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The Readiness of Big Data Implementation in Organizations from The Aspects of Knowledge, Skills and User Acceptance

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Abstract. This study is conducted to understand the readiness of Big Data implementation in organizational sectors from the aspects of knowledge, skills and user acceptance. Organizations now has been experiencing the challenges of the presence of large amount of data into their databases. Those changes can be seen from the effect of technological matters such as the use of larger memory, advanced computers and new networks being provided. Most of the organizations nowadays have changed and evolved into the advancement of technology. However, in some organizations which has less amount of data being transmitted and still using traditional computer may not be ready to accept the presence of Big Data into their sectors. Many organizations have implemented Big Data yet some are still considering Big Data as a new thing. The quantitative method of research has utilized three factors of measurement which are knowledge, skills and user acceptance towards Big Data in organizations. This measurement analyses on the level of respondents towards the implementation of Big Data whether they are ready enough or still in unidentified status. A structured questionnaire is used to measure the findings of the readiness of Big Data in organizations. The respondents comprise of the employees of public and private sectors of various departments and units. Each element of the questionnaire is being assessed whether the particular organizations are ready enough to accept the implementation of Big Data as well as accepted the challenges occur within. This study will then measure the leading of the organizations either towards Big Data implementation or in the other way round.
Keyword: Big Data, knowledge, skills, user acceptance, technology, decision making

1 Introduction

Organizational sector is changing rapidly nowadays by experiencing unprecedented challenges with regards to lack of staff, pressure towards performance and inadequate support from top management, financial constraint and workloads. Apart from that, some small sectors have lack of technological equipment to perform tasks. Technology is changing rapidly following the emergence of technology that is continually changing. It plays and important role in managing organization with most of the operations are being performed by machine. With rapid changes of technology, there is a term called Big Data that is emerging in this world which is related to data that is too diverse, fast and vast for ordinary technology and infrastructure. The presence of Big Data is too great to be implemented in organizations in order to ease and fasten the tasks to be completed. Big Data can be considered as a trend in the world of technology that stretches around numerous fields available. The management of Big Data comes from the knowledge and skills of experts as to make it beneficial to the organizations. The term Big Data has been established in 2005 by Roger Mougalas but the application of the use and concept of Big Data has existed long time ago as early as 7000 years ago (Anastasia, 2016). The establishment of social networking is also one of the factors of the Big Data existence as it produces multiple amounts of data and information which could not be handled sometimes. Big Data is seen to be the game changer of modern industries and it continues to influence our daily lives, interests and tasks. In some cases, Big Data can also analyse and understand the consumers' behaviour and interests.

Big Data in organizations

Big Data presents in almost every organization in Malaysia as it supports voluminous amount of data with high velocity and veracity. Managing Big Data is very crucial as it can give patterns and ease the users to an easier format that can be understood by users. Big Data in organizations give benefits to the users in terms of providing data services and developing data management in organization. According to Ahmad, Ming & Rafi (2019), the objective of Big Data in institutions is to enhance the effectiveness and efficiency of organizational approach through the analysis of data based on several highlighted issues occurred. The data can be found in charts, graphs or analytics which allows users to retrieve. According to Fuster (2016), the accessibility of Big Data by students and educators help in setting goals and strategies to make decision and solve problems. These help in improving the adaptation ability towards education.

According to Cabrera-Sanchez & Villarejo-Ramos (2020), Big Data gives a total change of the organizations in terms of data management as there is a storing, processing and combining large amount of data into several patterns which varies from different sources. In the field of engineering, data analysis is the most often use in the data and storage techniques. The storage techniques allow competitive advantage throughout the whole engineering field. In this field, Big Data being applied in several features such as manufacturing, production and innovation to optimize them. According to Karina (2015), Hitachi applies Big Data in its technological development for exploration and production as it is an open source

business intelligence. It aims to carry out global management strategy as well as leading the development of the company.

Big Data can be categorized into several levels such as aspirational, experience and transformation which all of them focus on business analytics technologies and target investment. According to Wang, Kung & Byrd (2018), real time analysis of Big Data can track the unexpected events such as fraud detection in healthcare sector. Fraud in terms of account and transaction usually happens in this sector as it relates to the misuse of patients' accounts. The purpose of Big Data in healthcare organization is to explore a deeper understanding to transform the organization. Several structured and unstructured data sources related in healthcare are electronic healthcare records, health monitoring devices and clinical images.

According to Shah, Irani & Sharif (2017), in the human resources context, Big Data carries out data analysis to perform rapid business decision making towards a large volume and velocity of data. It recognizes patterns and becomes readable for the users at hand. Structured and unstructured data can be generated from internal and external sources of the human resource field. Basically, this presents in almost all organizations that carry out business understanding field. Big Data gives a voluminous amount of data to be accessed into a derived strategic operation.

As the emergence of technology occurs, security threats also increases. Same goes to Big Data application, there will be security threats that coming through to disrupt any operational devices. According to Noutoua (2018), security threats are usually created illegally by irresponsible theft to steal valuable data and information belongs to an organization. This must be taken into account in which security measures must be prepared and set up such as authenticate access and pass codes. This is to avoid the stealing of data and to ensure safety and auditing measures to be in measured.

Definition of terms

Researchers define Big Data in many ways and field. They define it according to their related field and usage. According to De Mauro et al. (2016), Big Data is the information asset characterized by such a high Volume, Velocity and Variety to require specific technological and analytical methods to transform into Value. In brief, Big Data is also related to a huge amount of information or knowledge arrives at a certain area with supported technology. In addition, Talha (2017) quoted the definition from Paredes (2012) stated that Big Data is a field of algorithm science that allow complex patterns in data to be recognized by machines. Earlier said, Big Data is related to massive amount of data that needs technology to carry on work. Knowledge is defined as the facts, information and skills acquired through experience or education to understand about a particular subject. Knowledge is closely related with information management and technology. Advancement of technology and information management has given big changes to research which can ease the process of producing an article. According to Murshed and Zhang (2016), newer methods and toolkits has been introduced for academic and industrial purposes.

Skills are the expertise and ability to do something very well on a person. Skills is different in every person. Based on Meriam Webster's Dictionary, skill is defined as an ability to do an activity or tasks very well especially when you have already knew

or practiced it. According to Green (2011), skills refer to the ability of an individual to do tasks according to motivation and commitment depending on the concept and potential standards. User acceptance is when the users acknowledge the benefits or facilities given by certain individuals or organizations especially when it can ease the tasks of the users. According to Guru 99 (2021), user acceptance is defined as the performance of users towards the verification of products or services of an organizational businesses.

2 Literature Review

Big Data has gone through many revolutions following the emergence of technology. According to Butts-Wilmsmeyer, Rapp, & Guthrie (2020), ever since the year 2005, Big Data has been described as a large amount of data sets that are managed and derived for the processes of analysis and warehousing. Big Data is also known as the five Vs in common which resembles the volume, velocity, variety, veracity and value. In other hand, Big Data is also significant with several categories including automation, digitalization, connectivity and remote sensing. These categories are related to the technology that derives the use of Big Data.

When it comes to the five Vs, Big Data shows a very efficient process of managing data. Volume is the main aspect of Big Data which shows a large amount of data being presented. It was recorded that an amount of 40% of data increases every year worldwide. Velocity shows that Big Data arrives in a flow of real time expectation whereas variety explains that Big Data has several types including structured and unstructured. Last but not least, value enhances the data is valuable and considered as an asset to the respective organization (Ekambaram, Sorensen, Bull-Berg & Olsson, 2018).

According to Romero (2018), Big Data is often seen very important in big organizations. The closest example of the implementation of Big Data is in the academic libraries in which the usage of online public access catalog for users to search for materials in the libraries without having to go from shelves to shelves to look for books and other materials. It is one of the examples of Big Data as in the online public access catalog, there are a lot of data and information being uploaded and kept. Those data and information are meant to ease the users for information retrieval. All the data are being classified and organized correctly according to the order so that it will not mix up with other data and information in the online public access catalog. Usually, academic library users are the one who make full use of the benefits of having this online public access catalog.

Despite having to give academic libraries as an example, there are a lot more organizations from public and private sectors which implemented Big Data as one of their mediums for easy information retrieval.

Big Data has been through rapid development too in several years of its emergence. In some cases, Big Data has large quantities of data from the Internet that can be exposed for advertising, storage and analysis capabilities and its costly too. It enables the technological platform to be accessed for mapping and building of models (Ekambaram, Sorensen, Bull-Berg & Olsson, 2018).

According to Tang, Ma & Luo (2019), there are several domains related to Big Data such as data mining, artificial intelligence, cloud computing and others. These aspects show the development of Big Data technologies and applications. The revolution of Big Data may somehow attract the addition ideas of data-driven elements which can enable the processing or analysing large and complex amount of data which is too advanced for a traditional method. In addition, Big Data is also closely related to Internet of Things (IoT). It evolves in multiple technologies such as wireless communication, embedded system and electromechanical system. However, IoT has several cyber security issues as it leads to hacking personal data.

According to Foote (2017), when it comes to storage, Big Data is considered as one of the most expensive data storage methods. It has two types of storage which are magnetic and cloud storage. Cloud is the most popular in this 21st century as it is more secured and has large sizes as well as more ergonomic. It is low in maintenance and can be accessed anywhere with several helpful services.

Challenges in using Big Data

In all cases, Big Data has also its own challenges in implementing it. The challenges may vary from the function and usage of Big Data that is being applied and implemented in an organization. The challenges are only meant to make the implementation becomes stronger and wider. First of all, according to Jondoe (2019), the challenge of Big Data implementation is large amount of voluminous data entered the traditional technological systems. Big data is always seen to be related with volume. It shows the amount of data being stored in a database of an organization are rapidly increasing which is uncontrollable. In some organizations, they are still using a traditional technology such as old and outdated computers. Managing organizations with this kinds of technology is very difficult to handle all the voluminous data that is being received by the organizations. This can lead to unemployment due to massive amount of data that could not be handled by the employees themselves. Ways to overcome this challenge is to upgrade all the computers and technology into a newer version that can support the implementation of technology.

Next, according to Kumar (2018), the challenge of Big Data implementation is the shortage of professionals who understand deeper about Big Data. It is very difficult to have professionals who are expert in managing Big Data because in some organizations, Big Data is still a new thing. Not everyone knows how to manage the voluminous data without having to learn or go for a training. Kumar (2018) also stated that there will be an uncertainty of data management landscape in which the data management becomes unclear of the aim. This is because some may not fully expert in the field of Big Data. Other than that, the security and privacy of data also becomes the challenge as technological data is open to any loss and shortage due to some common cases such as hacking and cyber stealing.

Moreover, according to Kadadi (2015), the challenge of Big Data implementation in organizations is the approach gives complication to the present technology in the organization. This is because when new implementation does not meet the common usage of the organization. It can be slightly different in order to manage and identify

the data. When it comes to managing the data, there may be certain formats that is totally different and unsupported by the recent computers or technology.

Last but not least, according to Harvey (2017), he stated that the challenge of Big Data implementation is the organizational resistance towards the organizations itself. There may be insufficient alignment of management and the lack of understanding between the management support team. It is important to have understanding between the management support system because implementing the Big Data is not a small deal. Big Data needs thorough preparation and readiness from all aspects of the organizations.

Changes in organization towards Big Data

Big Data has always been one of the needs for everyone in the world regardless of background and walks of life. It gives a lot of tremendous benefits in its implementation to ease people in everyday life. By applying Big Data, organizations are able to know and keep track on their performances and insights with the presence of technological equipment. Big Data has also affected the changes occur in organizations from ordinary to extraordinary (Matthews, 2019).

Enhance customer's experience

According to Holmlund et al. (2020), customer experience is defined as the interaction and feedback given by users after conducting and consuming several products which in this study is referring to Big Data. Customer experience is usually being measured through feedback and evaluation such as survey forms, interviews and observation by employees. From this medium, organizations can detect the interaction given by customers after consuming and using the outputs. One of the concepts is touchpoints in which customers deal directly with organizations or producers.

Increase the amount of employees and expertise

The presence of Big Data in organizations somehow give impact to the additional of employees and expertise who are familiar and master in the management of Big Data analytics. According to Tabesh, Mousavidin & Hasani (2019), the increasing amount of employees and expertise related to the management of Big Data help in creating a conducive environment in the organization to sustain the implementation of Big Data continuously. Apart from that, the support from top management helps in easing and enhancing the implementation of Big Data as in the contributions of budgets, plans and mechanisms control. This is due to the increasing amount of data which has been created in the past two years causes by the growth of the human population (Tahir, 2016).

Reveal potential threats

The emergence of technology nowadays has always given the best for the management of everyday tasks. In this era, everything is on the fingertips and it can be accessed in no time, anywhere and everywhere. This makes it clear when more four out of ten people are owning smartphones (O'Dea, 2020). According to Tankard

(2015), Big Data has always been one of the crucial parts pf detecting any information security threats. It can also detect the anomalies behaviour as well as providing sudden attack and interaction on the threats. Detecting fraud is being manpower's ability as it is digitalizing. Thus, the presence of Big Data helps in detecting all the leakages and threats conducted and received by the unappropriated users online.

Factors influencing Big Data in organization

Knowledge

As for the implementation of Big Data in organization, there are some aspects that need to be focused on in order to ensure everything is ready for the changes. The most important aspect is the knowledge. Without knowledge, any operations might not be successful due to lack of knowledge and intervention. According to Khurshid, JianMing and Muhammad (2019), knowledge helps users to choose and do the right things. That is why knowledge and data literacy is very important for Big Data. The implementation needs further studies and deep knowledge in order to manage the Big Data. He also stated that one of the centers of knowledge is the libraries. Libraries are the place where any kinds of knowledge can be obtained. In fact, in some cases Big Data is forcing the libraries to redesign the patterns of services to carry out certain new operations related to it.

The knowledge depends on how big the data enters an organization. The maintenance is important too when the Big Data is being implemented in order to avoid any wrongdoings and misleading of data and information. According to Philip (2018), the tacit knowledge can be converted to explicit knowledge but it may be differing in terms of understanding. The knowledge creation process is important in order to manage the Big Data in the organizations. Knowledge creation is important to know which data is valuable and which is not valuable. If all the data being kept consequently, then the management of the data is robust. The bigger the size of data enters an organization, the more the needs of expertise in order to be given different tasks of managing data.

Skills

Skills is also one of the most important aspects in the implementation of Big Data in organizations. Skills can show the real way of managing certain tasks without having to get an error because skills are already in the expertise of professionals. As truly said, professionals need to learn potential skills especially in terms of data services skills. According to Khurshid, JianMing and Muhammad (2019), technological skills is important in order to manage metadata received and obtained by organizations. This skill can be developed through the participation of accelerated courses and workshops. Some organizations may send their expertise to any training outside of the organizations.

Apart from that, according to Philip (2018), computer and technological skills are very important in order to handle the arrival of Big Data in organizations. Some basic skills are being mastered through experience beforehand. Those are the common skills needed by all professionals and expertise in any types of organizations to be prepared on any arrival of changes in the emergence of technology in organizations.

In addition, according to Koman and Kundrikova (2019), the experts must have a lot of skills related to Big Data implementation as they are the ones who are responsible in managing the Big Data. Other than those skills, analytical skills are also important as Big Data has relation with that skills.

User Acceptance

Any implementation or changes made by organizations must be testified with the acceptance from the users. For example, academic libraries have their own users which are students and lecturers. Those people are the one who will declare whether the implementation gives benefits or the other way round. According to Juan-Pedro, Cabrera-Sanchez, Villarejo-Ramos, & F., (2019), the users may find the changes risky and troubling them, but in the meantime after a lot of updating they will find it at ease for them especially for information retrieval.

Furthermore, according to Philip (2018), users can search for queries easily after the Big Data has been implemented. They can also find and search for materials only with just a click as an example of academic library users. Apart from that, Koman and Kundrikova (2016) stated that the knowledge that is being processed by the Big Data can allow users for easy retrieval of information. This may help a lot in order to have such a crucial methods of information retrieval.

Decision making of Big Data in organization

Decision making is the act of making selection between alternatives and options about a certain important issue in order to reach a solution. It presents in daily life and being practiced before making a choice that is being called decision. It is formally known as a complex process which includes collection of evaluation, judgement and intervention towards certain issues (Tiffen, Corbridge & Slimmer, 2014). Decision making varies from several types including programmed and non-programmed decision, operational and strategic decision, organizational and personal decision, and lastly individual and group decision. These types of decision making can help in guiding organizations to make decision regarding the issues embark on particular tasks (G., n.d.). In addition, decision making in Big Data is factored by the governance, quality, knowledge exchange and infrastructure. Governance authority allows the making of agreements between organizations and providers to fully utilize the usage of Big Data in organizations in terms of building trusts and processing data especially when it comes to data management.

Stated by Janssen, Voort, & Wahyudi (2016), another factor is the quality of data must be excellent and relatable before conducting any decision making processes due to the lack of attaining complete data and information. With enough information and data, decision making can be made according to vulnerable issues and strong reasons to solving issues.

Next, the factor is knowledge exchange between the respective users to manage the data to be used correctly. Data must be interpreted to find patterns and understand the flow of information to conduct a step-by-step process to solve issues. Data and knowledge must be transferred from one another to perform activities related to

decision making and problem solving to maximize the implementation of Big Data (Janssen, Voort, & Wahyudi, 2016).

Last but not least, infrastructure is also relevant in assuming as one of the factors of decision making in Big Data. A conducive infrastructure which are ergonomic and user friendly is very important and gives benefits to the users to solve issues in an orderly manner comfortably. The use of system is also an advantage apart from conducting manual work which gives effect on a long duration to achieve.

3 Materials and Methods

The research design gives guidance to the planning, discovery and analysis of this research. This study is conducted using quantitative method by distributing questionnaires survey to respected respondents. This study focus on Big Data readiness to measure how far an organization has reached to the extent of implementing Big Data in it. Several data needed in this study includes the information on knowledge, skills and user acceptance toward Big Data decision making which are then being inserted in the survey later. The information will then be analysed accordingly to meet expectations. The research questions conducted before were to match with the current situation that happens in organization related to Big Data. The survey conducted will then be measured accordingly to the scale given and being analysed appropriately.

Population and sampling procedure

The target population in this study was the individuals who have close relation and management of Big Data. This includes the people working in organizations or studying in institutions. The organizations must be from various sectors such as institutions, government, private and government-linked companies. The target was chosen from various age range from 18 years old and above. The positions or levels of respondents include administration, human resource, executive, manager, officer and educator. According to Stewart (1989), target population must be focused to have and obtain more accurate results which varies from commentary and critique from respondents. This must be investigated to gain mutual cooperation between researcher and respondent. The pattern of spreading the survey must be planned to ensure the target population can be obtained. The target population mostly covered those who are working in organizations that have Big Data pattern in it.

Survey administration and data collection

In order to reach the ability of questioning about the readiness of Big Data, the respondents' understanding will be measured according to the answer given based on the questions. Their responds show the strength and capability of certain organizations to conduct Big Data. By receiving the complete responds from the respondents, the survey instruments can be measured in relation with the background of the respondents in terms of organization's sector.

Table 1. Survey description.

CATEGORY	DESCRIPTION
Data	Data is the component in Big Data that determines the successfulness of the implementation depending on other elements included in this study. Several types of data include structured and unstructured data which can be obtained from various sources such as internal and external in organizations.
Knowledge	Knowledge resembles the knowledge of users towards Big Data in terms of application and existence as well as common view they have towards the understanding Big Data in organizations.
Skills	Skills refer to the technical application of users towards the management and handling of Big Data. This include the common dealing with technological equipment and system as well as the facilities present towards the implementation of Big Data.

4 Conclusion

The aim of this study is to investigate the readiness of Big Data implementation in organizations and it can be seen from the aspects of knowledge, skills and user acceptance. These aspects are important to measure the relevancy of Big Data if it is being applied for the use of decision making in organizations. All the elements being measured in the recent survey questionnaire. When it comes to the target population, according to Stewart (1989), target population must be focused to have and obtain more accurate results which varies from commentary and critique from respondents.

In terms of organizational readiness, Big Data implementation shows a significant change on how the organizations react to the existence. First of all, organizations are equipped with complete facilities such as technological equipment, Internet of Things and software to undergo performance regarding Big Data. This help in easing the tasks given throughout the implementation. Technological department must also be ready towards any additional software to be inserted to further implement the Big Data (Harris, 2018).

Furthermore, the amount expertise in some organizations are less in which some of the employees have to do multiple tasks or workloads. The result of having lack of

expertise may lead to the dysfunction of technological equipment due to lack of monitoring. Having enough expertise leads to a successful business leader that manage the Big Data implementation and can be used as a guidance to others (Dubey & Gunasekaran, 2015).

All in all, Big Data in very beneficial to organizations. It has the potential to bring organizations further forward. It is parallel with the emergence and development of technology. The integration of Big Data really gives positive outcomes to organizations to perform data mining and modelling as these help in the development of sectors (Razaee & Wang, 2019).

Big Data has influenced several other factors such as manufacturing, education, architecture and others. Thus, deep understanding must be mastered by the employees to ease the tasks and retrieval of information. This can shorten the time as well as giving faster services when it comes to relation with customers. Organizations have capabilities in dealing with the readiness and design (Popovic, Hackney, Tassabehji & Castelli, 2016).

The challenges of Big Data are common and those are actually increasing the productivity to become more develop in terms of organizational management. Knowledge and economy are closely related to each other and mutually related to enhance the performances and development of the organizations (Torre et al., 2018).

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