Saving Costs with a Big Data Strategy Framework

Mike Lakoju
Department of Computer Science
Brunel University London
London, UK
Mike.lakoju@brunel.ac.uk

Alan Serrano
Department of Computer Science
Brunel University London
London, UK
Alan.Edwin.Serrano-Rico@brunel.ac.uk

***Abstract*—Disruptive innovations such as Big Data offer enormous benefits to organizations however they usually come with a cost. Decision makers instinctively seek to adopt such innovative technologies for competitive advantage, however, they also explore ways in reducing implementation costs to a reasonable level. This research was focused on developing and empirically testing a Big Data Strategy framework that helps organizations in aligning their business strategy with the Big Data project in order to identify the potential value before embarking on a full Big Data implementation. The SAVI-BIGD framework was tested in two different organizations and findings reveals that the framework can help organizations identify the potential value of the Big Data project and also to save costs. This paper reports on a second case study testing and suggests how any organization taking ownership and championing the implementation of this Big Data strategy framework could save cost and generate their Strategic Big Data Goals.**

Keywords— Big Data; Strategy; Methodology; Method; Framework; Business Strategy; Digital Strategy, IS Alignment; Data Science.

I. INTRODUCTION

"The world's most valuable resource is now data" [1] this statement published in the Economist can be sustained by observing the growing interest in Big Data projects by industry and academia. Technological advancements have made the world a smaller place and more easily accessible with disruptive innovations. Big Data is one of such disruptive innovations that has changed the way business can be approached and how decisions can be made more strategically being equipped with valuable and timely information. Big Data which can simply be understood as data that cannot be captured, stored and processed by conventional tools [2]. Big Data sources can be found from the internet of Things (IoT), sensors, social media platforms, legacy systems, etc. Digital technologies, one of the notable sources of Big Data, are becoming even more smarter. For example, we have now smart homes, smart cars, smart Televisions, smart phones, smart refrigerators, smart light bulbs, etc. Digitalization has led to an increase in adoption of technologies to improve the standard of living which consequently has also lead to an increase in the amount of data being created. A good majority of these technologies have become an integral part of people's lives, for example, social media platforms like Instagram is very popular with small and large business. Business owners advertise their products and services they even host live video feeds to capture and inspire their customers. Large volumes of data are being generated daily from the numerous Big Data sources inclusive of social media platforms such as Twitter, Facebook, Instagram, Google+ etc. Rijmenam [3] argues that the number of participants on social networking sites is on both a rapid and continues increase: With over 1 billion users on Facebook, an approximate of 850 million were active on a monthly basis. About 2.7 billion new likes were recorded daily. Twitter had about 500 million users, and 180 million tweets were sent daily.

Organizations have been able to identify the significance of harnessing the potential insights that can be obtained from all these Data that are being generated globally. Consequently, this has created a keen interest on Big Data projects, and therefore there is plenty of research that currently seeks to improve the way we can analyze and manipulate all sources of data described before. The authors of this paper approach this phenomena from a different perspective by focusing on the strategic side of Big Data projects. In a previous publication the authors proposed a Big Data strategy frame work namely "SAVI-BIGD Framework" [4]. It stands for "Strategic Approach of Value Identification Big Data Framework. The SAVI-BIGD framework focuses on aligning the business strategy with the Big Data project to identify the potential value that could be obtained from the Big Data project. A detailed summary of this framework is explained in section II.A in the context of the case study.

The framework was first tested on a case study, a Television station, and the results were reported in [5]. The focus of this paper is to report on the finding from testing the framework at a second case study organization, a Radio station in Nigeria namely Grace FM.

II. RESEARCH METHODOLOGY

A case study research method was adopted in this study. Case studies are helpful when observing change over a time frame and aid in the understanding of events that evolve over a period [6] [7]. Murphy et al. [8], argue that qualitative research can help in gaining a better understanding of the meanings nested in spoken words as well as the identification of the practices enacted and the actions expressed while investigating the complex chain of meanings, feelings, beliefs and preconceptions that humans are seen to exhibit [9]. The

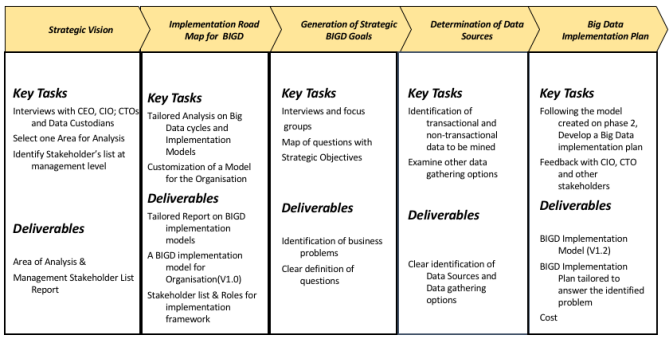
authors conducted qualitative research to gain understanding of the organizational challenges within the case study so as to generate the strategic Big Data goals that should be addressed with the big data project. Literature helps in justifying the adopted research approach by highlighting the fact that case study research methodology is an ideal choice for dealing with complex mega-systems such as developing a Big Data strategy especially where boundaries are more or less blurry [10], [11]. Benbasat et al. [12] suggest that these mega-systems can potentially be a very good avenue for generating theories [12].

A. Description of the Case Study Adopted in this Research

This paper concerns with the application of the SAVI-BIGD framework in an organizational case study namely Grace FM. Grace FM is a radio station that is owned by Confluence Cable Network (CCN) Ltd. It has a signal coverage area of six states within Nigeria. CCN also owns a Television Station which was adopted earlier in the research as the first Case study where the SAVI-BIGD framework was tested.

As illustrated in Figure 1, the SAVI-BIGD framework has 5 phases: Strategic vision phase, Implementation Road Map for Big Data, Generation of Strategic Big Data Goals, Determination of Data Sources and Big Data Implementation Plan. The project started from the first phase, which adopted Grace FM as the second case study to test the SAVI-BIGD framework. The second phase "Implementation Road Map for Big Data" involves identifying a suitable Big Data project implementation methodology to adopt which will later be tailored specifically for the case study in Phase 5. The implementation methodology put forward by Huang et al. [13] was selected, after careful evaluation and discussions with two data science experts. The next phase is the "Generation of Strategic Big Data Goals", in this phase some more qualitative data was collected stakeholders at GFM. The initial interviews carried out with the management of CCN were focused on measuring the level of IS-Business Alignment within the organization. To assess thelevel of aligbment in GFM, a total of 12 respondents were interviewed during the one-to-one interviews and the instrument used was adapted from Luftman [14]. While a total of 11 respondents participated in the focus group interview. The instrument used for the focus group interview was adapted from the Digital Business Strategy framework by Bharadwaj et al. [2]. The interviews were recorded and transcribed and Nvivo qualitative software was used to carry out thematic analysis on the data. The research took a hybrid approach of both deductive and an inductive. Employing this hybrid approach, allows for the ability to investigate the foundational ideas, assumptions & conceptualizations and also ideologies [15]. Coding of data was accomplished allowing the data to speak by first using theoretical predefined themes/perspectives and then also allowing for emergence of new themes [16]. The next phase of the SAVI-BIGD framework "Determination of Data Sources" follows immediately after the phase 3. However, the process of determining the right data source that will be required to address the generated Strategic Big Data Goals (SBDG) has to be approached in an iterative way. This is due to the fact that different data sources may be required to address different organization challenges. The last phase within the SAVI-BIGD framework is "Big Data Implementation Plan". In this phase a version 2 of the identified Big Data project implementation methodology identified in phase 2 is then put forward. It will contain the identified project team stake holders, Strategic Big Data Goals and determined data sources.

Fig. 1. SAVI-BIGD Framework [4]



III. BIG DATA STRATEGY PARADIGM

Big Data is seen to come with huge complexities, such as the variety of structured, semi-structured and unstructured data [17], [22]. These complexities have created new challenges for organizations implementing projects in this domain as it can be seen in the literature. For example Kelly and Kaskade [23] conducted research involving 300 organizations and they discovered that 55% of Big Data projects do not reach completion stages and many others fall short of their objectives. Bhardwaj et al. [2] also argues that Big Data teams actively engaged with data analysis and data science activities carry out their activities in more of an ad-hoc manner, basically a hit or miss approach towards identifying the right parameters, programs and tools for analysis. This is clearly indicative that there is need for a more strategic approach for implementing Big Data projects.

Saltz and Shamshurin [17] conducted an empirical study on Big Data projects, they used an ethnographic study to gain better understanding of Big Data projects. They reported that the absence of a Big Data implementation framework can be problematic to the success of the Big Data project. To this end, Salz, Shamshurin and Crowston [24: 1013] argue that *"there is need to have a properly structured and repeatable set of processes that can help guide data science teams in tackling a wide range of challenges, which could include understanding the stakeholders that form part of the implementation team, identifying the appropriate data architecture/ technical architecture, selecting the appropriate analytical techniques and validating the results"*. Literature, however, reveals that the predominant focus has been on the data as seen from a number of methodologies that have been contributed to the body of knowledge. Such methodologies attempt in providing a more step by step process for data

scientists to follow, however, they are more of a guide for understanding the various tasks for analyzing data than a methodological way to undertake these type of projects [17]. For example, Huang et al. [13] put forward a methodology that can be used for implementing Big Data projects. They highlight five phases that should be followed, starting from Defining the Questions, followed by Data collection, Data storage & Tranferring, Data Analysis, Report/Vissualization and Evaluation. Similarly Dutta and Bose [25] put forward another Big Data implementation methodology that can be used by data science teams. Their methodology is structured from the point of defining the business problem then to Research, Cross functional Team Formation, Project Roadmap, Data Collection & Examination, Data analysis & Modelling, Data Visualization, Insight Generation, Integration with IT systems, and Training People. Another methodology proposed by Gao et al. [26] came from a different perspective. Using success factors they proposed a process model that focuses on the resources to manage Big Data project. Finally, Kung et al. [27] proposed a model suggesting that IT capability, data management, Big Data competence and organizational capability are all interconnected. Their model is primarily focused on Big Data competence.

Although all the theoretical contributions discussed above contribute to IS literature it is critical to observe that there are very few references to the strategic side of Big Data. The authors of this paper argue that approaching Big Data from a strategic perspective will help in many different ways, First it will help to bring more clarity and synergy between the chosen implementation approach and the organizational objectives. This in turn will help to consider a more focused approach towards the adoption of Big Data projects and the identification of its potential value. The framework presented in this paper takes a slightly different position by focusing on the strategic side of Big Data project which is centered on aligning the Business strategy of the Organization with the Big Data project. The SAVI-BIGD framework was developed from combining both Alignment and Digital Business Strategy theories. More precisely, it was grounded on the Benbya and Mckelvey Coevolutionary Alignment Framework [28]. The next section discusses in more detail the context of Digital Business Strategy (DBS) and Alignment.

IV. THE RATIONALE OF USING DIGITAL BUSINESS STRATEGY AND ALIGNMENT

Digitalization has created a new culture where process, products and services are more interwoven, which in turn, has birthed the concept of Digital Business Strategy (DBS). DBS is basically the fusion of IT and Business Strategy while tactfully incorporating digital technologies in the business strategy [29], [30]. For a more strategic approach towards investigating the Strategic Big Data Goals of the organization, this paper adopts alignment and DBS theories, which in turn, guided the acquisition of qualitative data and its analysis. This process was broken into two parts: one-to-one interviews and focus groups. The focus group was guided by a DBS framework put forward by Bharadwaj et al. [2]. Combining the Alignment and the DBS frameworks allows for gaining a general understanding of the business challenges before focusing on the specific challenges that will be shaped by the strategic Big Data goals. Identifying the Strategic Big Data goals is key to the success of a Big Data project. Literature suggests that DBS as a field of study brings in a whole new mix to competitive strategy, which takes away the blurred line between IT and business strategy [2], [31], [34].

Bharadwaj et al. [2] put forward four Digital Business Strategy themes which provides a framework that could guide insight generation: Scope of DBS, Scale of DBS, Speed of Decision Making, Sources of Value Creation and Capture. These are explained in more detail next.

Scope is centered on the various portfolios of businesses, products and activities carried out in an organization which is essentially under its direct control and ownership. Literature indicates that the Scope has an impact on a firms performance [35]–[37]. Scope also looks at how to maximize organizational key assets, competencies and resources to grow their product and market reach [38]–[41]. When dealing with Scope, alignment theories discuss that it is important to factor in flexibility and adaptability of the planning system because this will aid in the alignment process [42], [28].

Scale: Bharadwaj et al. [2] points out that even though Scale has been perceived to be an instrumental driver of profitability in the industrial age, digitalization brings in a whole new mix which should bring a shift in thinking of Scale only in terms of physical factors of production, geographic coverage, or even supply chains to both digital and physical terms. Adopting digital technologies within the organization opens up new scales of opportunities for business growth and expansion.

Speed: Scholars within strategic management agree on the importance of timing as key driver for competitive advantage [43], however with digitalization organizations are forced to think about timing, specifically speed in crucial ways. Bharadwaj et al. [2] suggests that speed can be better viewed from four dimensions: speed of product launches, speed of decision making, the speed of supply chain orchestration and sources of value creation and capture. Digital technologies create a whole new environment of opportunities, and the speed by which individuals or organizations grab hold of such opportunities may be the difference as to how their products and services are received by customers. Decision-making process could be strengthened just from receiving valuable information promptly. Products can be made specifically to cater for a new demand opportunity that just breaks out within a customer segment. Numerous industry sectors benefit from the speed that can be obtained from harnessing digital technologies. For example, in the fashion industry there are companies using social media data for forecasting fashion

trends [44]. Ferraz [45] summarized within the context of the media industry how Big Data will impact businesses: "*Data will become an asset to radio companies, Big Data will equip radio companies with the ability to collect better market and customer intelligence, It will improve internal efficiency and operations, Data will allow radio stations to improve the listener experience and build big data into their content offering*". Grace FM anticipates that by implementing a Big Data project, it could open up itself to new business opportunities, tailoring programs specific to its audience and grow revenue. Bharadwaj et al. [2], highlights that by utilizing a Digital Business Strategy, Organizations can unlock value from information, create value from multisided Business Models, capture value through coordinated business models in networks while also appropriating value through control of digital industry architecture.

The research approach of combining both Alignment and DBS frameworks was critical in helping to gain clarity on the specific strategic Big Data goals that the organization will need to address first. This provided a good level of rigor to the entire research. Specifically, DBS help to set the foundations for the instruments used in the focus group interviews, helping to narrow down the business challenges. This was evident in the richness of conversations between the respondents. Having a mix of both business and IT respondents helped to have different perspectives during the discussions.

V. RESULT FROM CASE STUDY (GRACE FM)

The following section reports on the results derived from the focus groups at Grace FM using thematic analysis (See Table I). The participants of the focus group interview included the Manager Director, various heads of departments, and a mix of cross-functional people. The design of the data collection protocols that was used was guided by Bharadwaj et al. [2] themes of a Digital Business Strategy.

The analysis explores how the Strategic Big Data Goals of Grace FM can be articulated efficiently by applying the Digital Business Strategy paradigm. It is based on the five seed categories. The first four were initial themes from theory while the last one (Organization challenges) emerged from the study. The themes include Scale, Scope, Speed and Source of Value Creation & Capture. The researcher carefully followed a systematic process in performing the thematic analysis of the focus group interview data. The data were coded, and the highland seed themes were after that analyzed and discussed. This helps in articulating the Strategic Big Data Goals for Grace FM. The findings were presented at the end.

A. Scope

The scope is focused on the portfolio of products and business which form part of the activities that are undertaken within the control of the organization. Literature suggests the potential impact that the scope can have on the performance of the organization [36], [46], [47]. Additionally, Bharadwaj et al [48: 473] argues that "*Understanding the scope of digital business strategy helps to conceive its relationship to firms, industries, IT infrastructures, the external environment, and how digital business strategy can be more effective in a variety of settings*".

The research carried out at Grace FM reveals that the management staff is in agreement on the importance of GFM having a more integrated strategy between the Business and IT. For example, a participant responded
"I think it helps to tailor whatever you've got to your target audience, who you're trying to reach out to. As you had rightly said, the tailor has his target audience when he uses Instagram. For we as a radio station (sic), we have a target, the people we are trying to reach, integrating DBS will really help us streamline to those people we are trying to reach in particular, making it easier for us".

Radio has the potential for reaching a wide range of listeners especially in a developing country. This works in favor of GFM because of its signal coverage area which spans more than six states in Nigeria. To this end, harnessing the huge benefit of information that lies within the ecosystem around its coverage area is of paramount concern to the management of Grace FM.

TABLE I. RESULTS ON CODED THEMES OF FOCUS GROUP INTERVIEW AT GFM

Phase One: 18 Codes	Phase Two: 18 Codes	Phase Three: 12 Candidate Themes	Phase Four – Main Themes
Content	Content		
Demography	Demography	Financial Challenge	
Finance issues	Finance issues	IT Challenge and Limitations	
How to explore local Potentials	How to explore local Potentials	Human Resources	Business challenges
Listening Statistics	Listening Statistics	Marketing issues	
Marketing	Marketing		
Online Streaming	Online Streaming		
Power	Power		
Staffing Issues	Staffing Issues		
Scale	Scale	Scale	
Business Model	Business Model	Business Model	Scale
IT Infrastructure	IT Infrastructure	IT Infrastructure	
Streaming	Streaming		
Scope	Scope	Scope	Scope
Source of Value Creation and Capture	Source of Value Creation and Capture	Source of Value Creation and Capture	
In House IT Skills	In House IT Skills	In House IT Skills	Source of Value Creation and Capture
Target Demography	Target Demography	Target Demography	
Speed	Speed	Speed	Speed

Grace FM clearly seeks to take advantage of all available digital resources that is within its reach. The Organization seeks to break its current boundaries and explore new opportunities that will help in generating more revenue and improve the reach of the station. This is in line with literature also that indicates that the adoption and use of digital platforms empowers organizations with the right technology that will help in breaking traditional industry boundaries. It also equips them to operate in new territories [49], [51].

B. Scale

The scale of a Digital Business Strategy can be approached as follows:

- Rapid Digital Scale up/down as Strategic dynamic capability
- Network effects within multisided platforms create rapid scale potential
- Scale with digital business strategy will increasingly take place under conditions of information abundance.
- Scale through alliances and partnerships.

Technological advancements encourage transformation of business strategies making them become more digital than it was in past decades. Organizations now have to come to terms with the impact and role of network effect and multisided business models. This is even more glaring now looking at the supply side, it is easy to hand pick the digitally interconnected partnerships in a company. A typical example is Google and its partnerships for Android powered devices. While on the demand side a good example of interconnections among web pages is Facebook with its Open Graph [2], [52]. Within this context Participant 1 at GFM responded: *"I also feel there has always been a divide when talking about developing our IT segment and putting it into our business strategy so I think it needs a total overhaul in terms of the systems and the human resources and also the most current software that would be handy"*. This reflects the willingness of the management of GFM to move towards a more integrated strategy that factors in the capability of IT. GFM seeks to embrace the vast number of the listening audience that lies within the network of their coverage area. For GFM to benefit from this Digital era it would need to work on building capabilities within the organization that will enable them tap from the large quantities of heterogeneous data, information, and knowledge that is being generated on a continuous basis. Analysis reveals that GFM is clearly seeking to tap into such interconnections of people and Data so as to make more informed decisions while also coming up with products and services that are tailored more to their listening audience.

C. Speed

Technology helps organizations to speed up the rate at which certain decisions can be made. This can be seen from the rate by which information can be made available across multiple layers of the organization. Most innovative organizations, such as Cisco and General Electric, are seen to invest in innovative products that equip management with the capability to access multiple streams of information within the organization and also the ability to extend this information to its partners and allies [2]. The speed of the Digital Business Strategy can be better understood from:

- The speed of product launches
- The speed of decision-making
- The speed of supply chain orchestration
- Speed of network formation and adaptation

Research at GFM reveals that the management of GFM anticipates the effort that will be required to make their Digital Business Strategy a success, harnessing such benefits that can come from speedy transfer of information even to their listeners. Participant 8 responded:
"there is room for learning better and swifter ways to push out products. We did a lot before now, we used to send out messages about what was going on and people would see these messages and respond to it. So there is room for learning because if we are going to do this DBS, it means we have to stay committed to it and not just doing it a one-off. That means it is a big responsibility for everyone and if we are going digital we have to go all the way". GFM, plans to form new networks while also effectively adapting to the challenging business environment that they find themselves in. This approach is in line with the literature which suggests that there is an accelerated rate of network formation amongst organizations [53],[55].

D. Source of Value Creation

Digital Business Strategy brings added dimensions as to how to appreciate the nature of value creation and capture. Literature indicates that increase in value can be obtained from information, value creation from multisided business models, value capture through coordinated business models in networks, and value appropriation through control of Digital industry architecture [2]. The research at GFM revealed the mind-set of most of the management staff. They suggest that the current listening audience falls within a specific demographic group. Even though this group comprises of individuals who do not yet own their own business, like students and similar young individuals. There is a shared opinion amongst management staff, that suggest the organization has not been able to harness the opportunities they currently have with such a demographic audience. Participant 11 stated that: *"as my boss said we are number one but it has not reflected into money. I am trying to talk about the active users now on social media. Most active social media users are within that age range and if you study Nigeria most people within that age range do not have their businesses and so they can't come to advertise. So it is from that range upwards that you would find people that can advertise. So*

with this in mind you will see that just doing your homework and boosting traffic would not necessarily translate to adverts".

This targeted demography of listening audience actually serves as currency for the organization. They are a segment of the population that most advertisers are interested in reaching. Literature highlights how a Digital Business Strategy emphasizes the importance and potential benefits of a multisided revenue model [2]. Respondent 1 stated that: "*a multi sided model however has two sides of a story, here the goal is to deal, create, deliver and capture value from users but that value is monetized through different customers making it a multi act model. Let's take Facebook as an example, Facebook creates and delivers value to its users through its social network but it doesn't charge its users directly".* GFM is no different from organizations that is exploring the possibilities that lie within digital technologies [2], hence its decision to implement a Big Data project is evidence in itself that the organization is looking to increase value that could be obtained from information.

VI. DISCUSSION

Gaining a better understanding of the organizational challenges of GFM was a critical part of the entire research. Analyzing the challenges within the organization will help in generation of the Strategic Big Data Goals that would be addressed in the Big Data project. Analysis reveals that the management of GFM ranks the challenges in some order of priority. For instance, they believe that a good number of the challenges they currently have is tied to financial challenge and if addressed will have a positive ripple effect on the organization. Consequently, financial challenge is identified as one of the most pressing issues for GFM. Advertisement is one of the primary ways organizations in the media industry seek to generate revenue. However, in GFM members of staff suggest that there is a notion amongst citizens within the state they are located in. They believe that their prices are mostly on the high side when compared to other radio stations. They believe there is a need for rebranding and some sensitization campaigns. With an improved flow of information, GFM would gain better understanding of its dynamic environment and strategically come up with ways of capturing different segments of the market. This is in line with literature that suggest that an abundance of information as a result of a DBS stimulates more benefits for an organization [2].

In summary, the organization has not been able to grow its advertising income to a decent level and the location 'Kogi state' does not help matters. The Organization seeks to leverage on actionable insights from Big Data that could potentially help to reverse the current situation. Table 2 gives a summary of some key issues at GFM.

TABLE II. SUMMARY OF MAIN CHALLENGES AT GFM

S/n	Key Issue	Description
1	The Local market	This is where GFM is supposed to convince its immediate business and private community. This market is most critical as it is key to its survival. It has the highest income generating potential but it seems that GFM is currently unable to unlock its potential at the moment.
2	The Advertising agencies	Advertising agencies currently help in bringing in the highest income for GFM. However, at the moment due to the recession that the country is experiencing, the media industry has been most hit. We have experiencing between 70-80% drop in revenues (R1R). And this is due to a domino effect caused by the present economy.
3	Staff Issues	High staff turnaround has also affected GFM program durations and quality. The location and the weight of the remuneration the company is willing to offer at the moment may also be a contributing factor to this challenge. However, the CEO, anticipates that once the company is able to increase revenue, it will be able to offer an increase to staff.

After the analysis and evaluation of the challenges within Grace FM, Table 3 highlights a summary of the strategic Big Data Goals the should be addressed with the Big Data project.

TABLE III. STRATEGIC BIG DATA GOALS FOR GRACE FM

S/N	Strategic Big Data Goal
1	Accurately identifying the demographic trends, behaviours, needs and peak programs for GFM audience.
2	Identify the hook (i.e. type of program) required to pull maximum listeners and keep them glued to the station
3	Help to demonstrate to businesses analytically how the station can help to project customer products and to grow their business.
4	To also use Big Data to demonstrate to advert agencies the reach and demographic traffic of GFM

VII. COST SAVINGS FOR GRACE FM

Organizations are now empowered with this strategic Big Data framework that will help in generating the Strategic Big Data Goals. Organizations save money by using a champion selected from within the organizations to drive the entire process of capturing their goals. Cost is also saved from knowing the specific data source that will be required to address the targeted goals. This is a more strategic approach towards collection of Big Data. Each organizational challenge may be unique which may require one or more different data sources to adequately address it.

The empirical testing of the SAVI-BIGD framework successfully yielded the Strategic Big Data Goals (SBDG) for the Grace FM as illustrated in Table 3. This is indicative that this BIG Data Strategy Framework avails organizations with an empirically tested process framework that can be followed and re-used to continuously generate strategic Big Data goals for various organizations. A key attribute of the SAVI-BIGD framework is the fact that it helps in aligning the business strategy of the organization with the Big Data project. The alignment is focused on the project. This is in line with literature as suggested by Gutierrez et al [56]. They argue that IS Alignment is achieved differently on each IS project rather than approaching looking from an organizational perspective. The framework effectively directs the process of capturing the requirements from the organizations. It involved capturing data by one-to-one and focus group interviews then analyzing the data before presenting the findings.

This is empirical evidence that the process of capturing the requirements for the Big Data project can be done in-house while the actual implementation of the Big Data project can be outsourced to a data science team or specialized consulting firms. One major concern the MD of Confluence Cable Network Ltd had before the start of the research was on the cost of doing a Big Data project and the potential value. This is a typical question amongst top management. The researchers requested a proposed costing from a reputable analytics Consulting company in Nigeria. They provided a proposal for a project of capturing the requirements for a Big Data project for CCN. They gave a quotation of $42,000. They listed the following as justification for the project cost: Identify Key Evaluation Questions (KEQs); Review alignment of value proposition with KEQs; Evaluate existing data if any; Adopt mixed evaluation technique; Data analysis using exploratory techniques, correlations, cross tabulations, and parametric inferential. The SAVI-BIGD framework provides a more grounded approach, the potential value that can be obtained from the Big Data project becomes clearer as the organization evaluates their SBDG. This is empirical evidence that indicates that organization could save reasonable amount of money from using the SAVI-BIGD framework in championing their Big Data strategy before implementing a Big Data project.

VIII. CONCLUSION AND FUTURE RESEARCH

Organizations constantly seek ways of gaining competitive advantage at the best possible cost. Organizations taking ownership of the Implementation of the SAVI-BIGD framework empowers them in different ways such as saving cost, having well-articulated Strategic Big Data Goals and practicing a system of continuous alignment based for their Big Data projects. This Big Data Strategy framework also helps by giving a well-structured process that can be followed and repeated in iterations, it helps in identifying the stakeholders that will be part of the implementation teams. This directly addresses the gap identified by Saltz, Shamshurin & Crowston [24: 1013]. They argue that "*Having a well-defined repeatable process can help data science teams across a range of challenges, including understanding who needs to be included as a stakeholder in the process, selecting an appropriate data architecture/technical infrastructure, determining the appropriate analytical techniques and validating the results*".

Future researchers are however encouraged to do some further testing of this framework in order industries and sectors. The researcher also plans to conduct a cross case analysis of the findings from both case studies. Also the researcher still plans on evaluating the effectiveness of the SAVI-BIGD Framework in relation to the case study.

REFERENCES

[1] The Economist, "The world's most valuable resource is no longer oil, but data," The economist, 2017. [Online]. Available: https://www.economist.com/news/leaders/21721656-data-economy-demands-new-approach-antitrust-rules-worlds-most-valuable-resource. [Accessed: 02-Oct-2017].

[2] A. Bharadwaj, O. A. El Sawy, P. A. Pavlou, and N. Venkatraman, "Digital Business Strategy: Toward A Next Generation Of Insights," MIS Q., vol. 37, no. 2, pp. 471–482, 2013.

[3] M. Van Rijmenam, Think Bigger Developing a successful big data strategy for your business. New York: American Management Association, 2014.

[4] M. Lakoju and A. Serrano, "A strategic approach for visualizing the value of big data (SAVV-BIGD) framework," in 2016 IEEE International Conference on Big Data (Big Data), 2016, pp. 1334–1339.

[5] M. Lakoju and A. Serrano, "A Framework for Aligning Big-Data Projects with Organizational Strategy Full Paper," in Twenty-third Americas Conference on Information Systems, 2017, pp. 1–10.

[6] A. M. Pettigrew, "What is a processual analysis?," Scand. J. Manag., vol. 13, no. 4, pp. 337–348, 1997.

[7] L. Fitzgerald, E. Ferlie, and C. Hawkins, "Innovation in healthcare: how does credible evidence influence professionals?," Health Soc. Care Community, vol. 11, no. 3, pp. 219–228, 2003.

[8] E. Murphy, R. Dingwall, D. Greatbatch, S. Parker, and P. Watson, "Qualitative Research Methods in Health Technology Assessment: A Review of the Literature," Health Technol. Assess. (Rockv)., vol. 2, no. 16, pp. 1–274, 1998.

[9] M. Myers, Qualitative research in business and management. Sage, 2009.

[10] R. Yin, "The case study as a serious research strategy," Knowledge, vol. 3, no. 1, pp. 97–114, 1981.

[11] R. Yin, "Enhancing the quality of case studies in health services research.," Health Serv. Res., vol. 34, no. 5 Pt2, p. 1209, 1999.

[12] I. Benbasat, D. Goldstein, and M. Mead, "The case research strategy in studies of information systems," MIS Q., pp. 369–386, 1987.

[13] T. Huang, L. Lan, F. Xuexian, P. An, J. Min, and F. Wang, "Promises and Challenges of Big Data Computing in Health Sciences," Sci. Big Data Res., vol. 2, no. 1, pp. 2–11, 2015.

[14] J. Luftman, "Assessing Business-IT Alignment Maturity," Commun. AIS, vol. 4, no. December, pp. 1–51, 2000.

[15] V. Braun and V. Clarke, "Using thematic analysis in psychology," Qual. Res. Psychol., vol. 3, no. 2, pp. 77–101, 2006.

[16] J. Fereday and E. Muir-Cochrane, "Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development," Int. J. Qual. methods, vol. 5, no. 1, pp. 80–92, 2006.

[17] J. S. Saltz and I. Shamshurin, "Exploring the process of doing data science via an ethnographic study of a media advertising company," in 2015 IEEE International Conference on Big Data (Big Data), 2015, pp. 2098–2105.

[18] C. L. Philip Chen and C. Y. Zhang, "Data-intensive applications, challenges, techniques and technologies: A survey on Big Data," Inf. Sci. (Ny)., vol. 275, pp. 314–347, 2014.

[19] S. Parise, B. Iyer, D. Vesset, B. Iyer, and D. Vesset, "Four strategies to capture and create value from big data," Ivey Business Journal, 2012. [Online]. Available:

http://search.proquest.com.ezproxy.brunel.ac.uk/docview/1039465797?pq-origsite=summon. [Accessed: 12-Mar-2015].

[20] A. McAfee and E. Brynjolfsson, "Big Data: The Management Revolution," Havard Business Review, 2012. [Online]. Available: https://hbr.org/2012/10/big-data-the-management-revolution. [Accessed: 20-Jul-2017].

[21] T.-M. Song and S. Ryu, "Big data analysis framework for healthcare and social sectors in Korea.," Healthc. Inform. Res., vol. 21, no. 1, pp. 3–9, Jan. 2015.

[22] S. F. Wamba, S. Akter, A. Edwards, G. Chopin, and D. Gnanzou, "How 'big data' can make big impact: Findings from a systematic review and a longitudinal case study," Int. J. Prod. Econ., pp. 1–13, 2015.

[23] J. Kelly and J. Kaskade, "CIOS & BIG DATA What Your IT Team Wants You to Know," 2013.

[24] A. Bhardwaj, S. Bhattacherjee, A. Chavan, A. Deshpande, A. J. Elmore, S. Madden, and A. G. Parameswaran, "DataHub: Collaborative Data Science & Dataset Version Management at Scale," in Biennial Conference on Innovative Data Systems Research (CIDR), 2015.

[25] J. S. Saltz, I. Shamshurin, and K. Crowston, "Comparing Data Science Project Management Methodologies via a Controlled Experiment," in Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, pp. 1013–1022.

[26] D. Dutta and I. Bose, "Managing a Big Data project: The case of Ramco Cements Limited," Int. J. Prod. Econ., vol. 165, pp. 293–306, 2015.

[27] J. Gao, A. Koronios, and S. Selle, "Towards A Process View on Critical Success Factors in Big Data Analytics Projects," in Twenty-first Americas Conference on Information Systems, 2015.

[28] L. Kung, H.-J. Kung, and A. Jones-Farmer, "Managing Big Data for Firm Performance: a Configurational Approach," in Twenty-first Americas Conference on Information Systems, 2015, pp. 1–9.

[29] H. Benbya and B. McKelvey, "Using coevolutionary and complexity theories to improve IS alignment: a multi-level approach," J. Inf. Technol., vol. 21, no. 4, pp. 284–298, 2006.

[30] F. Holotiuk and D. Beimborn, "Critical Success Factors of Digital Business Strategy," in 13th International Conference on Wirtschaftsinformatik, 2017, pp. 991–1005.

[31] P. Setia, V. Venkatesh, and S. Joglekar, "Leveraging Digital Technologies: How Information Quality Leads to Localized Capabilities and Customer Service Performance," MIS Q., vol. 37, no. 2, pp. 565–590, 2013.

[32] J. Peppard, R. D. Galliers, and A. Thorogood, "Information systems strategy as practice: Micro strategy and strategizing for IS," J. Strateg. Inf. Syst., vol. 23, no. 1, pp. 1–10, 2014.

[33] S. Mithas, A. Tafti, and W. Mitchell, "How Firms Competitive Environment and Digital Strategy Posture Influence Digital Business Strategy," MIS Q., vol. 37, no. 2, pp. 511–536, 2013.

[34] C. J. Woodard, N. Ramasubbu, F. T. Tschang, and V. Sambamurthy, "Design Capital and Design Moves: The Logic of Digital Business Strategy," MIS Q., vol. 37, no. 2, pp. 537–564, 2013.

[35] C. Kahre, D. Hoffmann, and F. Ahlemann, "Beyond Business-IT Alignment - Digital Business Strategies as a Paradigmatic Shift: A Review and Research Agenda," in Proceedings of the 50th Hawaii International Conference on System Sciences, 2017, pp. 4706–4715.

[36] M. Wade and J. Hulland, "Review: The resource-based view and information systems research: Review, extension, and suggestions for future research," MIS Q., vol. 28, no. 1, pp. 107–142, 2004.

[37] L. H. Lang and R. M. Stulz, "Tobin's q, Corporate Diversification, and Firm Performance," J. Polit. Econ., vol. 102, no. 6, pp. 1248–1280, Dec. 1994.

[38] P. G. Berger and E. Ofek, "Diversification's effect on firm value," J. financ. econ., vol. 37, no. 1, pp. 39–65, Jan. 1995.

[39] K. R. Conner and C. K. Prahalad, "A Resource-Based Theory of the Firm: Knowledge Versus Opportunism," Organ. Sci., vol. 7, no. 5, pp. 477–501, Oct. 1996.

[40] B. Wernerfelt, "The resource-based view of the firm: Ten years after," Strateg. Manag. J., vol. 16, no. 3, pp. 171–174, 1995.

[41] J. Barney, "Firm Resources and Sustained Competitive Advantage," J. Manage., vol. 17, no. 1, pp. 99–120, Mar. 1991.

[42] R. Amit and P. J. H. Schoemaker, "Strategic assets and organizational rent," Strateg. Manag. J., vol. 14, no. 1, pp. 33–46, Jan. 1993.

[43] B. S. Chakravarthy, "On tailoring a strategic planning system to its context: some empirical evidence," Strateg. Manag. J., vol. 8, no. 6, pp. 517–534, 1987.

[44] G. Stalk and T. M. Hout, Competing Against time: How time-based competition is reshaping global markets. New York: Free Press, 1990.

[45] H. Hassani and E. S. Silva, "Forecasting with Big Data: A Review," Ann. Data Sci., vol. 2, no. 1, pp. 5–19, 2015.

[46] T. Ferraz, "4 ways big-data will change radio," Medium, 2015. [Online]. Available: https://medium.com/@tommyferraz/4-ways-big-data-will-change-radio-c0accc6b60e1. [Accessed: 04-Aug-2017].

[47] J. N. Luftman, P. R. Lewis, and S. H. Oldach, "Transforming the enterprise: The alignment of business and information technology strategies," IBM Syst. J., vol. 32, no. 1, pp. 198–221, 1993.

[48] A. C. Maltz, A. J. Shenhar, and R. R. Reilly, "Beyond the Balanced Scorecard:: Refining the Search for Organizational Success Measures," Long Range Plann., vol. 36, no. 2, pp. 187–204, 2003.

[49] A. Bharadwaj, O. a. El Sawy, P. a. Pavlou, and N. Venkatraman, "Digital Business Strategy: Toward a Next Generation of Insights," MIS Q., vol. 37, no. 2, pp. 471–482, 2013.

[50] R. Klein and A. Rai, "Interfirm strategic information flows in logistics supply chain relationships," Mis Q., pp. 735–762, 2009.

[51] A. Rai, P. Pavlou, G. Im, and S. Du, "Interfirm IT capability profiles and communications for cocreating relational value: evidence from the logistics industry," MIS Q., vol. 36, no. 1, pp. 233–262, 2012.

[52] N. Saraf, C. S. Langdon, and S. Gosain, "IS Application Capabilities and Relational Value in Interfirm Partnerships," Inf. Syst. Res., vol. 18, no. 3, pp. 320–339, Sep. 2007.

[53] D. Evans, A. Hagiu, and R. Schmalensee, Invisible engines: how software platforms drive innovation and transform industries. MIT press, 2008.

[54] J. T. M. Van Der Zee and B. De Jong, "Alignment Is Not Enough: Integrating Business and Information Technology Management with the Balanced Business Scorecard," J. Manag. Inf. Syst., vol. 16, no. 2, pp. 137–158, Sep. 1999.

[55] N. Venkatraman and C.-H. Lee, "Preferential linkage and network evolution: A conceptual model and empirical test in the US video game sector," Acad. Manag. J., vol. 47, no. 6, pp. 876–892, 2004.

[56] D. Easley and J. Kleinberg, Networks, crowds, and markets: Reasoning about a highly connected world. Cambridge University Press, 2010.

[57] A. Gutierrez, C. Mylonadis, J. Orozco, and A. Serrano, "Business-IS Alignment: Assessment Process to Align IT Projects With Business Strategy"," in AMCIS 2008 Proceedings, 2008