

Sustainable competitive advantage through the use of IT

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Many companies, in their quest to sustain a competitive edge, opt for technology as a natural strategic choice that will align with their business to help them maintain a leading position in the marketplace. The strategic use of information technology (IT) has applied a variety of methods and frameworks to enhance a firm's business performance through cost-effectiveness, firm capability leverage, business-IT alignment, and value chain integration, with the Resource-Based View of IT as an organizational resource being the most widely recognized practice. This article aims to review the position of IT as a possible means for organizations to achieve long term market advantage and the importance of strategic IT management in this process. Further discussion focuses on the apparent IT productivity paradox, and whether IT is indeed a source of sustained competitive advantage.

1 Introduction

The current debate as to whether IT can be used as a strategic tool to enable sustained competitive advantage is discussed principally in the strategic management literature, applying several different theoretical perspectives that build on predominantly economic and administrative rationalities. Using these viewpoints, the strategic management and use of IT will be critically reviewed, and the issue surrounding the benefits of IT investment will be highlighted.

2 Theoretical perspectives

A useful conceptual framework, drawing on economic and administrative rational concepts, is proposed by Feeny and Ives (1997) as a normative approach to assessing the sustainability of IT-enabled competitive advantage in organizations (Figure 1).

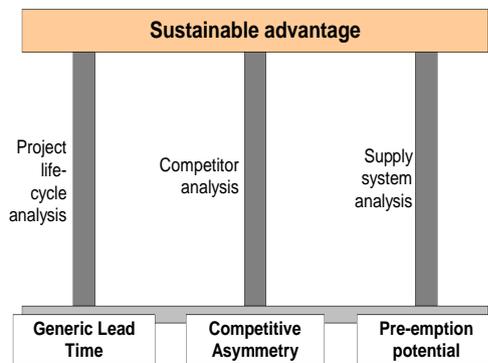


Figure 1. Three pillars of sustainable advantage
(Feeny and Ives, 1997)

Through personal experience, and founded on this normative model, the authors identify several firms successfully achieving sustainable IT-based competitive advantage, such as the well-known case of Merrill Lynch with their customer Cash Management Account IT system. By extending the time it would take a competitor to imitate the firm, possess the heterogeneous IT exploited firm-level capabilities, and using IT to build up switching costs limiting the customer's desire to switch to competitors, Merrill Lynch gained a sustainable market advantage over its competitors (Feeny and Ives, 1997). This proposed theoretical model however, deems sustainability as necessary only until the required investments have paid off, thus questioning whether competitive advantage

has serious long-term potential.

2.1 Economic perspective

Sustaining competitive advantage has long been associated with the financial benefits of strategic IT investment. Drawing attention to the difficulty of the market to assess the economic benefit of IT investments, it is argued that this benefit is only recognizable when it becomes known to the market and IT-enabled competitive advantage is no more long-term than competitive advantage achieved by other, non IT means (Davis *et al.*, 2003). Statistically assessed and not taking into account important social and political factors that may influence a market's ability to value competitive advantage, these arguments pose a very limited positivist view on how cost savings and business profitability can lead companies to sustainable market advantage.

In terms of cost reduction, an analytical framework has been developed enabling a company to gain competitive advantage by using IT to transform its value chain by reducing costs, enhancing differentiation, and changing the firm's competitive scope (Porter and Millar, 1985). Focusing mainly around the business attractiveness and the information intensity of products, this transformation however does not consider, from a structural viewpoint, how employees' levels of IT knowledge can shape the way IT is used to decrease expenses.

From the perspective of transaction costs, IT has the capacity to reduce complexity and decrease the cost of information searching and negotiating, and enforcing the exchange of goods or services, if the rate of adopting the technology is lower than the cost of the adoption affected externalities (Cordella, 2006). Conversely, IT can also increase transaction costs when extra overheads are needed to accommodate complex environments (Cordella, 2006). Nonetheless, these analytical arguments do not clearly elucidate how IT can enable the sustainability of competitive advantage through lowering transaction costs.

Evident in several studies (Porter and Millar, 1985; Davis *et al.*, 2003; Cordella, 2006), the economic rational view of IT-enabled sustainable competitive advantage does not identify how this is achievable by juxtaposing a firm's human assets and capabilities with the economic benefits IT produces. Although, one theoretical argument does apply the Resource-Based theory in stating that exploitation of a company's strategic resources can explain the cost advantage of using inno-

vative IT to manage vertically and horizontally interacting activities (Clemons and Row, 1991). In alignment with Feeny and Ives' (1997) third pillar of sustainability (Figure 1), Clemons and Row (1991) defend the, albeit decreasing, occurrence of switching costs as a source of sustainability. Nevertheless, their study does not describe how IT is used to transform these firm resources to core organizational competencies through which cost reduction can be achieved for long-term market advantage.

A need is hence identified to analyse the socio-technical perspective of using innovative IT as a cost decreasing tool for sustaining competitiveness in an organizational context of human interaction, IT culture, and technological understanding.

2.2 Resource perspective

As the diffusion of IT innovation makes it easier for customers to choose between suppliers, Mata *et al.* (1995) argue against switching costs as a promising option for sustainability, proposing the alternative notion of managerial IT skills as essential enablers of sustainable market advantage. This view stems from a theoretical analysis of the administratively rational Resource-Based View of the Firm (RBVF) which regards organizational resources as socially complex, difficult to imitate, and heterogeneously distributed across the firm and its competitors, in order to sustain business value (Mata *et al.*, 1995). These findings, derived from a non-exhaustive list of IT attributes, suggest that a more detailed analysis be carried out to understand the nature of managerial skills and how these are integrated and applied in an organization.

Viewing IT as an organizational capability, these managerial IT skills and other assets such as technology infrastructure, and IT-enabled intangible resources, can combine effectively to produce IT capabilities that will enhance a firm's financial performance (Bharadwaj, 2000), in accordance with Feeny and Ives' (1997) second pillar (Figure 1). However, the use of pre-determined rankings of IT leaders in this empirical study provides a subjective view of this statement, and there is an apparent gap between the IT capabilities argued for and their role in the strategic alignment of IT and business plans to enhance organizational performance.

While the applicability of the classic RBVF theory is limited to stable environments, two studies (Jarvenpaa and Leidner, 1998; Pavlou and El Sawy, 2006) provide an extension to this theory by introducing the notion of dynamic capabilities in two different unstable environmental contexts. In addition, Jarvenpaa and Leidner (1998) broaden the resource theory one step further, drawing upon aspects of institutionalist theory to state that resources will only be used successfully by a firm if their competency is attained through traditional and widely accepted actions and cultures of the organization. Establishing the importance of shaping the environment to achieve sustainable advantage in less developed countries, when basic foundations such as information culture and infrastructure are missing (Jarvenpaa and Leidner, 1998), this case study acknowledges the need to consider the socio-political issues present in the environment when leveraging IT to create sustainable advantage.

Assessing the strategic use of IT at a process level, Pavlou and El Sawy (2006) argue that the ability to combine technical, managerial, and customer skills, and dynamic capabilities

in turbulent environments, when developing new products, indirectly impacts a firm's competitive advantage by enhancing its core business resources. This subjective survey-based study found that the greater the environmental instability the stronger the impact of effective use of this IT leveraging competency on competitive advantage. Nonetheless, the way these dynamic and functional capabilities are gained and strategically situated in a firm, from a structural perspective, requires further research, as their use and understanding may differ depending on the organizational context.

2.3 Competitive positioning

Competitive positioning, simply put by Porter, entails "doing things differently from competitors, in a way that delivers a unique type of value to customers" (Porter, 2001, p70). This can be achieved by using IT to integrate a firm's distinctive value chain activities, as illustrated by the successful US pharmacy chain Walgreens for example, which offers customers a choice of service and delivery channels through its website (Porter, 2001). Drawing upon dot-coms and established businesses, this argument however leaves out small to medium sized enterprises, and family businesses. By focusing primarily on competitors' ability to imitate a product or service as becoming decreasingly arduous, this study thus portrays a less convincing argument for the difficulty encountered in sustaining higher levels of operational effectiveness. Here, the author focuses solely on the Internet as an Information Technology that can enable strategic positioning through long-term return on investment, offering products in special niche areas, and making interdependent choices throughout the value chain. Drawing upon his five competitive forces, Porter (2001) argues that these are the underlying determinants of business profitability, highlighting that industry structure, far from being static, is shaped by the choices enacted by competitors, as implied by structuration theory.

A conceptual framework extending the value chain, enables firms to strategically position themselves with regard to the scope of the product, market, business value system, and product creation, considering both vertical and horizontal integration, in order to create business value by developing products, resolving customer problems, and creating customer exchange relationships (Stabell and Fjeldstad, 1998). This analysis however does not mention the impact strategic firm positioning has on the sustainability of competitive advantage, and what value the exploitation of organizational assets has in this value configuration, as it mainly focuses on representing the latter.

Orientated around single industry service firms in the US as social organizations whose production and delivery process uncertainty is highly dependent on the interaction of customers, a recent normative study emphasizes that organizations strategically positioning themselves by combining an increased amount of highly educated and experienced employees with highly customized services and low customer interaction can gain performance benefits (Skaggs and Youndt, 2004). Limited to questionnaires, the authors' highly interpretive study results were empirically measured without considering the structure of a company's decision-making process or the varying customer knowledge level of certain services, assuming it to be homogeneous for all customers. Moreover, Skaggs and Youndt's (2004) claims exclude the assessment of technology as a sustainability enabling resource.

2.4 Competitive alignment

From a strategic planning viewpoint, aligning a firm's Information Systems plan to its business plan and vice-versa supports the use of IT-based resources to thus improve business performance and create competitive advantage, although non-IS executives are unsuccessful in associating firm resource use with business plan-IS alignment (Kearns and Lederer, 2000). These subjective claims are based on a field study conducted with both IS and non-IS senior executives and indicate an analytical gap between the nature of a firm's organizational IS-based capabilities and its ability to successfully apply them in the strategic alignment of technology with business in a socio-political environment.

Viewing alignment from a social dimension, although excluding the effects of political actors, Reich and Benbasat's (2000) normative study underpins strategic IT-business alignment as understanding current business and IT objectives (short-term) and creating IT vision (long-term), identifying shared domain knowledge between IT and business units as the factor enabling both types of strategic alignment, elucidating the vital role of senior managers in the process. These rather interpretive results were empirically tested through interviews and document collection in 10 business units in the unstable environment of the life insurance industry. This identifies a gap in cross-industry analysis of firms in stable and fluctuating environments considering IT as both of strategic and less strategic value.

The importance of business and IT planning integration and effective communication are identified as important social factors of strategic alignment (Reich and Benbasat, 2000; Huang and Hu, 2007), as well as strong relationships between IT and business managers and an institutionalized alignment culture (Huang and Hu, 2007), the latter enforcing long-term alignment.

Building on Reich and Benbasat's (2000) key alignment factors, a practical framework is proposed to develop future alignment perspectives, having the possibility to redistribute the organization's unique business and technology competencies (Avison *et al.*, 2004). This is achieved by classifying an organization's projects by business, information, and technology strategy domains, in order to detect patterns of project similarities across these domains (Avison *et al.*, 2004). Assessing the strength of this practical framework, however, the authors' analysis is not globally convincing as their model was applied to one financial services organization, limiting its scope of validity.

Following the difficulty in achieving sustained IT-business alignment through social factors (Reich and Benbasat, 2000), Huang and Hu (2007) suggest this could be achieved through identifying appropriate measures for business performance by applying the balanced scorecard approach in a top-down manner, driven by the CEO. Applying its principles to a case study of a manufacturing firm, the study presents an interpretive qualitative assessment through interviews, and does not identify how the scorecard implementation applies to politically sensitive environments where, seen from a social shaping perspective, these will affect its use in IT-business alignment.

2.5 Summary of views

The economic perspective of using IT to lower costs for busi-

ness advantage has shifted focus to the Resource-Based View as the dominant approach to strategically using IT in sustaining market advantage (Mata *et al.*, 1995; Jarvenpaa and Leidner, 1998; Bharadwaj, 2000; Pavlou and El Sawy, 2006), although some argue only in conjunction with strategic alignment (Kearns and Lederer, 2000).

IT infrastructure is highlighted as an important organizational resource, necessary to a firm but which alone cannot achieve sustainable competitive advantage (Mata *et al.*, 1995; Bharadwaj, 2000). Instead, the strategic management of IT in a business context is identified as the most important organizational capability to achieve sustainability (Mata *et al.*, 1995; Jarvenpaa and Leidner, 1998; Bharadwaj, 2000). This involves managers' ability to strategically deploy business and IT resources across the organization (Mata *et al.*, 1995; Bharadwaj, 2000) while considering the social and political nature of their business environments (Jarvenpaa and Leidner, 1998).

There is an inherent difficulty identified by the reviewed literature of adequately measuring the benefits of IT investment. The use of popular accounting measures such as return on assets and return on sales have been used by many (Bharadwaj, 2000; Davis *et al.*, 2003; Skaggs and Youndt, 2004; Pavlou and El Sawy, 2006) although these are limited as they use conservative cost saving principles and do not account for other important measures of competitive advantage such as intangible assets and the value gained by shareholders (Davis *et al.*, 2003).

3 Productivity Paradox

A long-lasting contradiction amongst the literature has been whether an increased investment in IT leads to increased productivity; the so-called "IT productivity paradox" (Willcocks and Lester, 1997; Brynjolfsson and Hitt, 1998; Bharadwaj, 2000; Carr, 2003; Huang and Hu, 2007).

Describing technology as a business supporting infrastructure, rather than as a strategic core business asset, Carr (2003) places little strategic value on IT when arguing that IT's competitive advantage is diminishing as it becomes an easily replicable commodity. In reference to Porter's (2001) strategic value of high barriers to entry for competitive advantage, it is argued that cheaper IT functionalities have removed these barriers making IT widely affordable (Carr, 2003). Although urging companies to spend less on IT, being a market follower rather than a first mover, and focusing on the ever increasing security risks posed to firms worldwide, rather than on opportunities (Carr, 2003), this study portrays a very narrow vision of technology as simply a commodity.

From an evaluation perspective, much of the IT discontent illustrated in the IT productivity paradox lies in the fact that there is a lack of appropriate evaluation of IT performance (Willcocks and Lester, 1997; Brynjolfsson and Hitt, 1998).

Brynjolfsson and Hitt (1998) provide a descriptive account of the need to understand the source of productivity and ways it can successfully be measured. IT value differs across businesses and focus must be drawn on leveraging the value of IT to successfully manage organizational change (Brynjolfsson and Hitt, 1998) rather than focusing on the productivity value of IT alone.

Taking a functional approach when examining the productiv-

ity paradox from an intra-organizational perspective, Willcocks and Lester (1997) propose a holistic life-cycle approach to evaluating IT performance, and test its applicability and validity through a case study. This approach aims at improving the quality of evaluation in the long run (Willcocks and Lester, 1997) but would require a more substantial cross-industry assessment of validity.

Realizing the global nature of the productivity paradox, Dewan and Kraemer (1998) analyze the return on IT investments in 17 of the world's most developed countries in terms of labour productivity. They highlight that the decline in labour productivity in these countries is not due to the increased investment in IT, as the latter produces a positive increase in the output per worker, but might be due to other macroeconomic factors, not mentioned in the study. This analysis does provide an important extension to the current, mainly US-based firm-level analysis of this IT investment issue, but does not take into account the socio-political factors of these countries which might have a significant effect on productivity growth rates.

4 Conclusion

The debate as to whether IT can enable sustainable competitive advantage rests at present with the importance of the way IT is managed and strategically utilized in an organization (Huang and Hu, 2007), and how well suitable measures are used to evaluate its performance (Willcocks and Lester, 1997). For completeness, it is imperative to include all actors participating in value-enhancing activities when empirically measuring the benefits of IT investment, and not only executives as the reviewed literature illustrates.

Quite a substantial limitation emerges from the majority of literature focusing solely on developed countries as a source of explaining IT-enabled sustained competitive advantage. It is suggested that much more research is required around the assessment of IT-enabled firm benefits in a global context.

This review, however, does not cover an exhaustive set of theoretical viewpoints, and it does not critique the mainly rational literature reviewed in its evident deterministic acceptance of IT as a positive influence on society, nor does it question the inherent subjectivity of the authors.

As the environmental consequences of IT innovation rest on the shoulders of current and future generations, a prospective research question should focus not on whether IT *can* achieve sustainable competitive advantage but rather *how* can firms leverage IT in an environmentally responsible manner to sustain a leading position in the marketplace?

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