How big data analytics affect management control in Indonesian companies

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Abstract: Big data is a new technology that is able to display pattern analysis and connections in data that can only be created by using big data, while management control cannot be separated from the role of supporting data, without which the control does not have a strong foundation and can influence the main objectives of management control. This study aims to investigate the role of big data in management control, such as what insight the organization knows about big data and how it is treated and whether big data influences management control over the organization. This study using qualitative research on research methodology. The data collection technique is conducted by interviewing two people representing an organization and carried out to three organizations in Indonesia. The result of this study, Although the organization recognizes the greatness of big data especially for proper management control, it is constrained by the large costs of collecting and processing big data, which exceeds the core operating costs of their business, and they are not ready for big data processing because they are faced with special expertise needs in running big data that they don’t already have.

1. Introduction  
IT applications have increased dramatically in recent years. This development makes it easy for organizations to develop in the field of information technology. Many organizations today invest in various forms of information technology and information systems by having various benefits. However, despite having various benefits, this information technology also leads to new challenges that must be faced by organizations [1-2].

Big data comes out as an alternative technology that offers many advantages that can be used for organizations. Big data is able to display pattern analysis and connections in data that can only be created by using big data. This analysis can produce the right decisions with comprehensive supporting data. Big data also produces analyzes that can be used by organizations to optimize their business processes [3-5].

Management control cannot be separated from the role of supporting data, without which the control does not have a strong foundation and can influence the main objectives of management control. With all of its advantages, Big data is challenged whether it enables to influence of management control so that it runs strongly and meets the main objectives of the organization. Apart from how big data is reviewed in the shared literature on idiosyncrasy and theories of greatness, big data also has challenges for organizations that use it [6–10].
Because of the above, this study tries to investigate the role of big data in organizational management control, how the organization has insight and treatment of big data, and whether big data is able to influence management control.

2. Theoretical Framework

2.1. Information Technology (IT).
The development of Information Technology (IT) has enabled organizations to improve existing data processing systems so as to bring up new information technology to new technology. With increasing reliability and speed in transactions and data. Today's IT can also increase the speed of communication and internal processes of an organization [1,12].

The emergence of Big Data signifies the development of new technologies from IT. Big Data is able to change the pattern of how data is collected and distributed. Then this research will look at how the possibility of the influence of new Information Technology and new Technology can affect control and management control systems [4,10,13].

2.2. Management Control.
Management control refers to applying an effective tool to ensure that employee's work complies with certain level agreement. Management control addresses behavioral problems and directs them in the desired direction. Management control also plays effective roles that govern organizational goals [14,15].

In the literature, management control has a different approach, depending on the formalization of each organization, this formalization has a different effect too because big data can develop or not in an organization. Therefore, this study aims to see how organizations understand big data and use it in management control [6,7,16].

2.3. Big Data
Big Data as a very innovative new technology on IT that occurs because of the extraordinary development of information technology. With IT now allows the use of big data because it is capable of handling the availability and accessibility of data. Organizations can make in-depth measurements and comprehensive analysis involving the use of big data, thus helping organizations to make decisions quickly and have a strong foundation [3,5,17].

Big data requires special and unique storage and requires sophisticated analysis that can visualize the results of the analysis. Big data collection also cannot be done manually, new data collection management tools are needed that support the collection of data from a variety of sources that are numerous, detailed and fast. That is why Big Data has 4 important aspects. Volume, how many big data can be collected. Variation, how much variation in the data. Velocity by how fast big data can be collected. As well as Veracity, correctness in the data collected. These aspects, in some of the literature added aspects of Value, namely whether the data collected is valuable to the organization [1,5,11,18–26].

3. Research Method
This study using qualitative research on research methodology. Data collection in this study was conducted by interviewing two people representing an organization and carried out to three organizations in Indonesia. By conducting interviews with different organizations, to see similarities between organizations and examine where differences are substantially occurring in the organization.

The organizations interviewed are companies that are in Indonesia with different business industries, the equation of the three is companies that have a big data system or process or store data. Although this company has a different business industry, the questions asked at the interview will be the same and not differentiated. Interviews are conducted in a face-to-face manner directly because face-to-face interviews are one method for collecting qualitative data. The purpose of this interview is to get opinions
and perceptions from the people interviewed and in detail can describe the current condition of the company. All interviewees must agree that the results of their interviews will be processed and published even though the names of the people interviewed and companies that are the object of data collection will not be specifically mentioned in this study.

After interviews, interview records were transcribed to analyze the data. To simplify analyzing the data, the interview questions were divided into 4 dimensions. The first dimension is general questions, with indicators of data usage, changes and thoughts on big data, this dimension to see the similarity of views on these organizations. The second dimension is the advantage of using big data, with profit indicators based on literature, possible losses, and future profits. The third dimension is the challenge of big data, with technological, managerial and other indicators. In addition, the fourth dimension, namely the last dimension is enabling control / coercive control with internal transparency indicators, global transparency, flexibility, and repair, to find out what type of control there is in the organization. [27].

To increase the reliability and validity of this study, the people interviewed were informed that all research results would be processed anonymously. The name of the company, the name of the person interviewed, or other specific information is not mentioned. Reliability is also enhanced by interview questions that use dimensions and indicators as mentioned before. Validity is checked by the question of whether the interviewer has the right to work in relation to the topic of the interview and his experience while working, so the interviewer can really measure and explain what he wants to be measured. Validity is also enhanced by the way the questionnaire is sent to the person interviewed before conducting the interview, so the interviewee can prepare himself and the data he has to answer these questions.

4 Discussion and Result

In this study, interviews were conducted with 6 employees from 3 different companies in their line of business. Interview questions are divided into 4 parts, in the first part questions about general discussion about where the company data is collected, in the second part questions about increasing companies in the use of data, the third part, questions focus on the challenges and problems that will or are facing companies in the use of big data, and the fourth part of the interview explores the changes that occurred in management control before and after involving data.

The results of the interviews examine the current ERP system has a gap with the needs of data and information processing. The ERP expectation shows that ERP documentation has not been fully recorded in the details. Company Z observes that it is business processes are related to data and information and use big data, but the analysis conducted is still manual and the data sources are not diverse, and data usage is not all digital, both files, documents, databases, and reports. Company Y, despite realizing that the direction of data usage has been directed towards digital and information technology, the data used is more likely to follow data sources and do not yet know how to process data for the next company's benefit.

4.1. Interest in Big Data
The three companies are indicated to be interested in developing big data. They support innovation with the existing era: "So far the company continues to support the existing innovations because innovation is part of the value of the company." (Company Z). Even though big data is not really their main business process, they realize that collecting big data and running data projects in their company will be able to produce something that can change the organization and achieve better organizational goals.

4.2. Data Trends
At company Z, data is a business process, but the data stored is not yet fully analyzed. Data which is used to be only as an archive now as an ingredient in analyzing: "Once the data used to be only as notes and archives, if there are new obstacles in the trace there are obstacles where, data is very much needed, especially integrated with each other, as an analysis in financial statements and making decisions" (Company Z). Even so, Company Y, which focuses its business more on services, considers that there
will be significant developments in data utilization for companies because the data is generated fully following parties outside the company such as service rates, financial reports, and tax reports. they still prepare infrastructure in digital data processing because of the trend of digitalization that is ready in the present.

4.3. Future Improvement
Even though the companies interviewed have different fields of business, there is one thing in common in data processing, namely the shift in patterns of data processing that used to be manual, written or printed onto paper shifted to all-digital. Because they understand that it's time for all the data that drives their business to be stored and processed to digital. That way they can develop it in the future for competence and data when it has become all-digital, the benefits in the future will be diverse and unlimited. Another possibility is collected into a single big data unit which is then processed in such a way as to be useful in making decisions related to operational, business processes to management control.

4.4. Improvements for Management
The three companies realize that there is a need to improve managerially, one of which is the processing of report data so that they can display uniformity and anomaly patterns, so that management can determine its future attitude. "Data acts as information in terms of production, especially from the delay time of existing production, if there are inhibited production findings it can be investigated for what production is hampered." (Company T)

4.5. Improvements for Business Process
In interviews conducted by the three companies, there are also similarities found in business processes, namely there are many different systems in their business processes and are not connected to each other, produce different data and process different data, which is actually when the system combined will cut some processes that do not need or can bring up something new for business processes. When communication increases through better data availability, organizations can act faster on data from other entities. "In terms of production, the data received, especially production can be used as an analysis in the delivery time of products ordered so that they can directly optimize the existing process." (Company T)

4.6. Improvements for Customers
Customers enable to acquire the benefits of data, this was stated by the three companies. "In terms of existing data production, especially production can help customers see the production progress of their orders." (Company T). "Data can be beneficial to customers if it is feedback from customers" (Company Y), "Survey results from customers become input data for process development" (Company Z). Although the data and processing between the three companies are different, there are similarities, namely improvements for customers and if big data is used, then the development in the use of data makes it possible to further improve and advance business processes as expected by customers.

4.7. Problems that arise in the use of big data
The Big Data application, although it is likely to solve several problems, is also likely to lead to new problems, such as the concerns expressed by the companies interviewed in this study. The problems that arise are the unpreparedness of the existing system, the issue of mistrust and skepticism as well as the losses which might appear if they fail to run big data.

4.8. Managerial issues
From the interviews, issues related to management, namely the system requirements that exist today, have not been centralized and well-distributed data, because there is still a lot of data stored by each
department in Excel: "For production systems using Excel and still manual, software that can record all existing production transaction history." (Company T).

Even so, the three companies interviewed considered management to support in the direction of the development of data processing and the use of technology. Company Y does not oblige but frees employees in increasing the use of data as long as they can use existing facilities and do not require companies to pay for it, while company Z frees employees in utilizing data and is willing to pay as long as it has been budgeted for before.

4.9. Management Control in preparing big data
The study results indicate that the data shifted from mere note-taking and reminders in business processes to become one of the critical instruments in business processes, thus making companies aware of the importance of making changes in managerial control, one of which is by studying the implementation of big data. Concrete actions taken are shifting patterns of data storage and processing to all-digital and increasing employee knowledge regarding data utilization, involving employees by recording employee insights and ideas. Company T, for example, gives employees the freedom to attend seminars and training to learn new things that have a good impact on the organization. Likewise, companies Y and Z, although they do not ask employees to develop data processing, still provide facilities if anyone is interested.

5. Conclusion
This study aims to gain further insight into how the influence of big data on management control uses a qualitative research approach. The existing literature is still largely focused on theory and also the advantages and positive aspects of big data. The challenges that organizations must face in using big data must also be seen and taken into account. From the results of this study, it can be concluded that the expected impact of big data in influencing management control is not achieved. Another conclusion is that the organizations interviewed in this study have not been able to apply big data in their organizations due to the lack of resources they have. These three organizations know the development and use of big data, especially in the face of the Industrial Revolution 4.0, they are aware that if they do not keep up with developments it can have a bad effect on the organization. Although the organization recognizes the greatness of big data especially for proper management control, it is constrained by the large costs of collecting and processing big data, which exceeds the core operating costs of their business, and they are not ready to process large data because they are faced with the need for special expertise in running big data that they don't yet have.

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