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Metamorphosis archivist in the Industrial Age 4.0: A challenge in the face of digital revolution

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Paper Type:

Research Paper

Abstract

Background of the study: Development of information and communication technology (ICT)

Purpose: This research analyzes that using Internet technology of things (IOT), for example in managing large archive-based computing can help archivists to master the technology used in the Industry 4.0.

Method: The author uses the method of hermeneutics Ricoeur (Hermeneutics Phenomenology). Hermeneutics method that seeks to bring interpreters at a better understanding of themselves through the activity of which is known as an appropriation. In this hermeneutic, activity is not a dichotomy between the subjective dimension of the subject and the object objectivity.

Activities interpret these methodological least cover four categories, namely: objectivation through the structure, distances through writing, distances through the world of the text, and appropriation (or sense of self).

Findings: As archivists need to consider the possibility that our jobs become more technical and complex if it wants to stay in the Industry 4.0. As an experienced in archival work, the author himself is still difficult to imagine what it might be like if the archival work associated with the field of biotechnology and nanotechnology as the convergence of these two areas are the development of the field of archives is not too obvious. However, considering that ICT is still the main technology, the authors will be focused in this area just by paying attention to the ongoing trend in this field in relation to archiving.

Conclusion: The constancy of this profession will depend on his response to the growing challenges of the digital world and the adaptation of professionalism does.

Keywords: *archiveist, industry 4.0, industrial revolution*

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Introduction

The information revolution has changed the face of the world so much so quickly and in a scope never been touched before. This revolution has been moving the world and its inhabitants live in an atmosphere full of information and wrestle in the information life cycle. Everyday information is created, processed, managed, and utilized as a cycle in connection with human activity in the world. The world of human life into the world surrounded and constructed with information. Information has become an integral part of human life and color. Fully human life has been mediated by information and they cannot live without information. Information has transformed the world of human relationships and human relationships with people both in the context of the individual and society. Therefore,

Information in this context by Luciano Floridi (2013) not only understood as epistemic thing only. However, much more extensive as the ontological. That is, information is no longer associated only entities that make up the human knowledge or who are familiar with the term semantic information (information about reality). However, the information itself as a reality (information as reality), information as Ada (information as Being). Thus, a discussion of information changing very radically and at the same time, forcing us to change the way we think, act, and relate to information. Flouride (2013) refers to this phenomenon as redefining ontology, re-ontologization.

Information quantity then grows in tandem with the acceleration of technological advances that occurred in the last decade. Furthermore, technological advances have succeeded in presenting a new, more advanced technologies and modern. A technology that challenges reason and the ratio of human to rethink the world and himself. A technology that is built up due to the high intensity and seriousness in developing research in particular areas: nanotechnology, biotechnology, information technology and cognitive science (NBIC). The progress of this confronts us with the question of the future of mankind. Therefore, the development of NBIC fields has been able to bring the entities with intelligence embedded into it, the artificial intelligence (artificial intelligence / AI). The emergence of AI and then challenges us to think about and be aware of the meaning of human existence and superiority objects in front of its own making. Of course the fear and concern of ours is that we as a 'creator' would not be able to control the objects of his creation. This is further reassured when we see a number of spectacle in the world of science fiction.

More recently, we snapped by at least by three important events that can be called to represent important advances in the field of NBIC. First, a robot 'woman' named Sophia draft US scientist, David Hanson, for the first time officially became a citizen (Weisberger, 2017). The existence of this artificial intelligence robot obviously shocked and at the same time we are aware of, and raises the question, whether it is the product of artificial intelligence has been able to match the superiority and primacy of man so that an intelligent artifact lift this country as citizens? That is, most people believe that this artifact in the future will totally replace the human role in the world? It is clear to the government of Saudi Arabia is not simply acknowledging existence of this technology, but further named him as a citizen. This condition, of course, further increase the tension of our concerns the existence and progress of artificial intelligence in the future. A similar sentiment was felt by Stephen Hawking, one of the greatest physicists of this century, which states that artificial intelligence will bring disaster to mankind. (Cellan-Jones, 2014).

Second, the Russian President, Vladimir Putin some time ago proclaimed the advent of super-human. According to him, the soldiers formed from genetically modified super humans are a bunch of warriors who do not have the feeling of trepidation, compassion, regret and pain. (Shivali, 2017)

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Third, Facebook through Facebook an Artificial Intelligence Research to develop artificial intelligence robot with the ability to mimic human negotiation process in the process of sale, purchase or barter goods. However, the company then shuts robot AI research that is being developed, because they saw the danger that will appear later with this AI. AI Robot what they are being developed are able to communicate in a language that is not understood by their programmer (Robertson, 2017).

Seeing this, we deserve to be vigilant and try to think seriously about the potential for damage and destruction caused by the existence of this smart technology. Perhaps this view is far-fetched Ngada and prone to exaggeration, but the same thing was also told by the CEO of Tesla and SpaceX, Elon Musk that we should be aware of the development of artificial intelligence that analogous as the business' calling Satan "and should focus more attention on AI development than the North Korean nuclear standoff. According to him, global competition in the development of artificial intelligence potential Third World War (Browne, 2017).

The third phenomenon clearly gives us that advances in science and technology, especially in the field of NBIC, the future will be increasingly difficult to predict the impact, potential to cause uncertainty and may be a negative impact on human life. This is our homework together to collectively think about, anticipate and prevent the destruction of human life. In fact, the evolution of ICT that occurred directed towards reducing human intervention in everyday life.

However, Mark Coeckelbergh (2010) clearly see this issue and put forward his view that the presence of artificial intelligence for the moment not to end in on replacing humans by AI (replacement). According to him, this artificial intelligence will only compliment her human ability will give better success. This condition is expressed by Coecelbergh as applicability.

Precautions for treating AI technology that will be used as part of human life have been undertaken by the world community. High-level Expert Group on Artificial Intelligence (AI HLEG) has even managed to put together a guide in connection with efforts to develop an AI that brings benefit to mankind. There are at least three things highlighted by AI HLEG in the guide: [1] guarantee attempt to maximize profits with the presence of AI and also at the same time minimizing the risks of it; [2] ensures that the development and utilization of AI must be on the right track through an approach centered on the human (a human-centric approach) where AI should not only serve as a means (means), but as a goal to improve human well-being (human well-being); and [3] establish trustworthiness (trustworthy) to AI, because people can be fully confident and reap more benefits if he believes the technology. (European Commission, 2018).

In addition, a group of people in Europe who call themselves Atomium European Institute for Science, Media and Democracy (Atomium EISMD) develop a forum named AI4People. The Forum is built in order to create an open discussion space to lay the foundations that contain principles, policies and practices in building "Good AI Society". There are at least three important things are highlighted as the outcome of the forum, namely: [1] the opportunities and risks of AI technology uphold the dignity and human growth; [2] 5 principles that support the adoption of AI technology; and [3] 20 recommendations for stakeholders to be able to take advantage of opportunities, minimize and offset the risk and respect the principles that can build Good AI Society. (Floridi, 2018) It is clear that the emergence of intelligent agency has built a man's consciousness of the potential benefits and risks at the same time both of which cannot be predicted from the beginning of time created. Therefore, efforts to do is minimize the risk acceptable because the existence of the human race AI.

In a narrower context, this situation clearly requires us to think seriously about the impact of information and digital revolution is happening, especially the direct implication of fields and

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professions that we wrestled. Critical reflection on this phenomenon is expected to provide guidance and practical solutions to be able to interpret the archival profession and continually adapt to the radical changes that occurred.

Method

To be able to reveal the discourse of the radical changes that occurred as a result of the evolution of ICT and the information revolution in professional archivists and how we should respond to this condition, the authors do a reading activity, the meaning and interpretation of the text / discourse. To that end, the author uses the method of hermeneutics Ricoeur (Hermeneutics Phenomenology). Hermeneutics method that seeks to bring interpreters at a better understanding of themselves through the activity of which is known as an appropriation. In this hermeneutic, activity is not a dichotomy between the subjective dimension of the subject and the object objectivity.

Activities interpret these methodological least cover four categories, namely: objectivation through the structure, distances through writing, distances through the world of the text, and appropriation (or sense of self).

Result and Discussion

The result and discussion : **A).** Archivist Challenges Amid swift Flow Changes. The role of an archivist in the development of today's digital world got a tremendous challenge. This challenge comes from ICT advances and other accompanying technologies that lead to professional archivists need to transform and align skills. Therefore, this new technology is predicted to be replacing the role of the archivist in archives management activities.

Changes due to the influence of ICT developments are of course properly responded to by archivists and archival world. Therefore, this intelligent technology, as echoed by many parties will replace the human role in job activity. However, the question naturally arises within us, whether this intelligent artifacts really can replace (replacement) the role of humans or they simply will replace most of the ability (replaceability) man alone?.

Various other questions of course, hovering in our minds because as a profession, of course, archivists equipped with specific competence and expertise learned and practiced over the years, which then adds to his expertise through experience (tacit knowledge) acquired. This experience so far has not been done by AI. The Senate (in Coeckelbergh, 2013) confirmed this that good work (good work) is a skilled job which includes physical and bodily involvement with technological artifacts. That is, a quality work left in office with physical practice that involves the body so it can provide direct touch experience that this then led to the tacit knowledge of the perpetrator.

In the field of archives, the use of AI in helping the management of the archive has been widely reported. National Archives in the UK utilizing AI, Discovery, to manage government files that include assessment, selection and review of the sensitivity of the archive. More recently, Gregory Rolan (2018) reports the use of AI in helping to manage archives in several archives institutions in Australia, including the National Archives of Australia (NAA). According to him, we need to understand how the AI in supporting the process of managing archives.

Besides AI, other ICT progress can alter not only our thinking, but also on how we do our work after the ICT presence. Gordon E. Moore, cofounder of Intel Corp., predicted that the acceleration of the development of microprocessors will grow twofold or applies exponentially in the next microprocessor development, then it is conceivable that the resulting computational speed will be more outstanding performed. Of course, this results in the digital archive management activities are fully

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prepared to integrate into a computer system.

In addition to the incredible computing capacities, ICT also has pushed the technological advances of 640 KB of data storage on a floppy disk (floppy disk) to be 60 tb (hard disk) within a period of approximately 15 years. It enables storage of 4.4 trillion pages of paper, or about 1,320 trillion words, if we calculate that one page typed in Microsoft Word will consist of 300 words with a space of 1.5 and approximately 15 KB file size. Or, if it is converted into a 300-page volume of paper, then it will get the amount of approximately 14.7 billion printed books. (BagiTekno.net, 2018)

With the two technologies, the field of archives will be affected and unable to escape the schema changes generated by ICT. If we look further, the first effects produced in the pace of ICT developments are opening up the possibility of archive storage in very large quantities. The archive has been digitized and become very flexible electronic records to be stored and be retrievable in a variety of formats using relational database management systems (relational database management system) for their retention systems. We find models such filing in the service of the search engines such as Google or Bing.

The second impact is no less important is the related matter of sorting should be done by an archivist with large data (big data). Although it was submitted that the retention system has been using a pattern that is the relational database, was not easy also to establish relationships and to make it more effective data search. If the trace on the use Dewey decimal classification, then it will be relatively easy for grouping data book. However, in the case of grouping the archives, this will depend on the procedural groove in each institution. For example, records management in state institutions will use the scheme set ANRI, while archives in private institutions can follow the ISO as a standard pattern.

Two impact that has been raised is the main characteristic that would be faced by archivists on industry developments towards Industry 4.0. Why is that? This is because the characteristics of the Industry 4.0 will be more prominent in terms of maximizing the use of ICT in every line of work, including in-line archiving. A job that we have elaborated so far and has many years we wrestled be eroded if not pay attention to both the impact. Therefore, to better understand this matter in depth, you need to know in advance what is meant by Industry 4.0 it and what kind of trends developments in the sphere of industry. If we have to understand it, then we as an archivist needs to take a similar stance on this situation is something we need to discuss together. **B).** Industry 4.0 and Characteristics enclosing. Klaus Schwab (2016) states that the Industrial 4.0 has distinctive characteristics that can be identified primarily on the use of a complex of three main technologies, namely nanotechnology, ICT and biotechnology. This is in contrast to the characteristics of Industry 1.0 to 3.0 that use only one or two technologies just as the foundation of its development. For example, in the Industry 1.0, the main technology is the steam engine as a tool for the production process. In Industry 2.0, a major mainstay of electrical technology in order to create production become more massive. While in the Industry 3.0, the technology consists essentially of information technology and electronics that support the automation industry.

In addition to such characteristics, as a consequence of the ongoing industrial 4.0, there are three subjects affected will feel the changes directly, namely: business, government, and society. On the business side, there are four factors that need to be involved in this situation, namely: the expectations of the customer, product improvement, collaborative innovation, and organizational forms. On the government side, aspects that need to be observed is the ability to adapt to changes and generate the right policy for him. Meanwhile, on the side of society, Industry 4.0 will not only change what we do, but also has the potential to change who we are.

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Looking at the characteristics and consequences of the aforementioned, we as archivists need to consider the possibility that our jobs become more technical and complex if it wants to stay in the Industry 4.0. As an experienced in archival work, the author himself is still difficult to imagine what it might be like if the archival work associated with the field of biotechnology and nanotechnology as the convergence of these two areas are the development of the field of archives is not too obvious. However, considering that ICT is still the main technology, the authors will be focused in this area just by paying attention to the ongoing trend in this field in relation to archiving.

Meanwhile, with regard to the three subjects affected by the proposed Schwab, the authors noticed that the segment of the business will be very quick to adapt in this matter because of their institutional organization more flexible than government institutions. However, in this context, if the private institutions fail to adapt, it is certain that they will collapse in a very tight competition arena this. As for government institutions, they may be a little lucky because the government can only protect and support them if it has not been able to adapt. Nevertheless, the slow archival performance can be consequences and it will impact the overall performance of the government in making decisions as the data source for this can come from government archives that we manage. For the last subject, in the context of our discussion, of course, is our own as archivists. This has been alluded to in the introduction that we will face two major impacts in the work of archives. Furthermore, this matter will be discussed in a trend that will take place in the archival work in progress the progress of the braid with ICT. **C).** Trends in ICT-based Records Management. In relation to ICT-based records management, an analyst with Forrester Research, namely Cheryl McKinnon (2013), has made an interesting article on this matter. He said that the trend in ICT that will affect the management will consist of 5 points. First, the paradigm shift from the original recording management (records management) into governance information (information governance). On the first point, there are two things to be noted, namely (a) the previous digital (digital-first) and (b) exceed the record (beyond records) (McKinnon, 2013). At institutions that promote ICT as its basis, the previous digital into something very vital and archiving underlying working order. It will like people create digital works or documents first and then stored in printed form to be archived. Moving into the second record, because of the work based on ICT, recording is not merely one but will be repeatedly processed. It appears in the format file sharing (file sharing) documents owned by Google Docs for co-workers can quickly edit the same file so given access (McKinnon: 2013).

The second point of the trend noted McKinnon (2013) with respect to the new platform in the digital world called cloud computing (cloud computing) and social media (social media). Both types of platform digital world have made a statement of affairs and a file (file and declare) which was originally important in the management of traditional tape methods into something obsolete because it is not effective. In simple terms what is meant McKinnon in this matter is actually composed of three basic elements. The first element is when an institution wants to adopt cloud computing as part of an archiving strategy, they will be confronted with the old mindset that is based on the consideration that was due to the paper-based recording / early electronic format. This mindset is not wrong, but may be based on the consideration that the hard work must be done with the migration of printed documents to digital documents. In addition, as the second element, other considerations related to security issues, legal and privacy risks of archives that will be stored in the cloud computing format often impedes decision-archiving in the cloud computing. This is because of the cloud computing service provider can not resolve the matter in the absence of a third party not authorized to access the archive of the institution through the hacking process and provide assurance that the digital recording data will not be

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used by the cloud computing service providers. On the last element, there is a problem in which the management of traditional tape were not able to reach the record on the data publication (posting) social media, SMS, and web sites. This is understandable because in the case of a social media platform is the first since the previous digital. People made comfortable to publish any media type originally in digital format (McKinnon: 2013).

The third trend relates to the preservation of digital data. It is quite difficult to implement considering there are some obstacles in this matter. For example, when the system was replaced with a new system, the process of data migration is often not easy because data formats and storage media were not similar. Even if the conversion process is done, the data obtained is often not the same as you see fit. This problem is more vexing when the data is formatted by the software paid to very protect their data format due regard to copyright. Party institutions that have digital data will be difficulties in the restoration of past data is when it happens. For example, they are used to store electronic mail in the format files WordStar, although there emulator for Word,

Problems encountered in these three trends have given rise to fourth in the ICT trends are trying to fix it by generating an open standard (open standard) and open source (open source). Open standards provide support for the preservation of digital data for storage standard format can be determined by the parties concerned. Likewise with the possibility of acceding and between operations in digital data archiving activities can be carried out according to the open standard created despite different systems. While the presence of open source, this allows the data format used will be restored legally without having to ask permission from the maker of its software (McKinnon: 2013).

In the latest trends, issues arise because of ICT automation has matured in its development. For example, we can make the process of copying the metadata records that are owned by the other archives unit. We do not need to enter the metadata. Likewise with the format of digital data classification can be built with metadata provided in each of these digital data. This issue is important because the volume of digital data will become bigger and transactions or interactions that use it will be a fundamental requirement in the future (McKinnon: 2013).

Through these five trends, McKinnon as if to show us that the world archivists experiencing tremendous changes in the structure of practice with their remarkable progress in ICT. As for the impact, not only on the two main effects are mentioned in the introduction, but there are a series of impacts that need to be observed as described McKinnon's. On the situation, we would need to reflect, a moment to think of the future archives lines in the challenge of such changes. The next section will attempt to answer this by considering our experience as an archivist. **D).** Metamorphosis archivist in the Digital Revolution. Questions need to be asked in relation to what initiatives should be done by archivists in the context of the digital revolution is whether the profession is willing to accept the challenge because there is a need to manage and preserve digital records or even stagnant is not willing to accept the challenge because they feel comfortable managing the archive conventional? The initiative on this issue will obviously bring different things to the archivists in treading the path of his profession. In the context of digital records management, an archivist in their role as a manager of archives in an organization is not a separate entity of an organization's information management system as a whole. But one part that plays an important role in the management information (information management) and ensure the organization's quality management (quality management). Records management is done based on the architecture of information (information architecture), which has been declared by the organization. Seeing it is clear that the knowledge and skills that must be owned by archivists no longer just mastered how to manage the archive only. However, more than

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that archivists should also have knowledge and skills in the sphere of information governance, information architecture, quality management, standards, applications and other things that are needed in the totality of information management. Records management is done based on the architecture of information (information architecture), which has been declared by the organization. Seeing it is clear that the knowledge and skills that must be owned by archivists no longer just mastered how to manage the archive only. However, more than that archivists should also have knowledge and skills in the sphere of information governance, information architecture, quality management, standards, applications and other things that are needed in the totality of information management. Records management is done based on the architecture of information (information architecture), which has been declared by the organization. Seeing it is clear that the knowledge and skills that must be owned by archivists no longer just mastered how to manage the archive only. However, more than that archivists should also have knowledge and skills in the sphere of information governance, information architecture, quality management, standards, applications and other things that are needed in the totality of information management.

Frans Smit (2013) noted that there are at least seven types of professionalism required in records management in the digital era, namely: [1] Auditor Archive (Records Auditor); [2] Control Archive (Records Controller); [3] Quality Manager Archive (Records Quality Manager); [4] Architects Archive (Records Architect); [5] The staff business Archive (Records Capture Officer); [6] The staff of Preservation Archives (Records Preservation Officer); and [7] Staff Archives Access Provider (Records Accessibility Officer). Of course, this is not the seventh expertise is static skills possessed by archivists. ICT is very fast acceleration also possible to change all of the expertise of archivists today. These changes cannot be seen as change are gradual, evolutionary and slowly, but a very radical changes and of course may create a shock archivist in adjusting itself. To that end, this radical change adaptation must be quickly responded to by archivists and archival field.

Conclusion

Challenges in records management to the front would be more complex and complicated. Therefore, archivists as an expert in managing the archives are required to adapt and transform into a new entity that is adaptable to change very revolutionary. An archivist is not a single agent that is only able to deal with the issue of the archive only. However, the archivist is a double agent or even a multi agency that has a variety of skills related to information governance, information management, information architecture and quality management. Therefore, the constancy of this profession will depend on his response to the growing challenges of the digital world and the adaptation of professionalism does.

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