DECISION SCIENCES INSTITUTE

Firm-level Evidence of Business Value of IT – A Case Study

ABSTRACT

Information technology (IT) is an essential part of organizations and significant investments are made in IT. Despite investment and enormous improvements in IT, quantifying the business benefits and value generated by such investments has been a challenge not only for practitioners but also for the academic researchers.
While extensive work has been done in developing theoretical frameworks relating to the business value of IT, challenges remain in implementing a practical model to derive business value generated by these investments at a firm level. Our work focuses on a practical unified model that integrates both resource based view concepts and competitive strategy perspectives to derive the IT business value generation and compare it using industry benchmarks. We use a case study approach to exemplify how firm level data can be utilized to provide such insights on IT business value.

KEYWORDS: IT business value, Firm performance, RBV, IT capabilities, and IT investments

INTRODUCTION

Despite the importance of Information Technology in modern organizations, it is difficult to establish its contribution to business performance (Kohli et al., 2008). Managers as well as research scholars are trying to understand and establish IT spending linkages to firm performance and value generation. IT spending is linked to firm performance and inter-firm process level measures (Barua et al., 1995). There is an inconsistency on the IT business value definition (Nigel et al., 2004) and our review highlights this inconsistency. Various conceptual models were developed to incorporate IT impact on operational level measures, external performance measures like market share (Barua et al., 1995) and sustainable competitive advantage over other firms in the industry.
Researchers have used various methodologies at multiple levels of analysis to study and operationalize the conceptual frameworks (Brynjolfsson 1993; Brynjolfsson et al., 1996; Wilson 1995). Most of the empirical work has focussed on capturing the business value of IT using industry level data (Yang et al., 2015; Ruivo et al., 2015; Powell et al., 1997; Brynjolfsson et al., 1996) and such models are difficult to operationalize at a firm level using system and firm level data. On the other hand, a lot of work has been done towards the development of theory and hypothesis on the business value of IT based on Resource based view (RBV) theory (Mata et al., 1995; Clemons & Row, 1991; Wade et al., 2004). In the context of business value of IT, the various definitions of IT business value generation can be broadly categorised into two paradigms – one that is focussed on cost, productivity, profitability and efficiency leading to competitive advantage and the other is the resource based view in which IT indirectly contributes to generate competitive advantage using firm's resources, assets and processes (Henderson and Venkatraman, 1999).
The theoretical work grounded on RBV theory and other perspectives for IT business value generation has been researched well. However, as evident in the literature review, such linkages are hard to quantify and difficult to operationalise at a firm level. While there are limitations and implementation challenges of the extant theoretical models using system and firm level data, it is important to note that the issue of business value of IT commences at a firm level since the IT investment happens at firm level and therefore it is critical to address it from a

firm level perspective using firm level data. In this work, we use a case study to describe the method for (a) collecting and organizing data of IT investments at a firm level and (b) test the business value of IT at a firm level by comparing measures at firm level and industry level and (c) use an integrative model to cover both competitive strategy and RBV perspectives for IT business value generation. The work demonstrates to both academia and industry how firm level data can be linked to firm and industry level measures establishing a critical link for IT business value. We provide a brief overview of the literature related to IT business value generation in the next section. This is followed by problem statement and the issues in implementing the extant theoretical models. We then discuss the methodology adopted in this paper. In the following sections, we elucidate the specific case study in a specific firm context, and the details on methodology, approach, and data. The concluding sections report the findings, implications and directions for further research.

LITERATURE REVIEW

Business value of IT has been a well-researched theme over the years and it is worthwhile to understand the definition and scope of the term, and how it has been operationalised. The commonly used term is typically operationalized in different and at times incommensurable ways and linked to enhancement of productivity, amelioration in profitability, cost abatement, and creation of competitive advantage (Devaraj et al., 2003). Nigel et al. (2004) define business value of IT at both firm and business process level and include external (competitive advantage) and internal benefits (cost efficiency). In this context, Henderson and Venkatraman (1999), proposed a framework using dual model that includes resource based view perspective and competitive strategy perspective. The competitive strategy perspective has external focus which requires business and IT strategy integration and requires IT support for strategy. On the other hand, the resource based perspective tends to be internally focused and requires operational integration and requires IT support for firm assets.

Resource Based View Perspective

We provide a brief review of literature and examine the proposed models in conceptualising IT business value specially focussing on operationalization and measurement at a firm level using RBV perspective. Mata et al. (1995) provide a framework to show how specific IT resources indirectly contribute to creation of SCA and their work uses RBV concepts at a conceptual level. They, however, do not provide any operational insights. Andreu and Ciborra (1996) again use RBV theory to investigate the role of IT in creation of competencies within the firm but they too provide little guidance on RBV measurement. IT assets and SCA conceptual linkages have been studied by Ross et al. (1996) but with little guidance on RBV measurement and the work is conceptual at large. Lopes et al. (1997) use RBV theory to provide a modified conceptual framework and multiple propositions in the context of online information services. Empirical work by Bharadwaj et al. (1998) provides multiple constructs to provide a useful conceptualization of IT capability for both researchers and practitioners. The work again is theoretical in nature and does not operationalize or test the links between capability constructs, firm performance or SCA. Work by Feeny et al. (1998) also studies core IS capabilities at a theoretical level. Work by Powell et al. (1997) provides empirical work based on retail industry survey to understand the relation of human, business, and technology resources. The work was focussed at an industry level of analysis and there is no direct measurement of business value of IT. In another empirical survey based work by Bharadwaj (2000), performances of firms having superior IT capability were compared to other firms. However, in their work also, the defined construct measures at a firm level were ignored in the empirical analysis. They use publicly available sources of data on corporate IT spending, IT budgets, size of IT staff, and other measures of IT use at an industry level. A survey based empirical work by Ray et al. (2001) to

study linkages between IT and enhanced customer service performance only supports IT dependence on RBV. Ravichandran et al. (2002) examine firm performance due to various types of IT and non-IT firm capabilities. However, capability measures were unspecified. Similar empirical work by Wade et al. (2003) uses the RBV as a guiding conceptual framework without any operationalization. Ruivo et al. (2015) assess ERP value from a different perspective using survey data. They use SMEs in European context to test their model. The study however is not at the firm level but across the SME sector.

Yang et al. (2015) also use industry-level data from 430 British SMEs to empirically examine the relationship between firm performance and ecommerce investments. This work specifically focussed on ecommerce as a capability but the results and analysis was based on survey results and analysis is done at a capability level across industry and not at a firm level.

Daulatkar and Sangle (2016) create a new IT business value conceptualization using systematic linking of various factors such as business and IS strategy, IS-business profiles but their work only provides operational definitions and remains untested.

While other management disciplines such as marketing, operations have used RBV theory to study areas like branding and product development capabilities (Wade et al., 2004), IT resources are less understood. RBV theory has been conceptually useful, it has also been less helpful in understanding how such key resources benefit the firm and how it can be measured (Stinchcombe 2000) and operationalised in a firm context. Our literature review reveals that there are still significant challenges in terms of applying and testing the available frameworks in operationalising the business value of IT at a firm level.

Competitive Strategy Perspective

In the context of IT business value discussion, the competitive strategy paradigm has been used to understand contribution of information technology to firm performance. This view stems from strategic management literature and dominated by competitive strategy framework (Porter, 1980). In IT context, Porter and Millar (1985), postulate that IT contributes by providing cost efficiency or enhancing differentiation to gain an attractive market position. Such a market driven perspective, differs from RBV perspective in that the resources are not valuable in itself but they provide value depending on how well they fit in the industry structure and how well they support a particular strategy. This differs from RBV perspective, which view resources as inherently valuable, and often rare and contends that the firm's unique resources should define the essence of strategy.

The competitive strategy or a market driven perspective has been discussed by Henderson and Venkatraman (1999) who view the firm as a bundle of strategic activities that adapts to industry environment by seeking an attractive position in the market. Bharadwaj (2000) also discuss the competitive strategy underpinnings in an IT context and sees IT capabilities like IT infrastructure, IT human resources, and IT intangibles - as a source of competitive advantage. Spanos and Lioukas (2001), argue on the divergent nature of the two perspectives and propose a composite model which elaborates upon both perspective’s divergent causal logic.

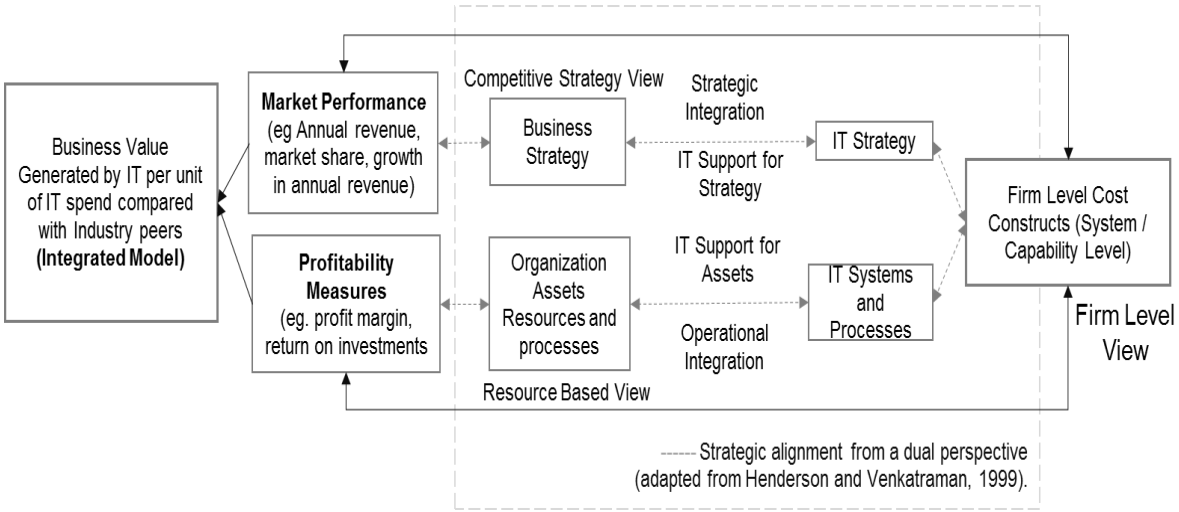
A number of IT researchers have adopted the market driven perspective to examine the potential and actual effects of IT on firm performance. Ives and Learmonth (1984) demonstrated how a firm can use IT to differentiate itself from its competitors and strengthen the relationship between a firm and its customers. Porter and Millar (1985) demonstrate how IT can alter the rules of competition by changing the industry structure, and can create competitive advantage to outperform rivals and create new business avenues. Tallon et al. (2000) rely on competitive strategy framework to study the relationship between goals that firms set for IT, management practices and executives' perception of the value of IT. They focus on IT effectiveness and strategic positioning and analyze how IT can help in extending market reach and changing industry and market practices. Although the premises on which the competitive strategy and

RBV frameworks differ, strategic management researchers, have studied on complementarity between the 2 perspectives (Henderson and Mitchell, 1997; Spanos and Lioukas, 2001). In IT context, the two perspectives have been used independently and often the perspectives have been suggested as competing (Duhan et al., 2001). Our review of the literature highlights that there are definitional inconsistencies, operationalization issues in existing frameworks specially at a firm level to understand and articulate the business value of IT. The objective of the present study is to improve our understanding of the contribution of IT to firm performance.

PROPOSED MODEL

We build upon the complementarity aspect of the two divergent perspectives and also address the issue of operationalizing the framework at firm level using firm level data. We are motivated to address these issues by adopting and extending the model proposed by Spanos and Lioukas (2001) which provides complementarity between the two perspectives discussed earlier. The proposed model encapsulates the effects of both IT support for business strategy and IT support for firm assets on firm performance. We also use a case study to demonstrate the concept at a firm level using firm level data and extend the model further to provide a comparison of firm's IT business value in comparison to its competitors using the proposed measures. The proposed model is depicted in figure 1

Figure 1: Proposed Model



Operationalization

To operationalize our model, we have considered multiple perspectives to cater to the specific objectives of our work. We propose to use an integrative approach to analyze business value of IT at a firm level using IT support for assets leading to profitability measures and IT support for strategy leading to market performance. Our operational requirement, therefore needs to consider outcome measures for IT support for strategy, IT support for profitability, benchmarking with industry peers that account for industry size, market dynamics and firm size and input costs at a firm level.

From RBV standpoint, IS researchers tend to conceptualize performance in terms of profitability. For instance, Melville et al. (2004) define performance in terms of efficiency, such as enhanced cycle time and cost reduction, while Bharadwaj (2000) and Santhanam and Hartono (2003) use

profit ratios. Profitability can also be measured in terms of profit margin, return on investments and financial liquidity (Suzanne et al., 2005). On the other hand, the discussions on the IT contribution to strategy suggests that the contribution is related to market performance, as IT helps change the rules of competition by new ways to outperform rivals and create new opportunities. Market performance, in this context can be measured in terms of annual revenue, market share, growth in market share and growth in annual revenue (Suzanne et al., 2005)
We also draw inspiration from Brynjolfsson et al. (2002) to examine the contribution of IT using the economic theory of production. The economic theory of production states that the output is related to inputs via a production function which can predict contribution of each input to output. In their work, they use firm level IS spending data as input against output generated by firms in the research framework. The inputs to our model are IT Capital, Non-IT Capital, IS/IT Staff spending, and other expenses but at a firm level, we have drilled down the component at a much granular level. These inputs comprise all spending by the firm in IT. This aspect is critical from a finance and economic point of view of attributing investments and costs in the context of the firm and IT spend.
Another critical aspect is of inter firm comparison of IT investments and costs in a specific industry context and market environment. Such a position helps to explain business value of IT even if IT investments and costs do not generate competitive advantage and when IT is treated as a necessity. We link the firm's IT resource costs to market and profitability measures depicting IT support for strategy and IT support for organization assets and resources and provide a comparison to industry benchmarks on those measures. We have picked one measure for each category and used Gartner benchmarking numbers to control for variances due to industry, firm size, and market specific characteristics. A brief summary of the input and output constructs used in our model is given in Table 1.

Table 1: Input and Output Cost Constructs

Inputs	Output Measures
- Flow Costs - Stock Costs	- Revenue (Competitive Strategy View) - Operating Expenses (Opex) (Resource Based View)
Operating expenses include items such as SG&A expenses, COGS / Cost of revenue, research and development, depreciation, and amortization expenses.	

Our work derives the flow and stock input parameters defined in production function theory at a firm and system level costs. Such a detailed view is helpful in understanding and taking all system level cost elements into consideration from a firm's context. In the context of larger capability discussion, the level of granularity also provides the required visibility to map, model and measure specific capabilities. Although the latter aspect is not in the scope of this work but the model takes care of a specific firm and industry context as capability definitions can vary across industries. Such a granular approach will be helpful in extending the model to resource based view conceptualizations.
We have chosen IT spend as a percent of revenues to represent the market performance at the firm level in the integrated model. This provides visibility into IT support and contribution towards strategy. For the profitability measures, we have chosen IT spend as a percentage of operating expenditure to reflect the IT support for organization assets and processes in the resource based view perspective in the integrated model. The two measures at the firm level in combination with the industry level benchmark numbers reflect the business value generated by IT in a specific market and industry context. The value of this measure also assists in identifying the competitiveness of investment levels relative to the most basic measure of business value generation.

Case Study Setting and Context

This paper uses a case study approach in a specific firm in the telecom industry context. The input cost construct and production output construct remains the same as posited in the paper in the earlier section albeit at a much-detailed level. The firm selected for case study was a medium size telecom service provider organization. Data was collected and analyzed after taking relevant approvals from relevant authorities, CIO and other stakeholders. For the purpose of anonymity and data privacy, name of firm has been masked. The study was done in multiple phases over a 9-month period as depicted in figure 2. Details of each phase and activities is depicted in Table 2.

Figure 2: Phases of the Case Study

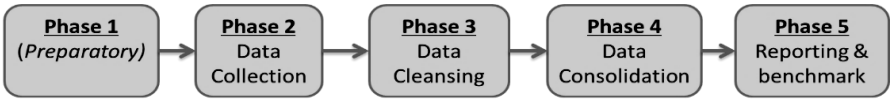


Table 2: Case Study Phase Details

Phase	Specific Activity / Methods	Participants
Phase 1 (1 month) *Preparatory work*	Interviews with senior stakeholders and managers of the system portfolio, review system, documents and user guides etc.	• Key systems • System managers • System details
Data Collection (3 months)	Interviews, system reviews with system SMEs for each system to create system specific inventory (structured and unstructured information).	• System subject matter expert (SME) and managers
Data Cleansing (2 months)	System specific reviews with SMEs for each system including feedback and correction.	• System SME and system managers
Data Consolidation (2 months)	Data consolidation, analysis and SME review for each system before reporting.	• System SME and system managers
Benchmarking	Final report preparation and benchmarking	
Final Review (1 month)	Presentation and review (multiple sessions)	• CIO/ CTO / CFO/ Heads/ Directors

Data Collection

Input Costs

Based on the criteria defined earlier, the following data was collected after discussion with the various departments within the IT function and discussions with the senior managers and CIO.

IT Footprint

The IT footprint covered 100+ business critical and high availability systems / applications, and included servers, databases, across countries. The study covered all aspects of IT function and broadly covers:

- Application development and support activities,
- IT infrastructure,
- IT service Desk,
- End user computing

- Software maintenance and vendors
- IT vendors

A high-level view of all systems covered is shown Table 3.

Table 3: IT Cost Components	
System	Generic / Industry Specific
Customer Facing Systems	Generic
CRM System	Generic
Order Management	Industry Specific
Inventory management	Industry Specific
OSS Systems (Service activation, provisioning, configuration, monitoring)	Industry Specific
Intranet and Internet applications	Generic
EAI Systems	Generic
Billing Systems	Industry Specific
HR systems	Generic
Sales and Marketing Applications	Generic
ERP Systems	Generic
Procurement Systems	Generic
Content Management Systems	Generic
Business Analytics and Reporting	Generic
Workflow management systems	Generic

The Opex and Capex costs components described in Table 4 were collected over a period of 1 year.

Table 4: IT Cost Components
Cost Components Covered (Capex and Opex)
Application Maintenance & Support Costs (Maintenance and Support)
Application Hardware
Database costs including Hardware
End User Computing hardware and maintenance
Internal and External Labor
Depreciation (Including license costs)

Data was collected for specific systems to map it to specific capabilities. Application maintenance and support costs cover the cost of supporting and maintaining systems that are in use and primarily include software support and maintenance costs, internal and external labor costs to support and maintain systems and IT infrastructure. Capex costs primarily include cost of building new systems, new IT infrastructure, and depreciation charges. Table 5a and Table 5b provide detailed stock(capex) and flow (opex) costs respectively.

Table 5a: Detailed Cost Components (Stock)					
Stock (€ '000)	Dep	HW Costs	Labor – Internal	Labor - External	Total
Area					
Order Management	1341	16	1099	806	1921
Billing Systems	4464	112	1125	582	1819
BI Systems	0	2	81	0	83
Telecom Systems	218	70	446	329	846
Digital / Online Systems	1085	31	88	622	741
Order Management	3585	214	1128	6155	7497
Collaboration and CMS	274	13	7	0	20
ERP	682	4	394	499	896
Middleware and EAI	328	7	628	211	846
CRM	1285	0	162	162	324
Workplace Technology	-			396	396
Total (Stock)	13262	468	5159	9761	15388
**Numbers masked by an unknown factor and averaged over 2 years to ensure anonymity while preserving the relationship*					

Table 5b: Detailed Cost Components (Flow)					
Flow Costs (€'000)	M&S Costs	Hardware, Database	Labor - Internal	Labor - External	Total Flow Costs
Area					
Order Management	857	276	239	314	1686
Billing Systems	1327	206	1131	458	3121
Business Reporting	810	0	293	360	1463
Telecom OSS Systems	1648	44	471	0	2162
Digital Systems	695	18	151	0	863
ERP System	2894	30	852	0	3776
Middleware and EAI	231	0	312	0	543
CRM systems	2211	236	890	2016	5352
Workplace technology	248		267	1362	1877
Total (Flow)	10920	809	4605	4509	20843
* *Numbers masked by an unknown factor and averaged over 2 years to ensure anonymity while preserving the relationship.*					

After data collection exercise, data was collated and summarized for aggregate external measures and inter-firm comparison. The inter-firm comparison was based on Gartner's telecom industry benchmark numbers during the study period (Gartner, 2013). These have been summarized in Table 6 below. For purpose of anonymity, the actual numbers have been masked, without prejudice to the results.

Table 6: Inter-Firm Comparison of IT Spend				
Key Measure for Business Value of IT	Industry Norms*	Firm Under Study	Perspectives	
IT Spend as % of Total Revenue	3.9%	< 2.8%	Competitive Strategy View	IT Support for Strategy
IT Spending as % of Operating Expenses	4.6%	< 3.5%	Resource Based View	IT Support for Assets and Organizational Processes

Discussion and Implications

The case exemplifies IT business value representation using an integrative model at a firm level. The integrative model provides visibility into IT support and value addition for both strategic as well as internal organization processes requirements. The case also provides a mechanism to compare the IT business value generation using industry level benchmarks. Such an inter-firm comparison of value generated by IT spend is valuable even if it is assumed that IT is a strategic necessity. The case suggests that under a steady state scenario, and under similar market and industry conditions - if IT spends are under the industry benchmarks, the specific organization is doing sufficient contribution to generate value – better than its peers. The IT support for business strategy and organizational processes cover both RBV and competitive strategy perspective. A review of the benchmarked data with the management and CIO, and analysis of firm specific IT activities, it was evident that the specific firm was doing better in terms of converting IT resources into capabilities which in turn may lead to SCA in the long run. Discussions with management and leadership also revealed several factors that were responsible for the better performance compared with the peers in the industry. These factors are described below:

- Increased offshoring to low cost geographies providing cost advantage.
- Insourcing in critical and strategic areas and reduced reliance on costly vendor resources.
- Infrastructure virtualization to reduce cost on IT Infrastructure.
- Centralization of IT workforce and systems from distributed country based IT work force model.
- Strong process and IT Governance leading to cost efficiencies.
- Process automation of multiple business processes.
- Use of matured open source platforms to reduce maintenance costs on software license and maintenance cost.
- Selective investments to switch off old technologies, duplicate platforms and replacement with cheaper and better open source technologies.
- Rationalization of hosted system usage and contract negotiation based on true usage.
- Regularly assess the business risk against the rewards by converting COTS vendor support to a managed service or Time and based model.
- Regular review of vendor / supplier performance and cost negotiation based on performance including changing vendor mix and rotation.

The above factors can be easily mapped to the IT support for strategy competitive strategy perspective) and IT support for systems processes and assets (RBV perspective). Such a view

provides a good view how IT investments generate business value. The case also demonstrates that contribution of IT investments at the firm under study is better than the other contributors to operating expenses after controlling other factors such as firm size, industry characteristics, market conditions. This view indicates better business value generated by IT spend vis-à-vis its competitors. It must be noted when industry growth is flat or declining, the capital expenditure in a specific industry will also be low and there will be significant cost pressure to increase profitability. This is typically an industry level phenomenon rather than firm specific characteristic and is a good indicator of steady state spend. On the other hand, when the industry is growing, the IT investments profile will be different and possibly high and may not reflect a steady state IT spend profile as the spend ratios may be skewed due to lead time to generate returns. Such factors need to be analyzed and controlled by extending the study over a longer duration.

CONCLUSION

In our work, we extended an extant model to analyze IT contribution to business value generation using a case study approach. We successfully demonstrated how firm specific data can also be linked to external measures and compared at industry level using a unified approach. One of the major contributions of our work is using an integrative approach to investigate business value of IT at a firm level considering both competitive strategy and resource based view perspectives. We also extended the proposed model to provide a mechanism for inter-firm comparison using benchmark data resulting in new knowledge creation.

A significant contribution of our work is the practical aspect of the model as we have demonstrated how firms can use firm level data to measure and compare business value generated by IT in comparison to industry peers. The work also contributes significantly towards linking an extant theory with practice showing the strong connection and how academics and practice can benefit from each other. While our work does not directly address the question of capability measurement, it provides a future research path by integrating capabilities with system level data and linking to external measures. We have also demonstrated how IT spend relate to other spend in contributing to business value. Future research work can focus on linking the granular system level data elements to intermediate capability measures which in turn can be linked to specific external measures. Possible extensions of this study can include linking specific capabilities to specific systems in a different industry and geography context.

REFERENCES

Andreu, R. and Ciborra, C. (1996). Organizational learning and core capabilities development: the role of IT. *Journal of Strategic Information Systems.* 5(2), 111-127

Barua, A., Kriebel, C. H. and Mukhopadhyay, T. (1995). Information Technologies and Business Value: An Analytic and Empirical Investigation. *Information Systems Research,* 6(1), 3-23.

Bharadwaj, A. S., Sambamurthy, V. and Zmud, R.W. (1998). IT Capabilities: Theoretical Perspectives and Empirical Operationalization. *Proceedings of the 19th International Conference on Information Systems*, 378-385.

Bharadwaj, A. S. (2000). A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly,* 24(1), 169-196.

Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM*,36, 12 (December 1993),67-77.

Brynjolfsson, E. and Hitt, L. (1996). Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending. *Management Science,* 42(4), 541-558.

Brynjolfsson, E., Hitt, L. M. and Yang, S. (2002). Intangible Assets: Computers and Organizational Capital. *Brookings Papers on Economic Activity,* 2002(1), 137-198.

Clemons, E. K. and Row, M. C. (1991). Sustaining IT Advantage: The Role of Structural Differences. *MIS Quarterly,* 15(3), 275-292.

Daulatkar, S. and Sangle, P. (2016). "Proposed re-conceptualization of IT business value benefits", *Business Process Management Journal,* 22(3), 522-545.

Devaraj, S. and Kohli, R. (2003). Performance Impacts of Information Technology: Is Actual Usage the Missing Link?., *Management Science* 49(3), 273-289.

Duhan, S., Levy, M., Powell, P. (2001). Information systems strategies in knowledge-based SMEs: the role of core competencies. *European Journal of Information Systems*, 10(1), 25–40.

Feeny, D. F. and Willcocks, L. P. (1998). Core IS Capabilities for Exploiting Information Technology. *Sloan Management Review,* 39(3), 9-21.

Gartner IT Key Metrics Data 2013: Key Industry Measures: Telecommunications Analysis: Multiyear, December 2013.

Henderson, R. and Mitchell, W. (1997). The interactions of organizational and competitive influences on strategy and performance. *Strategic Management Journal*, Summer Special Issue, 18:5-14.

Henderson, J.C. and Venkatraman, N. (1999). Strategic alignment: leveraging information technology for transforming organizations. *IBM Systems Journal,* 38(2/3), 472–484.

Ives, B., Learmonth, G.P. (1984). The information system as a competitive weapon. *Communications of the ACM*, 27(12),1193–1200

Kohli, R., and Grover, V. (2008). Business value of IT: An essay on expanding research directions to keep up with the times. *Journal of the Association for Information Systems,* 9(1): 23-39.

Lopes, A. B. and Galletta, D. (1997). Resource-Based Theory and a Structural Perspective of Strategy Applied to the Provision of Internet Services. *Proceedings of the Third Americas Conference on Information Systems*, Indianapolis, IN.

Mata, F. J., Fuerst, W. L. and Barney, J. B. (1995). Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis. *MIS Quarterly,* 19(4), 487.

Melville, N., Kraemer, K. and Gurbaxani, V. (2004). Information Technology and Organizational Performance: An Integrative Model of IT Business Value. *MIS Quarterly*, Vol. 28, 283-322.

Nigel, M., Kenneth, K. and Vijay, G. (2004). Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value. *MIS Quarterly,* 28(2), 283-322.

Porter, M.E. (1980). Competitive Strategy. *The Free Press*.

Porter, M.E., Millar, V.E. (1985), How information gives you competitive advantage. *Harvard Business Review*, 63(4),149–160.

Powell, T.C. and Dent-Micallef, A. (1997). Information technology as competitive advantage: the role of human, business, and technology resources. *Strategic Management Journal,* 18(5), 375-405.

Ravichandran, T. and Lertwongsatien, C. (2002). Impact of Information Systems Resources and Capabilities on Firm Performance: A Resource- Based Perspective. *Proceedings of 23rd International Conference on Information Systems*, 577-582.

Ray, G., Muhanna, W. A. and Barney, J. B. (2001). Information Technology and Competitive Advantage: A Process-Oriented Assessment. Working Paper, *University of Texas at Austin*.

Ruivo, P., Oliveira, T. and Neto, M. (2015). "Using resource-based view theory to assess the value of ERP commercial-packages in SMEs", *Computers in Industry*,(73), 105-116.

Ross, J. W., Beath, C. M. and Goodhue, D. L. (1996). Develop Long-Term Competitiveness through IT Assets. *Sloan Management Review,* 38(1), 31-42.

Santhanam, R., Hartono, E. (2003). Issues in linking information technology capability to firm performance. *MIS Quarterly*, 27 (1), 125–153

Spanos, Y.E., Lioukas S. (2001). An examination into the causal logic of rent generation: contrasting Porter's competitive strategy framework and the resource-based perspective. *Strategic Management Journal*, 22(10), 907–934.

Stinchcombe, A. L. (2000). Social Structure and Organizations: A Comment. *Economics Meets Sociology in Strategic Management: Advances in Strategic Management*, J. Baum and F. Dobbins (eds.), JAI Press.

Suzanne, R., Raymondb, L., Verreaultc, D. (2005). Resource-based view and competitive strategy: An integrated model of the contribution of information technology to firm performance. *The Journal of Strategic Information Systems*, 15(1), March, 29–50.

Tallon, P.P., Kraemer, K.L., Gurbaxani, V.(2000). Executives' perceptions of the business value of information technology: a process-oriented approach. *Journal of Management Information Systems*, 16(4), 145–173.

Wade M. and Gravill, J. (2003). Diversification and Performance of Japanese IT Subsidiaries: A Resource-Based View. *Information and Management,* 40(4), 305-316.

Wade, M. and Hulland, J. (2004). Review: Resource-Based View of IS Research Review, Extension and Suggestions for future Research. *MIS Quarterly,* 28(1), 107-142.

Wilson, D. D. (1995). It Investment and its Productivity Effects: An Organizational Sociologist's Perspective on Directions for Future Research. *Economics of Innovation and New Technology,* 3(3-4), 235-252.

Yang, T., Xun, J. and He, X. (2015). British SMEs' e-commerce technological investments and firm performance: an RBV perspective. *Technology Analysis & Strategic Management,* 27(5), 586-603.