Big Data and Its Impact on IT Consultancy

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Abstract: **This paper discusses some of the areas which encompass big data and its adoption within Information Technology (IT) consultancy and professional practice. Among the issues that are highlighted in this paper are the relation of big data and its relevancy to IT consulting practice, why big data is increasingly getting and being in the spotlight and how it impact businesses. Undoubtedly, big data technology enables businesses to seek new opportunities and help managers in organizational decision-making. The advisory from IT consultants' emphasis on what businesses need to get, and that is an expert's insight before they truly understand and adopt big data and making investments on this on-demand technology, as there are some challenges and issues in regards to big data that businesses need to be aware of and ready for.**

Keywords: **IT Consultancy, Big Data, Data Analytics, Information Technology (IT), Consultancy Services, Impact.**

1. INTRODUCTION

Big Data, and what it represents has revolutionized the way businesses are handled. It has become a big part of having a successful business, not just in the case of big players, but also for smaller and starter companies, providing valuable insights on customers' behavior, purchases and giving a chance for better marketing, sales and better targeting plans. It is something that is essential in this day and age of modern business, in order to survive and have a great profit in return. However, not all companies have sufficient expertise to use and interpret big data. Therefore, they hire IT consultants to help them leverage, analyze and utilize big data which is further used in important aspects such as decision making, leading to better decisions and lesser risks.

In this paper, overview of literature review related to IT consultancy and big data is highlighted. Moreover, big data in relation to consultancy services is further discussed in details. Furthermore, significant aspects of big data such as importance and impact of big data, and benefits and successes of leveraging on big data In addition to that, challenges and issues of big data are further looked at as well. Finally, the last part of this paper which is the conclusion summarizes the topic, big data and its impact on IT consultancy.

2. LITERATURE REVIEW

A. IT Consultancy:

A consultant, described by Shaikh, Habib and Ibrahim [1], is a professional with skills specialized in a particular discipline and acquired through different theoretical and practical experiences and provides advisory services to customers pertaining to a specialized area.

An IT consultant on the other hand, concentrates on serving a professional advice on the use of Information Technology to achieve the organization's business objectives which includes writing, testing, and supporting software to meet the needs of customers. IT consulting companies often work on behalf of companies or provide expert advice and assistance to evaluate, manage, implement, deploy and administer systems [2], [3].

Freedman [4] has outlined the framework of skill sets that an IT consultants should possess to gain success. Due to the fact that IT consultants are selling billable hours that clients are willing to invest in, to get the best insights and advices on

how they can meet their business needs; IT consultants need to have the technical expertise, understand the business context, and possess good communication skills, which, when converged, produces a trusted IT advisory.

IT consultants – by nature – are typically strong in the technical disciplines [4], but they should constantly upgrade their knowledge on the technology advancement that keeps on changing and spreading widely. Technology reaches people, with and without an IT background. Thus, constant learning and updating their knowledge of IT advancement is critical in order to be ahead of clients, as they are also becoming more sophisticated by the easy access to information and knowledge with just a few clicks. Consultants must have the know-how of technologies that would drive a competitive advantage and provide decision-making advices for clients around the world.

As such, one should acquire an in-depth understanding of business issues [4] because clients expects that an IT professional would deliver a solution that contributes to his business. The IT consultants would propose technical solutions which gives value to their clients' business in return. However, rather than just focusing on general business understanding, a pre-project homework or background check on the clients' company to know their nature of business is vital for a more engaging and meaningful advisory. In addition to that, IT consultants must have the communications skills [4] in order to convey their advices in the best and convincing manner. A clear, open, and effective communication between parties is what constitutes a smooth consultation. It takes communication to be able to help clients identify their needs and requirements, "understand the capabilities and constraints of technology, and create a clear and compelling project vision" [4] along the advisory process.

IT consulting can help businesses in so many ways through providing IT solutions that best suit their business needs. As IT advances are on the rise and continually evolving, businesses are looking into shifting their business operations to be digitized and to adopt on-demand IT practices with proper advisory from the IT consulting and services industry. Big Data, which is continuously evolving and expanding is one of the current pervasive technologies that IT consultants can adopt in their professional practice.

B. Big Data:

Big Data is a term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis [5]. Systems, sensors and mobile devices use information to transmit big data. Big Data is generated by various digital processes and social media [6].

In their work on Big Data analytics Singh and Singh state that the concept of Big Data represents datasets which continues to grow until it becomes difficult to manage using existing database management tools [7].

The main 3 dimensions of big data revolve around volume, velocity and variety. Volume of big data can be described as the size of data which is usually very large and counted in terabytes and petabytes. Velocity of big data is the speed of data processing. Variety of big data refers to the number of types of data. Variety of big data can be represented as structured and/or unstructured data including text, audio, video, posts, log files etc.

Big Data is a great opportunity to create significant business advantage and better service delivery. At the same time big data needs new infrastructure, a new way of thinking about the way business and IT industry works [7].

According to Oracle's predictions, companies not only capture a greater variety of data, they use it in a greater variety algorithms, analytics, and apps. But developers and analysts shouldn't have to know which data is where or get stuck with just the access methodologies that repository supports. Successful data virtualization technology will offer performance equal to that of native methods, complete backward compatibility and security.

A statistical survey on big data showed that big data is very important in public health sector where big data is being used for syndromic surveillance, the monitoring of the syndromes of transmittable diseases at the population level. Environmental science, education sector, material science are other sectors that widely use big data to analyze and predict various scientific results [8].

3. BIG DATA IN RELATION TO CONSULTANCY SERVICES

Companies that have a clear understanding on how to leverage their structured and unstructured data can uncover valuable customer data, new ways of marketing their products and services, and entirely new lines of business. But many businesses do not have sufficient experience in extracting useful information from big data. A research conducted by

Adam et al. proved that companies and organizations need consultants in order to handle security issues [9]. Thus, big data becomes very relevant for IT solution providers with the proper experience, skill sets and know-how.

IT consulting is a field that advise businesses on how best to use information technology to meet their business objectives. IT consultancy companies provide expert advice and assistance in the fields of writing, modifying, testing and supporting software to meet the needs of a particular customer. Experts in IT consultancy companies also plan and design different systems and integrate computer hardware, software and communication technologies.

IT consultants with vast experience in big data consulting practices conclude that big data is simply an evolution of business intelligence and data warehousing. Most IT consultancy companies use big data to develop advanced analytics strategies in order to help clients derive competitive advantage from their data assets and analytic capabilities. Advanced analytics is also used by IT consultancy to provide decision support, which helps clients improve operational effectiveness and efficiency through innovative uses of data and analytics.

A research conducted by Bain and company showed that "companies that are able to use analytics insights to change the way they operate or to improve their products and services are twice as likely to be in the top quartile of financial performance within their respective industries" [10].

A. Importance and Impact of Big Data:

To say big data is changing managing, consulting and IT sector would be an understatement. In the past few years, big data has emerged and took center stage when it comes to wanting to take your organization or business to the next level. And that is where IT consultancy comes in. Many organizations out there wanting and are competing for big data and big data skills, making sourcing talent an undeniably difficult task [11] And this is where it gets good for IT consultants, as studies have shown more than half of organizations and businesses, 57 percent to be exact, leveraged the help of consultants, while 45 percent used contract employees and 34 percent used technology vendor resources. Organizations that mainly relied on IT consultants, contractors and other similar external resources, found their big data installations a lot easier than others that are using only internal resources. [11]

 The fact that there is a shortage in key skills paved the way for IT consultants businesses to actually flourish. A data management survey [12] have shown that 28% of organizations identified a lack of skilled resources as a challenge they encounter as they attempt to manage their current database and supporting infrastructure with database administrators and data architects as the most challenges they face. This has shown the increase in data based skills and IT solutions, hence the need for IT consultancy. [12]

In addition, not only that organizations that are using big data in their daily businesses, are benefiting from it but also users have reported their tremendous satisfaction with their results and businesses outcomes and how its meeting their standards and needs. [11] Moreover, bigger companies are the biggest gainers from big data, basically, the bigger the company, the better the results, mainly because they bring more to the table. Larger organizations approach is different than any other organizations and that makes them a success, they start with focused goals and initiatives, and going in steps rather than trying to do everything all at once. [11] And this is done with the help of IT consultants, where they lay out the process and show the best solutions to handle and make use of this data in the best possible way that is in line with the organization's vision. IT consultants are outcome focused, and having to deal with big data definitely raises the bar when it comes to their approach on dealing with it. Understanding business use cases and data usage patterns provides important evidence leading to the right solutions, technologies and approaches that are need to be taken to provide the best results. [11] What makes IT consultants great when it comes to dealing with big data, is how informed they are, closely following developments in Big Data Technology and Analytics. [13] So surely big data is a good thing for IT consultants, their management and businesses Not only it brings a new set of challenges every time there is a project to handle, but also giving consultants the chance to find new ways to deal with the data and find the best approaches and solutions to reach those much desired outcomes.

Furthermore, the fact that more business models across industries around are becoming Customer Centric is giving IT consultants a lot to work with, just proves the point that big data is great for the consultancy business, bringing work, challenges and solutions. According to studies business leaders are so focused on "knowing" customers based on internal as well as external data. It is a priority for them. [14] With that being said, big data has been such an influence in various sectors, offering new ways and benefits to go about their businesses and achieving their goals and gaining customers and recognition. Companies and businesses, large and small are trying to take advantage of this platform and reach those goals they have set. Studies have shown that companies that use predictive analytics achieve 73% higher sales than others that don't, and 65% of customers feel frustrated when incoherent offers are sent to them through various channels. [15]. And

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that is where IT consultancy comes in, meeting expectations of the organizations by providing the best solutions through utilizing that big data and providing the customers with what they need and a great experience, leading to them coming back for more and taking the organization to new heights.

B. Benefits and Successes of Leveraging on Big Data:

Steve Lohr [16] claimed that the impact of data abundance extends well beyond business. The value of data has extended to effect different kinds of fields due to the data-intensive nature of emerging businesses. Furthermore, big data is not just merely collecting data, but it offers you an opportunity to steer the organization based on the metrics you really value in the long run [17].

Business organizations are seen to be increasingly gaining interest in big data technology adoption. It is through big data analytics that companies may find the problems that require attention; such as: "the combination of factors that causes defects in the manufacturing process or the factors contributing to the sales differential between two stores" [18].

In a research done by Forrester Consulting [19] to study the maturity of Italian enterprises in their Big Data strategy and operations; among the outlined factors which drive the adoption of big data were: improve data quality and consistency, make better informed business decisions, achieve better business transparency, improve business planning, improve customer interaction and satisfaction, and overall gain competitive advantage. These are among the benefits that big data can deliver. When Italian enterprises were asked about how they would consider the adoption of big data solutions based on those factors, most enterprises would actually focus on data quality, followed by business objectives.

Leveraging big data can benefit organizations in a lot of ways. It could benefit customer relations and understanding customer behaviours, such that, big data could target better social-influencer marketing, develop customer-base segmentation and get recognition of sales and market opportunities [20]. Business intelligence can be generated which could result in more numerous and accurate business insights, an understanding of business change, better planning and forecasting, and also the identification of root causes of cost [20]. It can also benefit analytic applications such as the detection of fraud, quantification of risks or analysing the market sentiment trends. Besides that, big data can also benefit other aspects which includes customers' loyalty, service experience optimization, healthcare delivery optimization, and supplier performance based on cost and quality" [20]

One of the available vendors for big data analytics is Impetus Technologies; a company which offers consulting, advisory and professional services. Its customers are large corporations that manage big data as part of operating a business. They help firms evaluate and embrace new technologies and business practices that are related to big data analytics. They provide consultation to assess big data and analytic opportunities, consultation to design and develop big data analytic infrastructure and applications and also long-term support [20].

As increasing number of companies have realized the importance of employing IT in their operations, and with the emergence of big data technology that is gaining much attention, IT consultants should also get on board and take this opportunity because many businesses which are considering to leverage on big data might not have the right resources and expertise within their company and they would most probably need expert advisory which comes from an IT professional to get the best results from investing in big data.

Through exploratory, detailed analysis of big data, consultants can help organizations to discover new facts about their customers, explore market trends, their partners, costs and operations, and eventually gather and use these sets of data for business advantage [20].

4. CHALLENGES AND ISSUES

Big Data is not only an opportunity for various businesses but it is also a challenge. Many scholars in their research works addressed the issues and challenges of big data. Kaisler et al. outlined three fundamental issue areas of big data: storage issues, management issues, and processing issues [21]. The storage issues occur when there is too much data being generated. As new data is created in large amounts there is no new storage medium. Nowadays, digital data can represent documents, drawings, pictures, sound and video recordings, models, software behaviour, user interface designs, etc. This leads to data management issues if there is no adequate metadata describing what, when, where, who, why and how it was collected and its provenance. Finally, the processing issues happen when there is no extensive parallel processing and new analytics algorithms in order to provide timely and actionable information.

In addition, another scientific research conducted by Katal et al. shows that there are privacy and security issues associated with big data [22]. The authors state that "the personal information of a person when combined with external

large data sets leads to the inference of new facts about that person and it's possible that these kinds of facts about the person are secretive and the person might not want the Data Owner to know or any person to know about them." Furthermore, the researchers point out that businesses may collect personal information in order to add value to the organization. Social stratification is another important issue related to privacy and security. In this case, a literate person would be taking advantage of the Big Data predictive analysis and on the other hand underprivileged will be easily identified and treated worse. Finally, law enforcement use big data to monitor certain individuals which might suffer from adverse consequences without the ability to fight back or even having knowledge that they are being discriminated against.

Moreover, analytical challenges are also among the issues associated with big data. It is very hard to analyze data because it can be unstructured, semi structured or structured. Analyzing different types of data requires advanced skills. Furthermore, the type of analysis which is needed to be done on the data depends highly on the results to be obtained i.e. decision making.

Technical challenges are also an important issue that should be considered in big data. According to Katal et al. there are four aspects of technical challenges that should be addressed: fault tolerance, scalability, quality of data, heterogeneous data.

"Cloud computing has a high demand by many organizations as well as end users since its first announcement." [23]. As cloud computing and big data may fail, the damage done should be within acceptable threshold rather than beginning the whole task from scratch. Fault-tolerant computing is extremely hard, because it uses sophisticated algorithms. It is simply not possible to employ absolutely fool proof, 100% reliable fault tolerant machines or software. Therefore, fault tolerance issues occur when people try to reduce the probability of potential failure.

The scalability issue of Big Data requires a high level of sharing of resources which is expensive and also causes challenges associated with running and executing various jobs. Cloud computing also has to deal with the system failures in an efficient manner which occurs more frequently if operating on large clusters. As a result, all these factors put the concern on how to express the programs, even complex machine learning tasks.

As a lot of data is used for decision making for predictive analysis in business Thus a big amount of data requires a big storage medium. Whereas big data mostly focuses on quality data storage rather than having very large irrelevant data so that better results and conclusions can be drawn. This further leads to various questions like how it can be ensured that which data is relevant, how much data would be enough for decision making and whether the stored data is accurate or not, to draw conclusions from it etc.

It is easy to manage structured data compared to unstructured data, because structured data is always organized into highly mechanized and manageable way and also integrated with database. The main challenge in this case is to organize and convert unstructured data into structured one, because it consumes a lot of resources and time. These issues can be quite the challenge for consultants when it comes to dealing with big data and giving the clients what they want and finding the right solutions that can fit the given situation and meeting the given objectives and tasks. These kinds of issues are where consultants need to dig deep and find ways to minimize these issues, learning more about big data, taking advantage of it and finding the best ways to handle those challenges.

5. CONCLUSION

In conclusion, Big Data has definitely made its way through modern day organizations and businesses, its impact is undeniable and the benefits that comes with it are limitless, these benefits were highlighted throughout the paper. It has also impacted the IT consultancy business, with many organizations wanting to leverage on it but not having the skills within their company to do so, opening the doors for IT consultants to meet those needs. Working with big data has definitely impacted how consultants handle things, finding the best ways possible to use it and helping the organizations reach their goals and objectives. But with using big data, consultants have to face a lot challenges along the way. Although there are challenges that comes with it, these issues are giving consultants new information, which solutions are successful and which aren't and what measures to take to better them. In all, big data has affected IT consultancy in a major way, and it is here to stay.

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