive relationship between external web content and firm performance. Jeffery and Leliveld (2004) demonstrate how well-structured IT models have positive effects on firm performance. Neirrotti and Paolucci (2007) assert that IT as a resource can contribute to improved growth and productivity; however, the question of whether IT can be a source of competitive advantage remains unresolved since they discovered that IT spending was not correlated with competitive advantage. Santhaman and Hartono (2003) find that firms with high IT capabilities have greater overall profitability (firm performance) while Ray et al. (2004) show how IT management capabilities can create competitive advantage without necessarily being reflected in performance at the firm level. Huang and Liu (2005) find that IT has no significant impact of firm performance, although in interaction with innovation capital a positive effect on firm performance does exist.

As the research field developed, studies moved beyond searching for the value of IT by reducing costs and increasing revenues to creating and achieving sustainable competitive advantage. In line with this, scholars have tried to contribute from different perspectives as we have seen, with Clemons (1986) being one of the first in that sense. He presented how switching costs can be a source of sustainable competitive advantage for IT firms. The idea has become known as the create-capture-keep paradigm. Switching costs are a result of customers' investments in specific IT, for instance software. When customers begin to use it, they become "captured" by their switching costs which can in some way be an advantage (e.g. the IT supplier knows the customer's business policies and procedures), yet it can also be a disadvantage (e.g. high investment, knowledge embedded in IT, additional cost of employee training to use the new IT, especially when a firm has an opportunity to switch to another IT supplier). Naturally, an IT firm can try to keep its customers by offer them a high and competitive level of support but, on the other side, IT suppliers can increase the price or reduce the quality of support knowing that their customers have been captured. The create-capture-keep paradigm has subsequently been discussed by other scholars and finally received support, along with criticism. For instance, Mata et al. (1995) describe why the create-capture-keep paradigm is unlikely to be a source of competitive advantage and conclude that if IT firms try to capture or bind customers they can easily lose them. However, customers in some way are captured since most of their business activities and good practices are embedded in software. In the last few years, the accelerated growth of IT has allowed many firms to replace customized applications with generic ones. In the early 1980s, everybody believed that IT applications could offer a potential competitive advantage (Ross et al., 1996); however, over time it

became clear that firms can copy most IT applications, hire similar contractors, and even outsource to the same vendors.

Research among CEOs conducted by Hall (1992) surprisingly shows that databases are not the most important strategic resources since they were ranked in 10th place out of 13 places in 1987, although their importance rose to 7th place out of 13 places in 1990. These findings indicate that the value of data is rising, but his research triggered the important question of whether CEOs are truly the appropriate respondents since they are unfamiliar with the real value of data and are not challenged to work with databases on a daily basis. Perhaps the ranking would be higher if key users were to take an active part in such research. Many scholars have recognized the value of human resources and their capabilities in creating competitive advantage. Bhatt and Grover (2005) studied IT human resources. They found that highly competent IT people can be a source of competitive advantage; moreover, with their expertise and knowledge a firm may be able to create and sustain competitive advantage. However, just having IT resources in the firm with the greatest potential but whose potential remains unexploited will not add to business value, it may even increase costs. Wade and Hulland (2004) recognized how important complementarity is at the firm level, especially when exploring the value of IT. They argue that IT software cannot be used without IT hardware and vice versa, or having the most competitive IT human resources or the latest IT technology without other (IT) resources since their benefits can only be result of their complementarity. The concept of complementarity refers to the influence and relationship between resources and their effect on performance and competitiveness. Powell and Dent-Micaleff (1997) explain complementarity as a condition that exists when one resource is enhanced by the presence of another. Taking IT as a source, the value of IT is enhanced when it is used to develop, exploit etc. with and by other resources. Indeed, complementarity cannot be ignored (Black and Boal, 1994; Brynjolfsson and Hitt, 2000) and is, in fact, very important on the strategic level of the firm since it implies a more complex role for IT resources and capabilities (Alavi and Leidner, 2001).

3 DISCUSSION

Based on our short review of the literature we cannot offer a clear-cut answer as to whether IT is a source of competitive advantage. Moreover, we believe that a more detailed overview would not bring us closer to the “right” answer. A range of research has shown the positive impact of IT on firm performance with case studies having the greatest weight in exploring the business value of IT. For instance, Wal-Mart has been able to manage its costs through IT. It implemented an IS for the purchasing and distribution process, leading to reduced inventory costs (Stalk et al., 1992) and a positively effect of the firm’s performance that enabled outperform competitors through cost differentiation. Similarly, General Electric has been able to differentiate its services from competitors by exploiting IT (Porter and Millar, 1985). Evidently, many cases demonstrate that IT can add value to a firm, but we cannot simply regard it as a source of sustainable competitive advantage. For instance, when Wal-Mart implemented its new IS, it gained a competitive advantage

over its closest competitor, K-Mart. But K-Mart has managed to copy the Wal-Mart idea and integrate a similar system. This suggests that Wal-Mart's system was a source of competitive advantage but only a temporary competitive advantage. If K-Mart had been unable to successfully copy Wal-Mart's IS idea, then Wal-Mart could still have achieved a competitive advantage based on its new IT (Mata et al., 1995). Indeed, K-Mart imitates Wal-Mart's good practice successfully, but without possessing and exploiting "the right capabilities" K-Mart has still not been able to overcome Wal-Mart.

Indeed, that the business value of the firm's core capabilities is beyond question is reflected in numerical recent studies and new approaches, such as the dynamic capabilities perspective. However, most research still focuses on studying resources and not capabilities since resources are easily quantified and accessed, visible, less complex, related data can be gathered from secondary sources etc. Newbert (2007) illustrates how measuring human resources as resources can be accomplished through employee numbers, but measuring human capabilities as capabilities can be more difficult since, compared to resources, measuring capabilities often entails a greater need for primary data collection methods and the potential for respondent bias. In the example of measuring human capabilities, Hatch and Dyer (2004) suggest that measuring can be made possible through operationalization. However, they point out that a broader insight is needed and complementarily relationships examined, for instance knowledge capability that enables human resources to learn quicker and implement knowledge better and more successfully than competitors do.

Similarly, a parallel can be drawn for IT resources and capabilities. If we regard IT as resources then the quantity of them or their costs will be the right measure. But if we study IT as capabilities, then we take into consideration their embeddedness throughout the entire firm, their high independence and complementarity with other capabilities, and so on. In line with this, the measuring of capabilities is difficult, including many differences in the use of data, measurement, sample size, selection of the dependent variable and so on that impact on diversity in research frame of studying IT value. Oh and Pinsonneault (2007) suggest the dominant reason for such diversity lies in the use of different research frameworks. They compare two conceptual (resource-based and contingency-based) and two analytical (linear and non-linear) approaches that can be used to study the strategic value of IT. Their assessment is that the contingency approach (e.g. Schoonhoven, 1981) is better at explaining the impact of cost-related IT applications on firm performance, while the RBV has a stronger ability to find the impact of IT on firm profitability. However, they understand the contingency approach much more narrowly since their focal point was the alignment of IT and business strategy, compared with other research concentrating on indirect relationships and the concept of complementarity with a range of other resources. They also focus solely on financial performance and do not pay much attention to the many intangible benefits (Brynjolfsson, 2002).

Evidently, scholars have used different research frameworks mainly because of the complex nature of IT and the difficulty of operationalizing and measuring firm-phenomena. First, scholars distinguish IT in a variety of ways, from being a resource/capability or a

bundle of resources/capabilities from narrow and broad perspectives. Piccoli and Ives (2005) argue that too narrow a view of IT is misguided and misleading, although narrow definitions help us better understand specific resources and their effect on the competitive position. However, it is true that too narrow definitions create difficulties in generalization to new contexts and, as Wade and Hulland (2004) highlight, too extensive a list of potentially relevant resources can quickly become inadequate for practical use. On the other side, broadly defined IT can have the advantage of being generalized but cannot have any real explanatory value. It seems that the appropriate level of IT specification will vary according to the research objectives (Wade and Hulland, 2004), yet that is not the only issue that is problematic for a coherent framework.

The choice of outcome constructs, and thus the many related dependent variables, introduces difficulties in establishing relationship and comparisons across studies, for instance, in the area of firm performance. Many studies have used different operationalization of the performance measures and that affect the results and the conclusions (e.g. Robinson, 1998). Such diversity also prevents valid comparisons among studies. Another aspect of measuring firm performance is the fact that most performance measures are rooted in financial or accounting measures. Accounting measures depend on the choice of methods, and have their weaknesses such as being past-oriented, being under the influence of accounting manipulation, the under-valuation of resources etc. Nevertheless, financial performance is still a common and important dependent variable in many research areas. The comprehensive literature review by Melville et al. (2004) indicates that scholars have employed two main formulations of performance, efficiency and effectiveness, and that ROI, ROA, sales and market share are commonly used metrics.

However, performance is affected by a multitude of factors and can be seen from different perspectives so it is no surprise that scholars have denoted it as a "slippery" construct (Lado et al., 2006). Similarly, the concept of sustainable competitive advantage is also very difficult to operationalize, there are still limitations on measuring it etc. Therefore, scholars suggest using other constructs such as above-average performance in the long run (Wiggins and Ruefli, 2002). Sustainable competitive advantage is also problematic, as many agree, because it is not so highly alike that it can endure for an extended period since the length of the sustainability results from a wide variety of factors, such as internal (e.g. causal ambiguity) and external (e.g. environmental turbulence) (Eisenhardt and Martin, 2000; Wade and Hulland, 2004). Firms can also have a competitive advantage in one or more areas but disadvantages in others. Consequently, linking firm performance with competitive advantage is very difficult. Naturally, if a firm's performance is superior, meaning it has above-average economic rents, then the firm has a competitive advantage. In that light, the relationship between firm performance and competitive advantage is symbiotic. However, it is important to acknowledge, as Newbert (2007) argue, that a firm can create a competitive advantage, for example because of IT investments, but still not have improved its performance. It could even become less profitable in some period, although in long run investments can show their real value, with this implying that the time component is a very important aspect in research since it can represent a huge bias as investments in IT are long-term-oriented and their implications and effects

cannot be seen in the short term.

As we have seen, the subject and the constructs are complex, and trying to find a (in) direct relationship between IT, performance and competitive advantage can be almost unachievable. Moreover, it has to be acknowledged that in some cases the causality could be reversed, for example a firm with competitive advantage which is a result of sources other than IT can then afford to invest more in IT because of its high performance (Neirrotti and Paolucci, 2007). As mentioned, it can even happen that sustained competitive advantage does not result in firm performance (Ma, 2000; Newbert, 2007). For instance, Ray et al. (2001) found that IT management capabilities can create a competitive advantage without having a direct impact on a firm's performance. Moreover, it is not necessary that IT resources or capabilities must have a direct impact on firm performance, maybe their influence on firm performance is indirect if they help to develop, integrate and exploit other resources (Wade and Hulland, 2004). Direct or indirect effects of IT indicate that IT can be a source of competitive advantage, but not always directly. However, studying indirect connections is not simple and remains controversial. Evidently, achieving a sustainable competitive advantage through IT may not be simple. Vitale (1986) even argue that in many cases trying to attain competitive advantage may even place firms in a disadvantaged position, i.e. competitive parity or even failure.

5 CONCLUSIONS

In today's environment IT represents a critical success factor in knowledge management and plays a dominant role in the decision-making process. Accordingly, Carneiro (2000) argue that the understanding, interpretation and use of IT may enable fundamentals to be created so as to sustain competitive advantage. However, a brief overview of the literature indicates that a variety of IT terminologies is used, along with range of differences in the use of data, measurement, sample size, selection of dependent variables etc. Exploring the value of IT in firm performance and trying to show its dominant role in sustainable competitive advantage is the focus of numerous articles already, yet the field still remains inadequately researched and empirically tested. Evidently, findings show that some scholars claim IT can be a source of competitive advantage and its impact can be either direct or indirect, others suggest that IT cannot be a source of competitive advantage since it does not fulfill the requirements of the competitive advantage concept while, finally, some even argue that IT has a negative impact on firm performance and thus does not create competitive advantage. Generally, we argue that IT can hold the potential for and be a source of competitive advantage, but not automatically. As many scholars acknowledge (e.g. Ray et al., 2004), IT alone will not improve performance or create a competitive advantage. In addition, the same applies to any other resource or capability of a firm.

Carr's seminal paper has indeed had a great impact on scholars and practitioners and raises some important questions; however, his remark that *IT does not matter* is not new. Many scholars in the past recognized the same issue, for instance Neo (1988) argues that IT itself does not lead to success. His study confirms the importance of customer needs

and management support as factors facilitating the use of IT for competitive advantage, or Powell and Dent-Micallef (1997) who stated that “Technology alone is not enough” (p. 396). We agree that there is something more than just the technology itself. IT has fundamentally changed over the last few years and become embedded in every sphere of our lives. So, any simply argument that IT has no impact or a negative one cannot be easily accepted. IT is an endogenous strategic resource that is bundled with other resources and thus its influence can be, and mostly is, indirect. Of course, measuring the effect of IT, especially because of the indirect links involved, is not easy and there is no verified framework for that. The RBV has been recognized as a useful tool for exploring the value of resources, although some scholars have criticized it for being too static, tautological, and too focused on resources and not on capabilities. Consequently, they suggest some improvements to the RBV and new approaches as an extension of the RBV such as the dynamic capabilities view. Barney (2007) importantly contributed to development of the RBV in his latest work by acknowledging that the RBV is not really about resources but about characteristics that resources must possess, and that resource is just a label and different labels have not changed the central proposition of the RBV. Something similar can be said about researching the value of IT since its value may not be visible at first sight and returns are unlikely to be reimbursed the next day. Brown and Hagel (2003) pointed out that many CEOs have looked at IT as a commodity because they have not thought enough about how IT can bring value to the business. We agree with Barney and Clark (2007) and Powell and Dent-Micallef (1997) who asserted that, despite case studies showing spectacular IT successes, not much has been done to help IT managers in real life. A similar suggestion was made by Jacks et al. (2011) based on their 20-year comprehensive snapshot research of IT on firm performance. In addition, every firm is particular and expecting that buying the software that one’s competitor has successfully adopted will also improve the firm’s condition and competitiveness is unreasonable.

Our suggestion is for scholars to look from the practitioner’s point of view. Concerning the gap between academia and practice, scholars need to contribute to practice with offering “unambiguous, implementable resolutions to real and immediate problems” (Lang, 2003, p. 22). For instance, inconsistencies in the terminology of IT unable managers to better understand the real value and exploitation of IT, hence, that can lead to overhasty IT investments. Additionally, the dilemma of IT being a strategic asset or a commodity input still remains open from the theoretical perspective, however, from the practitioner’s perspective such ambiguity can even threaten a firm’s survival ability. Moreover, managers usually do not read or sometimes even do not understand scientific papers, and scholars as some evidence show don’t really care about relevance to a practitioner audience (Fitzgerald, 2003). However, information systems (IS) theory is an applied discipline, therefore, the gap between theory and practice should be reduced. As Khazanchi and Munkvold (2001) illustrated: “In some sense, we are all practitioners of the IS discipline, except we have different motivations and expectations” (p. 9).

In conclusion, we hope that our short review highlights how important it is to build a coherent framework that can enable the synthesis, comparison and create implications of theoretical and empirical findings. However, it has to be emphasized that the constructs

being studied are complex and context-specific, and that this could present a challenge for further research, perhaps by also offering some new conceptualizations.

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