

FIRM LEVEL STRATEGIC DECISION-MAKING WITH DATA SCIENCE & ANALYTICS

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Abstract

Even though the usage of big data will add value for business throughout the whole value chain, the integration of big data analytics on the decision-making process is still a struggle. This particular study, according to an organized literature review, thematic analysis as well as qualitative interview findings, proposes a set of six steps to build each relevance and rigor in the approach of analytics driven decision making. Our findings illuminate the primary key stages in this particular choice process such as issue definition, review of previous results, data collection, model development, data analysis in addition to methods on insights in the context of service methods. Even though results are reviewed in a sequence of actions, the study identifies them as iterative and interdependent. The recommended six step analytics driven decision making process, pragmatic proof from service methods, along with future studies agenda, supply entirely the groundwork for future scholarly research and will function as a step wise guidebook for business practitioners.

Keywords

Big data analytics; Data mining; Banking; Survey

JEL Classification

M55, M56

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Introduction

The discourse on big data analytics and its related opportunities challenges show a nonstop development in each academic and practitioner literature, as stressed by Sazu & Jahan (2022) [8]. This emerging and fast rising analytics momentum is strongly connected to organizational possibilities like, cognitive computing and business intelligence, company development as well as information solutions, buyer churn prediction as well as sentiment analysis know-how co-creation or maybe organizational agility [1].

Service methods are everywhere, like in retail, healthcare, financial industry, supply chain management, or maybe hospitality, but little is thought about how you can use big data in service methods [4]. Appropriately, this particular project is focused on service devices as the worldwide economic climate is quickly expanding with providers, and today help much more than seventy % of the GDP. BDA is able to have fun with a top role of present-day service methods, and they are effective at learning, adapting, and making choices based on data collection, transmission, and processing to enhance the response of its to a future occurring. The extant literature reports the usage of BDA for service method originality in addition to improved decision making. For example, Amazon increased its sales revenue by more than 30% through its big data-driven recommendation engine, Capital One increased its retention rate by eighty seven %, Marriott enjoyed eight % more revenue via revenue optimization, along with Progressive enhanced the market capitalization of its of more than nineteen billion by using real time info, goods and rate comparisons [3].

Sticking to the success road of huge service firms, little and medium groups have began to invest seriously in BDA - however, these investments will surely profit whether BDA is incorporated to the decision making process. In general, as reported by Sazu & Jahan (2022), "innovation is essential to see new solutions to issues, enhance quality, and boost profitability [1]. Huge wide open linked information is a fledgling and quickly changing field which produces brand new possibilities for innovation", and by concentrating on analytics based decision making tasks for service methods, this particular newspaper increases the present important importance to recognize the way to facilitate decision making via huge open linked information [5]. Regardless of the value of BDA, lots of service firms continue to struggle to yield worth from BDA initiatives. Based on Sazu & Jahan (2022) "competitive benefit with analytics is waning [9]. The portion of companies that report acquiring a competitive edge with analytics has declined considerably over the past 2 years". Particularly, little is thought about the real operationalization of BDA running a business problem solving or decision making. Motivated by this particular task, the primary investigation issue we deal with in this particular paper is the next one: what exactly are the stages in the BDA driven decision making process of service methods? [2]

In order to respond to this analysis question, the paper seeks to make an overall taxonomy of BDA driven choice process to broaden the knowledge of both business problem solving and decision making based over a systematic literature review as well as qualitative studies. We present a six step framework and then discuss each phase of the decision making process of detail with examples coming out of the service sector. The paper was organized in 4 primary components. For starters, we add main ideas associated with the study such as big data, BDA, and BDA based decision making; next, we explain the methodological gestalt; third, we show the end result of the systematic review of ours as well as semi structured interviews, and lastly, we talk about the results of the research with a future exploration agenda.

Literature Review

Big data and service systems

Worldwide, Services have become the dominant type of economic exchange. Services are broadly deemed to cover all activities where individuals, technologies, specialized competencies as well as abilities come together and facilitate benefit co creation for all of the complex actors. Relying on these suggestions, scholars have regarded which a 'service product is a value co creating method which uses assets to satisfy customer needs much better compared to competition'. Extending these views, Sazu & Jahan (2022) explain service methods as "configurations of technologies, organizations, information, and people which work for mutual benefit [14]. Info produced from BDA turns service methods cleverer by facilitating learning, powerful adaptation and decision making below uncertainty [6].

As among the first adopters of BDA, service methods are continually fighting to attain naturally competitive benefits working with both unstructured and structured data. On one hand, we refer to structured information as market information like name, age, gender, date of birth, address, along with personal preferences. On the flip side, unstructured data describes clicks, voices, tweets, links, likes, and more [8]. Every day, we're producing 2.5 quintillion bytes of information, which is produced by online search engine, digital photos, social media, Internet and services of Things. Overall, the task in service methods consists of coping with both data types so that we are able to produce meaningful insights for strong decision making in this industry.

Big data analytics

Big data could be distinguished from standard data sets owing to the unique elements of its. First concentrate on big data characterized it using 3Vs - volume, velocity, and variety. Today, big data is recognized by increased detail including 6Vs - volume, value, veracity, velocity, variety, then variability [10]. The volume feature of big data belongs to the mass quantities or maybe magnitude of information. Businesses obtain sheer volumes of information from powerful, heterogeneous, along with ubiquitous energy as well as products to be able to make educated choices. These several sources products enable to obtain different 'varieties' of information like structured, unstructured or semi-structured [11]. Velocity or even the speed at which data are produced and must be examined as well as acted upon is a distinctive feature of big data [7]. Digitalization has accelerated information generation demanding real time analytics which can make decisional insights. Veracity refers to unreliability and uncertainty in certain kinds of big data. Complexity, anonymity and inconsistency of big data sets are able to result in information to be unreliable. Variability pertains to variation in the information flow rates which is primarily brought on by the sporadic velocity of big data. Lastly, the importance of big data describes its financial value which may be extracted from unstructured and structured data. Data in the original form of its is considered much less beneficial unless huge volumes of data are examined using suitable BDA strategies [9].

Methods

This particular study uses a qualitative technique dependent on both a systematic literature review, semi-structured interviews and thematic analysis. For starters, we followed an organized literature review strategy to build rigor in discussing the BDA driven choice procedure. This method was influenced by efforts that are similar by Akter as well as Wamba as well as Sazu & Jahan (2022) in BDA investigation as well as Neely and Benedettini in services investigation as well as Sazu & Jahan (2022), and Smart in management analysis [15]. Systematic literature review is a useful strategy to uncover,

manage, and deduce proof applicable to a specific investigation question in a logical, transparent, and repeatable fashion. In the effort of ours to shoot concrete, useful, and empirical evidence of BDA driven decision making of services companies, application

of systematic literature review technique is meaningful and appropriate rather. The following sections explain the research protocol like the research method as well as publication selection criteria.

Findings

Depending on the findings of qualitative interviews and thematic analysis, this study presents 6 steps of BDA-driven decision making process with pertinent research agenda. While the conversation is pivoted all over the service methods, this technique is usually used in virtually any BDA context.

Step one: Problem recognition

Recognizing the decision or the problem which has be taken will be the first stage of the decision-making operation. Correctly' framing' - realizing the issue and the reason it is important, is vital for the ensuing stages and what's anticipated being achieved in the conclusion of the decisional procedure. The issue must be certain and focused in an effort to know how it'll be resolved and who'll be engaged. For example, a participant pointed out a service business must be certain where issue or even what kind of development is anticipated to be resolved by BDA: "We are slowly heading to electronic innovations, sometimes via apps or maybe databased device, for instance Amazon has think of a recommendation device which changed their business model that is dependent on big data analytics, ANZ bank has developed home priced prediction... issue is exactly what sort of program innovation are we anticipating together with the usage of these analytics?".

Studies discovered through the systematic review offer cogent illustrations of the issue recognition action [12]. As a situation of fact, Nielsen Holdings had naturally competitive edge over the competitors of its through gathering, keeping, along with processing information by their very own. Nevertheless, the entire business model needed to be changed when cable/satellite businesses began to promote customer information; Nielsen don't had a competitive edge over information. Nielsen must explain the way to restore the company 's competitive benefit as it had been eroded because of new technological developments. Haier, for starters, pinpointed the problem of its in the online-to-offline business model of its and then optimized the supply chain of its as well as resource allocation capabilities utilizing great amount of customer data. Sazu & Jahan (2022) utilizing a case study at Trustev a worldwide provider of electronic verification engineering, described how issues regarding identity fraud in e commerce was combatted by using BDA [16]. Sazu & Jahan (2022) examined precisely how companies are able to work with social networking information for tourism location control. A certain issue they tackled was how BDA along with social networking could be utilized to forecast seasonal and future tourist demands [13].

These results offer support for trouble meaning as the very first stage in the decision process to determine a certain company condition or even, parts of an issue. T. H. Davenport as well as Kim stressed the significance about this step is usually to clearly frame the issue, and so they caution that very high volumes of data or maybe advanced analytics won't help unless business issue is properly identified. Sazu & Jahan (2022) said that once the trouble moves the option of styles, it elevates the usefulness of the designs, quality of the insights produced, as well as the consistency of choices which are considered dependent on these designs [17]. Our results suggest that trouble recognition will be the very first crucial stage of information driven decision making, and that is highlighted by one participant in telecommunication service process as follows:

"As I pointed out before that massive data was once merely technology driven these days it's to be business problem driven. The company of ours was concentrating on technology in the past these days it's changed the focus of its to solving business issues with large data".

Step two: Review of earlier findings as well as context

Framing the issue not just requires identifying the issue but additionally necessitates exploring related past findings as well as context [14]. It's essential that organizations as well as researchers grasp earlier findings to do pre-existing measures and stay away from pitfalls. Reviewing can often result in substantial revision of contextual exploration and the problem that will lead to improved framing of the issue. Based on a single participant, "In one case study we're consuming prediction to really know what we are able to do to up sell or even cross sell our services and product, the sole method we are able to do is actually by reviewing earlier findings as well as context about a consumer, thus, by we are able to anticipate what customer's following actions are as well as ensure the buyer to not turn away".

C. K. H. Lee investigated just how anticipatory delivery could be enhanced in omni channel commerce. Because of this purpose, the writer reviewed many prior techniques, like Amazon's anticipatory delivery design that is utilized to foresee a consumer 's buy choice and starts shipping the item prior to the purchase is placed. Miah, et al. discovered that previous analytical work have been brought to immediately detect tourist behavior as well as personal preferences.

Step three: Select the variables and build the model

A unit is a simple representation of a specific problem. Modeling formulating hypotheses about the connection between various variables and the impact of theirs on the consequence is crucial to resolve an issue. Although it's helpful to consider expansively in the issue identification stage, by the conclusion of the phase, it's necessary to have an accurate situation statement along with an unit consisting study variables. While BDA with the unprecedented volume of its, variability, and variety provides opportunities for greater insights as well as much better decisions, it may involve complicated modeling which could be a struggle. Conventional statistical as well as econometric airers are incapable of managing mass volume in addition to variety of information and consequently complicated models that can manage big data and the different effects of its are needed.

Conclusion

The proposed six-step framework offers an useful and clear manual to employ BDA in decision making. Nevertheless, whether or not the step wise procedure is linear and sequential, each phase is able to boost various other steps; thus, decision makers can still take a step to build upon brand new information. For example, in the analysis phase, analysts may well choose to obtain a lot more details to derive additional information, or maybe analysis may even transpire more recent issues which can lead to the modification of the entire design. In these conditions, BDA driven decision making is to be vastly distinct from much more organized conventional decision making. Regardless of the ease of the framework, BDA driven decision-making is not with no challenges. In the BDA context, previous research has identified problems related to the big information sources as well as large data itself, information processing, and control. These problems are decisive in the way firms embrace BDA in the decisions of theirs. Jagadish, et al. reported that deriving worth from BDA is a multi step procedure that runs from information acquisition to deployment and interpretation, and concentrating on not many actions are able to cost you the entire intent behind value creation.

Davenport and davenport and Kim elaborated the six step process under 3 analytical thinking stages. The very first 2 stages - issue recognition as well as review of earlier findings from the 'issue framing' stage. The following 3 measures - modeling, information collection, along with information analysis comprise the 'solving the problem' stage. The final action - acting on insights belongs to the 'acting and communicating on results' stage. The issue identification or even framing stage is common in decision making and design science system models. For example, very first stage of the Simon's decision making aier - intelligence or 'deciding what you should decide', focused on determining as well as formulating the context and the problem as well as situations surrounding it. Similarly, in design procedure models, Sazu & Jahan (2022) for instance, along with Chatterjee have distinguished 'issue identification as well as motivation' to be the original choice as defining the issue is essential to atomize the issue and provide strategies [18]. These decision making models and theories could thoroughly guide determination tasks which try to integrate BDA.

Immediately after an issue has been adequately framed, treatments have to be recognized based on modeling, analyses and data collection applying suitable methods. Many challenges inherent in big data impede the integration of BDA. Some problems for example heterogeneity, trustworthiness, abundance, incompleteness, inconsistency, then rapidity of big data are as crucial as the advantages big data are able to send. For example, overcoming data binge or maybe overload of data and inadequate data quality have shot increased interest of practitioners and scholars. These involutions are exacerbated by the information processing as well as infrastructure challenges. The large, range, and velocity of big data coupled with information provenance, and deficiency of expertise of scales immanent to information collection have produced worries over information acquisition, warehousing, and processing [20]. Many challenges as a result of unstructured, vibrant, varied, and unreliable characteristics of big data have shown to be difficult in data mining, integration, cleansing, and analysis. Besides technological resources, it's crucial that organizations hold the human resources or maybe the talent pool necessary to run this process. Additionally, BDA procedure involves the effort of people that are different with stakeholders, departments, and different skills-set. Thus, aside from the technical emphasis, organizations have to note about the human part of suitable BDA integration to the decision making process.

Theoretical Contributions

Theoretical contributions phase of the suggested decision making framework emphasizes on actions by professionals on insights, which typically involves interaction of BDA based outcomes a the last a the last overall market. The original phases of the suggested framework include data collection along with analysis of big data, and they are mainly performed by information miners analysts. Nevertheless, practitioners can play a substantial role in implementing the last step. Sazu & Jahan (2022) argue that providers can't depend solely on user-friendly and experienced based decision making any longer [14]. Particularly, practitioners are susceptible to ignore data driven findings as well as insights when it threatens present practices and beliefs. Thus, practitioners in the very first place has to be reactive to adopt insights from BDA and talk them properly. As contended by Akter, et al. "the insufficient organizational ability to articulate a compelling and solid business situation is apt to be an overarching struggle for BDA". Other BDA managerial challenges like security along with data ownership, security, operational expenditures and data governance consistently challenge information driven decision making.

Future Research Directions and limitations

The present paper focuses on big data analytics driven decision making inside service methods. The newspaper is based on an organized literature review in addition to triangulation of the results of in-depth interviews and thematic analysis, nonetheless, it's restricted towards realizing the six step framework in analytics driven decision making just. Further studies have to develop a complete picture of analytics driven decision making. Moreover, this particular newspaper is restricted to dealing with factors influencing the decision making just. The wider perspective of big data and the complex relationship of its with a certain service process aren't the emphasis of the paper. Since service product is a contextual phenomenon; effect of social and cultural impact on how individuals communicate with it is able to vary. Thus, studies should take into consideration the dynamism of a certain service system while generalizing the findings of ours to various other contexts. Potential research, thus, could concentrate on analytics driven decision making in the contexts of several service methods, like supply chain, healthcare, auditing, electronic advertising etc. With regard to investigate techniques, the most typical type of technique triangulation is utilizing both quantitative and qualitative techniques, nonetheless, our study relied on 2 qualitative techniques to allow for the outcomes. As a result, that creates a chance for future study to conduct additional methodological triangulation to help findings.

General, dependent on Sazu & Jahan (2022) we argue that "data without any unbiased evaluation, and understanding with no action, have comparatively marginal worth to organizations" [19]. Thus, for starters, decision-makers have to understand exactly how data could be changed into actionable understanding and the way to properly communicate as well as act on that understanding. Davenport as well as Prusak's difference between information, knowledge, and information, along with Argyris's conceptualization of actionable awareness are helpful theses for equally future research and training. We feel the six step progression mentioned in this particular paper is a helpful guide for businesses to adopt BDA driven decision making. As suggested in Appendix one, we've outlined several study questions which may be inquired as investigate agenda when managing each step.

Conclusion

BDA has grown to be ever more popular over every other managerial paradigms because of the ability of its to generate invaluable knowledge as well as actionable insights. Nevertheless, the usage of BDA for powerful and quality decision-making has turned into a challenge for a lot of companies. To overcome this challenge in practice and theory, we present a six step decision making process regarding how to effectively execute BDA projects to help data driven decision-making. This particular process

offers a foundation for scholarly study to build upon and provides practitioners with a step wise guidebook for integrating BDA making greater choices. By means of this particular systematic review, this particular study has additionally provided empirical proof from service organizations to set the workability of the procedure.

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