Business Analytics and Business Value: A Case Study

Completed Research Paper

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Abstract

In the backdrop of growing adoption of business analytics in various business domains, it is important for investing firms to understand how business value is created from the investments. Earlier studies conducted in IT domain have highlighted how higher investment in technology may not bring more returns, rather how IT as a capability built by the organization acts as a key mediator in the business value creation. This research extends the model to business analytics, first to identify elements of underlying concepts like analytics technology assets and analytics capability, using a case study approach. This research further captures how analytics resources contribute to business performance by developing suitable operational and organizational measures for performance. This research contributes to the body of knowledge related to business analytics in the form of theory building.

Keywords: Business Analytics, Business Value, Analytics Capability, Analytics Technology Assets, Resource Based View
Introduction

Business Analytics is generally understood as the extensive use of data, statistical, and quantitative analysis to support management decisions and actions. Analytics may be input for human decisions and could also drive fully automated decisions (Davenport and Harris, 2007). With the recent growth of big data and intuitive BI tools, data is more accessible and there is a big opportunity to make better decisions using that data to drive incremental revenue, decrease cost, and improve profit by building better products and services. More and more companies are now equipping their employees with the know-how of Business Analytics to drive efficiency in strategic and day-to-day decision making (Jain, 2013).

Achieving growth and business value in today’s challenging economy has driven many companies to focus on their core competencies by leveraging resources such as differentiated knowledge contained within their processes, technologies, and relationships. Business value of IT has been a focused area of research in information systems since IT represents a sizable percentage of the budget spending for companies and is quickly developing into a valuable strategic asset (Maizlish and Handler, 2005). Research on business value of IT examines the organizational performance impacts of information technology. Several studies have shown that information technology contributes positively to firm performance. Some studies have identified the determinants of business value, such as, type of IT, management practices, and organizational structure (e.g., Melville, Kraemer and Gurbaxani, 2004).

Information systems for business analytics have a distinct character and its implementation strategy and usage differ from previous IT systems used in business (Marchand and Peppard, 2013). Although business analytics appears to play a significant role in the business, understanding about how business analytics investments create business value has been quite limited. Davenport and Harris (2007) proposed a five stage model to classify firms based on analytics capability. According to this classification, firms in stage 1 have virtually no analytics capability, stage 2 firms have localized analytics, stage 3 firms have analytical aspirations, firms in stage 4 have clear intent and are close to developing analytics as a competitive strategy, and those in stage 5 use analytics as a competitive strategy. Several firms from diverse domains such as consumer products, financial services, hospitality and entertainment, industrial products, pharmaceuticals, retail, telecommunications, and transport have been identified as stage 5 analytic competitors. These organizations compete on analytics and their analytics practice exhibits distinct capabilities, enterprise wide use, and senior management commitment to use analytics for market competition.

Some studies by market research agencies have documented returns that companies can earn from investments in analytics. For example, International Data Corporation (IDC) reported that analytics projects for production function had a median ROI of 277%, financial management yielded a median ROI of 139% and investment in analytic CRM provided median ROI of 55% (Morris, 2003; Davenport and Harris, 2007). Following a large scale survey of large and medium sized firms, Davenport and Harris (2007) reported a statistical association between the use of analytics and business performance, the latter measured in terms of profit, shareholder return and revenue growth. However, the mechanism by which analytics contributes to business performance is not reported in academic studies. For example, when two organizations in the same domain invest in comparable analytics resources, the differential impact of the investment observed between the firms has not been studied.

Although concepts such as analytics capability and analytics technology have been used in prior studies (e.g., Davenport and Harris, 2007), it is not clear what are the elements of these concepts and how they contribute to business value. This paper addresses the following research question:

How does business analytics contribute to business value of firms?

To answer this question, we need to understand the key factors that constitute business analytics capability of a business organization. What are the measures used in understanding contribution of business analytics to firm performance as well as how the business analytics capability influences performance of various business functions. This study seeks to extend the previous studies on IT business value to business analytics and aims to build a suitable model using case studies.
This research is expected to contribute to the body of knowledge related to business analytics. In the backdrop of growing adoption of business analytics, it is important for investing firms to understand how business value is created from the investments. For example, similar research (Aral and Weill, 2007; Bharadwaj, 2000) conducted in IT domain has highlighted how higher investment in technology may not bring more returns, rather how IT as a capability, built by the organization acts as a key mediator in the business value creation. Following the same approach this research would extend the model to business analytics, first to identify elements of underlying concepts like analytics technology assets and analytics capability. This research will further capture how analytics resources contribute to business performance by developing suitable operational and organizational measures for performance.

Business Value in IS Literature

From the 1990s, the term Business Intelligence (BI) came into use by the IT and business communities. In the late 2000s, business analytics was introduced to represent the key analytical component in BI (Davenport, 2006). Recently big data and big data analytics have been used with reference to data sets and analytical applications that are large and complex (Chen et al., 2012). According to Davenport (2006) Business analytics in contrast with Business intelligence, “focuses on developing new insights and understanding of business performance whereas business intelligence traditionally focuses on using a consistent set of metrics to both measure past performance and guide business planning. This suggests a greater focus on statistically and mathematically derived insights in business analytics. If business intelligence typically stopped at performance reporting, business analytics encompasses both the reporting of performance and the attempt to understand and predict it.”

Since studies on business value of business analytics are scarce at this moment, we refer to the previous literature on business value of IT. Previous research on the business value of IT has addressed the issue of IT investment and business performance by using concepts from organizational theory and business strategy showing IT business value is dependent on various factors including the type of IT, management practices, organizational structure as well as competitive and macro environment (Melville et al., 2004). In the organization-centric pre-Internet era, the IT business value research was based on the perspectives of internal business processes, organizational structure and workplace practices (Bharadwaj, 2000; Lichtenberg, 1995; Mata et al., 1995). In the network-era, IT is found to be valuable, the extent and dimensions are dependent upon internal and external factors, including complementary organizational resources of the firm and its trading partners, as well as the competitive and macro environment (Melville et al., 2004). Complementary organizational resources include organizational structure, policies and rules, workplace practices, culture, etc.

Researchers have used many theoretical frameworks to analyze the value of IS for organizations including theories in microeconomics, industrial organization theory, socio-political theories, organizational behavior theory, resource-based view, and decision theory (Schryen, 2013). Many researchers have used Resource Based View of the firm as a conceptual framework (Barney, 1991; Melville et al., 2004; Nevo and Wade, 2010) to study the effect of IT investments on business performance. Resource Based View of the firm has been taken as the primary theory base because it combines the rationale of economics with a management perspective (Melville et al., 2004). Using this framework, previous research on IT business value was also focused on obtaining sustained competitive advantage, linking firm strategy and performance by creating IT capability (Barney, 1991; Aral and Weill, 2007).

Using Resource Based View of the firm, Mata et al. (1995) have showed that of the four attributes of IT: capital requirements, proprietary technology, technical IT skills, and managerial IT skills, managerial IT skills is the only one that can provide sustained competitive advantage. The Resource Based View on IT Value conceptualizes IS assets as resources and identifies the strategic purpose of IS resources for the firm (Wade and Hulland, 2004). Following the RBV framework some previous studies have also shown that IT investments have a positive relationship with firm performance, measured in terms of financial ratios such as return on assets and return on sales (e.g., Bharadwaj, 2000). The study concluded that firms should be doing much more than merely investing in IT, creating a firm-wide IT Capability, which is complex, requires time and effort, and underlying mechanisms through which it is created are not clear.
Despite the fact that IT business value is one of the widely researched topics, gaps still exist in terms of the ambiguity and fuzziness of IT business value construct, disaggregation of IT investments, and the value creation process (Schryen, 2013).

Aral and Weill (2007) observed substantial variation across firms on the return on investment in IT and suggested that a set of organizational characteristics that are simultaneously associated with both IT investments and organizational performance could explain the variation. This study has further conceptualized IT resources as a combination of investment allocations in certain set of IT assets and a system of competencies and practices which together form IT capability of a firm (Aral and Weill, 2007). There are differences in the use of performance metrics by various researchers, some have used measures pertaining to business performance limited to operational level performance impact of IT whereas others have used organizational level measures such as Tobin’s q, profit, revenues and financial ratios (Melville et al., 2004).

Since business value studies in business analytics is scarce at this moment, this study seeks to extend the previous studies on IT business value to business analytics. Though Business Analytics has a substantial Information Systems component, information systems for business analytics have a distinct character and its implementation strategy and usage differ from previous IT systems used in business (Marchand and Peppard, 2013). To understand the current state of research specifically in Business Intelligence and Analytics (BI&A), a recent bibliometric study of academic and industry publications revealed a total number of 3602 publications during the 12 year period of 2000-2011 with the largest source being academic conferences (Chen et al., 2012). The focus of the BI&A research has been primarily technical with some flavor of specific domains like supply chain so far with very few publications in the adoption, business process management, strategy and business value research areas. The Resource Based View and Dynamic Capabilities theory have been used as the basis to establish some of the business value models.

Based on the literature review above, we have presented a framework in the following section that captures the state of knowledge relating to business value of IT in the context of business analytics.

**Theoretical Framework**

This section provides the theoretical framework to address the research questions. An a priori framework is developed to serve as the basis for understanding and analyzing the factors behind the business value created by business analytics in an organization. We refine our theoretical understanding of the initial model using empirical evidence from the analysis of case study data.

![Figure 1. Theoretical Framework for Business Value of Business Analytics](image-url)
have been used as complementary concepts in defining IT capability (Aral and Weill, 2007). Following this approach, it is expected that quantitative skills, expertise in scientific problem solving approach, and IT skills would be important constituents of analytics capability. Drawing on the theory of resource based view of the firm and its previous application in IT business value studies (e.g., Aral and Weill, 2007, Bharadwaj, 2000), the model depicted in Figure 1 is proposed for further explorative case study.

**Research Methodology**

For the purpose of theory building, we use a qualitative case study approach. We use a single site multiple case study approach with replication, following Yin (2014, p. 57). The replication logic is analogous to that used in multiple experiments. Case study methodology is used to examine a phenomenon in its natural setting employing multiple data collection methods to gather information from people, groups or organizations. Most of the times, the boundaries of the phenomenon are not clearly evident at the start of the research (Yin, 2014). In addition, case research strategy is well suited to understand the nature and complexity of the phenomenon. It is also an appropriate methodology where studies are scarce, providing an opportunity to gain further valuable insights (Benbasat et al., 1987). Case studies offer in-depth understanding of contemporary phenomenon within their organizational context (Yin, 2014). Business value studies in business analytics is scarce at this moment and the mechanism by which analytics contributes to business performance is also not clear. Hence case study approach was chosen.

For theory building research, though it is preferred to start with an ideal clean theoretical slate of ‘no theory under consideration’ and ‘no hypothesis to test’ (Eisenhardt, 1989, p.536), we chose to formulate the research problem with some potentially important variables from extant literature. The approach of starting with an a priori research model for theory building is based on the “retroduction” strategy which describes the interplay of deductive and inductive research, referred to as ‘reality check’. The inductive and deductive methods are intimately related in the activities of doing empirical research and theory building (Harrison, 2002). Koh, Ang, and Straub (2004), while studying IT outsourcing success, started off with a similar deductive approach and used a theoretical lens of psychological contracting since no model existed that captured all possible factors affecting IT outsourcing success. Selection of the case study organization was done based on the criteria of 'best' environment for exhibiting the phenomenon under study, best from the point of view of ease of access and management support (Harrison, 2002). The strategy of choosing a single research site also helped us to control for potential bias of organizational culture (Hofstede, 1980). The unit of analysis for the case study was chosen to be the 'analytics organizations’ which are the analytics teams or analytics departments catering to specific business domains of the case study organization. In order to achieve analytic generalization (Yin, 2014) of our model, we have used a single site multiple case studies research approach. Analytic generalizability will be achieved through replication of the multiple cases. The case study approach was found to be very effective in arriving at the constructs and their relationships for refining the theoretical model. Our approach didn’t force the informants into pre-specified constructs, rather it gave us a tool to listen and encapsulate the information provided by informants. It allowed for the important dimensions to emerge from the analysis of the interviews and other sources of information collected. Dibbern, Winkler and Heinzl (2008) adopted a similar single site multiple case studies approach and used an a priori theoretical framework as the basis for analyzing the extra costs in offshoring software projects to Indian vendors.

We were provided access to the analytics team leaders, who were managers or senior managers and senior executives of the analytics organization as well as the customer organization. Data collection was carried out using interview method and relevant documents were also made available based on request. We conducted nine case study interviews with key informants and informants over a period of 3 months in 2014. During the preliminary interview with the key informant, informants were identified for further interviews. The key informants and informants had over 10 years of experience including analytics domain experience and had sufficient knowledge to provide information on behalf of the organization they represented. Most of these interviews lasted for about an hour with some of them lasting up to two hours. A semi structured questionnaire based on the theoretical model was used as the interview protocol and the questionnaire was revised subsequent to the first interview with one of the key informants. All the interviews were conducted over phone and were recorded with the informant’s permission and the audio
was manually transcribed to text form. We also made extensive notes during the interviews for reference during data analysis.

During the data analysis, the transcribed text, across all cases would be reviewed to identify concepts and will be captured under common items. These items will then be grouped based on their relevance to the concepts where they are already available in the business analytics domain or will be grouped under new concepts to be included under the dimensions of the refined model.

**Case Study**

**Case Study Organization - Background**

The case study organization is a computer technology company headquartered in the USA and has Shared Services Centre in India. The shared services centre also hosts a captive analytics division supporting multiple business domains with dedicated analytics teams working collaboratively with the business functions. The organization has been code named CompuCorp and its captive analytics division, CompuCorp Analytics (CCA).

The analytics division has teams or departments (also known as 'Analytics Organizations') catering to analytics needs of all key business functions of CompuCorp such as pricing and product, sales and marketing, contact centre, service, online, supply chain and operations, and CompuCorp Financial Services (CFS). It is a centralized analytics entity having a global view of the entire organization, catering to most of the analytics needs of the computer technology company working closely with all global business functions. The analytics division caters to the global business functions in all three geographies (Americas, Europe Middle East Africa and Asia Pacific Japan). The analytics division has its own employees as well as partners to provide resources for the analytics needs. While the business divisions are free to outsource their analytics services requirements from the recognized vendors, the captive analytics division seems to be well patronized by the business divisions. Funding for the analytics division is by individual business functional teams (in the form of head count or resources) and is at global level. Central funding also exists for the analytics division. For investments in software and hardware, IT division provides funds and analytics division utilizes the same.

The analytics division was established ten years ago primarily to address the reporting needs of the organization. When it was established, there was no major corporate strategic direction and was established in India mainly due to the availability of talent pool as well as following some of the peer organizations which had set up analytics division in India then and started functioning well. The analytics division functional heads report into the head of analytics division either directly or through a layer of senior management. The analytics division head reports into the Sales and Operations Business Intelligence Centre of Excellence.

In the initial years, the business functions were not clear about the contribution of Analytics division - 'are they building only models and acting as consultants or are they part of the extended team?' From the point of view of senior management, the analytics division was a strategic partner. From the point of view of operational teams at ground level, there were problems for Analytics division as a whole. However, over the years, business divisions have started feeling that Analytics division is part of their extended team. Over the last ten years, the analytics division has transformed itself completely in terms contributions made to the business, from a reporting arm to a completely decision science based data driven analytics division, driving business.

**Profile of Case Study Participants**

In line with the requirements of single site multiple case studies envisaged in the research methodology, the informants were from various analytics departments of CompuCorp Analytics. The informants for the case studies were identified during the preliminary interview with the senior executive, the key informant. Table 1 provides the details of the case study informants, their departments, roles and number of years of experience including analytics.
Table 1. Case Study Participant Profile

<table>
<thead>
<tr>
<th>No.</th>
<th>Analytics Organization / Department</th>
<th>Participant Role</th>
<th>Total Experience including Analytics (No. of years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Product &amp; Pricing Analytics</td>
<td>Senior Manager</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>CompuCorp Financial Services</td>
<td>Manager</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Contact Centre Analytics</td>
<td>Senior Manager</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Services Analytics</td>
<td>Senior Manager</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>Online Analytics</td>
<td>Manager</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Marketing Analytics</td>
<td>Manager</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>Supply Chain and Operations Analytics</td>
<td>Senior Manager</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>CompuCorp Analytics</td>
<td>Head (Director)</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>Technical Support, CompuCorp</td>
<td>Director</td>
<td>25</td>
</tr>
</tbody>
</table>

Data Analysis

The transcripts from the 9 case study interviews were collated into a case protocol comprising 30,789 words and 70 pages of text. When we did the encoding, we didn't have an a priori list of concepts and hence we did more of an inductive approach to generating items (codings) from the data. The approach to data analysis was twofold. While the case studies were encoded and structured by us using the software Nvivo, we got the coding and structuring done manually too. In order to establish definitional clarity and reliability of data analysis and also mitigate potential bias (Dibbern et al., 2008), a researcher not related to the project, who had not taken part in the interviews read and coded the case study interview transcripts by identifying text passages that included information about the constructs. Comparison of the two sets of coding resulted in an inter-coder reliability of 80 percent. The mismatched codings were examined and the final codings were mutually agreed between the two sets. This process resulted in a table of 79 items (codings) and 762 passages with each case study analyzed separately, reusing the coding and creating new ones where required. To increase the validity of our coding and data analysis procedure, we examined multiple sources of evidence from different informants in the form of documents and multiple citations.

Table 2 provides the concepts that emerged along with the items (codings) as outcome of the analysis of case studies. In addition, Table 2 provides the definition of the concepts that emerged out of the case study analysis. Of the eighteen concepts that emerged from the analysis, we have used the existing definitions for ten concepts (notated * and #) from the current literature on Business Analytics. For the rest of the concepts we have provided the definitions.

Discussion

Based on the concepts that emerged out of the case study analysis, mapping of the concepts to the dimensions of the initial theoretical framework was done (Table 2) to arrive at the proposed model.

Dimensions of the Proposed Model

Analytics Technology Assets

As part of the case study we observed that the Analytics Technology Assets which are key to the setting up and existence of the Analytics division are actually at the responsibility of the IT organization and as the analytics organization matures, the processes around creating and managing these physical assets become stabilized and streamlined. In the context of the case study organization, these are the BI Infrastructure, Analytics Software and Tools, and Data Sources. Data sources are also managed by a separate division similar to infrastructure, relieving the analytics team of that responsibility. IT organization plays a key role in collaboratively working with Analytics division to cater to its ever increasing IT needs on a continuous basis.
## Table 2. Items (Codings) and Concepts from Data Analysis, Definitions and Dimensions

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Items</th>
<th>Reference / Definition of Concept</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analytics Adoption</td>
<td>Analytics Usage-Adoption</td>
<td>This refers to Organization's prioritization of analytics usage in business domains. Typically they begin with efficiency goals, followed by growth objectives and finally move on complex business challenges. As this happens, adoption both spreads and deepens (LaValle et al., 2012)</td>
<td>Analytics Capability</td>
</tr>
<tr>
<td>2. Analytics Alignment with Business</td>
<td>Alignment to Business Goals Business Goals (Business &amp; Analytics plan together &amp; agree on goals) HOSHIN Plan - Analytics &amp; Business Plan together Integrating Business &amp; Analytics Stakeholder Alignment</td>
<td>This refers to the Analytics team and Business team performing the goal setting together. They plan together and agree on the goals and deliverables.</td>
<td>Analytics Capability</td>
</tr>
<tr>
<td>3. Analytics Culture #</td>
<td>Analyst Alignment Analyst Attrition (as Opportunity) Analyst Career-Lifecycle Management Analytics Culture Culture as highest level of Competitive Advantage Driving Business Functions Open Culture within Analyst Community</td>
<td>Cosic et al. (2012, p.5)</td>
<td>Analytics Capability</td>
</tr>
<tr>
<td>4. Analytics Ecosystem</td>
<td>Tie-ups with Vendors for Sourcing Industry &amp; Academia Collaboration Knowledge Management Level of Expertise in Analytics (Evolved) Participation in Analytics Forums (External and Internal)</td>
<td>Refers to the collaborative vendor environment of the organization to leverage its analytics goals. Extends well beyond providing requisite human resource pool, training, sharing the resource requirement fluctuations, providing support for niche skill project requirements. In addition, it refers to the Organization’s ability to collaborate with academia and other players in the industry, its ability to capture and manage the knowledge assets, artifacts and processes related to analytics and effectively utilize them, ability of the organization to move up the analytics ladder in terms of providing diagnostic, descriptive, predictive and prescriptive modes of analytics outcomes, ability to share analytics knowledge internally and externally freely.</td>
<td>Analytics Capability - Value Enhancers</td>
</tr>
<tr>
<td>5. Analytics Leadership *</td>
<td>Leadership - Direct Communication, Goal Sharing Leadership Commitment</td>
<td>Seddon et al. (2012, p.6)</td>
<td>Analytics Capability - Value Enhancers</td>
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<tr>
<td>6. Analytics Organizational Structure</td>
<td>Analytics Team Structure</td>
<td>Refers to the organizational structure of the analytics team and its positioning with regard to the business divisions or domains to achieve maximum value from the analytics - business collaboration.</td>
<td>Analytics Capability</td>
</tr>
<tr>
<td>8. Analytics Tools &amp; Techniques #</td>
<td>Analytics Tools &amp; Techniques</td>
<td>Cosic et al. (2012, p.5)</td>
<td>Analytic Technology Assets</td>
</tr>
<tr>
<td>9. Competitive Environment</td>
<td>Competitive Environment</td>
<td>Refers to factors that are not in control of the business organization - competitors and their strategies, human resource attrition to other Analytics players, peer pressure on analytics adoption.</td>
<td>Control Variables</td>
</tr>
<tr>
<td>10. Enabling Technology *</td>
<td>Leveraging Data and IT Infrastructure Managing Technology through IT</td>
<td>Seddon et al. (2012, p.4)</td>
<td>Analytic Technology Assets</td>
</tr>
<tr>
<td>12. Enterprise-wide Analytics Orientation *</td>
<td>Acceptability of Analytics Team</td>
<td>Seddon et al. (2012, p.6)</td>
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<tr>
<td>Emulate Peer Analytics Setup</td>
<td>Analytics Adoption to sense changing customer needs</td>
<td>Analytics Capability - Value Enhancers</td>
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<tr>
<td>Organization Mandate for Analytics Culture</td>
<td>Analytics Centre Of Excellence (CoE)</td>
<td></td>
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<td>Unique Approach to Business Problems - Change the Business</td>
<td>Business Priority</td>
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<td></td>
<td>Commoditytize Analytics</td>
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<td>Funding by Business</td>
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<thead>
<tr>
<th>13. Evidence-based decision making embedded in “DNA” of organization *</th>
<th>Data Driven Work Culture</th>
<th>Seddon et al. (2012, p.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence-based decision making embedded in “DNA” of organization</td>
<td></td>
<td>Analytics Capability</td>
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<thead>
<tr>
<th>14. Market Factors</th>
<th>Market-Field Dynamics Impacting Implementation</th>
<th>Refers to the field dynamics adopted by front ending personnel, like Sales force, which is dependent on competition, channels, season, revenue targets and incentives, and similar market factors that affect the implementation of analytics based decisions.</th>
</tr>
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<td></td>
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<td>Control Variables</td>
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</table>

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<tr>
<th>15. Organizational Benefits from Analytics Use *</th>
<th>Analytics Driving Critical Initiatives</th>
<th>Seddon et al. (2012, p.6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytics Support for Portfolio Level Analysis</td>
<td>Analytics Support for Project Delivery</td>
<td>Business Performance</td>
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<tr>
<td>Analytics Support for Sales Force Performance</td>
<td>Benefits Measured in Terms of Metrics</td>
<td></td>
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<tr>
<td>Business Process Improvement - Define, Measure, Analyze, Improve &amp; Control (DMAIC)</td>
<td>Business Value of Analytics</td>
<td></td>
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<td>Business Value of Analytics</td>
<td>Contribution of Analytics Team</td>
<td></td>
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<tr>
<td>Customer Focused Support</td>
<td>Fulfilling Business Needs</td>
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<tr>
<td>Innovation and Patents</td>
<td>Management Decision Quality</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
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<td>------</td>
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</table>
Relationship with Business Partners (Crawl-Walk-Run)  
Soft Factors & Change Management influencing Analytics Adoption (or) Value |
| Seddon et al. (2012, p.6) | Analytics Capability - Value Enhancers |
| 17. Regulations | Data Export Restrictions  
Regulatory Reasons and Business Imperatives |
| Refers to the policies brought in by governments and politico-economic unions that has an impact on the way business is conducted and data is handled across the countries and unions by the business organizations. In addition, this includes any internal policies brought in place by the business organizations which has an impact on the way decisions are taken, especially driven by data. | Control Variables |
| 18. ROI Justification | Alternatives for ROI Calculations  
Challenges in Measuring the Impact  
Cost Benefit Analysis  
Measure Financial Impact  
Offshore Advantage  
Partner Experience Survey (Net Promoter Score)  
Performance Improvement - Measurable Impact  
Return on Investment (ROI) |
| This refers to established method of calculating the Return on Investment (ROI) or the absence of such a method, substituted by other metrics in measuring the impact for the investment made in analytics. | Business Performance |

**Source:** * Seddon et al. (2012), # Cosic et al. (2012)

**Table 2. Items (Codings) and Concepts from Data Analysis, Definitions and Dimensions**
While from the point of view of IT business value, the IT assets are disaggregated into infrastructure, transactional, informational and strategic assets (Aral and Weill, 2007) based on their strategic purpose, in case of business analytics, the research at the case study organization suggests there are two key areas 'run the business' and 'change the business' and these assets can be utilized in any one of the areas or both depending upon the nature of the projects chosen in each of these areas. The case study reveals that 'run the business' is most of the times human resource intensive and 'change the business' involves deployment of IT / Analytics technology assets in addition to human resources.

**Analytics Capability**

The Analytics Capability plays a very vital role in determining the stage (Davenport and Harris, 2007) at which the organization currently is and where it is heading to. We observed that in addition to Scientific Problem Solving approach, IT skills and Quantitative skills, that we started off with the initial theoretical model, business domain knowledge plays an important role in providing the right analytics solution to the problem, leading to the success of the business function. While in the initial model, we had considered digital transaction intensity as part of Analytics Capability, in the case study organization, it follows the data stream and is handled by the IT division, which can now be considered as part of the Analytics Technology Assets dimension. Analytics Culture is observed to play a significant role along with Adoption, Structure, Business Alignment, People Management and Evidence based decision making. Based on the case study, from a Business Analytics perspective, the above factors assume a greater significance in contributing to the business value.

**Analytics Capability - Value Enhancers**

While the factors identified under the dimension Analytics Capability contribute to the business value, the case study has brought to light another set of factors that could be appropriately termed "Value Enhancers". In the case study organization, it is observed that these factors serve as key for enhancing the value derived out of business analytics. These factors (Analytics Ecosystem, Analytics Leadership, Enterprise Analytics Strategy, Enterprise-wide Analytics Orientation and Overcoming organizational inertia (OOI)) can really make a difference in enhancing the value of Business Analytics, explaining the differential impact of business analytics on business performance when two organizations in the same domain invest in comparable analytics resources.

**Control Variables**

Based on the observations in the case study organization, Competitive Environment, Market Factors, and Regulations have emerged to be the Control Variables. This is not very different from the set of variables in the initial theoretical model, Government policies, Brand, Market Segments, and Competition.

**Business Performance**

While the initial theoretical model focused on Customer Acquisition, Customer Retention, Customer Expansion and Increased Revenues, data from the case study organization brought to light two key factors, Organizational Benefits from Analytics Use and ROI Justification. Breaking down the concept, Organizational Benefits from Analytics Use, we found there are number of items that contribute to this concept. This concept encompasses all the items that contribute value to the organization - right from driving critical initiatives, supporting various business domains, business process improvements, customer focused support, fulfilling business needs, contributing to the intellectual capital of the organization, improving the quality of management decisions, providing business insights and metrices associated with routine deliverables to business. The concept, ROI Justification includes all that is measurable in terms of costs, benefits and revenues including the perceived levels of customer satisfaction.

While we tend to generalize that managers would make an investment only after due diligence into the business value it might generate, one of the inputs we got from this case study is that managers more often do the business value analysis post facto. Especially, when the value is derived from the
collaborative efforts using business analytics and strategic business decisions, it becomes all the more political to assign the business value only to the analytics component. The case study brought out this perspective very well.

Table 3 provides some exemplified quotes from the interviews along with the Concept / Item combination they have been classified into.

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Exemplified Quotes (Source)</th>
<th>Concept / Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;One thing what I have seen different in CompuCorp is, the way the tracks are structured, they are tied to the business very closely&quot; (Senior Manager - Product &amp; Pricing Analytics)</td>
<td>Analytics Organizational Structure / Analytics Team Structure</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Acceptability is very strong - I don’t think there is any business unit today in CompuCorp which doesn’t use analytics. Analytics has become indispensable and it is inherent part of decision making process to look at analytics output&quot; (Director - Technical Support)</td>
<td>Enterprise-wide Analytics Orientation / Acceptability of Analytics Team</td>
</tr>
<tr>
<td>3</td>
<td>&quot;last 5 years I have been trying various frameworks and metrics to establish the value, the dollar number, how the dollar number is derived, frameworks in measuring the dollar number and all that - and lot of these things have been happening - but right now my gut feel tells me, not the analytics, I think it is better for you to be a Strategy Formulator rather than a Value Deliverer! That is a hard one to articulate, but we continue to think about better ways of doing it&quot; (Director - CompuCorp Analytics)</td>
<td>Enterprise Analytics Strategy / Analytics as Strategy Formulator (than value deliverer)</td>
</tr>
<tr>
<td>4</td>
<td>&quot;Most important competitive advantage is Culture at CCA - very unique competitive advantage. Propensity to adopting to change. Culture in CCA is an open culture. 'You can go as far as you want to go'&quot; (Senior Manager - Supply Chain and Operations Analytics)</td>
<td>Analytics Culture / Analyst Alignment</td>
</tr>
<tr>
<td>5</td>
<td>&quot;It always depends in terms of how do you start proving yourself, how do you start adding value and make them realize that you are adding value - and that is how you start getting accepted. I don't think it will happen in a day or two. Everyone who is part of the analytics team has to build the credibility with whoever the program manager they are working with. Over time, that will help you get larger acceptability. That is what is happening in the last few years. That is how we have moved ahead.&quot; (Business Analysis Manager - Online Analytics)</td>
<td>Organizational Benefits from Analytics Use / Business Value of Analytics</td>
</tr>
<tr>
<td>6</td>
<td>&quot;In the beginning of the quarter, what we do is, we sit down and plan for the entire quarter - we chalk out week on week what the delivery will be. We make a project plan at the beginning of every quarter and we list down what the exact deliverables will be, along with the timeline.&quot; (Manager - Marketing Analytics)</td>
<td>Enterprise-wide Analytics Orientation / Business Priority</td>
</tr>
<tr>
<td>7</td>
<td>&quot;I will go back to the anecdotal conversation I had with partners, 'You guys have good math skills and so on. What is lacking is probably how to apply those math skills or understand where math stops and common sense begins'. This common sense refers to the domain / business acumen and that is what we need to build on - understanding how things work, understanding of process maps, how decisions get taken at a business level.&quot; (Senior Manager - Services Analytics)</td>
<td>Analytics People Management / Business Domain Knowledge - Business Acumen</td>
</tr>
</tbody>
</table>
"one thing that has come out clearly in that is the kind of work-life balance that CompuCorp provides to its employees. That is where we have an edge in retaining our employees. The kind of flexibility that CompuCorp provides, a person can choose to work in any shift, or work from home if there is a requirement. We have very simplified processes around that. CCA has an edge over others in managing the people." (Senior Manager - Contact Centre Analytics)

"Business impact of the projects we do, rigorously tracked within CCA in terms of having the engagement with our partner - how much money gets generated - measured purely in terms of dollars. Calculating dollar terms is fairly straightforward - what is the business impact of our project on an annual basis. This is the expected benefit from all our projects at CCA in an year." (Business Analysis Manager - CFS)

Table 3. Exemplified Quotes from the Case Study Interviews

Proposed Research Model

Based on the concepts that emerged out of the case study data analysis, the initial framework has been modified to reflect the refinement and the proposed research model is presented in Figure 2.

Propositions

With the outcome from the case study data analysis highlighting the need for Analytics Technology Assets and Analytics Capability (with the inclusion of value enhancers) as the key Analytics Resources influencing the Business Performance of the firm in the presence of identified Control Factors, we put forward the following propositions to carry the research further from the theory building into the theory testing and validation phases.

Analytics Technology Assets

The case study reveals that 'run the business' is most of the times human resource intensive and 'change the business' involves deployment of IT / Analytics technology assets in addition to human resources. **Proposition 1** - Analytics Technology Assets have a positive influence on the business performance of the firm.
Analytics Capability

Analytics Culture is observed to play a significant role along with Adoption, Structure, Business Alignment, People Management, and Evidence based decision making. Based on the case study, from a Business Analytics perspective, the above factors assume a greater significance in contributing to the business value.

**Proposition 2** - Analytics Capability has a positive influence on the business performance of the firm.

Analytics Capability - Value Enhancers

Analytics Ecosystem, Analytics Leadership, Enterprise Analytics Strategy, Enterprise-wide Analytics Orientation, and Overcoming organizational inertia (OOI) can really make a difference in enhancing the value of Business Analytics, explaining the differential impact of business analytics on business performance when two organizations in the same domain invest in comparable analytics resources.

**Proposition 3** - With the inclusion of Value Enhancers, Analytics Capability has an increased positive influence on the business performance of the firm.

Analytics Technology Assets and Analytics Capability

The interaction between Analytics Technology Assets and Analytics Capability (with the inclusion of Value Enhancers) will further drive the business performance of the firm due to cross leveraging of the dimensions of the Analytic Resources.

**Proposition 4** - The inter relationship between Analytics Technology Assets and Analytics Capability (with the inclusion of Value Enhancers) contribute to an increased business performance of the firm.

Conclusion

This research is expected to contribute to the body of knowledge related to business analytics as well as provide key inputs to business organizations, particularly the participating firm, which will benefit from the early findings from this research.

Being an academic investigation aiming to conceptualize business value of analytics and analytics capability using theoretical support, this research is expected to provide neutral and reliable results to practicing managers. Business managers could prioritize their analytics contracts after understanding the business value created by the investment moving from the current practice where the assessment of business value happens post facto, most of the times. They could also examine if their investments lead to analytics capability building at business division and organization levels. The management could compare analytics investments based on their contribution to business performance and allocate resources accordingly.

Limitations & Further Research

**Limitations**

Following are the limitations of the proposed theoretical model.

The findings from the data analysis are based on single site multiple case studies. For extending this model to other organizations, it is suggested to examine the applicability of these factors that influence the business value of business analytics setup in the organization under consideration. The proposed model offers a good starting point for this exercise.

From a methodology perspective, the research was carried out with single level for each case study and the objective of triangulation has been achieved by considering different levels across the case studies at the single site. This is in contrast to what most of the case study research methodology suggests in terms of including multiple levels in a single case study to obtain data triangulation. The main reason for not going
in for multiple level is that the organization is relatively flat due to the nature of (analytics) work and apart from the heads of the analytics organizations, the lower level managers do not have complete visibility of overall activities of their domain.

Further Research

Having done the theory building part in this phase of the research, it is planned to conduct the theory testing and validation phases subsequently. This will be after the completion of a factor analysis to better understand the newly found concepts as well as conduct scale building of the concepts to arrive at the final combination of constructs. The theory testing phase is expected to be conducted as a quantitative research method, as part of the mixed methods research to achieve the research objectives. The quantitative research phase will include a survey questionnaire with the constructs from extant literature as well as newly created constructs. The data analysis procedure for the quantitative research phase is yet to be finalized. It is also planned to conduct the next phase of research at organizations drawn across few business verticals to ensure widespread applicability of the model developed.

References


