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Research Article

The Impact Of Business Intelligence Implementation On Information Quality And Marketing Effectiveness Of Organizations

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ABSTRACT

Business intelligence (BI) systems have become a vital requirement for corporate establishments nowadays. The aim of the paper is to find and empirically study the factors affecting the implementation of Business intelligence (BI) systems which are important for its adoption in organizations, in India. This research also gives novel insights on the impact of BI implementation on marketing effectiveness through the mediating role of information quality.

The datasets are collected from banking, telecom, and retail sectors organizations of the Indian subcontinent. The data collected is tested using PLS-SEM (Partial Least Square-Structural Equation Modeling) software. In this paper, the identified success factors for Business Intelligence (BI) implementation are empirically tested by estimating their measurement and structural model parameters. The results of bootstrapping and hypothesis testing show that there is a significant effect of all the success factors, except one i.e., change management, on the effective implementation of BI as well as there is substantial influence of BI implementation on the marketing effectiveness of the organizations. The study contributes uniquely to both academia and industry by providing evidence of determinants of BI solutions implementation and BI impact on organizations in India. This is a first attempt to the best of our knowledge to study the impact of both, BI tools and organizational influence with respect to marketing effectiveness, taking the perspective of specific firms working in the Indian subcontinent.

Keywords: Business intelligence (BI) implementation, BI success factors, Information quality, Marketing effectiveness.

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1 Introduction

Business Intelligence (BI) systems are the novel technological innovation that has added meaningfully to the organization's vision of refining the process of making decisions (Popovič et al., 2012). Business intelligence tools are an innovative technology that could bring about better data management and analytical capabilities that can be beneficial for people in diverse organizations (Yeoh & Popovič, 2016). The international business intelligence sector is estimated to be worth United States Dollars (USD) 43.03 billion by 2028, with an 8.7 percent growth over the forecast period. The market was worth USD 22.26 billion in 2020 and is expected to be around USD 24.05 billion in 2021. Growing digitization, the advent of various online firms, and high

desire for data personalisation are all predicted to drive market expansion (Gobalwire, 2022).This clearly shows the impact this technology is going to have in future.

Business intelligence (BI) technology have always proved to have huge ability to enhance a corporate's efficiency of doing business (Al-Eisawi, Serrano & Koulouri, 2020). BI is a crucial part of learning for industry experts as well as scholars viewing the extent and influence of glitches involving data, to be resolved in present-day corporate organizations (Chen *et al.,* 2012). The term business intelligence describes the set of applications as well as architectures which convert raw data into beneficial data for executives which improves decision-making (Wixom & Watson, 2010). BI is an overall, combination of Information Technology (IT) infrastructures, data warehouses and mining tools (Sharda et al., 2016). Additionally, a BI system also embraces a wide variety of analytical tools for various organizational purposes (Loon, 2019).

In this research, we firstly aim to study the success factors that impact the implementation of these business intelligence systems in organisations. A major challenge for organisations today's is to identify these success factors as they have utmost impact on implementation of BI systems (Sangar & Iahad, 2013). This has been the reason for acknowledging the subject of key success factors as a crucial one, as it helps comprehend the various aspects of a successful BI project. It also helps the stakeholders like functional managers, IT experts, and other people from diverse areas to understand the problems and practical solutions of the implementation process (Arnott, 2008). The various factors considered in this study are researched and analysed through a detailed literature review and are further empirically tested.

In the study, we further, examine the influence of BI implementation on the quality of information, as well as on marketing effectiveness using PLS-SEM analysis on survey responses collected. The study of the previous literature has revealed that business intelligence (BI) systems have been given a lot of importance by IT managers for the past few years, but little knowledge is existing about effective management of the systems after the implementation phase. In this research, thus, the post-implementation impact is also reviewed by analysing the impact of BI on information quality and marketing effectiveness with respect to Indian organisations. The study reveals mediating effects of quality of information on the marketing effectiveness of the firm. Information quality (IQ) is considered a vital parameter to define the level to which accessible information is utilised in organizations, as previous researches propose varied responses for the association between IQ and its usage (Petter, et al., 2008).The use of BI systems in organisations helps the employees, such as the IT workforce, associates, and dealers, to access the information easily, share it and analyse it in a feasible manner. The research model shows the direct as well as indirect impact of BI tools on marketing effectiveness also. Previous researches highlight the need for BI applications to be oriented towards business requirements and should have the capability to expand organizational productivity (Watson, 2009; Wang & Byrd, 2017; Grezes, 2015). The study analyses the vital parameters of BI systems implementation and further try to understand the value created by BI in the business areas related to marketing function such as customer segmentation analysis, trend analysis, sales prediction, and consumer behaviour. As per Li et al. (2013), the post-implementation phase of large IT projects, such as Business intelligence implementation, can be used frequently to analyse client behaviour, track competitors' activities; and detect market trends. Lastly, the industry types is considered as the moderating variable whose role is being analysed on successful BI implementation in the study. The three sectors taken into consideration are banking, telecom and retailing, based on report of Netscribes report, (2013) which states that these sectors have the maximum BI usage. The existing research proposes to deliver experimental evidence to evaluate this hypothesized perspective.

1.1 Research gap

A lot of studies have been done on business intelligence with respect to comparative analysis of techniques, vital success parameters of Business Intelligence implementation, Business Intelligence adoption, Big Data and many others. The recent focus on BI has gained importance due to its significant positive change in the organisations towards getting a desired outcome. In India, the study of BI tools holds a lot of significance because they are being implemented by a lot of organisations, but a few studies empirically are conducted to study the underlying factors impacting it and show the impact of BI tools in organisations. The three sectors whose BI implementation has been studied in this research are banking, retailing and telecom. All these sectors hold crucial value for the Indian economy and are important sectors where the interaction with the customers is very high and its contribution to the industry is large. All types of business activities are involved in these sectors, be it business to business, business to customer or customer to customer. There is a complexity in the operations across all the industry sectors because every day they have to run through a number of transactions. The adoption of BI, thus, has a deep impact on these customer-data rich Indian organisations and need to be studied to help them to ease their processes more effectively. The study is a novel effort to address the existing research gap and understand the BI implementation success factors for these sectors of the Indian economy. Further, impact of BI implementation is further quantified by understanding how it impacts the marketing effectiveness of all these organisations. This aspect has not been previously, studied for organisations in Indian scenario as well as across others organisations. The research also addresses the effect of information quality in the relationship between Business Intelligence implementation and Marketing effectiveness. Thus, the research insights addressed in this study are:

RQ1: What are the critical success factors for implementation of BI systems in the Indian subcontinent?

RQ2: What is the impact of successful BI implementation on the information quality and on the marketing effectiveness of organisations?

2 Theoretical Background

2.1 Business Intelligence Implementation

The complex nature of BI systems necessitate the development of a robust theoretical foundation to assure their deployment is a success (Olszak & Ziemba, 2012). To offer a better contextual understanding of the critical success factors for BI systems in the Indian subcontinent, detailed analysis of various factors involved in successful BI implementation in India was undertaken. To comprehend the various factors affecting the BI systems implementation, previous researches were analysed. The methods and procedures related to the identification of critical success factors vary extensively. As per Yeoh & Popovi˘c (2016), the BI implementation seems to be a complex project, and have a lot of risks involved. Organisations use the critical success factor method to bring about effective BI system implementation. There are numerous outlines laid down in literature for categorizing and recognizing critical success factors. The critical success factors differ based on the result achieved, based on how it is applied, and based on when it is used (Hawking & Sellitto, 2010). Iahad & Sangar (2013) separated the success factors based on managerial and technological dimensions. A review of various literature, thus, throws light on diverse significant standards to gauge BI implementation success. In the study, based on through literature review twelve factors were finalises, which were: business-driven approach, management support, business goal alignment, data quality, change management, champion, fast implementation, project resources, system quality, team skills, organisational culture and user participation. The shortlisted factors further, were shown to panel of 10 experts consisting people who have worked the BI domain in India in the banking, retail or telecommunication sector, for the past 10 years. Based on the opinion of the experts seven factors were finalised for further analysis. The summarised list of authors and their contribution towards the seven critical success factors are shown in Table (I) below:

Table I: Literature Review of Critical Success Factors

S.no.	Critical Success Factors	Authors/Researchers
1	Management Support	Arnott, (2008); Yeoh et al., (2007); Hawking & Sellitto, (2010); Yeoh & Koronios,(2010); Cidrin & Adamala,(2011); Olszak & Ziemba,(2012); Chan, et al., (2013); Dawson & Van Belle, 2013; Sangar & Iahad, 2013; Yeoh et al., 2006; Yeoh etal., 2008; Olszak, 2016; Pham et al., 2016; Yeoh & Popovič, 2016 Yeoh & Popovič,(2016), Lautenbach, et.al (2017), Villamarín (2017), Puklavec (2018), El-Adaileh (2019), Moghim,(2020)
2	Business Goal Alignment	Arnott,(2008),Yeoh, et al.,(2008);Yeoh & Koronios,(2010); Hawking &Sellitto, (2010); Cidrin & Adamala, (2011); Olszak & Ziemba, (2012); Sangar & Iahad, (2013); Yeoh & Popovič, (2016), Rezaie, (2017), Zaid, et al (2020).
3	Change Management	Yeoh et al., (2008); Yeoh & Koronios, (2010); Hawking & Sellitto, (2010); Olszak& Ziemba, (2012); Sangar & Iahad, (2013); Pham et al., (2016); Yeoh & Popovič, (2016) ,Villamarín, (2017), Moghim,(2020)
4	Project Resources	Motwani et al., (2005); Yeoh et al., (2008);Sangar & Iahad, (2013); Olszak, (2016), Zaied, et al, (2018), El-Adaileh, et al ,(2019)
5	Team Skills	Wixom & Watson, (2001); Arnott, (2008); Yeoh et al., (2008);Yeoh & Koronios, (2010); Olszak & Ziemba (2012) ; Dawson & Van Belle (2013); Sangar & Iahad, (2013); Pham et al. (2016); Yeoh & Popovič, (2016), Villamarín, (2017), Rezaie et al, (2017), El-Adaileh ,2019, Zaid, et al (2020).
6	User Participation	Olszak & Ziemba, (2007); Hawking & Sellitto, (2010), Nasab, (2015), Yeoh & Popovič, (2016), Mesaros, et al,(2016), Rezaie, et al, (2017), El-Adaileh et al ,(2019), Zaid, et al (2020).
7	Technical Infrastructure	Watson &Wixom ,(2007); Yeoh, et al., (2008); Yeoh & Koronios, (2010); Mungree et al., (2013), Sangar & Iahad, (2013);Yeoh &Popovi˘c,(2016) ; Thamir & Poulis,(2015); Olszak,(2016); Khalilzadeh, et al (2016), Rahman,(2021)

2.1.2 Management Support

Management support denotes all forms of assistance, sponsorship and backing provided by the senior management team throughout the tenure of the BI project. Management support is considered to be crucial for any software implementation process and is equally vital for BI projects as well. Senior management guidance and support are very crucial where there are concerns regarding the acceptance and implementation of expert recommendations (Davenport & Harris, 2017) Issues associated with scope of the project, business intelligence tools selection, resolving conflicts and related issues; support from top management is considered to be most crucial for BI implementation. The complexity of implementing a BI project, usually has a prerequisite of a lot of support from management team. This is because a successful implementation requires a sound business plan and a high level of management support (Cidrin & Adamala, 2011). Thus, for successful BI implementation the below hypothesis is made:

H1: Management Support positively impacts Successful BI Implementation

2.1.2 Business Goal Alignment

A BI (Business Intelligence) project is initiated by a sound business vision, so a good business plan is desirable to give direction to the implementation. The alignment between business strategies and BI can help organizations improve their processes and gain a greater understanding of the concept of BI (Watson & Wixom, 2007). As per Salmasi et al. (2016), "For successful BI implementation in any corporation, information systems needs must match with the business needs". A robust business plan should comprise of all the necessary details, such as budget, resource details and risks involved to create a profitable BI project. Hence, successful BI implementation the following hypothesis is made:
H2: Business Goal Alignment positively *impacts successful BI Implementation*

2.1.3 Change Management

Change management refers to the efforts which are done to prepare the workforce and people involved to accept the change in business processes, resulting from the introduction of new BI technology. A change management program is vital as it reduces implementation resistance and provides support (Hawking, 2013) during the implementation process, as most of the changes take place during this time (Fourati-Jamoussi et al., 2016; Hobek et al., 2009). Productive communication and improved participation of user in the change process helps in improved understanding of their requirements and aids in delivering an effective system implementation (Koronios & Yeoh, 2010). For, successful BI implementation the following hypothesis is made:

H3: Change Management positively impacts successful BI Implementation.

2.1.4 Project Resources

Project resources refer to all the parameters for judging the success of a project which includes subjects related to the budget, timelines, customer needs, and decision making. As per some researchers, resource allocation has evident importance in the scope of the BI project (Arnott, 2008; Hawking & Sellitto, 2010; Yeoh et al., 2006; Yeoh et al., 2007). The parameters which are considered important and are studied mostly by researchers are schedule, quality, cost and user satisfaction (Heck & Zaidman, 2018; McLeod et al., 2012; Siau et al., 2010). Proper availability of these resources helps to accomplish the main objective of the BI project. It is vital to appropriately make good use and ensure proper availability of these resources to bring about effective implementation of BI systems.

H4: Project Resources positively impact successful BI Implementation.

2.1.5 Team Skills

Team skills refer to a suitable combination of both business and technical knowledge owned by people working on BI projects. The BI team has to perform on diverse interfaces, connecting old databases and a variety of softwares and hardwares. These tasks involves people with varied abilities and competencies. Yeoh *et al.,* (2007), stated that configuration of the team and the capabilities of individuals involved had significant impact on the implementation process.BI team must be cross-functional and comprising of both business and technical people for better implementation success (Hawking & Sellitto, 2010; Morien et al., 2013). The expertise of the individuals of the organisations have a key impact on the BI project outcome.

H5: Team Skills positively impacts successful BI Implementation

2.1.6 User Participation

User participation refers to the activities and responsibilities which are carried out involving the user during the BI implementation. User-oriented and interactive participation during the implementation process can aid in realizing the IT needs of the organization in a more precise manner (Popovi˘c & Yeoh, 2016). The expectations and demands of several end-users are taken into consideration during implementation process.

Various business rules, data dimensions, metadata that are suggested by the end -users are considered while building the BI systems (Watson & Haley, 1998). End-user involvement during the process of implementation leads to proper communication of the needs of the users, which leads to better understanding and adaptation to the new BI system later. Unfortunately, companies sometimes find it difficult to get such skills and experience in workforces' in the organizations. Several corporations have to internally staff people for the BI project at times compromising on the quality and required expertise for the BI team. The users are able to accept and understand the BI system more readily when they participate themselves. The project team also gets support from the users as they help understand the requirement and needs in a focussed manner. Understanding the needs and requirements of the various groups of users can however, sometimes be a challenging task for the BI team members

H6: User Participation positively impacts successful BI Implementation

2.1.7 Technical Infrastructure

Technical infrastructure denotes all the software, hardware, technologies, and tools that can meaningfully increase the success rate of BI implementation. Researchers believe that the technical structure of a BI system should preferably accommodate scalability and flexibility demands under varying business requirements. The successful BI implementation requires the systems to be business-driven, meeting the needs of the business; to be flexible and scalable so that any updation on the technology and functionality can be accommodated (Koronios & Yeoh, 2010; Popovi˘c & Yeoh, 2016). BI system's flexibility is, thus of high importance as it helps to change to new business needs or situations and also helps in the integration with a varied heterogeneous systems in the organisation.

H7: Technical Infrastructure positively impacts successful BI Implementation

2.2 Impact of BI implementation on Information Quality

The other construct which is taken into consideration in the proposed model under study is information quality. The current research is an effort to estimate the impact of successful BI implementation on the information quality of the processes impacted in organisations. There is growing acceptance regarding the importance of information quality in corporations' in today's time ,as it helps in gaining edge against competition in the market (Redman, 1995; Ruževičius & Gedminaitė, 2007; Salaun & Flores, 2001). Relevant information diminishes ambiguity for the managers by helping in recognizing the choices existing for them by forecasting the precise consequences of a decision taken. The process of converting data into better-informed organisational activities is greatly influenced by information technology (Laursen & Thorlund, 2017). Business Intelligence systems, is one such technology, which has a significant role to play as it creates information which has direct impact on a variety of organisational results and consequences (Todd, 1999). Failure to use BIS-enabled data can lead to strategy vision loss (Arvidsson et al., 2014), which occurs when a company is unable to fully use its system capabilities (Arvidsson et al., 2014). BIS have one of the highest potentials in establishing information advantage (Marchand et al., 2002) and ability to achieve distinctiveness from rivals, respectively, and thus, generating competitive advantage with IT (Information Technology), according to a study by IT Strategies, Inc. (2008). BI tools thus, play a crucial role of delivering information of good quality to aid executives in decision making process. (Wieder & Ossimitz, 2015).
Good quality information, is defined as information that is relevant, trustworthy, accurate, and timely (Low & Mohr, 2001; Popovic et al., 2012; Wixom & Todd, 2005), facilitates better decision-making and, as a result, improves business performance (Raghunathan, 1999).The meaning of Information Quality (IQ) in various disciplines, is subject to the use of information. Kahn et al. (2002) perceive information quality as a distinctive feature of information to deliver or surpass expectations of clients. There are various other frameworks for assessing IQ, out of which, a few of them are suitable for accessing information quality for BI systems. A framework which is a very comprehensive for evaluating BI related IQ is given by Eppler (2003). Another framework was given by Wong & Strong (1996) provided reliable dimensions for measuring information quality of data warehouse systems. These frameworks were used, to measure and analyze the BIS's information quality in the present study. The study is an attempt to understand the impact of business intelligence on quality of information produced. There is a big research gap as per the studies conducted previously in empirically quantifying the effect on information quality of the organisations who have been using BI tools. We have tried to address this research gap by understanding the impact on information quality and have chosen it as the mediating variable in our conceptual model.

H8: Successful BI implementation positively impacts the information quality of organizations.

2.3 Impact of BI implementation on Marketing Effectiveness

In this study an effort is made to study the value created by BI implementations in organizations. The use of business intelligence (BI) may aid in the development of firm insight, enterprise competence, management intellectual ability, and marketing intelligence, all of which are important for marketing effectiveness (Sun et al., 2018). Competitive intelligence, customer intelligence, market intelligence, product intelligence, strategic

intelligence, and technology intelligence are all aspects of BI (Ram et al., 2016). For customer opinion mining using social media data, customer purchase-pattern data, market survey data and other sources, BI can use data mining, predictive analytics, and machine learning approaches (Fan et al., 2015). Thus, studies by various researchers state that BI has an impact on improving marketing effectiveness in several ways. As per various sources in literature, business intelligence systems can significantly impact a firm's position in the marketplace, because of its data integration and prediction competencies, (Chen & Siau, 2011). Several similar studies support the fact that firms mainly use IT (Information Technology) innovation to improve their performance, related to marketing, supply chain, and various related business processes (Stieglitz & Brockmann, 2012). As per Picoto et al. (2014), there is a relationship between the usage of innovative methods and effect on organizations' success. The usage of these innovations, hence, is said to influence internal operations, such as procurement, marketing and sales related functions. Another theory known as Resource-Based View (RBV) states that companies which use IT (Information Technology) more have equally more chance of creating capabilities and skills related to it, thus contributing to creation of value. The Use of IT capabilities, such as Business intelligence tools, in firms, aids the formation of resources beneficial for the organisation and later to organisational gain (Zhu & Kraemer, 2005). According to a 2001 article in Microsoft Business, the more relevant, valuable knowledge you have about your industry, clients, associates, and services at your disposal, the more your management can implement smarter decisions and gain a competitive advantage. BI is frequently used to assist businesses in better understanding their consumers' purchasing habits, identifying sales and profit development prospects, and improving overall decision making. Thus, there is no doubt that better and more consistent quality data should lead to increased confidence in decision-making in all functional areas, especially marketing.

Marketing effectiveness depends on "the extent to which the marketing activities entail the five main features of market orientation (Kotler & Keller, 2006, p.719).These features consist of customer philosophy, integrated marketing organisation, sufficient marketing knowledge, strategic orientation and operational effectiveness.Marketing effectiveness has been studied by Nwokah, (2006) who has defined it through similar four dimensions. Based on the above concepts the various activities involved in defining the marketing effectiveness in the study are as follows: the identification of customers' needs and purchase patterns, conducting marketing research activities, promotional efforts, advertising, measuring the sales potential of various segments/products and forecast regarding future trends.

In this research, thus, we are studying the direct as well as the indirect influence of business intelligence implementation on marketing effectiveness through the mediating role of information quality. There is again a research gap in this area, as previous researches have not empirically tested the impact on this aspect. This is a novel effort, to the best to our knowledge, to measure information quality and marketing effectiveness together as both are related to each other. As per literature too, information quality can aid in exploiting the marketing investments and good information abilities help to increase the connection between a firm and its customers, and these competences empower companies to raise their sales turnover (Elbashir et al., 2008; Negash & Gray, 2008).

H9: Information quality significantly impacts the marketing effectiveness of the organizations.

H10: Information quality significantly mediates the relationship between successful BI implementation and marketing effectiveness.

2.4 Moderating Variable (Industry Type)

The moderating effect of industry type is evaluated in this study. As per literature, BI system provides differential benefits to different types of organization or industries (Elabshir, et al, 2008; Melville et al., 2004). Considering industry type as a moderator will help the researchers determine the technical and social boundaries of conceptual framework and IS theories (Davidson, 2005).Thus, in this study, we have evaluated the relationship between BI success factors and successful BI implementation comparing it between three industry groupings i.e., Banking, Telecom and Retailing. To explore the differential effect of industry types on the relationship between BI success factors and BI implementation, we propose the following hypothesis (H11):

H11: Industry type has a significant moderating effect on the relationship between BI success factors and successful BI implementation.

3 Research Methodology

This research work has the prime objective of studying the success factors for BI implementation in India and assessing the impact of the BI implementation on the organisations. Based on the above literature, top cited success factors were noted and then discussed with experts. Finally, seven critical success factors were identified. The conceptual model was developed using the previous literature and expert opinion, as the foundation to the study. The final proposed research model of the study is shown below in Figure (i).

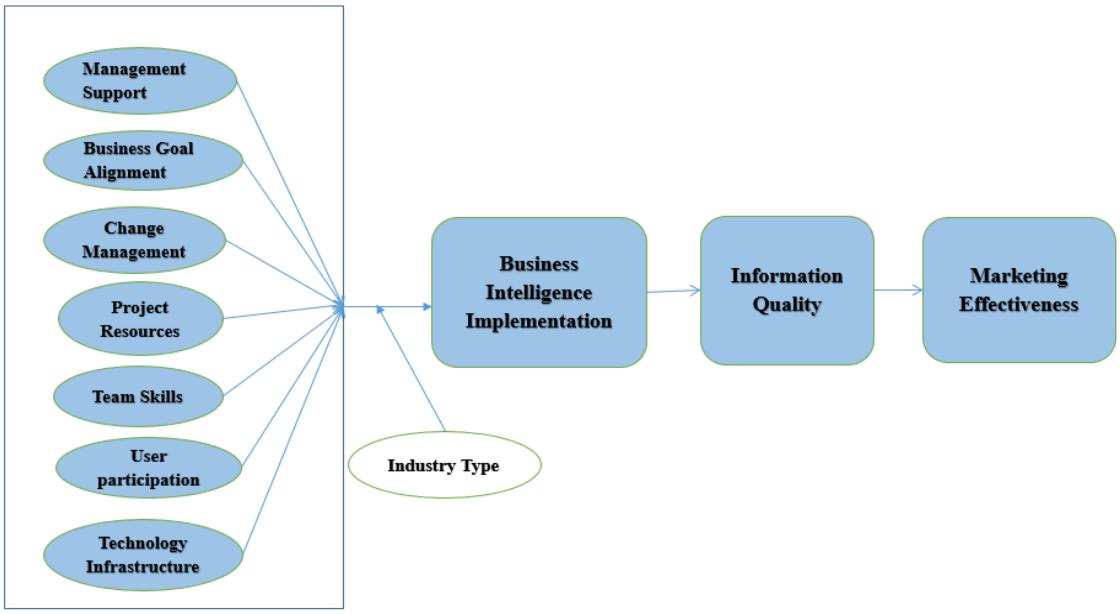

Figure II: Conceptual research model

3.1 Instrument Design

In the present study, a quantitative research methodology is followed after reviewing the literature. A questionnaire was made to conduct the survey and collect responses. The questionnaire covered the following constructs, namely: MS (Management Support), BG (Business Goal Alignment), CM (Change Management), PR (Project Resources), TS (Team Skills), UP (User Participation), TI(Technological Infrastructure), EBI(Effective Business Intelligence Implementation), IQ (Information Quality), ME (Marketing Effectiveness). The questionnaire contained variables of all the constructs of the proposed model. Each independent factor comprises 4 measured items while the dependent variable consists of 4 items, 7 items and 9 items respectively, thereby amounting to 43 items in the survey questions. Based on previous literature available, all the constructs used were operationalized as reflective constructs for analysis using PLS-SEM software. The items of the questionnaire were selected from the previously validated measures. A five-point Likert scale questionnaire was used to access all the items/variables, the scale ranged from "(1) strongly disagree" to "(5) strongly agree". The questionnaire was tested and adapted consulting experts from the target population. Content validity was established by reviewing items in the questionnaire by a set of 10 BI experts (shown in table ii (a)), who were well acquainted with the usage and effect of BIS (Business Intelligence Systems) on Indian organizations. Based on their suggestions a few modifications were done in questionnaire. After this, pilot testing was done by taking responses from 70 employees of the concerned organisations and the questionnaire was finalised (Questionnaire attached in Appendix (i)). The primary data was collected based on the instrument developed.

3.2 Data Collection

The final version of the questionnaire was distributed among respondents within banking, telecom, and retail sector organizations using BI tools. We conducted a questionnaire survey-based study in the current research, both by face-to-face interaction as well as through mailing the respondents. The breakup of the respondents from various industry sectors is shown in the table below (Table ii (b)). The participants of the survey included BI managers, heads of data analysts, senior data analysts, data architects, senior BI consultants. These participants were carefully chosen on the basis of their understanding and experience in BI implementation process and their ability to understand the impact of this on other functional areas of the organizations. A total of 351 responses were collected from the respondents, out of which 27 were removed due to incorrect or incomplete information. Finally, 324 responses were used for further data analysis.

The responses collected by the usage of a single respondent questionnaire may have issues from common-method bias as well, which might impact our outcome as well (Podsakoff & Organ, 1986). To determine the adverse impact caused by common method bias, we conducted Harman's one factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) to inspect whether a single factor would explain for all the hypothesized factors (Dubey et al., 2018). Exploratory factor analysis was done for estimating the common method bias. The total variance explained by a single factor was only 37.9 %,(less than 50%) showing that the issue of common method bias is not having a significant impact on the findings.

Table II (a): Panel of BI Experts

S.no.	Current Position	BI system	Industry Sector
1	Analytics manager	Microsoft Power BI, Zoho	Telecommunications
2	IT manager	Tableau	Banking services
3	Team lead	Tibco, Spotfire	Banking services
4	Analyst	Microsoft Power BI Pro	Retail
5	Senior Manager	Dono	Telecommunications
6	Consultant	Tableau	Insurance services
7	Project Manager	Microsoft power BI	Telecommunication
8	Consultant	Zoho analytics	Retail services
9	System Support Engineer	Microsoft power BI	Telecommunications
10	Senior Consultant	Tableau, Microsoft power BI	Banking services

Table II (b): Breakup of Respondents

S.no	Industry Sector	Percentage of Respondents
1	Banking	56.03%
3	Telecom	23.76%
4	Retail	20.06%

3.2 Non Response Bias

To assess for the non-response bias in the sample, a comparison is done between the distributions of early and late responses. Non-response bias denotes "the differences in sample distribution due to differences in the time when participants completed the survey" (Cascio, 2012).To measure non-response bias ten questions were taken randomly from the questionnaire. The mean value of each question taken is used for conducting independent sample t-test. The outcome (shown in Table III) signifies that the null hypothesis stating that there are "no significant differences between the two response data groups" is not rejected. This signifies that the difference in the time of completion did not lead to significant differences
in the responses. Therefore, it is verified that is there is no substantial non-response bias in the data-set of our study.

Table III: Non-Response Bias Test

Randomly selected survey questions	**Mean** Early Responses **(N=100)**	**Mean** Late Responses **(N=100)**	**Statistical Difference** $\alpha < 0.05$, or the null hypothesis is accepted
Q. In your view, there has been strong leadership and mentorship throughout, in promoting the BI project in the organization.	4.29	4.41	0.322
Q. The BI implementation process received widespread financial sponsorship, by the senior management.	4.20	4.33	0.248
Q. To promote the acceptance of the BI project undertaken, there has been adequate linking of organizational goals to BI goals.	4.37	4.47	0.429
Q. There have been efforts to generate willingness to accept change of business processes because of BI implementation	4.27	4.20	0.577
Q. There were processes to manage the scope of work and controls on quality.	4.16	4.33	0.245
Q. The BI team members had decent communication as well as interpersonal abilities.	4.20	4.31	0.436
Q. The implemented BI system has the suitability for users' business need.	4.04	4.08	0.808
Q. There was a stable technical infrastructure supporting the ETL process of data.	4.12	4.18	0.757
Q. The BI implementation process has procedures to bring about change if required on overall plan, quality and associated risk.	4.33	4.78	0.201
Q. The information is obtainable in a style that is more comprehensible and understandable for the users.	4.29	4.33	0.839

4 Results and Discussion

In the research, partial least squares (PLS-SEM) based structural equation modeling technique is used for analysis of data and uses the software Smart PLS version 3.2.8 for analysis (Ringle et al., 2015). PLS a variance-based technique and is more appropriate for this study. The main reason being that the proposed model understudy is complex and has not been empirically analysed before.

4.1 Measurement Model

To analyse the measurement model, firstly, the validity and reliability tests for all the constructs and respective measurement items were done. As stated earlier, the constructs were shared and deliberated upon by various business intelligence experts. Based on their suggestions and confirmations, content validity was established. (Churchill, 1979).

4.1.1 Internal Consistency and Reliability

To measure internal consistency, the factor loading for each separate item is estimated by "the outer loadings of items on their specific construct and this is assessed using the criterion that the factor loadings should exceed the value of 0.7" (Henseler *et al.,* 2009).Table IV shows that, the loadings are above 0.7 which satisfies the above criteria, and hence, all constructs of the model show adequate internal consistency. To measure the construct reliability, Cronbach's α and the composite reliability (CR) are calculated. As depicted in Table 4, all constructs have CR and Cronbach's α as above 0.7, signifying construct reliability (Chau, 1999; Straub, 1989) for all the constructs of the scale.

4.1.2 Convergent Validity

Construct validity is measured through convergent and discriminant validity. The measure to test convergent validity is average variance extracted (AVE) where all constructs should record a value more than 0.5 (Yoo & Alavi, 2001). As depicted in Table IV, an AVE higher than 0.5 can be seen for all the constructs, thus confirming the presence of convergent validity among measured constructs of the questionnaire (Henseler et al., 2009; Bagozzi & Yi, 1988).

Table IV: Construct Reliability and Convergent Validity

Constructs/ Variables	Outer Loadings	Cronbach's α	Composite Reliability	AVE
Management Support (MS)		0.886	0.886	0.610
MSI	0.74			
MS2	0.79			
MS3	0.84			
MS4	0.71			
MS5	0.82			
Business Goal Alignment (BG)		0.827	0.827	0.544
BG1	0.71			
BG2	0.73			
BG3	0.77			
BG4	0.75			
Change Management (CM)		0.816	0.816	0.527
CM1	0.78			
CM3	0.77			
CM4	0.70			
Project Resources (PR)		0.843	0.843	0.575
PR1	0.82			
PR2	0.81			
PR3	0.72			
Team Skills (TS)		0.870	0.870	0.627
TS1	0.82			
TS2	0.79			
TS3	0.77			
TS4	0.78			
User Participation (UP)		0.881	0.881	0.650
UP1	0.79			
UP2	0.83			
UP3	0.79			
UP4	0.81			

Technical Infrastructure (TI)		0.886	0.866	0.660
TI1	0.76			
TI2	0.81			
TI3	0.88			
TI4	0.80			
Successful Business Intelligence Implementation(SBII)		0.872	0.872	0.578
SBI1	0.79			
SBI2	0.77			
SBI3	0.75			
SBI4	0.75			
SBI5	0.75			
Information Quality (IQ)		0.901	0.901	0.566
IQ1	0.74			
IQ2	0.73			
IQ3	0.70			
IQ4	0.72			
IQ5	0.74			
IQ6	0.78			
IQ7	0.84			
Marketing Effectiveness (ME)		0.907	0.907	0.549
ME1	0.77			
ME2	0.84			
ME3	0.73			
ME4	0.69			
ME5	0.70			
ME6	0.73			
ME7	0.76			
ME8	0.78			

4.1.3 Discriminant Validity

The Fornell-Larcker criterion is used for estimating discriminant validity. Discriminant validity proves "whether a construct explains the variance of its indicators better compared with the other constructs" (Fornell & Larcker, 1981). The method assesses discriminant validity, "which is the square root of the average variance (AVE) for each construct, such that it should be greater than all the other inter-construct correlations" (Fornell & Larcker, 1981). Table V depicts the results as per the above criteria showing the diagonal of the matrix is the square root of the AVE, and the diagonal elements are larger than the off-diagonal elements, thus confirming the presence of discriminant validity in the proposed model constructs.

Table V: Fornell-Larcker Method -Discriminant Validity

Dimension	MS	BG	CM	PR	TS	UP	TI	OBI	IQ	ME
MS	**0.781**									
BG	0.434	**0.738**								
CM	0.688	0.555	**0.726**							
PR	0.534	0.496	0.533	**0.758**						
TS	0.564	0.513	0.617	0.608	**0.791**					
UP	0.548	0.478	0.513	0.515	0.615	**0.807**				
TI	0.509	0.453	0.493	0.605	0.587	0.605	**0.813**			
EBI	0.761	0.684	0.698	0.707	0.739	0.734	0.738	**0.760**		
IQ	0.544	0.537	0.540	0.617	0.589	0.633	0.582	0.711	**0.752**	
ME	0.598	0.429	0.434	0.577	0.474	0.572	0.537	0.682	0.743	**0.747**

Note: MS-Management Support, **BG-** Business Goal Alignment, **CM**- Change Management**, PR-** Project Resources, **TS**- Team Skills, **UP**- User Participation, **TI**- Technological Infrastructure, **SBII**- Successful Business Intelligence Implementation, **IQ**- Information Quality, **ME**- Marketing Effectiveness

Based on the results thus obtained from the Cronbach alpha, Composite reliability, outer loadings of the indicators, Average value extracted, convergent validity, and discriminant validity- Fornell and Larcker test it is established that the measurement model (outer model) has adequate validity and reliability for all the constructs.

4.2 Structural Model

After the adequate evaluations of the measurement model's construct reliability and validity, we proceed with the testing of the structural model. The evaluation of the structural part for the proposed research model involves evaluating the R^2 values (co-efficient of determination), Q^2 values and the testing of hypothesis. In the proposed research we also include evaluation of the impact of mediation in the model.

4.2.1 Co-efficient of determination (R^2) and Predictive Relevance (Q^2)

R^2 is defined as "variance in the endogenous constructs explained by all of the exogenous constructs associated with it" (Hair *et al.,* 2017). R^2 is referred to as the co-efficient of determination. In the study, the three endogenous constructs present are; business intelligence implementation, information quality and marketing effectiveness. The impact of BI implementation on marketing effectiveness is mediated by information quality, so it is also a mediating endogenous construct in the proposed model. The exogenous constructs are the seven success factors for successful BI implementation. "The effect of the exogenous construct on the endogenous constructs is thought to be substantial, moderate, and weak if they have R^2 values of 0.75, 0.50, or 0.25, respectively" (Hair *et al.,* 2017). Table VI displays the R^2 values for all the endogenous construct. The total variance explained by the impact of all the success factors for BI (exogenous constructs) on effective implementation (endogenous construct) is 87%, showing a substantial impact of success factors on implementation. The variance explained by the impact of effective BI implementation on the information quality of an organization is shown as 51% and the impact of improved information quality on marketing effectiveness is analysed to be 58 %. These R^2 value of 0.505 and 0.589 respectively show moderate impact of BI implementation on information quality and marketing effectiveness, in this study.

The research model's predictive capability was assessed through Q^2 values using bind-folding technique (Hair et al., 2017).These values as should be greater than zero for every individual endogenous construct of the model to have predictive relevance. The Q^2 value for this study, for all three endogenous constructs was 0.476,0.242 and 0.302 respectively, which was greater than the threshold limit (greater than zero), and it suggests that predictive relevance for the path model is satisfactory for proposed BI model. The results are shown in table VI below.

Table VI: R^2 Values and Q^2 Values for Endogenous Constructs

Endogenous Constructs	R square (R^2)	Impact on endogenous constructs	Predictive Relevance (Q^2)
Successful BI implementation	0.873	Substantial	0.476
Information quality	0.505	Moderate	0.242
Marketing effectiveness	0.589	Moderate	0.302

4.2.2 Model fit

The model fit parameters, which are Goodness of Fit, Standardized Root Mean Square Residual (SRMR), are described in Table VII below.

Table VII: Model Fit Parameters

Parameters	Observed values	Benchmark values	Inference
Goodness of Fit	0.600	GOF=0.1(small), GOF=0.25(Medium) GOF=0.36(Large)	Large GOF
SRMR(Standardized Root Mean Square Residual)	0.047	< 0.08	Satisfactory

4.2.2 Hypothesis testing

The significance levels of the path coefficient were analysed by the bootstrapping technique (Chin, 1998; Henseler *et al.,* 2009). "Bootstrapping is a non-parametric resampling technique that depends on assessing the adaptability of the data by testing the variability of the collected sample without the use of parametric norms" (Efron & Tibshirani, 1994) For the ensuring the development of a strong research model bootstrapping procedure is of crucial importance. The bootstrap test displays the values of coefficients and assesses the attributes of the underlying model. T-statistic value was utilized to test the coefficients. As per

the guideline given by Hair et al. (2013) this value should be more than 1.96 at 95% confidence interval for it to be thought as critical and significant.

It is displayed in results shown in Table VIII, each of the ten hypothesis, with the exception of one, demonstrated that the connections between the different constructs were significant. In light of these outcomes, it is construed that success factors positively affect BI frameworks implementation as proposed in the model. The study likewise demonstrates a critical impact of BI tools implementation on marketing effectiveness. The model shows the mediating role of information quality between successful BI implementation and the impact it has on the marketing efforts of the organization. The model which is shown in Figure II, outlines the structural relations between the various factors, BI implementation, information quality and marketing effectiveness.

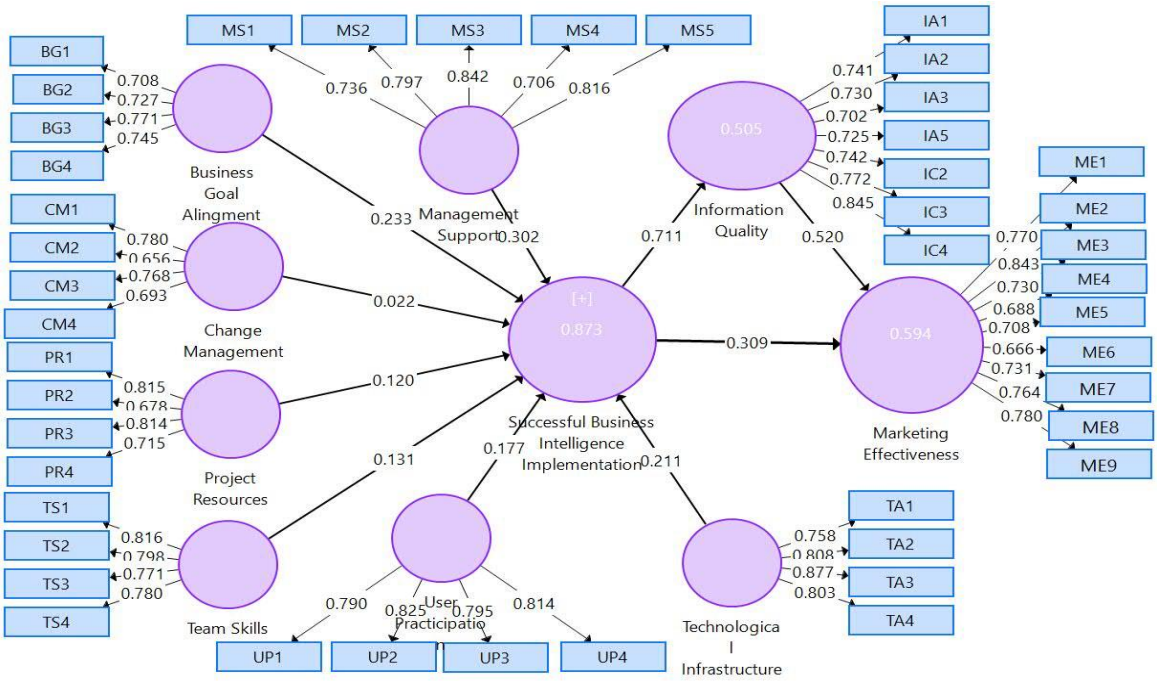

Figure II: Measurement and Structural (Mediation) Model using Smart PLS

Table VIII: Bootstrapping Results

Hypothesis	Effect	Path Coefficient (β)	T-Statistics	p-values	Supported/ Not-supported
H1	Management Support> BI implementation	0.302	5.052	0.000	Supported
H2	Business Goal Alignment> BI implementation	0.233	3.767	0.000	Supported
H3	Change Management> BI implementation	0.022	1.152	0.250	Not-Supported
H4	Project Resources> BI implementation	0.120	2.496	0.013	Supported
H5	Team Skills>BI implementation	0.131	2.502	0.012	Supported
H6	User Participation> BI implementation	0.177	3.744	0.000	Supported
H7	Technical Infrastructure>BI implementation	0.211	3.587	0.000	Supported
H8	Successful BI implementation>Information quality	0.711	10.098	0.000	Supported
H9	Information quality> Marketing effectiveness	0.519	5.077	0.000	Supported

The results shown in Table VIII depict that out of the ten hypothesis, nine are accepted and one is non-accepted. The hypothesis, H1 stating positive impact of management support on effective BI implementation (β=0.302, t =5.052) was affirmed. The bootstrapping results also supported proposition (H2), which anticipated a huge, positive connection between business goal alignment and BI implementation (β=0.233, t =3.767). Hypothesis (H3), however, did not get supported through the results of bootstrapping. Change

management showed an insignificant relationship with business intelligence implementation (β = 0.022, t =1.152). Further, the results upheld hypothesis (H4) in which project resources was seen to have a positive relationship with successful BI implementation (β =0.120, t =2.496). Likewise, hypothesis (H5) was also upheld indicating that team skills and effective BI implementation are associated in a positive manner (β =0.131, t =2.502). User participation (H6) has a substantial, positive association with BI implementation, (β= 0.177, t =3.744) was shown by the results of the analysis. The results showed that technical infrastructure and BI implementation are positively related (β =0.211, t =3.587), thus affirming hypothesis 7. Our analysis helped to find the presence of a positive relationship between the information quality (β =0.711, t =10.098) and successful BI implementation, which justifies the fact that the quality of information is improved by using BI tools (H8). The results also testify and support the hypothesis (H9) regarding the impact of information quality on marketing efforts (β = 0.519, t = 5.077). As depicted in Table 7, the association between successful BI implementation and information quality represents the path- coefficient with the highest value (β = 0.711). The path coefficient of the lowest value is depicted from change management to successful BI implementation (β= 0.022). The management support factor has the greatest value of 0.302, which represents a stronger effect on BI implementation. The second highest β value is manifested by business goal alignment, which is 0.233, followed by technical infrastructure and user participation.

4.2.3 Mediation Analysis

In the study, the construct information quality's mediating role between successful BI implementation and marketing effectiveness is evaluated. The prerequisite for doing mediation analysis is to verify whether the direct effect between the constructs, without the mediating construct, is significant. The bootstrapping results showed that there was a substantial direct impact of successful business intelligence implementation on the marketing effectiveness of the organization, in the absence of the mediating construct i.e., information quality (β=0.679, p<0.05).

For mediation analysis, the bootstrapping results are then, analysed to estimate the direct effect between BI implementation on marketing effectiveness in presence of the mediator. The p- value is significant, (β=0.308, p<0.05), showing the presence of direct impact of BI implementation on marketing effectiveness. Secondly, the indirect effects via information quality are also seen to be significant (β=0.711, p<0.05; β=0.519, p<0.05). As both the direct and indirect effects in the presence of the mediating variable are significant, its shows that the mediator absorbs some of the direct effects (results shown in Table IX). The level of mediation is determined by Variance Accounted for (VAF) which "depicts the magnitude of the indirect effect in comparison to the overall effect" (Hair et al., 2013). The VAF value is estimated to be 54.5%, showing that there is partial mediation (as the VAF value is > 20 % and <80%) via the mediator, information quality. The results of mediation analysis thus, verify that the proposed relationship stating that effective BI implementation impacts marketing effectiveness is partially mediated by information quality.

Hence, the hypothesis (H11), information quality positively mediates the relationship between successful business intelligence implementation and marketing effectiveness is accepted.

Table IX: Mediation Analysis

S. no.	Path	β (Beta)	Significance level (p-value)
1	**Direct Path** (presence of mediator) (Effective BI implementation → Marketing Effectiveness)	0.308	0.000
2 (i)	**Indirect Path** (Effective BI implementation → Information quality)	0.711	0.000
(ii)	(Information quality → Marketing Effectiveness)	0.519	0.000

Estimation of **VAF (Variance Accounted For**) : Indirect effect/Total effect
= (0.711*0.519)/((0.711*0.519)+ 0.308)
=0.545
= 54.5% (VAF Value)

5 Effect of Moderating Variable

The moderating effect of the industry type on the relationship between BI success factors and BI implementation was assessed using Multi Group Analysis (MGA) in Smart PLS. Three specific groups were created for the industry type, namely- Banking (A) - 174 cases, Telecom (B)- 88 cases and Retailing (C)- 62

cases. The MICOM analysis (Measurement Invariance of Composites using partial least squares) is done to check whether the data sets show invariance and are fit for doing moderation analysis. The results of the MICOM analysis confirmed that the data sets showed Configural Invariance & Compositional Invariance and were eligible for running MGA tests.

As evident from Table X, the results show that the path coefficient value is significantly small and the p-value is larger than 0.05 for all the three groupings, which suggests that moderating variable has a negligible effect on the relationship between the constructs.

Hence the hypothesis (H12) that industry type has a significant moderating effect on the relationship between the BI success factors and BI implementation success is rejected.

Table X: Moderation Analysis

Construct Relationship	**Path Co-efficient**			**P- value**		
	Banking V/s Retailing (A-C)	Banking V/s Telecom (A-B)	Telecom v/s Retailing (B-C)	Banking V/s Retailing (A-C)	Banking V/s Telecom (A-B)	Telecom v/s Retailing (B-C)
Management Support> Successful business intelligence implementation	0.002	-0.181	-0.209	0.968	0.166	0.230
Business Goal Alignment> Successful business intelligence implementation	-0.004	-0.046	-0.102	0.964	0.801	0.467
Change Management> Successful business intelligence implementation	-0.014	-0.142	-0.021	0.329	0.260	0.883
Project Resources > Successful business intelligence implementation	0.022	0.150	0.107	0.860	0.326	0.472
Team Skills > Successful business intelligence implementation	-0.017	0.091	0.174	0.404	0.410	0.158
User Participation> Successful business intelligence implementation	-0.015	-0.049	-0.023	0.647	0.650	0.850
Technological Infrastructure > Successful business intelligence implementation	0.120	0.195	0.190	0.303	0.131	0.190

5 Discussion

5.1 Impact of success factors on effective BI implementation

The objective of the quantitative research to examine the various aspects impacting the implementation of BI systems and their further influence on the marketing effectiveness of organizations in India.

Firstly, we found that management support (β=0.302, t =5.052) is the most important critical factor which positively influenced the BI implementation process and should be given priority while going for implementations in Indian organisations. This outcome and several research studies of other countries state that management support is vitally associated to the implementation of an innovative technology (Chong et al., 2009; Hameed et al., 2012). Our findings make sense because as per our respondents as well, the role of planning, prioritizing, and controlling the entire implementation process is most crucial for the BI project and is played by senior management across all organizations in India. The second most important factor for BI implementation is business goal alignment (β=0.233, t =3.767), which has a significant impact as well. Some previous researchers highlight the fact that for BI implementation success, the business needs must be linked to the information needs (Salmasi et al., 2016). There has been a lot of discussion and debate regarding this aspect and finally business has started taking ownership of IT projects in India, thus leading to successful implementations.

The third hypothesis (H3) regarding change management positively impacting BI implementation is not supported through our data analysis. Our results contradict the previous research in this aspect, as we see an insignificant impact of change management on the BI implementation process in Indian companies. One relevant explanation given by the respondents is that most of the organizations in the banking, telecom and retail sectors in India have previously experienced other IT project implementations like ERP (Enterprise Resource Planning), SAP (Systems, Applications & Products in Data Processing), etc, so the employees and people involved in the implementation process are already accustomed to adapting to new processes and do not require change management programs. The organizations are thus, not undertaking special workshops to accustom them to the change that is likely to happen due to BI tools being implemented. Another reason for the absence of any such apparent change management processes in organizations is to reduce the time and cost of doing such exercises. However, there is a lot of scope for the development of such efforts in companies to bring in such forums and workshops for adaption to changes in processes.
Our findings further show that the factor of technical infrastructure (β =0.211, t =3.587) is considered as the third most important factor, positively impacting the effective execution of BI projects in India. The development tools used by the team, play an equally crucial role as others parameters such as people and resources. The tools can influence the productivity and competence of the team members, when they are not well comprehended (Banker and Kauffman, 1991).The IT infrastructure lays the foundation for a sound BI system that can be reliable and scalable. Further, responses by BI professionals in India highlight user participation (β= 0.177, t =3.744) as the fourth most important factor influencing BI implementation success and highlighting the fact that the people involved as team members must have suitable understanding, information, and expertise regarding BI systems. The participant teams should ideally comprise of individuals from varied areas, with sound technical knowledge and profound understanding of business (Burton et al. 2006).

Our analysis also further show that adequate project resources (H4) and good team skills (H5), both seem to play a positive role in the process of implementation. The respondents claimed that the proper allocation of timelines, funds, and manpower plays a vital part in the framing of a proper implementation plan. Thus, six out of the seven success factors considered, with an exception change management, show to positively impact business intelligence implementation in India. The predictive relevance of the model's endogenous construct (being greater than zero) also show that the model can be used for future estimations and analysis.

Thus, we can conclude that the factors management support, business goal alignment, technical infrastructure and user participation play the most significant role in implementation of BI systems in Indian organisations in the banking, retail and telecom sectors. Thus, these factors should be given most importance for effective implementation efforts. Other factors like, project resources and team skills are also having positive and important role related to BI implementation.

5.2 Impact of effective BI implementation on Information Quality and Marketing Effectiveness

The purpose of the research is to deliver understanding about the direct and indirect effect of BI on marketing effectiveness of the organisations in India. This is one of the first attempts to study the impact the IQ and marketing effectiveness together and understand the direct as well as indirect impact of them on enterprises. The outcome of the analysis shows that BI implementation success has significant direct impact on information quality (H8), and has a positive direct and indirect effect on the marketing effectiveness (H9) of organizations as well. As per literature, for acquiring competitive advantage organisations are leveraging information quality are an important tool. (Redman, 1998; Ruževičius & Gedminaitė, 2007; Salaun & Flores, 2001).BI systems help to mitigate the decision risk using improved information quality, to bring in faster response time to a query (Watson et al., 2002). For long, understanding and quantitatively estimating the business value of BI has been a challenging task for industry people as well as academicians. We through our research have tried to show empirically that there exists a significant positive effect of BI implementation on information quality which leads improved marketing effectiveness. This substantiates the need and importance of BI implementation for improving decision-making in organizations in India. The results show that there is partial mediation and there is a positive direct effect from successful BI implementation to marketing efforts and an indirect effect through information quality as well. This signifies that the BI implementation not only improves information quality in Indian companies but also impacts marketing related business processes directly. The marketing effectiveness of business processes is positively impacted by the usage of BI systems in various organisations in India.

The results of this study, thus indicate that the organizations get improved information quality, better processes, such as changes in marketing-related activities like customer profiling, selling across various consumer groups and other related improvement in processes as a tangible benefit of the implementation of BI tools. The inferences made from the result also substantiate the theory of critical success factor by showing the vital impact they have on proper BI implementation. One may conclude that effective business

intelligence implementation effort results into more inclusive and better penetration of business intelligence systems across organisations in the Indian sub-continent.

6 Implications

Theoretical Implications- To the best of the researchers' knowledge, this is the first empirical research in India for understanding the critical success factors for business intelligence implementation which has taken the three sectors of retail, telecom and banking into consideration. As business intelligence is growing at an exponential rate across the globe, such studies are required for effective implementation in developing economies as well. This study provides an inclusive model for the BI implementation considering the critical factors along with the mediating variable, information quality and the impact on marketing effectiveness. It is different from the earlier studies, as it combines technological and organizational factors along with the role of information quality and organization's marketing effectiveness, considering factors which are specific to the Indian scenario. The factors are not only specific to the Indian context but also peculiar to the three sectors of the industry taken into consideration. It is observed that the companies in the Indian subcontinent earlier viewed BI implementation as a technical project and subsequently faced implementation failures. The involvement of business side and senior management has enhanced the acceptance and has reduced the resistance for implementation in the organization over the past several years. Factors like business alignment with BI, user involvement, training and awareness are vital and need to be focussed on, to further encourage BI implementations in India and other developing nations.

Practical Implications- The findings of this work focuses on the BI implementation and impact, in India which may provide a greater understanding for policymakers to formulate a strong BI strategy for their organizations. This study can help to identify the gaps in realization for BI implementation**.** It is established that there is significant effect of BI implementation on information quality, so it brings to light that along with the data processing and data transformation processes, other organisational success factors has an important role to play in implementation process. The impact of BI on improving the marketing effectiveness is also empirically proven through the research, which can help justify the future investment in BI tools in various organisations, as its helps to achieve the much desired competitive advantage in the market.

7 Conclusions

Based on the results we can also conclude that it is essential to give heed to the BI implementation success factors to be able to get the effective implementation done in organizations. Support from management and alignment of business goals with BI goals are the most important success factors impacting effective BI implementation. Thus, greater attention to support from management and BI oriented business strategy will go long way in making investments on BI systems fruitful. This also leads to information quality getting significantly improved and further impacts other business processes. Marketing-related activities focussed on getting customer-related insights are also seen to be largely benefitted, making it worth investing in this technology in all organisations, belonging to different sectors of the industry.

8 Limitations and Future Scope

Any research has its scope and limitations and the present study has its set of limitations as well. In this research, only selected seven success factors for BI implementation have been studied based on their relevance in Indian subcontinent. However, previous researches have studied and elaborated on others critical success factors which are not taken into consideration in this particular research scenario in India. As this study is based on empirical analysis, a qualitative approach can also be included to bring in a more effective and precise investigation of the key factors. The study's scope is restricted to the investigation of key factors in India's retail, banking and telecom sector organizations, which can be further enhanced by covering a greater universe by the inclusion of the other sectors.

Generally, the research adds to both scholarly world and industry by giving proof of advantages of determinants of BI implementation. It methodically examines the intervention between the effect of BI implementation, information quality and marketing effectiveness. It addresses significant advancement in our hypothetical comprehension of the importance of BI implementation on firm performance measures. The outcomes also gives knowledge to administrators and managers to help them to comprehend the impact of different determinants/ factors to be able to more successfully accomplish the implementation process. We believe that the exploration will motivate further work towards this path.

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Appendix I

Questionnaire

Please tick the suitable option for the questions below using the following scale-
1= Strongly Disagree; 2= Disagree; 3=Neutral ; 4= Agree; 5=Strongly Agree

S.no.	Questions	1	2	3	4	5
I	**Factors on Implementation of Business Intelligence. (Please tick on the options, sharing your experience during the BI implementation.)**					
1	**Management support**					
i	Business Intelligence implementation in the organization, has received the commitment and support of the senior management.					
ii	In your view, there has been strong leadership, guidance and mentorship throughout, in promoting the BI project in the organization.					
iii	The senior management provided the governance structure which gave support to the BI project team.					
iv	In your opinion, the BI implementation process received widespread financial sponsorship, by the senior management.					
v	For the successful completion of the project, the top management was willing to invest a great deal of effort beyond what, is normally expected.					
2	**Business Goals Alignment**					

i	There has been a clear understanding of the business problem and need/requirement for BI systems in the organization.
ii	To promote the acceptance of the BI project undertaken, there has been adequate linking of organizational goals to BI goals.
iii	In your view, there has been an alignment between business strategy and BI implementation strategy.
iv	Overall, you feel that there was a well-established business objectives supporting the BI implementation objectives.
3	**Change Management**
i	In your opinion, there was enough flexibility in the organization's environment for implementation of new BI systems.
ii	There have been efforts to generate willingness to accept change of business processes because of BI implementation.
iii	The BI implementation was done through small understandable and measurable steps , for effective change management.
iv	Information sharing sessions were conducted to remove domain knowledge gaps and ambiguities, to bring in acceptance for change in technology.
4	**Project resources**
i	As per your opinion, the project met the budgetary estimate requirements.
ii	The BI project has been completed in the scheduled estimated time period.
iii	In your view, there were processes to manage the scope of work and controls on quality.
iv	In your view, the BI project had enough team members to get the work done.
5	**Team Skills**
i	Members of the BI team (including consultants) had the right technical skills for implementing BI tools.
ii	In your view, members of the BI team had good interpersonal and communication skills.
iii	In your opinion, the BI team members had the adequate experience, on working on BI systems.
iv	There was a balanced team composition having both functional and non-functional experts/consultants for BI implementation.
6	**User participation**
i	In your opinion, the end-user was timely involved for giving feedback during BI implementation.
ii	The implemented BI system has the suitability for users' business need.
iii	In your view, users performed hands-on activities during the BI implementation.
iv	The BI team was accommodative of the difficulties caused by the frequent changes in requirements from user-end.
7	**Technical Infrastructure**
i	Appropriate technology was available to implement the BI systems.
ii	The BI technology that the project team used worked well with technology already in place in the organization.
iii	There was a stable technical infrastructure supporting the ETL (Extraction, Transformation and Loading) process of data.
iv	The technical framework was made scalable and flexible enough, to meet the requirements of changing business needs.

i	There was overall effective BI implementation, in the organization.	
ii	In your view, the BI technology had support from people throughout the organization.	
iii	The BI project has processes to manage controls on overall schedule, cost, quality and risk.	
iv	In your opinion, the BI system provided all of the functionality that it was supposed to deliver.	
v	Many technical problems which arose during the BI implementation, were managed effectively.	
II	**Impact on Information Quality (Please tick on the relevant options, sharing your view on the Impact on the quality of information generated by BI (Business Intelligence) systems in your organization.)**	
1	**Information Quality**	
i	The information generated correspond more specially to the user's needs.	
ii	Information created using BI tools is more precise and free of distortion/bias.	
iii	In your opinion, the information is presented in a manner that is more understandable and interpretable to the users.	
iv	In your view, the information obtained through BI systems is up-to-date and not obsolete.	
v	As per your understanding, BI systems helps to effectively provide continuous and unobstructed information to the users.	
vi	The BI infrastructure processes information more rapidly without delays.	
vii	In your view, the information obtained through BI systems is more organized and updated on on-going basis.	
III	**Impact on Marketing Effectiveness (Please tick on the relevant options, sharing your view on the impact on the marketing related efforts of your organization ,by the usage of BI (Business Intelligence) systems.)**	
i	Identification of customers' needs and purchase pattern is more effectively being done by using business intelligence system	
ii	In your view, BI tools help in giving more insights in the marketing related strategy/planning process.	
iii	In your opinion, the BI tools are being used for conducting marketing research activities for better understanding of customer behaviour.	
iv	In your opinion, profiling of various customers for different segments of the market is being supported through BI system.	
v	As per your understanding, improved analysis regarding future trend and forecast of customer demand in the market is being made by using BI system in your organization.	
vi	Analysis through BI system is helpful in creating promotional efforts and advertisements targeted towards specific customer segments	
vii	In your view, use of BI has helped the organization in creating intelligence on competition.	
viii	In your opinion, there is increased understanding of sales potential of various segments, territories, products, etc.,	
ix	Overall, the BI technologies are significantly impacting the marketing effectiveness of the organization.	