

ASSESSING THE EFFECTIVENESS OF BUSINESS INTELLIGENCE AS A STRATEGICALLY IMPORTANT DEPLOYMENT

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ABSTRACT

The strategic importance of IT [Information Technology] and the perception that IT is effective is impacted by business intelligence and cloud computing. Personal interviews with 131 senior level executives during a three-year period (2012 to 2014) were conducted by MBA graduate students at their place of employment. The executives were asked to rate and discuss a series of questions about IT strategy and issues affecting business intelligence and other related issues. Analysis of our quantitative data indicated that organizations recognize the strategic importance of IT, the effectiveness of IT, and business intelligence but are less likely to see a role for the cloud. The ramifications of business intelligence and the cloud on IT strategy and effectiveness reveal that Business Intelligence is an important concern across multiple industries, with CIOs being the most strongly focused on this issue. There was a significant link between business intelligence and cloud usage. We used qualitative data to understand further these findings.

Key Words: IT Strategy, Effectiveness, Business Intelligence and Cloud Computing

INTRODUCTION

As with other forms of capital, organizations are motivated to invest in IT to increase their productivity, to gain an advantage over their competitors, and ultimately to increase their profitability. Competitive advantage through investment in IT alone, however, is difficult to achieve and sustain and is vulnerable to the ability of competitors to replicate the productivity and profitability improvements gained through innovation.

The business world is rapidly changing, and business processes are becoming more complex. This complexity increases the difficulty managers have in forming a comprehensive understanding of their business environment [8]. Competition and technological innovation have motivated companies to re-think their business strategies. Many companies have employed Business Intelligence [BI] techniques to help understand and control their business processes to maintain and improve their competitive advantage. BI is perceived as a way to improve the timeliness and quality of information and enable managers to understand better the position of their firm about their competitors. BI applications and technologies help companies to analyze changing trends in market share; changes in customer behavior and spending patterns; customers' preferences; company capabilities; and market conditions. It is difficult to deny the benefit of BI. Recent industry analyst reports show that millions of people will use BI visual tools and analytics in the coming years [2].

The role of Information Technology (IT) is also changing [5]. Gone are the days when IT can be viewed as a necessary evil or as simply a "cost center." Many organizations now view IT as a valuable business-enabling necessity. In some cases, whole businesses have been built around information technologies. These changes require rethinking the orientation and operation of IT. For organizations to successfully make this transition, they need to leverage operational information to provide depth and granularity to reveal what is happening in the IT realm and insights directly into the business.

More organizations are using the cloud for business intelligence, research shows, and more still are expected to make the move [10]. Cloud BI usage is slowly rising. In a recent cloud BI survey the percentage of organizations running BI applications in the public cloud increased from 13% in 2012 to 17% in 2013 and to 20% in 2014 [10].

The user value of cloud BI lies in cost and time savings —particularly small and midsize businesses with limited budgets, staffing and skills—and makes it easier for them to benefit from reporting applications. Also, cloud users can rapidly deploy and modify cloud-based data as needed; BI tools can also be quickly implemented. Many IT and BI managers still have concerns about putting data in the cloud, so user demands for data protection may be acute. Most providers of cloud system implementations address the need for strict security provisions and compliance with data privacy requirements—offering a more secure environment than many companies have internally.

In this paper, we address the pros and cons of IT as an effective instrument in maintaining its competitive strategies given the impact of business intelligence and cloud computing. Figure 1 shows the relationships and proposed framework. We focus on business intelligence and cloud computing as change agents across industries. We begin with a consideration of IT as a part of corporate strategy and competitive positioning. The main focus of this study addresses the need for an effective competitive strategy given the changing landscape of business intelligence and cloud computing. In section two, we provide a background and a brief discussion on varying strategic perceptions of IT across industries and the impact of cloud computing and business intelligence. In section three, we detail the methodology and research questions addressed in the study. In section four, we reveal the results of the analysis and related discussion. Lastly, in section five we provide conclusions, limitations, and opportunities for future research on this subject.

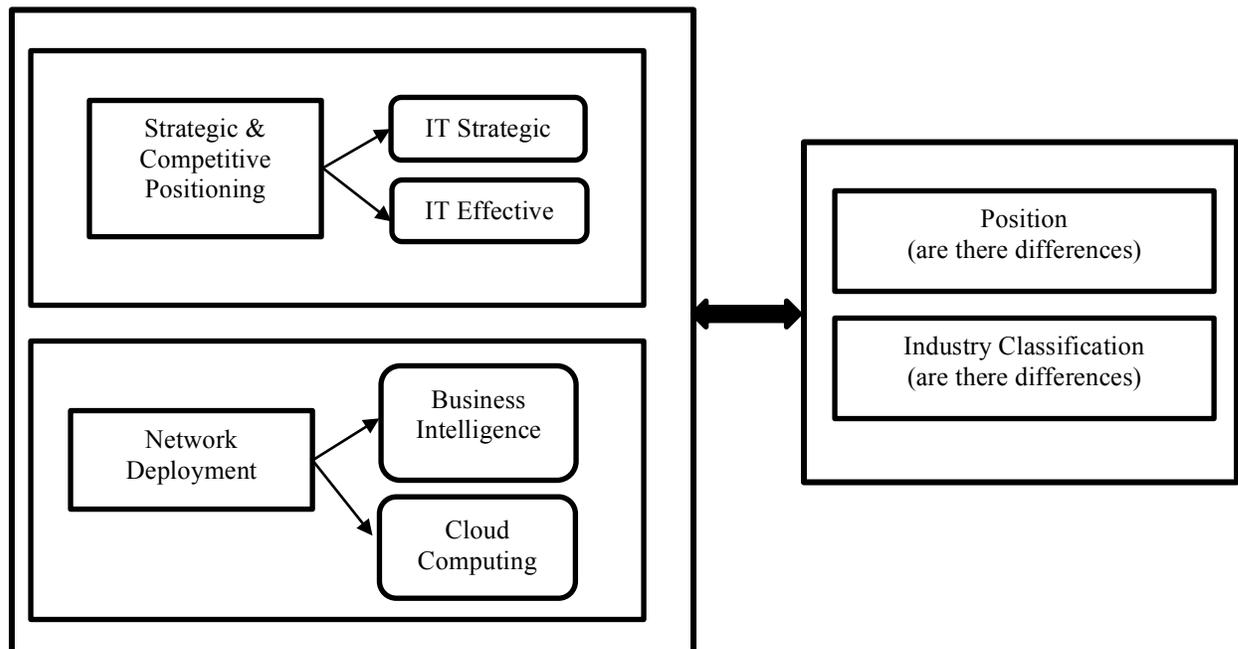


Figure 1. Relationships and Proposed Framework

FRAMEWORK

Strategic Use of IT

Investments in IT are more likely to be effective when coupled with some other forms of sustainability to take advantage of changing conditions in the workplace. There are four forces driving recent innovations in the deployment of IT: maintaining control of data; IT implementation costs (e.g. software as a service); responses to changes; and, foremost providing a secure work environment.

IT Considerations

Perspectives on investing in IT as a viable means of gaining a competitive advantage is a matter of debate. Some subscribe to the theory that IT has become a commodity due to the prevalence of outsourcing, packaged software, and ability to acquire expertise equally across firms [3, 4]. Others [9] realized that these trends change the nature of IT management – equal access to IT resources may not result in equal IT investments success (e.g., the variation in success of ERP implementations). IT has had mixed results on the perceived success or failure of IT investments [15].

In general, the literature supports the notion that IT initiatives do not necessarily lead to a positive return on investment. A McKinsey Global Institute study [11] on “U.S. Productivity Growth for 2000-2008” found a positive correlation between IT investments and productivity in only 35% of the industries. Strassmann [13] earlier contended “profitability and IT spending were unrelated” and return on IT investments is a primary concern and appropriate measures necessary to “distinguish fads from substance.” He asserted that the major pitfall in IT decision-making was embracing a solution without fully understanding underlying needs.

According to McKinsey [1], when CIOs play an active role in business strategy, IT performance on a wide range of functional and business tasks improves. However in their survey, few executives say their IT leaders are closely involved in helping shape the strategic agenda, and confidence in IT’s ability to support growth and other business goals is waning [1].

Network Deployment

In most organizations, customer information resides in multiple places, is utilized by multiple departments and is captured through multiple channels. Regardless of the industry customer data is analyzed and actions are applied for operational and strategic decision support. The demand to transform data from business applications into actionable information has created an explosion in offerings for business intelligence [7]. Many organizations have utilized cloud computing as part of their IT infrastructure to minimize these complexities [14].

The sheer size and complexity of today’s enterprises makes it nearly impossible to keep up with the rate of change in business intelligence and cloud computing. This complexity requires a top-down strategy that prioritizes risk and accepts the limitations of available technologies. Only through the adoption of high-level policies and controls aimed at fostering flexible network deployment practices across the organization, their partners, the supply chain, and the customer interface can companies effectively improve their use of information and continue to do business as usual.

Business Intelligence Considerations

Every organization has a distinct threshold for absorbing change. This threshold ultimately determines the pace at which many initiatives can be implemented and accepted. When considering business intelligence both IT and the organization at large needs to understand the supply and demand of change and anticipate appropriately. To be a successful enabler the organization and the IT function must achieve a balance between tolerance and need for change.

Business intelligence is derived from data generated during the normal course of the business organization [12]. Specifically data arise in different places and is entered through different devices and channels. BI systems should be viewed primarily as a tool for identifying customer needs and desires, and for customizing products and services. Business Intelligence gives companies the ability to access, analyze and use their data to make business decisions. This system is used both for daily operational activities and long-term strategic decisions. There are two areas of interest where BI is necessary: Business Planning and Business Execution. Business planning includes objectives such as increased revenue or reduced costs that align with business goals and provide actionable metrics to guide the company toward performance. Business execution refers to tactical and operational activities. The difference

between the two is time. If tactical refers to business activities over a certain period, days, weeks, operational refers to daily business activities

Cloud Computing Considerations

Cloud computing enables companies to store data in a common repository, either public or private, rather than having to build and maintain computing infrastructures in-house. Cloud computing promises several attractive benefits for businesses including self-service provisioning of computing resources on-demand; elasticity as computing needs increase and concomitantly scale down as demands decrease. Of course, this repository comes with a price - security assurance, especially when addressing business intelligence.

In a recent cloud BI survey [10] security was listed as “the greatest barrier to cloud BI adoption”. However, the majority of security breaches were not cloud implementations—they were on-premises implementations. Potentially an organization could be reluctant to store and access business intelligence data in the cloud. However, cloud providers employ many technologies and procedures for ensuring that there is not a data breach. Nearly 50% of the respondents were running BI applications in private clouds or planned to do so by the end of 2015; for both public clouds and hybrid environments, it was only about 30%.

The overall corporate policy should limit the amount, availability and type of sensitive information in cloud storage. If a small amount of sensitive information must be stored, the policy should mandate software that executes some storage-level encryption. Of course, for the highest levels of data sensitivity, the policy should protect the confidentiality, integrity and availability of electronic information. This policy is an important issue for businesses. Most all businesses, regardless of size, have a web presence, interact with their suppliers and customers via the Internet and perhaps have offices or presence in different geographical areas.

RESEARCH QUESTIONS AND METHODOLOGY

To investigate the ramifications of business intelligence and the cloud on IT strategy and effectiveness we examine the following research questions:

- Research Question 1: To what extent is IT used as a strategic resource? And does strategic use of IT differ across industries and position?
- Research Question 2: To what extent is effective use of business intelligence resources related to strategic use of IT?
- Research Question 3: To what extent is effective use of business intelligence related to cloud computing?

The investigation based on these research questions consisted of personal interviews with 131 senior level executives during a three-year period (2012 to 2014). Table 2 lists the interview questions we focus on in this study. MBA graduate students at their place of employment conducted the interviews primarily face-to-face. The subjects were offered confidentiality – their names and affiliations were not revealed in the data set. Most of the interviews were conducted with executives in a relatively large city in the Midwestern United States. Consistent with other academic empirical research, the subject pool was not limited to one respondent per organization. Thus, the results should be interpreted with the potential that large companies might have multiple entries.

The executives were asked to rate their place of employment across several dimensions of IT use including IT strategy, effectiveness, business intelligence and cloud computing using a Likert scale rating (5=strongly agree, 3=neutral, 1=strongly disagree). Interviewees were then asked to comment on each of these dimensions of IT use and provide a narrative discussion around each.

Table 2. Interview Questions

| | |
|--------------|--|
| | Question: “To what extent do you agree with each of the following statements...” |
| IT Strategic | 1. My organization uses IT as a strategic, competitive resource. |

| | |
|-----------------|---|
| IT Effective | 2. My organization manages IT projects effectively. |
| Business Intel | 3. My organization is effective in providing business intelligence resources (databases, analytical technologies) to its decision makers. |
| Cloud Computing | 4. My organization uses cloud computing to allow web-based access to data and key systems. |

We constructed two tables (see the Appendix) that presented the question results by industry classification and position expressed in mean values and percentages. Also, correlations along with relevant question nomenclatures were included. The intent was to place the research questions interpretation in a holistic manner.

To better understand these dimensions of IT use in organizations, our interviewees were asked to describe in more detail why they gave a particular rating for each of the questions listed in Table 2. We used NVivo, a qualitative analysis software package, to analyze this additional data. Each interviewer provided detailed notes and quotes from the interview that was conducted and the notes for all 131 interviews were imported into NVivo for analysis. To conduct this analysis, we first grouped the interviewees into categories depending on how they answered the study questions. Responses to each study question were collapsed into two categories: (1) high (Likert score above 3), or low (Likert score less than or equal to 3). We then created collections of interviewees in NVivo for each of our research questions based on responses to the study questions. For example, to help us explore our first research question we created collections (groups of interviews) based on respondents' answers to interview questions 1 and 2, regarding whether the company uses IT as a strategic resource and whether they feel they are particularly effective at harnessing IT. One collection is those respondents who both felt they were using IT as a strategic resource but were not effective. Two of the authors then met in a series of face-to-face meetings to code the data by group to identify common themes that emerged and cluster these themes into categories. For example, "Lack of IT staff" and "Shifting Priorities" emerged in coding responses to the questions of whether IT is used strategically. These codes were clustered into a higher level category called "Barriers." Themes that emerged are displayed and discussed for each research question.

ANALYSIS AND FINDINGS

The Pearson Correlation was conducted to examine the research questions (see Appendix). The Pearson Correlation is a measure of linear dependence between two variables. Since the data used in the study is Likert-scaled, with end points of "strongly agree" to "strongly disagree", it is common in academic literature to perform statistical tests that test linear, continuous relationships among the variables.

Research Question 1: To What Extent is IT Used as a Strategic Resource? How Effective are Efforts to Use IT as a Strategic Resource? And Does Strategic Use of IT Differ Across Positions and Industries?

The question as to whether IT is a strategically important resource had generated a great deal of controversy in the past decade initiated by [3] publication of "IT Doesn't Matter" in the *Harvard Business Review*. Table A-1 in the Appendix reveals that there is statistically significant correlation between the *Strategic Importance* of IT and the *effective* use of IT to manage IT projects (.348). Based on the survey Information Technology is regarded as being very important to the strategic success of their organization with an overall mean value of 3.89. As one might expect, there is a very significant correlation between perspectives on IT as being strategically important and the effectiveness of IT. For those respondents (Table 3) that did not view IT to be *Strategically Important* (35%) a third of the respondents rated IT as effective. And for those that viewed IT to be strategically important (65%) a third also felt that IT was effective.

To further explore this data we performed an NVivo analysis to identify factors that shaped strategic and effective use of IT. The Nvivo analysis allowed us to identify key facilitating factors and constraints that either enabled or hindered companies in using IT strategically and effectively (see Table 3). On the positive side, nine key facilitating factors emerged from the qualitative coding process. For example, companies that reported both that IT was used strategically and the company was effective at harnessing IT reported that major investments were made in IT both for general systems as well as specifically in the areas of mobile device and cloud use. IT also brought internal and

external data to connect staff with mission critical stakeholders. Strategic use of IT was not always linked with effective use of IT, however. Constraints to using IT effectively include changes and delays in scope and project size, risk averse stakeholders, and other activities (e.g. security compliance) slowing down systems.

Table 3. Comparison of IT Strategy with IT Effectiveness

| IT Strategic = Yes [64.9%] | |
|--|--|
| IT Effective Yes [57.5%] | IT Effective No [42.5%] |
| <i>Facilitating Factors</i> | <i>Constraints</i> |
| Company made a major investment in IT | Lack of key IT resources, such as equipment and staff |
| Major investments made in mobile and cloud areas | Change takes too much time, training, and attention |
| Company able to maintain scale and cost | Security compliance slows implementation |
| Provided outside IT services | Key stakeholders are highly risk averse |
| Supply chain operates efficiently | Sense of complacency |
| IT harnessed to connect with mission critical people | Delays due to scope and size |
| IT Strategic = No [35.1%] | |
| IT Effective Yes [33.3%] | IT Effective No [66.7%] |
| <i>Facilitating Factors</i> | <i>Constraints</i> |
| High commitment to providing mobile solutions to employees | Company believes IT is not a differentiator because all companies utilize it |
| Ample supply of contract IT workers | Industry regulation creates constraints |
| Company uses latest IT collaboration tools | Company believes IT plays only a supporting role |

With respect to the industry categories respondents (see Table A-2 in the Appendix) across most all industries rated IT to be of strategic importance. In terms of effectiveness, there appears to be substantial variation where respondents from service industries (health, insurance, retail) and technology industries seem to have greater agreement that IT serves as a basis for competitive advantage than respondents from 'government' and 'other' industries. And perceptions of effectiveness did not agree with strategic importance for the energy, retail and professional services sectors.

From a job position standpoint (see Table A-3 in Appendix) there were slight differences in the means of the three position categories for IT being strategic and effective. Table 4 depicts the breakdown for IT Strategic and IT Effectiveness in the position survey and the distribution for each preference. Of note though for those that regard IT to be strategic (64%) only 53% felt IT to be effective. The CIOs in contrast to the other two positions (CEO and other professionals) regarded the IT Effectiveness as much higher than the CEOs.

Table 4. Job Position for IT Strategic Competitiveness and Effectiveness

| Overall Breakdown | IT Strategic | | IT Effective | | Overall |
|--------------------------|---------------------|-------|---------------------|-------|----------------|
| | No | Yes | No | Yes | |
| 0-CIO (CTO, MIS, IT) | 6.1% | 46.6% | 22.1% | 32.1% | 54.2% |
| 1-CEO(Pres, Ex VP) | 3.1% | 13.7% | 9.2% | 7.6% | 16.8% |
| 2- Other | 3.1% | 26.0% | 15.3% | 13.7% | 29.0% |
| Grand Total | 12.2% | 86.3% | 46.6% | 53.4% | 100.0% |

Research Question 2: To What Extent is Effective Use of Business Intelligence Resources Related to Strategic Use of IT?

The correlation table A-1 in the Appendix reveals that there is a moderate statistically significant correlation (.272) between the strategic importance of IT and the business intelligence. The mean values for IT Strategy was 3.89, for IT being Effective was 3.55 and Business Intelligence 3.55. The relationship between IT effectiveness and Business Intelligence showed a significant correlation (.384).

For those respondents (Table 5) that did not view IT to be strategically Important (35%) over seventy-three percent of the respondents felt Business Intelligence to be important. And for those that viewed IT to be strategically important over eighty percent felt that Business Intelligence was important. Those interviewees who felt that Business intelligence was an important component in their strategy stated that, “without BI in our company it would be impossible to function” and that the “data is one of the most important tools for managers to make decisions”. At the opposite end of the spectrum, some organizations we spoke with had no Business Intelligence system at all: “Honestly, I don’t know if our IT team knows what intelligence resources are” and “they don’t exist”.

To further explore this data we performed an NVivo analysis to identify factors affecting the strategic use of Business Intelligence. We clustered these emerging themes into two categories: facilitating factors (factors that helped the organization harness Business Intelligence effectively) and barriers (factors that prevented the organization from harnessing Business Intelligence effectively). These are displayed in Table 5. For example, one of the most common facilitating factors mentioned by our interviewees was the sense that the organization had adequate resources for implementing and making effective use of Business Intelligence. Various barriers included having technology misaligned with business needs and autonomous groups within the organization that makes it much more difficult to harness Business Intelligence: “We have disparate systems and technologies because of how we are organized as a business”, “We have incredibly talented people here who are forced to work with a system that doesn’t take advantage of their talents.”

Table 5. Comparison of IT Strategy with Business Intelligence

| IT Strategic = Yes [65%] | |
|--|--|
| Business Intelligence: Yes [80.2%] | Business Intelligence: No [19.8%] |
| Facilitating Factors | Barriers |
| Supportive and involved leadership | Technology misaligned with business needs |
| Having the right suppliers | Capturing data, but not analyzing it |
| Having the right resources (e.g. experts, software, money for investing in IT tools) | Lack of management understanding of Business Intelligence system |
| Building in-house software solutions | Incomplete data (e.g., not tracking needed data) |
| Employees receive proper training | Lack of powerful analytical tool |
| Employees have the tools they need (e.g., iPads, laptops, etc.) | Communication failures (e.g., not communicating data analysis needs effectively) |
| IT Strategic = No [35%] | |
| Business Intelligence: Yes [73.9%] | Business Intelligence: No [26.1%] |
| Facilitating Factors | Barriers |
| Supportive and involved leadership | Groups within the organization are autonomous with different systems |
| Can access anything they need | Technology misaligned with business needs |
| Having the right resources (e.g. experts, software, money for investing in IT tools) | Incentive systems are not aligned with use of Business Intelligence |
| Building in-house software solutions | Total lack of Business Intelligence system |
| System allows for customization | Problematic, inconsistent data |

From a Position standpoint (Table 6) fifty-three percent overall considered Business Intelligence to be important only 37 percent of CEOs agreed, Of note the CIOs and other positions (over sixty percent) rated Business Intelligence to be important. With respect to the industry categories respondents (see Table A-3 in the Appendix) across some industries rated business intelligence to be very important (Consumer Products, Insurance, Government, Retail, and Technology). Considering the need for business intelligence in these industries, this would be expected. However, several industries were somewhat neutral in considering business intelligence (Energy, Financial Services, non-profits and Professional Services.) These ratings were unexpected especially professional and financial services.

Table 6. Job Position for IT Strategic Competitiveness and Business Intelligence

| Preference Breakdown Position | IT Strategic | | Business Intelligence | | Overall |
|----------------------------------|--------------|-------|-----------------------|-------|---------|
| | No | Yes | No | Yes | |
| 0-CIO (CTO, MIS, IT) | 50.0% | 55.3% | 32.9% | 67.1% | 53.4% |
| 1-CEO(Pres, Ex VP) | 21.7% | 14.1% | 63.6% | 36.4% | 16.8% |
| 2- Other | 28.3% | 30.6% | 38.5% | 61.5% | 29.8% |
| Grand Total | 35.1% | 64.9% | 47.3% | 52.7% | 100.0% |

Research Question 3: To What Extent is Effective Use of Business Intelligence Related to Cloud Computing?

The correlation table in the Appendix reveals that there is a moderate statistically significant correlation (.261) between business intelligence and the cloud. The mean values for Business Intelligence is 3.55 and 3.22 for the Cloud. The relationship between IT effectiveness and the Cloud showed a moderate statistically significant correlation (.244).

For those respondents (Table 7) that did not view Business Intelligence to be important (39%) over sixty-nine percent of the respondents felt Cloud usage was not important. And for those that viewed Business Intelligence to be important (over 60%) over forty-three percent felt that Cloud Usage was not important. Fear over hacking and loss of control over data was a dominant theme among those whose organizations not using cloud capabilities: “there is still a fear among many in the business world regarding the security of cloud-based information systems.” On the other hand, many whose organizations did use cloud computing felt strongly that cloud usage was essential to their successful functioning: “Cloud computing is truly a life saver”. Another interviewee stated that “The ability to access documents anywhere is truly essential in the digital world we live in.” To further explore this data anomaly we performed an NVivo analysis to identify clusters of reasons. These are shown in Table 6. On the positive side reasons for Cloud Usage being important were increased efficiency and effectiveness, as well as the ability for employees to conduct virtual work. One interviewee stated that “Having this information available to them at any time in any interval truly provides our clinicians and leadership team with the knowledge they need to make more informed decisions.” The two most common reasons for not using cloud computing were security fears and a lack of awareness of any benefits of cloud computing. Security concerns regarding cloud usage often had to do with losing control over the data: “I have a fundamental problem (that I share with upper management) about hosting our proprietary data on someone else’s hardware”. Another interviewee described the problem this way: “By not having physical control of the plane you feel uneasy and at risk. The same can be said for cloud computing, by not having control of the location of the data yourself, you feel there is a significant danger in its management.”

Table 7. Comparison of Business Intelligence and Cloud Usage

| Business Intelligence = Yes [60.3%] | |
|--|---|
| Cloud Usage: Yes [57%] | Cloud Usage: No [43%] |
| Increased efficiency | Security (fear of hacking) |
| Increased effectiveness | Security (fear of losing control over security) |
| Stakeholders can access critical information offsite | Management doesn’t see a need for use of cloud |
| Use private cloud | Lack of awareness |
| Allows for virtual work | Problems using the technology |
| Business Intelligence = No [39.7%] | |
| Cloud Usage: Yes [30.8%] | Cloud Usage: No [69.2%] |
| Having the right software (e.g., Dropbox) | Security (fear of hacking) |
| Access via all devices | Security (lack of reliability of partners) |
| Increased efficiency | Security (fear of losing control over security) |
| Increased effectiveness | Technology too new/ risk averse |
| Use of private cloud | Management doesn’t see a need |

From a Position standpoint (Table 8) over sixty percent of CIOs and over 70 percent of CEOs and other respondents considered Business Intelligence to be important. Of note over fifty-three percent did not rate Cloud Usage to be

important. With respect to the industry categories respondents (see Table A-3 in the Appendix) across some industries rated business intelligence to be very important (Consumer Products, Insurance, Government, Retail, and Technology). There was some agreement in Cloud Usage except for Retail Industries. Several industries were somewhat neutral in considering business intelligence (Energy, Financial Services, non-profits and Professional Services) whereas Cloud Usage rated Professional Services as being important but not Financial Services.

Table 8. Job Position for Business Intelligence and Cloud Usage

| Position | Business Intelligence | | Cloud Usage | | Overall |
|---------------------|-----------------------|-------|-------------|-------|---------|
| | No | Yes | No | Yes | |
| 0-CIO (CTO, MIS,IT) | 44.2% | 55.8% | 52.9% | 47.1% | 53.4% |
| 1-CEO(Pres, Ex VP) | 26.9% | 73.1% | 18.6% | 81.4% | 16.8% |
| 2- Other | 28.8% | 71.2% | 28.6% | 71.4% | 29.8% |
| Grand Total | 39.7% | 60.3% | 53.4% | 46.6% | 100% |

CONCLUSIONS

This research provides insights into the potential differences and commonalities among organizations regarding IT as being strategic and effective—a competitive weapon and the impact of business intelligence and cloud usage. The key findings of this study can be summarized as follows:

- Strategic IT is an important concern across most industries. However, there is not as strong a link between effectiveness and competitive strategy for those that do not regard IT projects to be effective. Qualitative analysis revealed that companies that used IT strategically and effectively made major investments in IT both for general systems as well as specifically in the areas of mobile device and cloud use. Key constraints to using IT effectively included delays in scope and project size, risk averse stakeholders, and for some, a sense of complacency among key decision makers.
- Business intelligence is an important concern across some industries. Concerning positions, only the CIOs strongly emphasized business intelligence. However, there is not a strong link strategically between business intelligence and IT but there was a significant link between the effectiveness of IT and BI. Follow-up analysis of the qualitative data suggested that the most common facilitating factor was the sense that the organization had adequate resources for implementing and making effective use of Business Intelligence. Key barriers included having technology misaligned with business needs and autonomous groups within the organization that made it much more difficult to harness Business Intelligence.
- Business intelligence is an important concern across some industries. This differed slightly in Cloud Usage. Concerning positions all strongly emphasized business intelligence but not Cloud Usage. However, there is not a strong link strategically between Cloud Usage and IT but there was a significant link between the effectiveness of IT and business intelligence and the Cloud. Coding of the qualitative data suggests that Cloud Computing is viewed as increasingly important because cloud use was associated with increased efficiency and effectiveness in the organization and allowed employees to conduct virtual work. Fear of cloud computing is still prevalent though. The two most common reasons for not using cloud computing were security fears and a lack of awareness of any benefits of cloud computing. Security concerns regarding cloud *usage largely revolved around losing control over the data.*

There are a few potential limitations to this study. Interviews for this study were conducted primarily in one metropolitan city in the mid-western part of the United States. The perceptions of the respondents may not reflect the national or worldwide view of the subject matter. While interview subjects were granted assurances that results were confidential, there may be inherent bias in the results if respondents were reluctant to express criticism of the role of IT and the impact of business intelligence and cloud usage in their organization. Despite these limitations, these findings provide an important foundation for future research to develop models and analyze in a more complex and rigorous nature, the issues raised in this exploratory study.

REFERENCES

1. Arandjelovic, Pedja Libby Bulin, and Naufal Khan (2015) Why CIOs should be business-strategy partners, McKinsey Quarterly Insights, February, 2015
2. Buam, D. (2006). The face of intelligence. ORACLE Magazine
3. Carr Nicholas G. (2004) In Praise of Walls. MIT Sloan Management Review April 15, 2004
4. Carr, N.G. (2003). IT doesn't matter. Harvard Business Review, 81(5), 41-49.
5. Enterprise Management Associates White Paper (2014), Driving Business with Continuous Operational Intelligence, Extrahop, October 2014
6. Gartner Inc. (2012). Gartner Says 821 Million Smart Devices Will Be Purchased Worldwide in 2012
7. Information Builders (2015), Embedding Business Analytics to Improve Your Applications Value Proposition, CIO Insights, May 2015
8. Khan, Rafi Ahmad; Quadri, S M K (2014), Business Intelligence: An Integrated Approach, International Journal of Management and Innovation 6.2 (2014): 21-31.
9. Levanda, David (2013) The Changing Role of IT in a Technology World Full of Choice. CMS Wire| Jun 6, 2013, <http://www.cmswire.com/cms/social-business/the-changing-role-of-it-in-a-technology-world-full-of-choice-021204.php>
10. Loshin, David and Vaughan, Jack (2015), BI in the Sky: Making Cloud Analytics Work, Search Business Analytics, Tech Target.
11. Manyika, James and David Hunt. Growth and renewal in the United States: Retooling America's economic engine. McKinsey Global Institute, 2011.
12. Rovcanin, Adnan; Mataradzija, Adna; Mataradzija, Amra (2012). Knowledge Management through the implementation of Business Intelligence tools International Conference on Business Strategy and Organizational Behavior (BizStrategy). Proceedings: 68-75. Singapore: Global Science and Technology Forum.
13. Strassmann, P. A. (2003). Letters to the editor, Does IT matter? An HBR Debate. Harvard Business Review, 81(7), 7-9.
14. TechTarget (2015) Common Cloud Pitfalls, and How to Avoid Them, www.bitpipe.com
15. The Economist. "Special Report Outsourcing and Offshoring: Here, There and Everywhere." The Economist, 2013: 3-20.

APPENDIX

Table A-1: Correlations

| Correlation | IT Strategic | IT Effective | Bus Intel | Cloud |
|--------------|--------------|--------------|-----------|-------|
| IT Strategic | 1.000 | | | |
| IT Effective | 0.348 | 1.000 | | |
| Bus Intel | 0.272 | 0.384 | 1.000 | |
| Cloud | 0.175 | 0.244 | 0.261 | 1.000 |

Table A-2: Mean Values by Category

| Category | Percent | IT Strategic | IT Effective | Bus Intel | Cloud |
|-----------|---------|--------------|--------------|-----------|-------|
| CONSPROD | 14.5% | 3.89 | 3.68 | 4.05 | 3.42 |
| Energy | 10.7% | 3.50 | 3.00 | 3.32 | 2.36 |
| FINSVC | 14.5% | 4.00 | 3.66 | 3.32 | 2.45 |
| Govt | 3.1% | 2.75 | 3.50 | 3.63 | 4.00 |
| Health | 16.8% | 3.95 | 3.59 | 3.23 | 3.32 |
| INSURANCE | 3.1% | 3.75 | 4.50 | 4.50 | 3.25 |
| MFG | 8.4% | 4.00 | 3.73 | 3.36 | 3.55 |
| NONPROFIT | 2.3% | 3.00 | 3.67 | 4.67 | 3.67 |
| Other | 4.6% | 4.00 | 3.33 | 3.00 | 2.83 |
| PROFSVC | 5.3% | 3.86 | 3.00 | 3.00 | 3.57 |
| Retail | 3.1% | 4.25 | 2.75 | 3.63 | 2.50 |

| | | | | | |
|--------------------|-------|-------------|-------------|-------------|-------------|
| Tech | 13.7% | 4.22 | 3.78 | 3.89 | 4.08 |
| Grand Total | 100% | 3.89 | 3.55 | 3.55 | 3.22 |

Table A-3: Mean Values by Position

| Position | Percent | IT Strategic | IT Effective | Bus Intel | Cloud |
|----------------------|----------------|---------------------|---------------------|------------------|--------------|
| 0-CIO (CTO, MIS, IT) | 54% | 3.90 | 3.66 | 3.70 | 3.15 |
| 1-CEO(Pres, Ex VP) | 17% | 3.68 | 3.23 | 3.02 | 3.43 |
| 2- Other | 29% | 3.97 | 3.53 | 3.56 | 3.23 |
| Grand Total | 100% | 3.89 | 3.55 | 3.55 | 3.22 |