

## Information Technology and Competitive Advantage of the Firm

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### ABSTRACT

This paper seeks to highlight the role of IT resource as a source of sustained competitive advantage. The paper's objective is to provide a fine grain examination of IT resource attributes and its role in building sustained competitive advantage. Utilizing the resource based view framework of VRIO, the paper presents the proposition that IT managerial skills contribute to building sustained competitive advantage; and that other IT resources such as switching cost, access to capital, proprietary technology and IT technical skills, though valuable, are inadequate to meet the criteria of VRIO based framework of sustained competitive advantage.

**Keywords:** Competitive Advantage, IT Managerial Skills, IT Managerial Skills, Resource Based View, Sustainability of Profit

### 1. INTRODUCTION

One of the key questions of strategic management is the issue of competitive advantage and its sustainability over the long run. Several scholars have approached the issue of competitive advantage from different perspectives. Industrial organization economics based researchers posit the idea that the structure of industry defines the issues of competitive advantage. They present the view that how a firm positions itself in the industry will depend on the characteristics of the industry; and that this positioning of the firm in the industry will have implication on the nature of sustained economic rent over the long run (Porter, 1980).

On the other hand, another group of scholars have looked inside the activities of the firm in seeking the answer to the issues of sustained competitive advantage over the long run. The resource based view of sustained competitive advantage present the view that unique attributes of the firm is the key to maintaining sustained competitive advantage (Barney, 1991). Resource based view of strategy research, over the years, has identified resources that contribute to sustained competitive advantage. For example, these streams of research have presented the idea that organization culture, trust, absorptive capacity of the firm contributes to sustained competitive advantage (Peters & Waltherman, 1982; Barney, 1991; Henderson & Cockburn, 1994; Bates & Flynn, 1995; Collis, 1991). Another key resource introduced in the examination of competitive advantage is information technology (IT) resource (Barney & Clark, 2007). As IT has become one of the engines that drive organization these days, it is not far-fetched to present the idea that IT is one of the major contributors of competitive advantage of the firm. However, over the years as the cost acquisitions of IT resource came down, and with the emergence of new technology such as cloud computing and IT as a service concept, the question is what kind of IT attributes is the key to sustained competitive advantage? Previous studies conceptualized IT as a generic construct in building the model of sustained competitive advantage (Benjamin et al., 1984); however, as the cost and ease of acquiring IT resources have become lesser over the years, this democratization of ease of acquisition of IT resources phenomenon has highlighted that one must examine the attributes of

IT as a resource for sustained competitive advantage more closely. Therefore, this paper seeks to highlight what of kind IT attributes contribute to sustained competitive advantage of the firm. In the next section, the paper will lay out the theoretical foundation of resource based view and its relationship with competitive advantage.

## **2. SUSTAINED COMPETITIVE ADVANTAGE: A RESOURCE VIEW PERSPECTIVE**

The long term sustainability of profit is an issue companies have faced in a fast changing business environment. In the age of globalization, in which, competitors can emerge from any part of the world; it becomes fundamental for companies to engage with the issue of sustainability of profit over the long run. When such a question is put forward, the fundamental issue of the competitive advantage as to where the source of sustainability of profit over the long run lies is a challenging question. The industrial economics based theory of competitive advantage puts forward the idea that the structure of the industry defines the competitive advantage of the firm (Porter, 1980). On the other hand, resource based view of firm takes the inside view of the organization to explain the sources of competitive advantage of the firm (Barney, 1991). The resource based view scholars present a complementary view of firm's profit sustainability that looks inside the activities of the firm as the source of long term profit sustainability. So, the question is as to what kind of resources is fundamental in attaining competitive advantage. To answer this question, Grant (1990) highlighted a framework to assess whether a particular type of resource is fundamental in achieving sustained competitive advantage. To understand the nature of sustainability of competitive advantage, one must also take into account the way in which in resources are organized and deployed for organizational performance. This activity of resource organization and deployment is termed as capability. Grant (1991) argues that capability is the differentiating factor in separating firms with sustained competitive advantage and vice versa. The VRIO (Valuable, Rare, Imperfect Imitability & Organization) framework gives us a comprehensive model for assessing resources and capabilities that are the building block of sustained competitive advantage (Barney & Clark, 2007). According to the VRIO framework, first, resources must be valuable and it must also be rare; only then, the resources could be considered fundamental to sustained competitive advantage. The third part of VRIO is the aspect of imperfect imitability. This aspect is related to how the resources are organized and deployed in the organization. The imitability aspect refers to the path dependent manner in which resources are organized and deployed and its consequences that aid it creating perfect imitable resource. The model also refers to causal ambiguity of organizing and deployment of resources which make it difficult to pinpoint the causal link between resources and organizational performance. Finally, the imperfect imitable attributes stems from the manner in which social actors organized and deploy resources in the organization which makes it difficult for the organization or competitors to codify the knowledge behind the sustained profitable performance of the organization. The last aspect of VRIO framework refers to the organizational processes that aid in organizing and in deploying the resources for sustained competitive advantage. Thus, VRIO framework sums up a parsimonious model that depicts the relationship between resources, capabilities and sustained competitive advantage.

From prior empirical research, we know that resources such as trust, organizational culture, absorptive capacity, firm's history, firm's network position, employee know-how, firm's innovativeness etc. are resources that are in congruence with the VRIO framework and thus aid in building sustained

competitive advantage of the firm (Peters & Waltherman, 1982; Barney, 1991; Henderson & Cockburn, 1994; Bates & Flynn, 1995; Collis, 1991). Another resource which is presented in the paper by Barney (1991) is IT resource; IT resource has been identified as a key resource for sustained competitive advantage especially in the today's world of internet. However, an aspect on IT resource which is a little different from other resource is the fact that its competitive advantage attributes can be diluted over time as new technologies are introduced in the marketplace. Previous studies have conceptualized IT resource as a generic concept without considering the temporal attribute of IT as resource. Thus, it becomes prudent to examine which aspect of IT attribute really contributes to sustained competitive advantage. So, in the next section, the paper will examine IT attributes against the VRIO framework to highlight the aspect of IT attribute that contributes to sustained competitive advantage.

### **3. IT RESOURCE AND COMPETITIVE ADVANTAGE**

With the introduction of new technologies such as cloud computing and IT as service concept, the previous conceptualization of IT as a source of competitive advantage needs a re-examination. Today, IT resources are easier to procure and thus, IT resource is distributed heterogeneously in the marketplace. In such a business environment, the paper will examine the attributes of IT resource that could be considered as core to competitive advantage of the firm. In order to examine the sustainability of profit over the long run, IT attributes will be examined against the VRIO framework to assess the issue of permanence of IT resource characteristics and its impact of sustain organizational performance. The paper will examine different IT attributes against the VRIO framework to examine the issue of IT resource as a source of competitive advantage.

#### **3.1 Switching Cost**

Earlier investment in IT required major capital outlay and also time to ensure the successful implementation IT project in a firm and this is especially true for ERP projects. This aspect increased the transaction cost of IT project and increased the asset specificity of IT project (Clemons & Kimbrough, 1986). Thus, reliance on single vendor specific project increases asset specificity of a firm and therefore, it increases the cost of switching to new vendor in short period of time. Consequently, this limitation in transition from one vendor to another vendor leaves room for the existence temporary heterogeneous rent generation potential to few competitors. However, as the source of heterogeneity of a firm lies in the temporal aspect and the difficulty of switching from one vendor to another (Clemons & Row, 1987), this scenario has been rendered outdated in the face of new generation of IT technologies such as cloud computing and IT as service. For example, Amazon's cloud computing service has given equal access to firms in the marketplace to procure computing power and scalability of the project within short span of time. Thus, vendor specific IT investment can increase switching cost and provide temporary competitive advantage to a few firms with the right vendor technology at the right time. However, vendor specific IT investment does not stand the test of VRIO framework because of the transitory nature of competitive advantage in the face of new IT technologies (Mayer & Argyres, 2004).

#### **3.2 Access to Capital**

As mentioned earlier, business system requires substantial investment in capital to implement IT projects. This requirement exposes firms to two forms of risks, namely IT implementation risk and

market risk. IT projects with large capital investment take long time horizon to execute, so the issue of completing the project in time and within budget is a key criterion for project managers, in order to avoid cost overrun (Etheridge, 1988; McFaran, 1984). However, in today's IT environment, when concept of IT as service is introduced and with the event of cloud computing, scalability is accessible to the smallest firm and thus, it has reduced IT risk exposure of firms. In such a scenario, firms with access to capital to procure IT resources do not fulfill the first two criteria of VRIO framework, which is – valuableness and rarity. Market risk is related to the risk exposure related to the economic business environment, i.e., the cost of borrowing in order to access capital for IT resources. Therefore, access to capital to procure IT resource fails to suffice the conditions highlighted in VRIO framework.

### **3.3 Proprietary Technology**

Another attribute of IT presented a source of sustained competitive advantage is proprietary technology. However, unlike other proprietary technology such as in pharmaceutical, biotech or material technology, IT based proprietary technology are prone to imitation and reverse engineering (Bain, 1956). Since, most IT technology is driven by software based proprietary technology, code for programs are easier to copy than in pharmaceutical technology. Mobility of knowledge workers, reverse engineering and the ways in which informal communication of organization software based projects makes proprietary based technology in IT makes it vulnerable to imitation (Jakes & Yoches, 1989). Even when software proprietary technology is combined with hardware technology, it only gives a head start to the firm with new proprietary technology (Mansfield, 1985). Over time the innovation is diffused over time to the marketplace and it is available to competitors. Thus, IT attribute such proprietary technology are important, but when examined against the VRIO framework of imitability issues such as history, casual ambiguity and social complexity; it falls short on the criteria linking to sustained competitive advantage of the firm.

### **3.4 IT Technical Skills**

IT technical skills are core process of building organization with IT as competitive advantage (Copeland & Mckenney, 1988). However, IT technical skills even though valuable, do not meet the VRIO criteria of building sustained competitive advantage. One of the reasons IT skills fail to meet the VRIO framework is the nature of IT technical skills attributes. IT skills are highly mobile in the marketplace; one may argue that that IT technical skills could be heterogeneously distributed in the marketplace and it could contribute to temporary competitive advantage, but the mobility of IT technical skills rendered the IT resource as a source of competitive advantage inadequate (Capon & Glazer, 1987). Additionally, with the event of outsourcing of skills worldwide, IT technical skills as a source of sustained competitive advantage has weakened.

Another reason that makes IT technical skills inadequate to meet the criteria of VRIO framework is the way in which IT technical skills knowledge is managed. Usually, IT technical skills knowledge base is in the form of codified knowledge database, blueprint etc. These make IT technical skills resource vulnerable to imitation (Teese, 1988). Therefore, even though IT technical skills are a valuable resource; it is inadequate to meet the framework of VRIO competitive advantage.

### 3.5 IT Managerial Skills

The organization and deployment of IT resources for organization performance is considered as IT managerial skills. IT resource investment is a team based effort; not only that, it requires an understanding of implications of IT resources on business operation. Additionally, IT managers must forecast the future IT needs of the organization (Capon & Glazer, 1987). These composite skills requirement demands IT managers to efficiently and effectively organize and deploy IT resources for organization's performance (Castanias & Helfat, 1991). The social interface in building IT capability of the organization makes the process a socially complex phenomenon. The process is intertwined with the organizational processes and socialization of social actors in the organization. Thus, making the process of building IT capability is specific to the organization and thus making it path dependent. Since it is a path dependent process, the causal factors leading to organization performance is ambiguous (Copeland & McKenney, 1988).

Therefore, for firms that build sustainable competitive advantage based on IT managerial skills, the likelihood of sustainability of its profit in the long run is higher. IT managerial skill by nature is defined by firm specific attributes; for this reason, heterogeneous distribution of IT managerial skills can be expected. Since the IT managerial skills meets the VRIO framework, one can lay out the proposition that IT managerial skills could be a building block for organization's sustained competitive advantage.

## 4. CONCLUSION AND FUTURE CHALLENGES

One of the key elements presented in the paper is the rationale that IT resources are valuable resource for the organization to build capability. However, to state that the IT resources are key element in building sustainable competitive advantage, one must examine the criteria based on VRIO framework of competitive advantage to highlight whether IT resources meets the criteria. In order to examine IT resources as building block for sustainable competitive advantage, one needs to examine IT resource not as generic resource. A finer examination of IT resource attribute is warranted to figure out which type of IT resource attributes really contributes to sustainable competitive advantage.

IT attributes such as switching cost, access to capital, proprietary technology and IT technical skills, though valuable resources and they could provide temporary competitive advantage; however, all of the felt short of the criteria lay out in VRIO framework of competitive advantage. Thus, with the help of VRIO framework, we are able to differentiate the different aspects of IT resource attributes and its contribution to sustained competitive advantage of the organization. Finally, the paper presents IT managerial skills as key to building sustainable competitive advantage since it meets the criteria of the VRIO framework.

The next step to the development of IT resource and its role in developing sustainable competitive advantage is to seek out other IT resource attributes that can contribute to sustainable competitive advantage. Process oriented qualitative studies could be of help in answering the call for finding out other IT resource attributes and its role on competitive advantage. Empirical studies can strengthen the role of IT managerial skills and its implications of sustained competitive advantage. The other element unexplored is the question of how firms build IT managerial capabilities. On this issue, organization learning lens could provide the field fruitful areas related to organizational learning and IT managerial skills based competitive advantage issues.

**REFERENCES**

- [1] Bain, J.S. (1956). *Barriers to New Competition*. Cambridge: Harvard University Press.
- [2] Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99–120.
- [3] Barney, J.B. & Clark, D.N. (2007). *Resource based theory: Creating and sustaining competitive advantage*. New York: Oxford.
- [4] Bates, K.A. & Flynn, E. J. (1995). Innovation history and competitive advantage: A resource view analysis of manufacturing technology innovations. *Academy of Management Journal*, 238, 235-239.
- [5] Benjamin, R. I., Rockart, J.F., Scott Morton, M.S. & Wyman, J. (1984). Information Technology: A strategic opportunity. *Sloan Management Review*, 25(3), 3-10.
- [6] Capon, N. & Glazer, R. (1987). Marketing and technology: A strategic co-alignment. *Journal of Marketing*, 51(3), 1-14.
- [7] Castanias, R.P. & Helfat, C.E. (1991). Managerial resources and rents. *Journal of Management*, 17(1), 155-171.
- [8] Clemons, E.K. & Kimbrough, S.O. (1986). Information systems, telecommunications, and their effects on industrial organization, in *Proceedings of the seventh International Conference on Information Systems*, December, 99-108.
- [9] Clemons, E.K. & Row, M. (1987). Structural differences among firms: A potential source of competitive advantage in the application of information technology, in *Proceedings of the Eight International Conference on Information Systems*, December, 1-9.
- [10] Collis, D.J. (1994). Research note: How valuable are organizational capabilities. *Strategic Management Journal*, 15, 143-152.
- [11] Copeland, D.G. & McKenney, J.L. (1988). Airline reservation systems: Lessons from History. *MIS Quarterly*, 12(3), 353-370.
- [12] Etheridge, J. (1988). Sky wars over Europe. *Datamation*, 34(3), 84-85.
- [13] Grant, R.M. (1991). The resource based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, Spring, 114-135.

- [14] Henderson, R. & Cockburn, I. (1994). Measuring competence? Exploring firm effects in pharmaceutical research. *Strategic Management Journal*, 15, 63-84.
- [15] Jakes, J.M. & Yoches, E.R. (1989). Legally speaking: Basic principles of patent protection for computer software. *Communications of the ACCM*, 32(8), 9222-924.
- [16] Mcfaran, F.W. (1884). Information technology changes the way you compete. *Havard Business Review*, 62(3), 93-103.
- [17] Manfield, E. (1985). How rapidly does new industrial technology leak out? *Journal of Industrial Economics*, 34, 217-233.
- [18] Mayer, F.W. & Argyres, N.S. (2004). Learning to Contract: Evidence from the personal computer industry. *Organization Science*, 15(4), 394-410.
- [19] Peters, T.J. & Waterman, R.H. (1982). *In Search of Excellence*. New York: Harper and Row
- [20] Porter, M. E. 1980. *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
- [21] Teece, D.J. (1988). Capturing value from technological innovatin: Integration, strategic partnering, and licensing decisions. *Interfaces*, 18(30), 46-61.