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# Classification of IT Investment: A Resource-Based Perspective

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## Abstract

The monolithic treatment of IT resources brings incomplete models in measuring IT value, especially profitability. Using resource-based view, IT is treated as a resource that has multidimensional and interdependent characteristics. The two basic characteristics of IT resources, complementarity and immobility, are introduced. The combinations of these characteristics produce a classification of IT investment strategy: parity, niched, temporary, and sustained competitive advantage. This classification can be used to better define and manage IT resources.

## Introduction

There have been increasing concerns about economic value of IT investment. Previous studies argued that productivity paradox exists due to mismeasurement inherent in research models. To overcome these shortcomings, some studies divided the measure of IT value into three dimensions, i.e. productivity, profitability, and consumer welfare and developed models to measure each dimension separately, based on economic theory (cf. Brynjolfsson, 1993; 1996; Brynjolfsson and Hitt, 1996; Hitt and Brynjolfsson, 1996). These studies found that IT investment has significant impact on the productivity and consumer welfare, but has negligible or negative effect on firm profitability.

This paper argues that there is still mismeasurement in the profitability model, with regard to IT investment's contribution to competitive advantage. Previous studies used aggregated IT investment measures, such as IS budget (Weil, 1992) or aggregated amount of computer capital (i.e. spending for hardware) and IS labor (labor portion of IS budget) (Hitt and Brynjolfsson, 1996). These coarse measures could not fully reflect the contribution of IT investment in measuring IT value. Profitability in IT value indicates supernormal profits that companies accrue in the market due to competitive advantage achieved through the use of IT. Thus, strategy development that optimizes investment in IT resources to achieve and maintain competitive advantage and thereby accrue supernormal profits, would be immensely beneficial in both practitioner and academic arenas. In the next section, the resource-based view of competitive advantage is employed to develop IT investment strategy.

## Theoretical Perspective: Resource-Based view of Competitive Advantage

The resource-based view of competitive advantage asserts that a firm can obtain unusual return only when other firms are unable to imitate its resources. The resource-based view defines two underlying characteristics of resources for competitive advantage: heterogeneity and immobility (Barney, 1991). The resource heterogeneity refers to uniqueness in a firm's resources. The resource immobility refers to the duration of this uniqueness. Therefore, an organization's competitive advantage depends upon the degree of its resource heterogeneity and immobility.

## Classification of Investment in IT Resource

Since IT has been considered as an important organizational resources, the two underlying characteristics of resources can be used to develop IT investment strategies. However, since the IT resource heterogeneity merely indicates differences of IT resources possessed among firms, it does not imply how IT can be applied to improve organizational performance. The complementarity of IT resource implicitly indicates

IT's contribution for this. IT resource complementarity refers to IT's interdependency with other organizational resources and the resulting IT capabilities to alter the value of the resources through the application of IT (Clemons and Row, 1991). The use and implementation of IT, not the IT itself, have the extraordinary implications for competitive advantage. Thus, IT investment strategy can be classified based on the IT resource complementarity and immobility dimensions. Here, the IT investment is comprised of spending for acquiring, developing, and using IT resources.

### *IT Resource Complementarity*

IT applications interacts with tangible and intangible organizational resources, either directly or indirectly, to perform an organization's economic activities. The interactions (or interdependencies) between IT and other resources implies that the functions of these two resources need to be closely coordinated and concurrent in operations. A firm, for example, produces products using an information systems in product design, development, operations, marketing, sales, and administration. There is a positive relationship between the IT resources complementarity and organization performance (Poppo and Zenger, 1995) by providing organizations efficiency to produce products at lower price relative to competing products and desirable functionality to enhance the quality of users' work (Sethi and King, 1994). Clemons and Row (1991) illustrated the impact of interdependency between IT and organization's structural resources, such as vertical integration and diversification, to gain the sustained competitive advantage.

		IT Resource Immobility	
		Low	High
IT Resource Complementarity	High	Temporary	Sustained
	Low	Parity	Niched

Figure 1. Classification of Competitive Advantage

### *IT Resource Immobility*

Immobility refers competitors' difficulty to imitate IT resources. Some resources can be relatively easily obtained in the resources markets and/or produced internally, while other resources cannot be readily acquired because they are highly specialized and non-separable from the firm that produces and controls them (Rumelt, 1982). Imperfectly imitable resources exists for any one or more of three reasons: acquisition of the resources is dependent upon unique historical conditions; the link between the resources and competitive advantage is casually ambiguous; the resource is socially complex (Barney, 1991). These conditions produce various isolating mechanisms that make competitors difficult to duplicate IT resources. Exploitation of flexibility using IT infrastructure (Ketinger, et al., 1994), of managerial IT skills required to build and use IT applications (Mata, et al., 1995), of organizational knowledge base accumulated through learning and training, of IT culture, and of IT planning for aligning its objectives with business strategies, are considered as important factors that determine the immobility of IT resources.

The two IT resource dimensions can be combined to develop four distinctive IT investment strategies, as Mata, et al. (1995) did. If a firm possesses a common, valuable IT such as a standardized or vendor-based IT, the IT is a source of competitive parity. If a firm possesses a common, valuable IT and competitors face cost disadvantage in developing, acquiring, and using that resource compared to the firm that already possesses and uses it, the IT is a source of niched competitive advantage. If a firm possesses an IT resource that has high complementarity and that is highly mobile, it is a source of temporary competitive advantage,

but if it is hardly mobile, a firm that already possess and use it can gain sustained competitive advantage. The below figure is a pictorial presentation of these strategies.

## Implications

This model can guide organizations to which types of IT resources they should invest to create sustained competitive advantage. Although firms invest on IT for hopefully gaining sustained competitive advantage, their investment bring them one of these benefits, depending on the degree of the IT resource complementarity and immobility that are developed through the interactions with other tangible and intangible organizational assets. In this vein, the model can provide organizations guidance in IT resource acquisition and management for sustained competitive advantage.

In measuring profitability of IT investment, researchers need to consider the distinction in competitive advantage that implies a different degree of impact on the profitability. They may divide an organization's IT-related spending into the suggested categories in this study and weight them based on theories or experiences in industries. In this way, we can capture the real contribution of IT investment on the profitability.

## Conclusion

So far, IT was treated as a monolithic entity in the IT value studies. However, it should be treated as an entity that has multidimensional and interdependent characteristics. The basic characteristics of IT as important organizational resources must be used to inform how IT resources are defined and subsequently managed.

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