NG-IoT Challenges and Solution

Issues and Challenges of Big Data in Information Management
New technology comes with uncertainty as it may not be understood well by all organizations
especially during its early introduction, adoption, and implementation. Big data is not an exceptional.
Organizations lack of information and understanding on the fundamental of big data such as what is
actually is, the benefits, and the infrastructure requirements.
Uncertainties are the outcome from
unknown opportunities, challenges and emerging risks. While opportunities create new values, risks
create threats to the organization.

Lack of Business Sponsorship and Management's Support
When introducing any new technology in the organization, it is important to obtain top
management's buy-in. This is very essential if it involves changes in the organizational culture and
structure as well as amount of time and money to invest. Hence, big data as any new technology
needs support from top management and stakeholders. Since investing on big data wisely would give
organizations competitive advantage, top management should have the vision to see the impact of
big data in the organization's future. Big data is not only a technology, but it involves innovation,

cultural change, analytical mindset and new skillset. It also requires more effort to educate people
on how to treat the data.

Data Privacy and Security
Organizations benefit from many conveniences and breakthroughs due to Big Data-powered
applications and services. However, one of the most sensitive issues that organizations feel reluctant
to adopt big data is privacy. It involves the disclosure of personal and sensitive information to people
who should not have access to it, whether it is done intentionally or mistakenly. Privacy breaches
occur when there are insufficient security measures in place. Safety and diversity can be
compromised with the absence of privacy. Since most of the data in the data sets are important, it
should be a top priority for organizations to secure the data from security breaches as it may cause
serious privacy concerns and safety of employees and customers could be compromised.

Data Discrimination
Tapping into big data can make discrimination more prevalent. While Big Data helps businesses
become better marketers and service providers, as well as making consumers accept that they are
being analysed in detail hence their better experience, it makes them feel discriminated. The ability
to access electronic information on users' behaviour on Internet activities and preferences could
negatively affect a person's opportunity, such as on his or her bank loan application without giving a

chance for him or her to justify or defend himself or herself. It is unfair and not acceptable to discriminate against people based on data that organizations have collected on peoples' lives.
Therefore, decisions should not be made solely out of electronic data, especially those that have an adverse impact on someone.

Inaccurate and Incomplete Data
Big data is meaningless unless it is used for improved decision-making. For that, organizations must take necessary actions to manage data such as data acquisition, extraction and recording, data cleansing, data integration and aggregation, as well as data representation and analytics including modelling, analysis and interpretations. Data that will be used to analyse comes from diverse sources and of different formats. It may contain wrong information, duplication and contradictions. It is unlikely that data of extremely inferior quality can bring any useful insights or promising opportunities to organization's precision-demanding business tasks. Carefully structured data is essential for efficient and accurate data analysis. Incomplete data can lead to incorrect data analysis resulting in poor result, judgement and decision. Data cleansing or data scrubbing involves inconsistent data, data derived from heterogeneous sources, and data that are not up-to-date or

obsolete. Data needs to be cleansed to be ready for contemporary use and available for discovery and reuse.

Data Availability and Accessibility

This is referring to data being available and accessible much larger and faster in real time and across various industries. This huge amount of data need to be processed and analysed, and the tasks could be time-consuming as it takes longer time to analyse. In this fast moving world, results of the analysis are demanded almost immediately.

Organizations need to have information from different resources. There may be cases when organizations do not have sufficient data to do the analytics and would probably seek or buy data from third-parties that may or may not want to share the data. It is difficult to consider that big data analytics always gives correct results as erroneous data could generate inaccurate results resulting in misleading decision-making.

Interpretations can become an Ethical Issue

A significant share of big data is generated from people's perception, intentions, and desires. The purpose of analysing big data is to help organizations to make decisions. However, relying on electronic data alone without much concern on its impact to people or the environment, can lead to ethical issues. Organizations must be careful when making conclusion and judgment about what the data conveys. This is because perception, intentions, and desires can change rapidly. They must learn that decisions should always be based on how it will affect everyone involved, and not only from the numbers and information shown on papers.

Other ethical issues when handling big data could also include issues of identity, privacy, ownership,
and reputation. Intellectual property right issues also arise during the collection, storage, sharing,
and processing of big data. Veracity is closely related to trust issues. All these ethical considerations
are related to one another. The situation is even more sensitive when it has to do with personal and
confidential data such as medical and financial records. From the process of big data cleansing up to
analysis, the privacy may be threatened due to the exposure of this information to unauthorized
parties.

Decision making about adopting new technologies can often take a long time or to due to
necessary process to be followed including levels of approvals. It can also be confusing to choose big
data technologies on the market. Choosing a technology itself can be time consuming and it evolves
to fast making organizations hard to keep abreast with the latest technologies and trends, resulting
in poor decision making even from the beginning of choosing a product or solution to help them with
actual issues with big data management.

Big data, being fast data, if its relevance can be obtained, quickly analysed, planned and applied
them back into operational systems, then it can affect events as they are still unfolding. The ability to

make fast and right decisions are very important too. Data management for computation may be a challenge and will require major investment in information and communication technology.

Lack of Skill Set

As new technologies become available in the market, new skillset are demanded. Accurate and actionable data mining and analysis, particularly in real-time, requires extensive technical skills. It would be a great challenge for organizations to find skilled data analysts to make use of the organizations' data. Although data analysts were always being needed in the organizations, the required analytics skills are different with big data. Organizations need to form a common data analyst team either to equip existing staff with the right skillset by ending them to trainings and obtain necessary certifications, or source out for new employees who are specialized in big data as they can understand data from a scientific perspective, the business and its customers, relate their data findings and apply directly to them. Besides the critical analytical skills, they need to be close to products and processes within organizations.

Scale

Organizations are required to reconsider about the design, build and operate data processing components to meet data volumes scale that is scaling faster than computer resources. Furthermore, as the technology now is moving towards cloud computing, sharing of resources on expensive and

large clusters requires new methods to execute data processing jobs to achieve the objectives of
workload in a cost effective manner as well as to face with system failures and could adversely impact
data processing and recovery methods.

Big investment
There is no denying that the adoption of requires a big investment. Some of the major investment
will be on the location of storage whether it is on-premise or on cloud, cost of new hardware, and
anticipate future expansions to cater the growth of big data, and ths again includes on hardware,
software, maintenance, subscription, and people to manage.

Storage, Sharing, Transfer
Location to store the big data is another great issue that organizations are dealing with. New storage
models are in the form of elastic web services with petabytescale data warehouses and have
limitation to keep low input/output latency from large data repositories. It is hard to avoid increased
latency while handling high-volume data acquisitions and supporting a variety of mixed data
structures.

Different Expectation from Different Audience
Data analysis and results may be time-sensitive, while the accuracy depend on the target audience
who may have different objectives out of the information, such as a team looking for trend analysis,

another team looking for profit and there may be other teams expecting different information that
they can use to make other decision for the business. Latency must be taken into consideration as
mass user behaviour with respect to real-life events demands a desired output. As much as the
analysis can help, it can also be a big challenge for the data analysts to cater all expectations from the
management and different groups of users.

Solutions for Big Data in Management
In managing big data, there are three element involved which is people, process and technology.
Every organization generated and use large amount of data and information in the organization
environment and the requirement of processing, sharing, storing, securing and displaying
information give emphasis to the vital role that information plays in achieving success. People or
leader in the organization have on accurate, relevant and timely information to make data driven
decisions regarding the current and future goals of the organization. The fact that information is
without any doubt is not only a valuable corporate asset but the difference between a successful and
unsuccessful organization. Implementing a successful solution for organization management on
information in today's environment requires a complete understanding of the organization and the
three element which is people, process and technology.

In this sense, these three element should be considered as the solution for demanding management

of big data in the organization. To improve competitive advantage and decision-making, an organization must consider information as the fundamental key to manage the whole organization.

In the information and digital era, information has become an asset necessary for business survival.

O'Brien and Marakas (2013) argue that there are three key in information systems which are: 1) supporting processes and operations, 2) supporting decision making by agents of the organization, and 3) supporting strategies for competitive advantage. Basic requirements need to collaborate decision-making and information systems such as the sources of support given, frequency and form of information presented, information format and method used in processing the information.

Big data is considered as an important tool to generate fundamental input to decision-making and competitive advantage. Every leader and manager in any organization want all of their action and decisions is based on accurate and precise information. Therefore, big data analytics is the best solution that distils terabytes of low-value data, transforming them into a single bit of high-value

data. Big data management has the ability to generate information from a single bit of high-value data that present different structures. And, for as the solution to data management of big data, three element mentioned earlier can assist helps the environment where big data is identified. Therefore, the three elements for managing big data are discussed as follows.

People element – in big data management, it is a new trend use in organization, people involved
must be prepared with new skills to process the data. Therefore, this people need to have skill to
understand and to work with the large amount and different type of data. The skill also not restricted
to those who manage data process related with big data technology but also to the people who act
as the decision maker as they need to view those large amount of data to gain the needed information
for making important decisions in the organizational and cultural changes.

There are a few titles given to people dedicated with big data management and positions as such
Data Analyst, Data Architect, BI Manager and Data Scientist which is really related with big data. The
demand on professionals with the data-savvy know-how to analyse big data to make effective
decisions is really high in the current global technology and business environment. However, big data
capability does not remove human factor. We know the most important aspects of big data is the
outcome of reports on how decisions are made and who are in charge to make them. Therefore, the
capability of managing big data technologically is not correlate with the ability big data gives to the
decision maker. People who manage big data in the organization must be seen as the valuable
element that give the organization competitive advantage.

Process element –process related to the actions performed in the technological environment. For

instance, some process in the technological environment use specific tools and techniques to ensure
the business process work properly and it also responsible to generate the data as well as to use them
precisely and accurately. However, in big data management, process can be interrelated because it
is essential that they simultaneously perform the activities and process and technical activities
related to the business.

Technology element – several technologies and techniques are considered in big data management
and it is started from collecting, storing, processing and analysing data. After the trend of big data
existed in the technological environment, many technologies and techniques have been developed
and it capability to the analysis that is important in big data performance. For examples of the
techniques used are as follows:

- Data mining – technique used to extract patterns from large amounts of data by combining statistical methods and machine learning data management.
- Machine learning – the technique used artificial intelligence principles and concerns the development of algorithms for recognising complex patterns in large volumes of data and propose intelligent decisions.

Technologies that related to big data environment which include:

- Hadoop – distributed framework in processing large volumes of data in distributed systems.
- MapReduce – software framework introduced by Google company to process huge volumes of data.
- [illegible] refers to a combination of software and to computational resources sometimes configured as distributed systems to provide services through digital networks.

Solutions for Business Challenge

In competitive business environment, every organization must utilize the information and manage
and process the data in hand to generate a good business activities and better management of the
resources. There are six factors of performance management where big data would improve
considers by Cokins (2015):

1. Strategic planning and execution

Strategic planning is the fundamental process in an organization in defining the strategy, direction
and decision making by utilising the data and resources. The organization will develop a strategy map
and balance scorecard. By using this two, they set the navigation to fulfil the mission and vision
strategy. Key performance indicator (KPI) will be outline based on the analysed big data that helps
the organization to do better planning and can forecast the trends of their business.

2. Cost visibility and driver behaviour

With the help of big data, profitability analysis can be process to analyst organization activity-based
costing principles by modelling cause-and-effect relationship established on business and cost
drivers. This involved the use of technique and technology of big data not the conventional and
traditional managerial accounting (Cokins, 2015).

3. Customer intelligence

Customer intelligence is about generating information regarding customers where powerful

marketing and sales can be analysed to find out trends and preferences of the customers. In the organization customers' information consist of large volume of data and with big data, business analytics can help the organization to create more profit from the customers. The most used tools are Customer Relationship Management (CRM) software application for this purpose.

4. Forecasting, planning and predictive analytics

Business Intelligence and data mining generated data to help the organization to forecast the future volume of data and information from many variables such as, future workers need and budgeting level for resources spending can be manage and calculated to help the organization to give accurate and timely data in organization strategy and planning. Using big data analytics it is possible and help the management of organization to predict the best scenario or business activities in future.

5. Enterprise Risk Management (ERM)

Enterprise Risk Management is a process of planning, organising, leading and controlling the activities in the organization to minimise the risk and increase opportunities on the organization resources and earning. Big data analytic help the management in organization to understand risk and plan on how to reduce risk and also evaluate the opportunities that relevant with the mission and vision of the organization.

6. Process improvement

Using big data analytic, the organization can improve their business process in order to reduce or remove long process that will affect the cost and to accelerate the process to increase the productivity of their business and also will raise the organization personnel as their skills and competence can be use efficiently.