

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Business Intelligence & Analytics (BI&A) has an increasing impact on making business decisions and on performance of the business within most organizations. The increasing use of big data and data-driven decision making is becoming a motivation for organizations to invest in BI&A. BI&A has become one of the main requirements to achieve competitive advantage in the market place (Abzaltynova and Williams, 2013).

For business organizations, many of the previous bases for competition such as technology, products, protective regulation are gradually becoming redundant. What remains as a basis for competition is to run a business to make smart business decisions wherever applicable and run the business with maximum efficiency and effectiveness as stated by (Davenport and Harris, 2007).

This can be achieved using BI&A, which is referred to as the techniques, methodologies, systems, technologies, practices, and applications that analyse critical business data, to help an organization understand its business and market better, and make informed and timely business decisions. BI&A also includes business-centric practices and methodologies that can be applied to various high-impact applications such as healthcare, e-commerce, e-government, security and market intelligence to increase efficiency and effectiveness, as stated by (Chen et al., 2012).

Organizations may vary in the way they have started, they may have different combinations of capability and varied rates of progression with analytics (Davenport et al., 2010). The rate at which BI&A has been adopted for making decisions and improving experiences of customers has been quite slow. Research has confirmed that while relatively few companies

have adopted analytics as a competitive capability, many others aspire to build it as a capability, as discussed by (Murthy, 2006). India is shifting to usage experience in the value created by businesses. The movement is from manufacturing and agrarian economy to the 'experience' economy, where business analytics and experimentation is the key to creating considerable competitive advantage (Murthy, 2006).

Research and industry experience have shown that organizations with perceived higher level of maturity in BI&A capability have better business performance than those with lower levels (Davenport and Harris, 2007). Also, it is being observed that organizations with more mature business analytics capability enjoy higher value and sustainable competitive advantage (Cosic et al., 2012). As mentioned in Davenport's book, Netflix, founded in 1997, is one such company which has a strong culture of analytics and has grown using analytics for competitive advantage. Netflix employs analytics to drive customer behaviour and buying patterns using mathematics and algorithms for coding. It started off as a movie delivery company and has grown to a media-services provider today.

A successful BI&A implementation journey can enhance productivity and improve efficiency (ALRashdi and Srinivas, 2016). For adoption and implementation of BI&A, it becomes imperative to assess and understand the level of maturity of an organization for its analytical capability. Only then can one gauge the readiness of the organization and the initial investment required in terms of time, resources and capital to improve its analytical capabilities. Organizations need to first assess their maturity level or capabilities of business analytics and then build an implementable strategy to move to higher levels of analytical capability. (Davenport and Harris, 2007), (Liberatore et al., 2017) have found that once there is an increase in familiarity and past experience with investments in analytics, consequently there is found to be an increase in the amount of investment in the practice. To gauge the readiness or familiarity of the organization with analytics, a study by (Tavallaei et al., 2015),

has shown that organizations need to first assess their BI&A capability maturity level as this is a fundamental and critical issue to draw a suitable road map in order to attain higher levels of analytical capability.

There is a wide range of maturity models used to assess BI&A capability maturity. Maturity models have a dual objective – one being descriptive and the other prescriptive. These models may be used to describe the context of an organization, i.e., to assess the existing level of maturity of an organization with respect to any specific technology or capability, and these models are able to prescribe the steps that organizations should go through to improve their existing level of maturity, say (Comuzzi and Patel, 2016), i.e.: a roadmap for getting to a higher level of maturity.

BI&A solutions have proved to be of immense use in understanding how to analyse data, align results with the business objectives and improve the overall efficiency of business as concluded by (Popescu, 2012) . According to (Saeed Rouhani et al., 2016), although a large number of different benefits are expected to result from BI&A, it is important for organizations to recognize which functions are benefited and where is the effectiveness seen. In the book “Profit Impact of Business Intelligence”, by (Williams and Williams, 2010), the authors describe BI&A as a powerful new management approach, which can deliver knowledge, better decisions, efficiency and profit to an organization if done the right way. And to do it the right way, new board positions such as CAO – the Chief Analytics Officer are being developed with a focus on growing teams with the required skill sets for analytics (Lismont et al., 2017). Most organizations today, invest considerable resources in the area of BI&A, in response to the increasing awareness of importance of data driven decision making for better business performance.

As per Gartner’s CIO agenda (2019) for BI&A in India, BI&A ranks as the topmost technology area attracting new or additional funding. This indicates that organizations are

looking at the usage of BI&A as an important strategic initiative. BI&A is extremely strategic and the capability is very necessary to remain competitive in the market (Davenport, 2013). While studies have shown that the adoption of BI&A influences business process performance in a positive manner (Aydiner et al., 2019), there is insufficient empirical research about how organizations can translate their BI&A use into value for the organization (Fink et al., 2017). Where is the effectiveness of BI&A seen? Which are the topmost functions or areas of BI&A usage? This research explores these questions with organizations in India.

1.2 NEED AND MOTIVATION FOR THIS STUDY

According to the findings of (Vanani and Jalali, 2018) the most significant keyword trends searched for in the field of business analytics include contemporary technologies like web, wavelets, neural nets, classification and analytics. There was a lot of research found around the analytical techniques, algorithms and predictive nature of analytics. While there were a few international studies highlighting the importance of understanding the BI&A capability maturity in organizations, there were none found with a study of organizations in India.

There were many maturity models for BI&A in extant literature, yet not a single model is a standard like the Capability Maturity Model (CMM) for software development. A total of 29 BI&A maturity models from 2001 to 2018 were studied. While (Salah et al., 2014) has introduced an assessment template for expert review of maturity models, it was found that there were no clear guidelines for managers to decide which of these models to use to assess BI&A maturity of their organization especially with the advent of big data. Hence, to remove the difficulty of choosing the right model to use, it is proposed to find critical success factors from the multiple dimensions found across all the maturity models. For this, an understanding of all the dimensions found across the 29 models would help in identifying a

relevant and consolidated group of critical factors needed for assessment of BI&A capability maturity. Managers will find this helpful as identification of critical success factors have a positively significant and direct influence on the BI&A systems implementation as stated by (Yeoh and Popovič, 2016).

It is unclear how many organizations in India are actually building the BI&A capability or are aware of how to go about building it or moving to a higher level of maturity. There is no empirical study with organizations in India, which is helpful in determining BI&A capability maturity of an organization. Analytics, Data Science and Big Data industry in India is expected to grow seven times in the next seven years. It is estimated to become a INR 1,30,000 crore industry in India by 2025 (*DATAQUEST*, 2018) as indicated by Data Quest. Organizations across all sectors will be required to develop the BI&A capability to remain competitive and relevant.

Hence it is important for organizations in India to understand their level of BI&A capability maturity. This study also focuses on determining the maturity level of BI&A capability in organizations in India with the help of a questionnaire survey based on critical success factors which influence the BI&A capability maturity.

1.3 OBJECTIVES OF RESEARCH

The objectives of this research are as follows:

- 1) To study the dimensions and maturity levels from the existing maturity models of Business Intelligence & Analytics (BI&A), needed to build analytics capability in organizations.
- 2) To identify critical success factors which influence the maturity of BI&A capability of organizations in India.
- 3) To determine the maturity level of Business Intelligence & Analytics capability (BI&A) of organizations in India.

4) To assess the effectiveness of BI&A of organizations in India.

1.4 SCOPE OF RESEARCH

The purpose of the present study is twofold. The first aim is to identify critical success factors which influence the maturity level of BI&A capability in organizations in India. And the second aim is to determine the maturity level of BI&A capability in organizations in India and create a roadmap to move to higher level of maturity.

An extensive literature review was conducted for understanding BI&A, its evolution, where was BI&A adding value to an organization, where was it used in organizations and how was it measured. It was found that maturity models helped to assess the level of BI&A. Hence, a literature review of maturity models for BI&A was conducted and 29 models were studied with a focus on understanding the dimensions which assess BI&A and their maturity levels. The maturity models studied were from 2001 to 2018. There were no BI&A maturity models found before 2001. The dimensions derived from literature review were consolidated to six critical factors with help from an Expert Panel which was knowledgeable and working in the domain of BI&A in India. This ensured that the critical factors derived from the study were based on the Indian context.

Data was collected from 145 organizations across various industry segments covering manufacturing and service sector to have an overall breadth of understanding regarding state of BI&A in India across sectors. Respondents from these organizations were largely middle to senior management level business users and business analysts. The data was collected over a period of three months from January 2018 to March 2018, by administering an e-questionnaire after extensive pre-testing and conducting a pilot study.

The respondent organizations were grouped and analysed in two phases – In the first phase by industry sector and in the second phase on the basis of similarity in maturity of the critical

success factors, using k-means clustering technique. Each cluster of organizations was further analysed. One case organization was taken from each cluster to gain further insights using in-depth interviews. This gave a comprehensive understanding of the key characteristics of organizations in different clusters. This study also examines the effectiveness and usage of BI&A in organizations.

1.5 PLAN OF CHAPTERS

The Thesis is organized as follows:

Chapter 1 is the Introduction chapter which includes the need and motivation for this study, the objectives of research, scope of research and this plan of chapters.

Chapter 2 describes the literature review. This chapter is divided into five sections – The first section is the Introduction. The second section describes BI&A, its evolution, the changing and evolving characteristics of data and the advent of big data over time, scope of BI&A in India, BI&A implementation, effectiveness of BI&A and building BI&A as a capability. The third section explains the concept of maturity models (MMs), discusses various BI&A maturity models and their maturity levels, the fourth section discusses the dimensions for each of these maturity models, the fifth section highlights the observations and gaps from literature review and the sixth section states the operational definitions derived from literature review.

Chapter 3 describes the research methodology which includes an overview of the research process, process of identification of the critical success factors, development of the tools for data collection - questionnaire design and interviews for the case organizations, sampling procedure, data collection and analysis which include factor analysis, k-means clustering, case method analysis and thematic analysis used for analysing the interview scripts.

Chapter 4 presents the results and discussions of the data analysis done of the data collected from 145 organizations in India. The results show the BI&A maturity (BIAM) score for different organizations which indicates the BI&A capability maturity level. The BI&A usage and effectiveness in an organization are also presented. And finally the findings from the cluster analysis where organizations are grouped into six clusters. Each cluster was found to have a different level of BI&A maturity.

Chapter 5 presents the data collected through in-depth interviews taken for respondents from the six case organizations, one from each cluster. There are six case studies, one from each cluster and the seventh case study is from the Cement Industry which was found to have the highest level of BI&A maturity amongst the organizations in the sample. This case study was selected to validate the findings from the quantitative data.

Chapter 6 presents the conclusion of this study which includes a roadmap for business managers. This roadmap has been derived from the combined results of the quantitative and qualitative analysis of the key characteristics of the clusters. This chapter also presents the academic and managerial implications, limitations and future scope of this study.



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