

Value based Technology Management – A Literature Review

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ABSTRACT

This paper presents a multidimensional framework that provides insights in Value based Technology Management after reviewing exploratory as well as empirical research already carried out in this direction. It is an attempt to identify the variety of value sources that are required to be considered for efficiently assessing the value added by technology.

Keywords: Value based Management, Technology Management, Corporate Value Added, Information Systems, Business Value of Technology, IT Management, Competitive Advantage

INTRODUCTION

With the immense growth of technology and its capabilities, the need to change approach to technology investment and management (Nicholas Carr, 2003) has also arisen. There is lot research already published on how the technology can be managed better in context to its benefits offered to business organizations going the technology way. The key strategic issues in technology management include which particular technology to adopt; how much should be capital investment in technology; should the company go either for outsourcing the technology or opt for in house Research & Development, to name a few. With the global business offering multiple and diverse technologies and its capabilities, it is getting more and more difficult task for managers to decide on which particular option in this context will best serve objectives of their firm. Value based Technology Management possesses the potential to aid managers in the aforesaid decision making process.

METHODOLOGY

The Study

The introduction describes how difficult task is for managers to decide upon the technology related issues in business world. Literature Review which follows this section will highlight how various resources and/or factors contribute to create value

for the stakeholders of a business and further scope of research to be carried out in this area of management.

The Objective

The objective of the paper is to identify the various factors and/or resources that are critical while deciding the value of a particular technology option under consideration.

Data Collection

The study was based on the secondary data. To answer the research questions (objectives of the study), the required secondary data was collected by exploring various research papers which were accessible to the researcher through different Research Database Search Websites like www.search.ebscohost.com, www.ssrn.com, www.emeraldinsight.com, etc.

Data Analysis

The collected secondary data in the form of research papers was thoroughly studied to understand the key concepts and facts that were highlighted there. Sections like Abstract, Introduction, Methodology, Results and Discussion, Conclusion were studied. After developing the basic understanding of the underlying concepts, those were discussed with faculty members at LMTSOM as mentioned in Acknowledge Section towards the end of this paper. Their applicability to this study was discussed and then a framework was proposed as depicted in *Figure 4*. Once the proposed framework was ready, then the contents of this paper were compiled.

LITERATURE REVIEW

Seisreiner A. and Träger S. (2004) propose a multidimensional framework for Value based Management (*Figure 1*) and argues that this will help in assessing corporate value added in a comprehensive way. This framework divides the value chain into three independent dimensions: 1) *Value Investment*, 2) *Value Creation* and 3) *Value Transfer*. It also considers the value from every stakeholder (like Suppliers, Employees, Shareholders, Customers, and others) point of view. This paper sets the aforesaid framework as the basis of its objective of literature review as the said framework provides the greater insights into underlying concepts of value based management.

Capital is one of the scarce resources available to the firm, thus contributed proportionality for value addition to the firm. As a result, “[the] language of cost obscures the simple facts that value is lodged in scarce factors, not ‘economic profit’” (Seisreiner A. & Träger S., 2004; Lippman S. A. & Rumelt R. P., 2003). It is very likely that real corporate value added is not reflected as other significant sources of wealth are simply ignored by relying on free cash flow or profit as major measure of firm’s value added. The literature on real options

suggests that firms should not commit its resources until it is absolutely necessary or an alternative is available which will provide highest returns for allocated resource and its combination with others (Seisreiner A. & Träger S., 2004; Trigeorgis L., 1996; Copeland T. & Antikarov V., 2001).

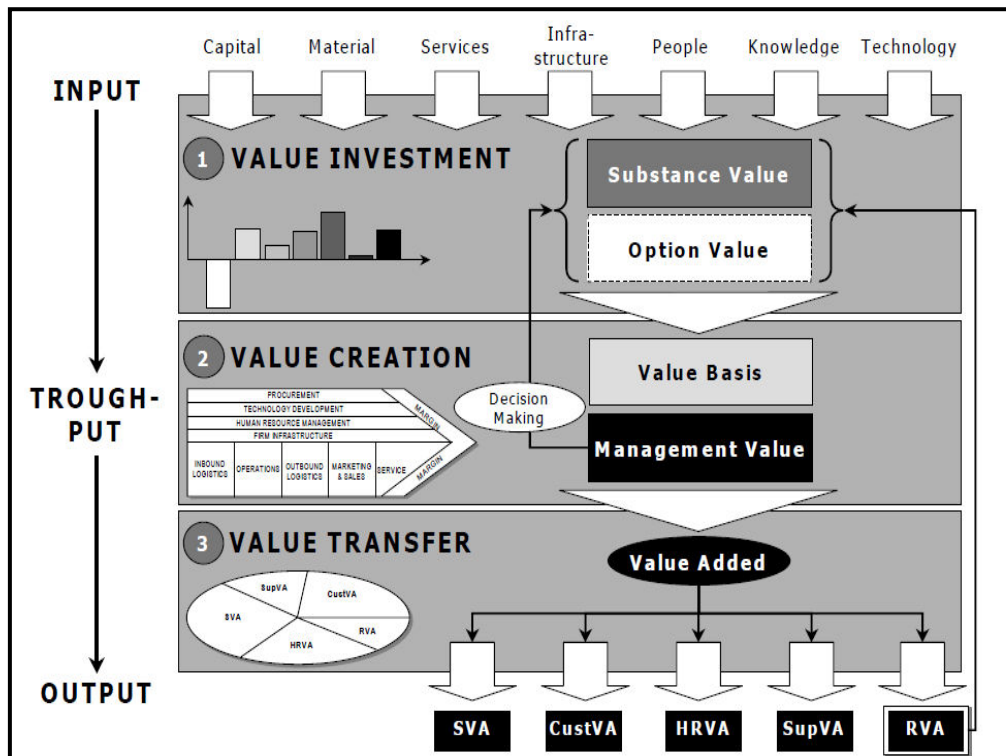


Figure 1: Multidimensional Value Framework (Seisreiner A. & Träger S., 2004)

The information about *Substance Value* can be acquired from corporate accounting system in general whereas *Option Value* depends largely upon external and/or environmental developments. Latter is subjected to the question of effective implementation or termination management (Seisreiner A. & Träger S., 2004; Adner R. & Levinthal D. A., 2004). Thus both are to be considered as primary building blocks for assessing the firm's ability to generate value in its applicable environment.

The research conducted in the field of Information Systems focused on the value generation potential of an outsourcing relationship is based on three aspects: *Client Characteristics, Vendor Characteristics and the vendor-client relationship* (Levina N. & Ross J. W., 2003; Goles, 2001). The client characteristics include managing resources not under firm's ownership (Levina N. & Ross J. W., 2003; Elitzur and Wensley, 1997; Henderson and Venkatraman, 1990; Kern, 1997; Lacity and Willcocks, 1998; Lacity et al., 1995; Sabherwal, 1999; Saunders et al., 1997; Useem and Harder, 2000) and retaining in-house capabilities. It also covers vendor selection, relationship management, managerial competence, architecture

planning and monitoring emerging technologies (Levina N. & Ross J. W., 2003; Currie, 1998; Goles, 2001; Lacity et al., 1995; McFarlan and Nolan, 1995; Quinn, 1999).

It is ascertained from the literature that in vendor-client relationship, the two aspects play an equally important role – one is Informal (interpersonal trust) and second one is Formal (Contractual) (Levina N. & Ross J. W., 2003; Poppo, 2002; Sabherwal, 1999). The development considerations are required to be given to these aspects (Levina N. & Ross J. W., 2003; Kern and Willcocks, 2001; Willcocks and Kern, 1998; Willcocks and Lacity, 2000). Strategic intent as well as technical capability affects both informal and formal aspect development in vendor-client relationship (Levina N. & Ross J. W., 2003; Kern and Willcocks, 2001).

Vendor's own capability (Levina N. & Ross J. W., 2003; Willcocks and Lacity, 2000; Goles, 2001; Saunders et al., 1997) is the third factor in value proposition for outsourcing decisions. Goles (2001) proposed that capabilities such as technical competence, customer business understanding, and relationship management must be there in vendor's possession. Due to lack of awareness about this aspect, Levina N. & Ross J. W. (2003) conducted the exploratory study and followed the case study methodology for carrying their research work. The outcome of one of their analysis is shown in *Figure 2*.

The resource-based view (RBV) (Barua A. et. al., 2004; Barney, 1991) theory has been adopted by IS researches to study the way in which IT has helped the firms grow business value (Barua A. et. al., 2004; Bharadwaj, 2000; Mata et al., 1995; Ross et al., 1996) by considering certain IT and IT-related resources (e.g. IT Skills, IT human resource, IT knowledge, IT capability) as rare and valuable. Barua A. et. al. (2004) and Bharadwaj (2000) figure out that the customer orientation, business unit synergy, and knowledge prove to be critical IT-related resources as these enable valuable exploitation of information available through IT.

IT security and/or Information Security is nowadays the area of topmost concern while managing IT infrastructure, as reflected in increased security budgets of the firms (Cavusoglu H. et. al., 2005; Hulme, 2002). The reason behind this is theatrical increase in number of IT security breaches and attacks launched on firms' information systems. The business organizations and governments have adopted various methods to reduce the deficit caused by security breaches. The external control mechanisms like cyber laws enacted by governments augment the internal controls (preventive and detective) of a firm (Cavusoglu H. et. al., 2005). The hackers are either employees or insiders as reported by studies (Cavusoglu H. et. al., 2005; Escamilla, 1998; Russell and Gangemi, 1992).

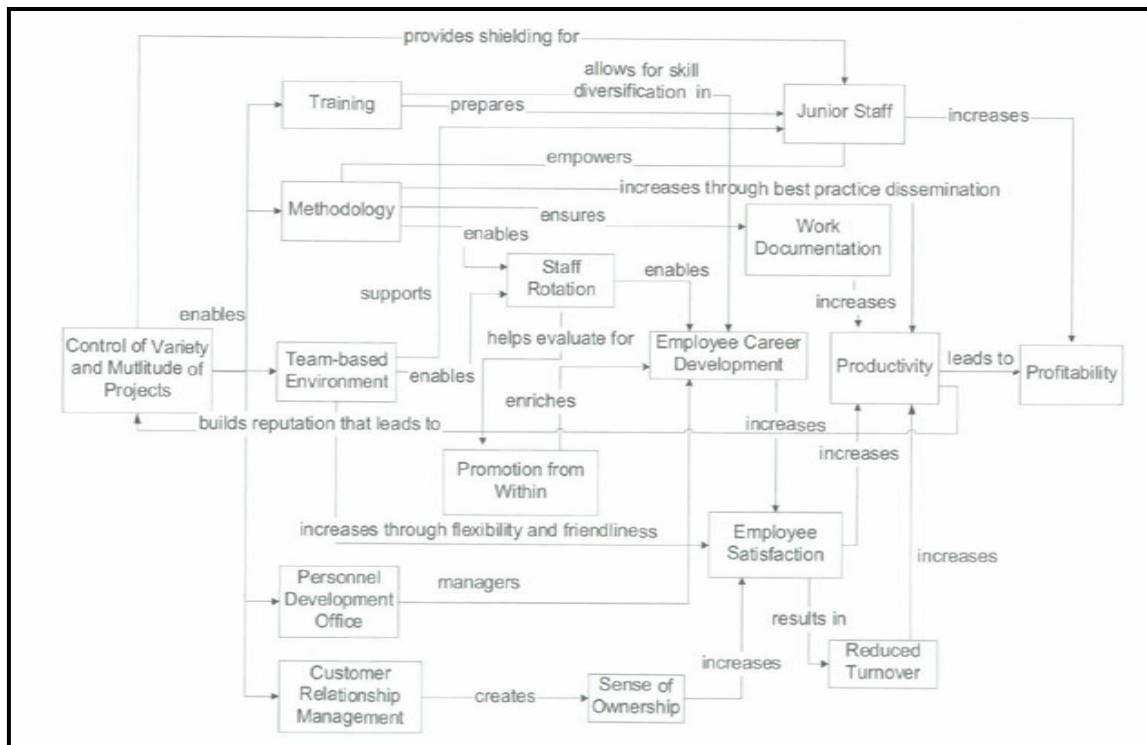


Figure 2: Vendor's using control over projects to develop and use competencies (Levina N. & Ross J. W., 2003)

The advent of web-based tools has encouraged information sharing and knowledge management, which has led to supply chain optimization, mass customization, benchmarking, customer relationship management and e-transformation that has left its impact on the conventional functions like product design, project management, plant operations, manufacturing and others (Chang C. M., 2005; Deetz, Tarcy and Simpson, 2000). The communication technologies advancements like these have made the business transactions economic, faster and better in meeting customer demands than these were earlier. Value addition opportunities are classified into three categories: 1) *e-Transformation opportunities*, 2) *Opportunities due to web-based tools*, and 3) *Opportunities for sustainable strategic advantages* (Chang C. M., 2005).

e-Transformational opportunities include enterprise resource planning, supply chain optimization for parts, e-market utilization, outsourcing of non-core activities, WACC reduction, decapitalization of non-competitive assets and enhanced customer services (Chang C. M., 2005; Paisie, 2001). *Opportunities due to web-based tools* involve the application of web-based technology tools for value addition. These tools are useful for 1) product design and development, 2) project management and 3) manufacturing plant operations (Chang C. M., 2005; Chang C. M., 2005A). *Opportunities for sustainable strategic advantages* include new products & technologies, new ventures based on corporate knowledge and global supply chain of knowledge shops (Chang C. M., 2005; Bryan, 2004). After analyzing the aforesaid

value addition opportunities, Chang C. M. (2005) depicted the linkages between opportunities and shareholder values in *Figure 3*.

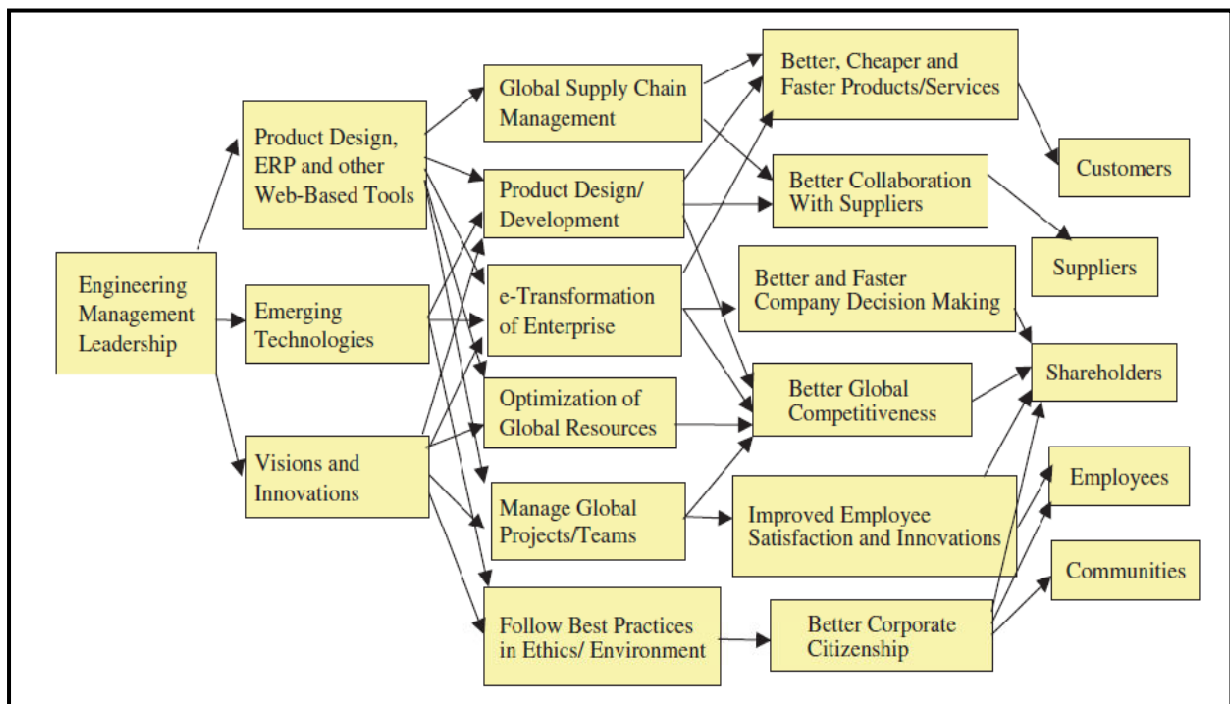


Figure 3: Linkages between Opportunities and Shareholder Values (Chang C. M., 2005)

The role of IT capabilities in creating competitive advantage for firms has been a topic of research for a long now. Competitive IT capabilities cater to IT management capabilities which further include 1) *IT Business Experience* and 2) *Relationship Infrastructure*. IT Business Experience is extent to which IT groups understand the business whereas Relationship Infrastructure defines extent to which there are positive relationships between IT and business managers (Bhatt G. D. and Grover V., 2005). IT business experience includes firms' ability to integrate IT strategy & business strategy, develop reliable & cost-effective systems for the business, and anticipate business needs sooner than the competitors (Bhatt G. D. and Grover V., 2005; Sambamurthy and Zmud, 1997). IT groups' business expertise, in combination with IT skills, determines the firm's ability to rapidly develop and deploy critical systems for the long-term competitive advantage (Bhatt G. D. and Grover V., 2005; Ross et. al., 1996). The ability of IT group to understand business requirements, creating business partnership groups in meeting and exploiting new business opportunities is reflected in relationship infrastructure. It consists of risk sharing and responsibility of IT applications between IT and business unit management. Leveraging of IT resources by a firm critically depends on the interaction of IT function with business units (Bhatt G. D. and Grover V., 2005; Ross et. al., 1996; Bassellier et. al., 2001).

Hitt L. M. and Brynjolfsson E. (1996) attempted to measure the IT value in three different dimensions: 1) *Productivity*, 2) *Business Profitability* and 3) *Consumer Surplus*. They found empirical evidence for the impact of IT on increase in productivity and consumer surplus whereas the impact on business profitability (supranormal business profits) could not be established. But they also showed that there is no intrinsic opposition to idea that IT can create value but destroy profits.

EVA® (Economic Value Added) is a performance evaluation system developed by Stern Stewart Corporation as an overall measure of financial performance which emphasizes “*net operating profit after taxes less a charge for the capital employed to produce those profits* (Stern et. al., 1994; Yao et. al., 2009).” Yao et. al. (2009) employs EVA® to assess the impact of IT investment of a firm’s performance. *EVA® is calculated as “NOPAT – Cost of capital” where Cost of capital = WACC* net asset; where WACC = {debt/[debt + Shareholders’ Equity (SHE)]}*cost of debt + [SHE/(SHE + debt)]*cost of equity; net asset = (current assets – cash and marketable securities) – (current liabilities – short-term debt and current portion of long-term debt)* (Pelapu et al, 2000). It is concluded by Yao et. al. (2009) that for assessing IT value of a firm, EVA® which is arguably major determinant of firm’s performance can be used along with other managerial controls for internal performance measurement.

CONCLUSION

Literature review shows the lack of uniform measures available for assessing the IT value of a firm. The various resources available to a firm for creating IT Value include Capital, Technology/IT infrastructure, Vendor(s), Personnel (IT Skills & IT Human Resources), Information/IT Security, Knowledge (both Technical as well as Managerial), in house R&D efforts in case of larger firms among others. Proper strategic planning and optimal allocation & utilization of those available resource(s) have capability of leveraging IT value for the firm. Firms should plan to create IT value while keeping every stakeholder in consideration and finally transfer it to them. The various IT value assessment options available to firm include Productivity, Consumer Surplus, Business Profitability (not necessary always) along with EVA®. The multidimensional framework for Value based Technology Management (*Figure 4*) is proposed here by modifying the framework depicted in *Figure 1* after analyzing secondary data/literature contents available from various journals, proceedings and similar resources that were accessible to researcher.

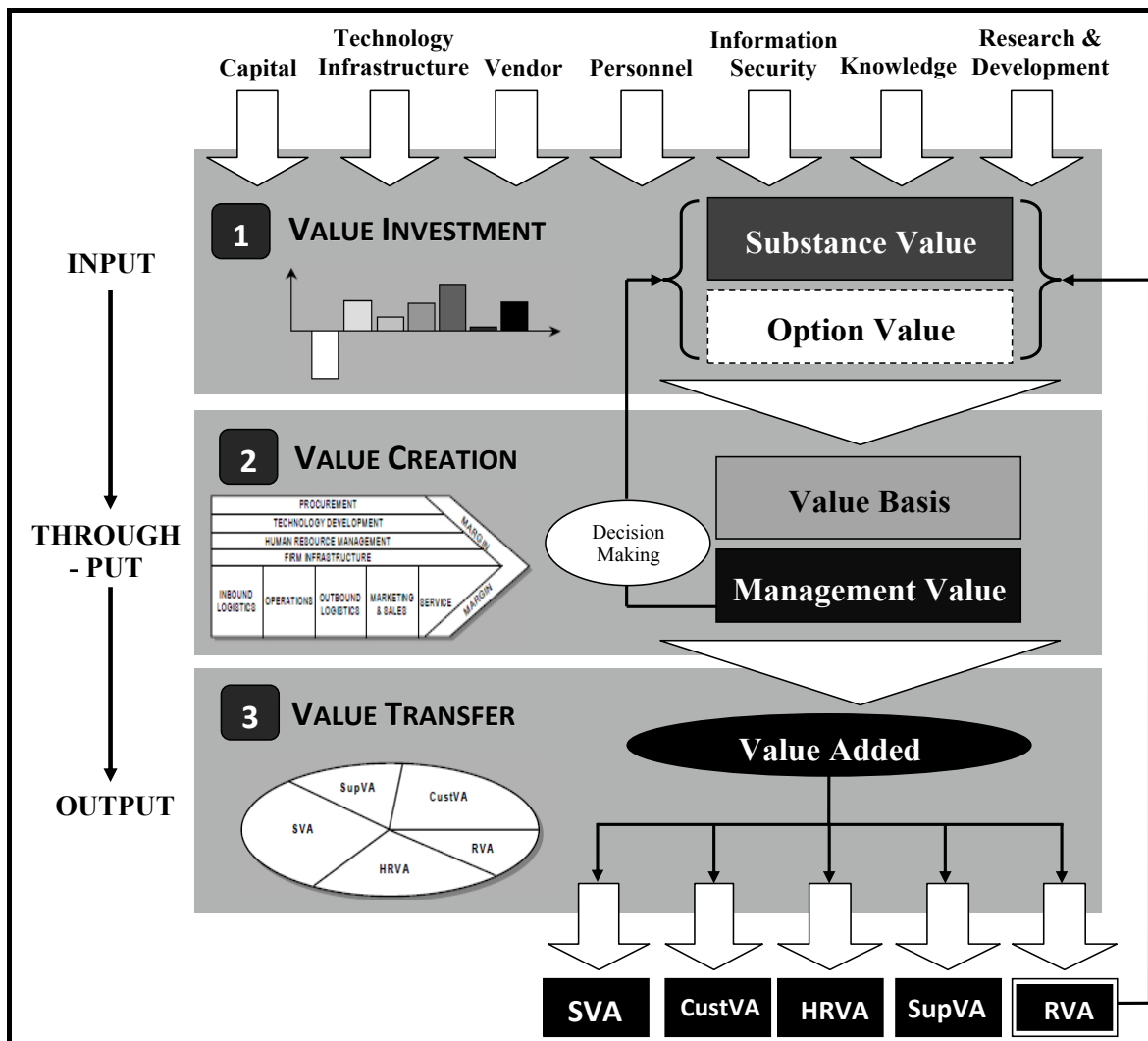


Figure 4: Proposed Multidimensional Value Framework for Value based Technology Management

Still, there is further scope of research in this field of technology management based its value added to the stakeholder of a firm as even after decades of intensive research in this field nothing uniform could not be proposed and established between IT Investments and Firm Performance.

ACKNOWLEDGEMENTS

This literature review is an internship opportunity provided by Professor Saku Makinen, Dr. Marko Seppanen and Dr. Jouni Lyly-Yrjänäinen at Tampere University of Technology, Tampere, Finland. I would like express my sincere regards to Dr. Alok Chakrabarti (Dean, LMTSOM), Mr. Vibhava Srivastava and Mr. Ankit Mahindroo (both Assistant Professors at LMTSOM) for providing me with their expert and valuable guidance in writing this paper.

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