

# Exploring Success Factors For Effective Implementation of Business Analytics

Prathamesh R.Potdar<sup>1</sup>, Santosh B.Rane<sup>2</sup>

<sup>1</sup> Research Scholar, Sardar Patel College of Engineering, Munshi Nagar, Andheri –West, Mumbai -400058

<sup>2</sup> Associate Professor, Department of Mechanical Engineering, Sardar Patel College of Engineering, Munshi Nagar, Andheri –West, Mumbai-400058

## Abstract-

**Context:** - Business Analytics (BA) plays very important role to provide a solution for businesses in the dynamic decision-making information. So there is a need to address the critical success factors (CSFs) of BA to improve the probability of success of new projects needs.

**Purpose:**-The main focus of this paper is to identify the success factors for effective implementation of business analytics.

**Methodology:** - Identify success factors, the number of experts from a different domain and collect expert opinion through questioner.

**Research findings:** - Identified 24 critical success factors for business analytics.

**Conclusion:** - Identified data quality, technical capability, and process automation are key success factors of business analytics.

**Limitations:** - This research considered only IT project.

**Impact on technology:** - Optimization of business operations and planning, make better decisions, offer new products and services, and capture new market opportunities.

**Impact on business:** - BA explore the new opportunities for decision makers to resolve the challenges faced by industries at different levels.

## I. INTRODUCTION

Business analytics (BA) refers to the skills, technologies, practices for continuous iterative exploration and investigation of past business performance to gain insight and drive business planning Bartlett, Randy, 2013. BA is the solution for analyzing big data by using advanced mathematical and statistical models, databases, and interfaces to answer “what has happened” and “what will happen” questions Wicom et al., 2011. According to a study done by International Data Corporation (IDC), business analytics is one of the top two IT priorities for large enterprises SAS-b, 2011. BA gives companies the ability to handle a new type of data such as voice, text, log files, images, and video Davenport and Dyché, 2013. In the era of Big Data, Business Intelligence & Analysis can help to improve organizational

performance as a result of improvement on business decision-making Chen H, Chiang R, Storey V.2012. Huffman and Whitman, 2015 provided a background on Enterprise Intelligence Capability Maturity Model and lists a summary of the key advancements in enterprise analytics.

## II. DELPHI METHOD OVERVIEW

Rikkonen, et al., 2006 suggested that the Delphi technique is a method for the structuring of a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. Grisham, 2009 reviewed the use of the Delphi technique as a testing method for complex and multifaceted topics. Musa, et al., 2015 used Delphi method of developing environmental well-being indicators for the evaluation of urban sustainability in Malaysia. Quyen, 2014 discussed the development of university governance indicators and their weighting system using a three-round Delphi method.

## III. METHODOLOGY

The methodology was developed and implemented to identify the success factors for effective implementation of Business analytics, which is shown in Figure 2. The methodology initiated by Literature survey. A literature survey was done in the domain of Delphi method and exploring success factors of Business Analytics, Marketing, Enterprise resource planning (ERP) and Customer relationship management (CRM). Literature survey explores more prominent success factors for BA and understanding of Delphi method. The next step of the methodology is to explore and identify a number of Delphi round, identify a number of experts from different domain also finalized the success factors for BA. To collect expert opinion the questioner was developed with appropriate a criterion. The developed questioner is circulated with experts to collect expert opinion. After collection of expert comments, data processing, and data analysis was performed in the next step of methodology. The results are represented by Pareto chart and findings are

discussed in the last step of methodology. Execute the same methodology for more than one round of Delphi method. Figure 2 represents the research methodology flow diagram.

**Business Objectives**

Business objectives are the statement of specific outcomes that are to be achieved. The business objectives are very import for any organization to grow and to make a brand in the market. The objectives of this research are as follows,

- 1) Increase the success probability of new projects.
- 2) Improve profitability.
- 3) Improve customer satisfaction.

**A. Business Scope**

This research will help to know most critical success factor for BA implementation. The industries like Oil & Gas, manufacturing, fabrication, power generation, transportation, construction companies, etc. are looking for the effective implementation of BA for getting new opportunities and business. Identify the most critical success factor of BA implementation is one of the main concern of most asset propelled industries.

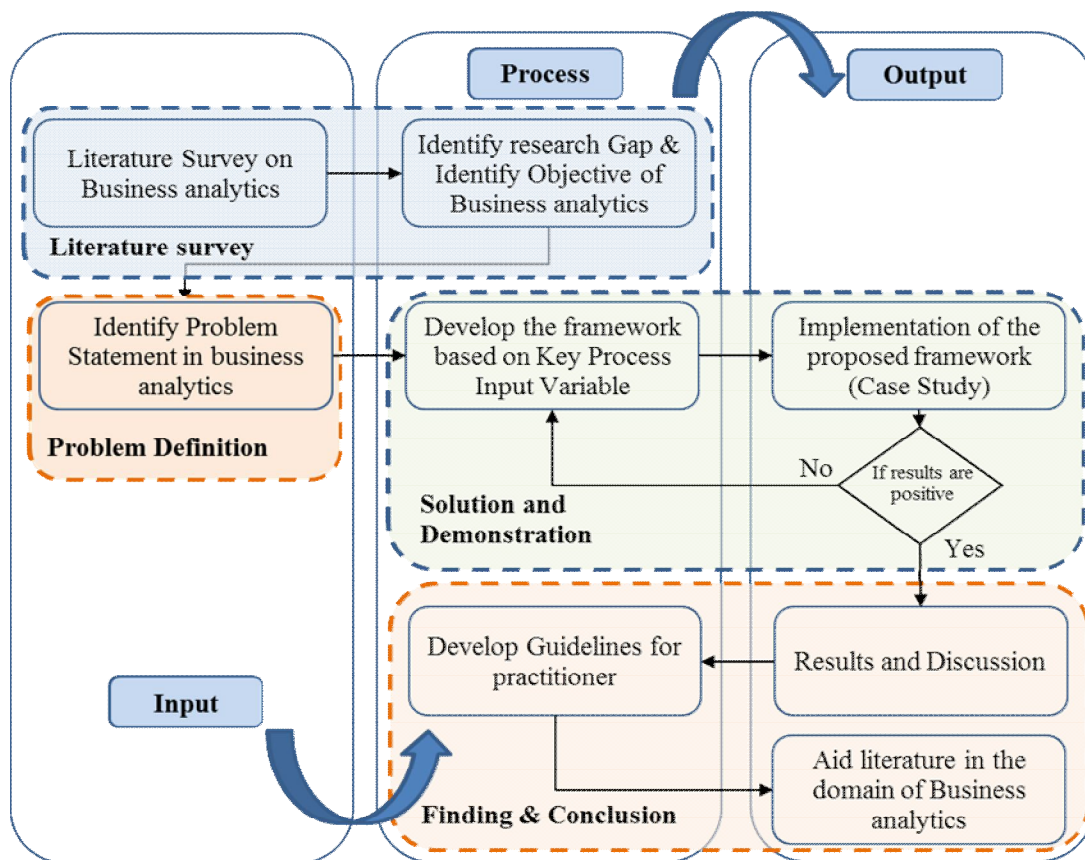


Figure 2 Research Methodology

**IV. SUCCESS FACTORS**

The list of selected success factors is listed in Table 1. The success factors were identified after reviewing more than 50 articles in the domain of Business analytics, Business Intelligence, ERP, CRM, marketing and Business Process Reengineering (BPR). The business success depends on success factors and implementation of success factors. The organizational level factors are top management support, management vision, management structure and Business

champion. The developer skills, problem difficulty, project management, business strategy, technical and business knowledge, business case, vendor partnership, recourse, Interdepartmental Cooperation & Communication and team composition are selected in process category. Data quality, process automation, technical capability, infrastructure, product selection, system integration and training and education are the factors under the category of technology factor. User involvement, end-user characteristics and performance evaluation and monitoring are the co-factors of

user factor. The factors have a different impact on organizational success, project implementation success, and technical implementation success. The organizational success depends on the top management support, management vision, management structure, Business champion, business strategy and business case. Developer skills, problem difficulty, project management, business strategy, technical and business knowledge, business case, vendor partnership, recourses, etc. are the key drivers of project success. All technology factors and some process and user factors are contributing to the success of technical implementation. The business success comprises system quality, business profit, data quality, and analysis.

## V. DATA COLLECTION PLAN

- 1) Identify the success factors.
- 2) Identify the number of experts.
- 3) Identify number of Delphi rounds
- 4) Develop the questioner.

## VI. EXPERT OPINION

The main objective of this study is to identify the most prominent factor for effective implementation of business analytics. The distribution of experts from a different domain is mentioned in Table 2.

### A. Delphi I<sup>st</sup> Round

In the first round of Delphi method, the finalized 24 success factors are circulated with all experts, with defined criteria as strongly effect, Moderate effect, low effect & no effect on business analytics. Table 3 shows the assigned code for success factors. The matrix was formed based on success factors versus criteria and circulated with the selected expert panel. In the first round of Delphi, method expert has to record their opinion by putting a tick on appropriate option for given success factors. The opinion was observed and recorded by the experts of different departments of one organization. The data were collected from 27 experts and Figure 3 shows the distribution of expert opinion.

### B. Delphi II<sup>nd</sup> Round

In the second round of Delphi method again same 27 experts were selected to give rating base on design criteria for selected 24 critical factors. The rating criteria are started from strongly disagree and ends with strongly agree, the rating also changes from 1 to 5 respectively. The rating criteria are as shown in Table 4.

Table 1 List of Success factors

Sr. No.	Factors	References
1	Top Management Support	Ang et al.(2002), Al-Mashari et al. (2003), Sangar and Iahad (2013).
2	Management Vision & Mission	Umble et al. (2003), Somers and Nelson (2004), Yeoh and Koronios (2010)
3	Business Champions	Akkermans et al., (2000), Yeoh and Koronios (2010)
4	Management Structure	Sumner (1999)
5	Developer Skills	Mykytyn et al., (1994), Yoon, Guimaraes, Clevenson, (1998)
6	Problem Difficulty	Yoon and Guimaraes, (1995), Yoon, Guimaraes, Clevenson, (1998)
7	Project Management	Umble et al. (2003), AlMashari et al. (2003), Garg,(2010)
8	Business Strategy	Somers and Nelson (2004)
9	Technical & business Knowledge	Sumner (1999)
10	Business Case	Dawson and Van Belle (2013)
11	Vendor Partnership	Somers and Nelsons (2001), Motwani et al. (2002)
12	Resources	Dawson, Van Belle (2013)
13	Interdepartmental Cooperation & Communication	Esteves and Pastor (2001)
14	Team Composition	Remus (2006), Garg (2010)
15	Data Quality	Zhang et al., (2002), Dawson and Van Belle (2013)
16	Process Automation	Dawson and Van Belle (2013)
17	Technical Capability	Dawson and Van Belle (2013)
18	Infrastructure	Yeoh and Koronios (2010)
19	Product Selection	Wei and Wang (2004), Shehab et al., (2004), Garg (2010)
20	System Integration	Dawson and Van Belle (2013)
21	Training & Education	Umble et al. (2003), Woo (2007), Garg (2010)

22	User Involvement	Yoon, Guimaraes, Clevenson, (1998), Zhang et al., (2002)
23	End-user Characteristics	Yoon, Guimaraes, Clevenson, (1998)
24	Performance evaluation & Monitoring	Holland et al. (1999)

Table 2 Expert Segregation

Sr. No.	Expert	No. of experts	Percentage (%)
1	Business Analytics Professional	5	18.51
2	Business Experts	4	14.81
3	Project Manager	4	14.81
4	Management Member	2	7.42
5	Analytics	6	22.22
6	Business Analytics Manager	4	14.81
7	Executive	2	7.42
<b>Total</b>		<b>27</b>	<b>100</b>

Table 3 Code for Success factors

Code	Success Factors	Code	Success Factors
SF1	Top Management Support	SF13	Interdepartmental Cooperation & Communication
SF2	Management Vision & Mission	SF14	Team Composition
SF3	Business Champions	SF15	Data Quality
SF4	Management Structure	SF16	Process Automation
SF5	Developer Skills	SF17	Technical Capability
SF6	Problem Difficulty	SF18	Infrastructure
SF7	Project Management	SF19	Product Selection
SF8	Business Strategy	SF20	System Integration
SF9	Technical & business Knowledge	SF21	Training & Education
SF10	Business Case	SF22	User Involvement
SF11	Vendor Partnership	SF23	End-user Characteristics
SF12	Resources	SF24	Performance evaluation & Monitoring

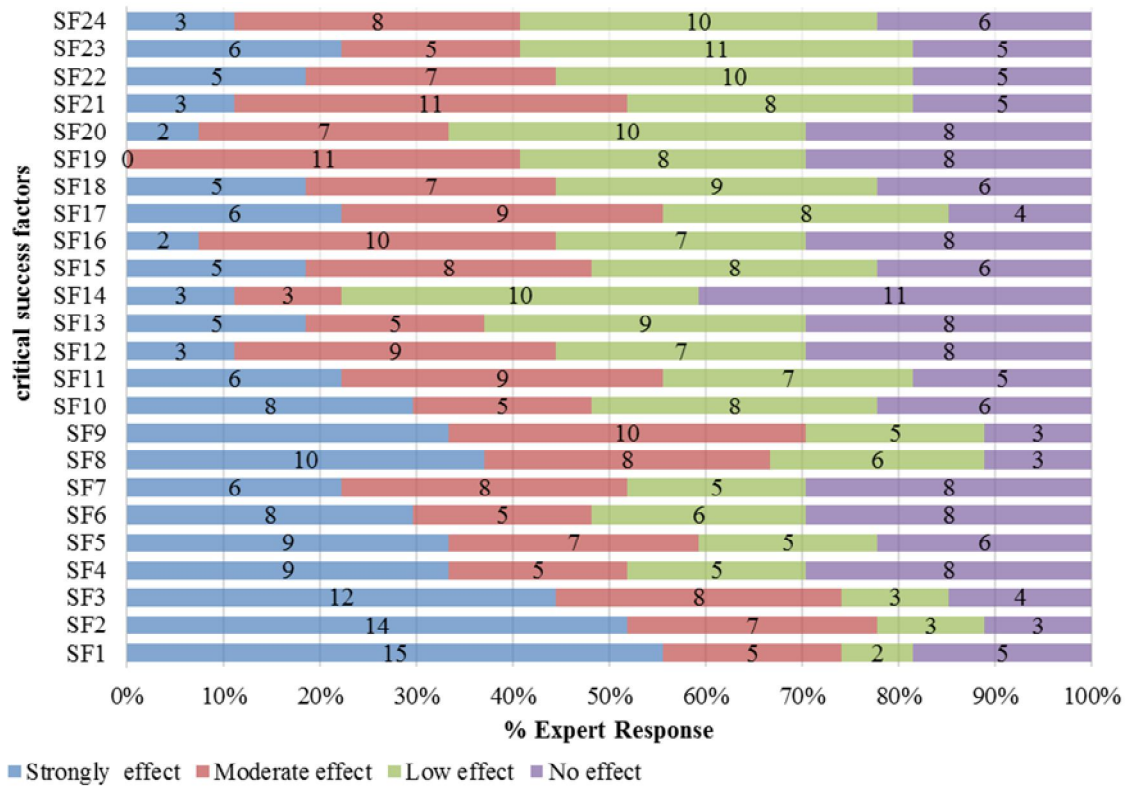


Figure 3 Representation of Expert opinions

Table 4 Criteria for Rating

Sr. No.	Criteria	Rating
1	Strongly Disagree	1
2	Disagree	2
3	Neither Agree nor Disagree	3
4	Agree	4
5	Strongly Agree	5

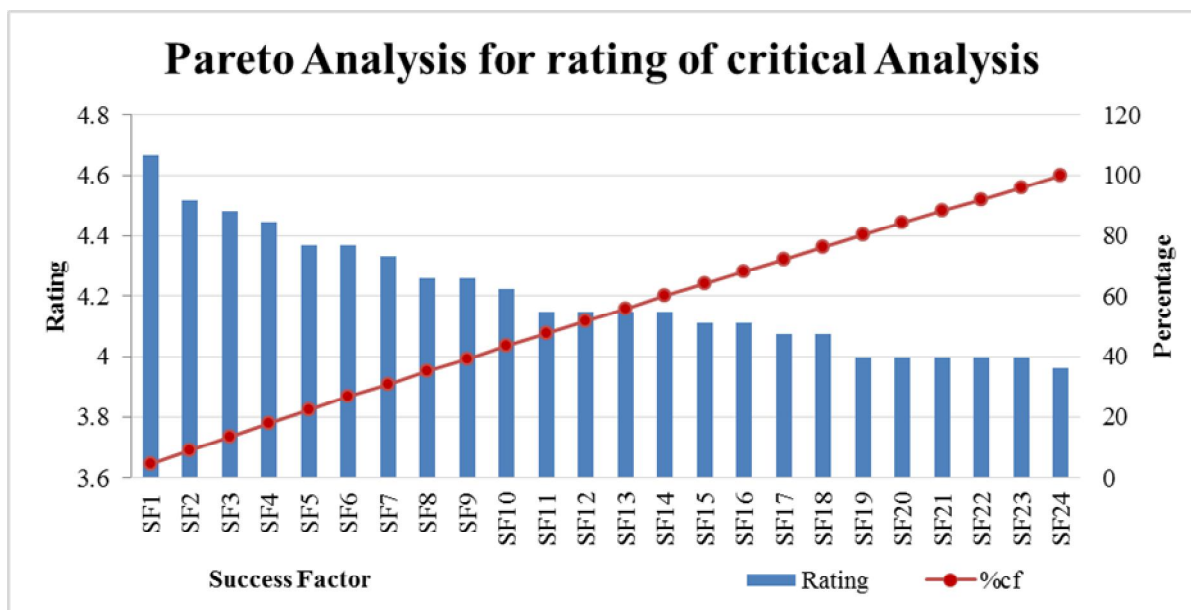


Figure 4 Represent rating of success factors

## VII. PROJECT DELIVERABLES

- 1) Industry can capture new business opportunities as project completion will be as per schedule.
- 2) Improve the performance of the business by an enhancement in quality.

## VIII. PROJECT PRODUCT DELIVERABLES

- 1) This research provides guidelines to solve similar kind of problems.
- 2) This research optimizes the business operations and planning.

## IX. DATA ANALYSIS AND FINDINGS

Data analysis is a process for obtaining raw data and converting it into useful information for decision-making to the users. The 15 out of 27 experts were recorded data quality strongly effects on the business analytics. Total 11 experts were recorded the user involvement and project management has a moderate effect on business analytics. Performance evaluation and monitoring have no effect on business analytics recorded by 11 experts. The data shows process automation, Technical capability, and data quality has a major contribution to the strong effect criteria. The results were represented graphically in Figure 4. Pareto chart was used to represent collected data. This stage helps to take correct decision for given condition with proper justification. With such a large compendium of data available for statistical comparison, small businesses can turn modest operations into highly effective and profitable multi-scale operations. The success of Business analytics mostly depends on data quality, technical capability, and process automation. The data quality has the highest rating as 4.65 and technical capability has a second highest rating of 4.51.

## X. RESULTS AND DISCUSSIONS

The 1<sup>st</sup> round of Delphi method observed data quality and technical capability have received maximum voting of 15 and 14 experts in strongly effect criteria. User Involvement obtained a very poor response from an expert in the criteria of strong effect. The finding of 1<sup>st</sup> Delphi round is data quality, technical capability, and process automation is most significant factors for BA. The 2<sup>nd</sup> round of Delphi method observed data quality obtained the highest rating and business strategy obtained the lowest rating as compared to other factors. The findings of Delphi 2<sup>nd</sup> round are data quality, technical capability and process automation obtained highest ranking as compared to other factors. This study suggested

data quality, technical capability, and process automation are a most critical factor in the success of business analytics.

## XI. CONCLUSION

Organization/ Industries/ Companies recognize that BA is a very important tool for addressing challenges, predicting future outcomes, and capitalizing on the value of data. Growing companies and industries mainly depend on BA for planning and optimization of business operations, improve efficiency, make better decisions, offer new products and services, and capture new market opportunities. Business analytics explore the new opportunities for decision makers to resolve the challenges faced by industries at different levels. The Delphi method was analyzed and implemented to identify most prominent critical success factor. Two round of Delphi method was demonstrated to identify the most critical success factor. The experts participated in this study believe that the use of business analytics will change the current scenario of the analytics. The total 24 success factors of BA were selected for this research. Total 27 experts participated in the survey from different department of one organization. In the first round of Delphi method, the data quality recorded as the highest value of 15 expert's opinion under the criteria of strong effect. In the second round of Delphi method, the data quality, technical capability and process automation received rating greater than 4.5. This research concluded that data quality, technical capability, and process automation are a key success factor for business analytics.

## XII. ACKNOWLEDGEMENT

This research made possible through the help and support from everyone, including researchers, supervisor, and experts from industry. We would like to thank all researchers for the made literature available.

## REFERENCES

- [1] Akkermans, H. A., Bogerd, P., Insead, E.Y., and Insead L. W. (2000). The impact of ERP Systems on Supply Chain Management, Exploratory Findings from a European Delphi Study.
- [2] Al-Mashari, M., Al-Mudimigh, A., Zairi, M. (2003). Enterprise resource planning: A taxonomy of critical factors. European Journal of Operational Research Vol. 146, pp.352–364.
- [3] Ang, J.S.K., Sum, C.C., Yeo, L.N. (2002). A multiple-case design methodology for studying MRP success and CSFs. Information and Management Vol.39, pp.271–281.
- [4] Bartlett, Randy (2013). A Practitioner's Guide to Business Analytics: Using Data Analysis Tools to

- Improve Your Organization's Decision Making and Strategy. McGraw-Hill. ISBN 978-0071807593.
- [5] Chen H, Chiang R, Storey V. (2012), "Business Intelligence and Analytics: From Big Data to Big Impact, MIS Quarterly, Vol. 36, pp.1165-88.
- [6] Davenport T. H. & Dyche, J. (2013). Big Data in Big Companies, Retrieved January 5.
- [7] Dawson, L., Van Belle, J-P., (2013). Critical success factors for business intelligence in the South African financial services sector, SA Journal of Information Management Vol.15, Issue 1, Art. #545, 12 pages. <http://dx.doi.org/10.4102/sajim.v15i1.545>.
- [8] Esteves, J. and Pastor, J. (2001). Enterprise Resource Planning Systems Research: An Annotated Bibliography, Communications of the Association for Information Systems, vol. 7, Issue. 8, pp. 1-52.
- [9] Garg, P., (2010) Critical Success factors for Enterprise Resource Planning implementation in Indian Retail Industry: An Exploratory study, International Journal of Computer Science and Information Security, Vol. 8, Issue 2.
- [10] Grisham, T., (2009). The Delphi technique: a method for testing complex and multifaceted topics. International Journal of Managing Projects in Business Vol. 2, No. 1, pp. 112-130.
- [11] Holland C.P. and Light B. (1999). Global Enterprise Resource Planning Implementation, 32nd Hawaii International Conference On System Sciences. Hawaii.
- [12] Huffman, J., and Whitman, L. E. (2015), "Aligning Enterprise Analytics to Business Process Capability Maturity", IFAC-Papers Online Vol. 48, pp. 2220-2225.
- [13] Motwani, J., Mirchandani, D., Madan, M., Gunasekaran, A. (2002). Successful implementation of ERP projects: Evidence from two case studies, International Journal of Production Economics Vol.75, pp.83-96.
- [14] Musa, H., Yacob, M., Abdullah, A., Ishak, M. (2015) Delphi method of developing environmental well-being indicators for the evaluation of urban sustainability in Malaysia, Procedia Environmental Sciences Vol. 30 pp. 244 - 249.
- [15] Mykytyn, P.P., Mykytyn, K., Raja, M.K., (1994). Knowledge acquisition skills and traits: a self-assessment of knowledge engineers. Inform. Mgmt., Vol.26, pp.95-104.
- [16] Quyen, D., (2014). Developing university governance indicators and their weighting system using a modified Delphi method, Procedia - Social and Behavioral Sciences, Vol.141, pp.828 - 833.
- [17] Remus U. (2006). CSFs of Implementing Enterprise Portal, Proceedings of the 39th Hawaii International Conference on System Sciences.
- [18] Rikkonen, P., Aakkula, J. and Kaivo-Oja, J. (2006). How can future long-term changes in finish agriculture and agricultural policy be faced? Defining strategic agendas on the basis of a Delphi study, European Planning Studies, Vol. 14 No. 2, pp. 147-67.
- [19] Sangar, A., Iahad, N. (2013). Critical Factors That Affect the Success of Business Intelligence Systems (BIS) Implementation in an Organization, International Journal Of Scientific & Technology Research Volume 2, Issue 2, pp. 176-180.
- [20] SAS-b, (2011). The Current State of Business Analytics: Where Do We Go From Here? Retrieved January 3, 2015
- [21] Shehab, E., Sharp, M., Supramaniam, L. and Spedding, T. (2004). Enterprise resource planning: An integrative review, Business Process Management Journal, Vol.10, Issue 4, pp.359-386.
- [22] Somers T.M. and Nelson K.G. (2004). A taxonomy of players and activities across the ERP project life cycle, Information and Management, Vol. 41, Issue3, pp. 257-278.
- [23] Somers, T.M., Nelson, K. (2001) "The Impact of CSFs across the Stages of Enterprise Resource Planning Implementations", In Proc of the 34th Hawaii International Conference on Systems Sciences, Vol.8, 8016, IEEE Computer Society, Washington, DC, USA.
- [24] Sumner, M, (1999), "Critical success factors in enterprise-wide information management systems projects", Proceedings of the Americas Conference on Information Systems (AMCIS), pp.232-234.
- [25] Umble, E.J., Haft, R.R., Umble, M.M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. European Journal of Operational Research Vol.146, pp.241-257.
- [26] Wei, C. and Wang, M. (2004). A comprehensive framework for selecting an ERP system. International Journal of Project Management, Vol.22, pp.161-169.
- [27] Wicom, B., Ariyachandra, T., Goul, M., Gray, P., Kulkarni, U., & Phillips-Wren, G. (2011). The Current State of Business Intelligence in Academia. Communications of the Association for Information Systems, 29(16), 299-312.
- [28] Woo H. (2007). CSFs for implementing ERP: the case of a Chinese electronics manufacturer Journal of Manufacturing Technology Management, Vol. 18, Issue 4, pp.431-442.
- [29] Yeoh, W., and Koronios, A. (2010). Critical success factors for business intelligence systems, Journal of Computer Information Systems, pp. 23-32.
- [30] Yoon, Y., Guimaraes, T., (1995). Assessing expert systems impact on end-users' jobs. J. Mgmt. Inform. Systems, Vol.12, Issue 1, pp.225-249.

- [31] Yoon, Y., Guimaraes, T., Clevenson, A., (1998). Exploring expert system success factors for business process re-engineering, *J. Eng. Technol. Manage.* Vol. 15, pp.179–199.
- [32] Zhang, L., Lee, M. K.O., Zhang, Z., and Banerjee, P. (2002). CSFs of Enterprise Resource Planning Systems Implementation Success in China, *Proceedings of the 36th Hawaii International Conference on System Sciences*, Vol.5, No.3, IEEE.