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The Integration of Cloud Computing With Lean Theory to Improve Academic Researcher's Productivity

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***Abstract*—Today, higher education communities are faced with several new challenges such as information explosion and the diversity of their sources, increasing competitive pressure, shorter study life cycles, and shorter technology innovation cycles. Two possible ways to cope with these challenges are the implementation theory of lean system (LS) techniques to map the researcher's needs across the academic research processes and integrating it with a services and applications of cloud computing technology. In order to, eliminate waste which come out through the tasks of academic researchers during the academic research stages. This study has been assembled to value stream map the academic researcher tasks and wastes during their research life to determining the needs of the academic researchers through research stages that provide value. This paper presents results of an interview that was conducted amongst academic researchers in Malaysia Universities. Through the development and application of a face to face interviews, we will identify the wastes and researcher's need to providing solutions with using of cloud computing services and applications to meet their needs and eliminate wastes. Using the information gleaned from these maps, the conventions of academic research tools can be critically evaluated and changed to better meet the needs of academic researchers to improve their productivity and performance.**

Keywords—Academic Research Process, Cloud computing Services and Applications, Lean System, Value Stream Mapping, Academic Researchers, Improve Productivity.

I. Introduction

There are many studies that have addressed the researcher as a key factor to raise the productivity of knowledge and exploration [1,42]. Today academic researchers are faced with several new challenges such as information explosion. The diversity of their sources, increasing competitive pressure, shorter study life cycles, and shorter technology innovation cycles [3,4]. In addition, they have a wide range of tasks and roles in research process [2,4] interconnected with each other, they must be completed them. So the academic researchers are demanding variety of tools to support them to reach the information resources with increased quality of services and flexibility. They will enable deliver their outcomes in shorter lead times and at a lower price [2, 5].

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Never before have had academic researchers faced a greater need to become more agile and responsive. In order to survive, academic researchers have had to develop strategies to deal with these challenges. Two popular ways are eliminating waste that effect on productivity improvement by using services and applications of cloud computing technology and integrating it with a theory of lean system (LS).

Lean system (LS) principles and practices is a strategy that aims to eliminate waste that effect on peoples' performance or input value and centred in satisfying a customer to achieve the productivity improvement [1]. There were various studies which integrate lean practices with technology such as, IT, ICT, and Internet, that has provided positive results in productivity [3,11]. Now, many countries have started to practice lean tools in the higher education sector and observed tremendous improvement [6,8].

Alternatively, by transmitting information electronically, cloud computing technology can create high quality and more efficient applications and service as well as higher levels of satisfaction among end-users [16,18]. In addition, effective services of cloud computing based application plays a vital role in the growth and productivity of organizations, companies and university communities, with many high points (efficiency, reliability, portability, flexibility, and security) to enhance their knowledge, education, and accomplish their work better and faster than ever [17].

To complete this study, several goals were established. The first goal of the study is to define the current wastes which come out from the academic researcher tasks of research stages. The second goal is to determine the needs of the researchers to eliminate those wastes by using cloud computing technology. The last goal of this study is to develop a future state map that could be used to improve the researchers' productivity. A future state map is a representation of an ideal system of that meets researcher needs and serves as a means to develop improvement goals for the academic research. In order to reach these goals, it is important to understand how the academic researcher currently delivers the outcomes, and identify gaps between the current state and a future state. Therefore, the purpose of this study is to develop a current and future state value stream map of the academic researcher's tasks during their research stages using Lean system techniques and integrating it with a cloud computing technology to add value, which can be used to develop plans for researchers' productivity development. The researchers were then asked to build a future state based upon the identified significant needs. The researchers assigned this study were intrigued by the idea that they could shape the future of the academic research tools.

II. Methodology

The methodology of the research is based on theory and process observation to apply Value Stream Mapping (VSM) in tasks of the academic research process and this research used empirical as well as qualitative information from interviews approach. It is common to use the interviews for Value Stream Mapping (VSM) to identify waste and their needs [1,6,18] . Value Stream Mapping (VSM), is a tool developed by Toyota, is often used in a lean system environment .Value Stream Mapping provides a visual map that shows the flow of value through the academic research process. It also helps identify wastes in the system. [19].

An open-ended questions were asked, they were required to give reason(s) for their answers in details and can qualify and clarify response.

First, important to define the primary customer in the tasks of academic research. The primary customer, including the postgraduate students, Master and Ph.D, the University lecturers and professors. In this article we decided in the end that the primary customer is the postgraduate students, Master and Ph.D in semester three and above since. The researchers who have been in the university longer are in a better position to provide information for opinion items under the respective construct of the study. This study to examine the current case, and analyse the tasks of other successful studies. A comprehensive interview instrument was developed based on lean structure for interviewing academic researchers.

The interviews asked specifically about wastes and their needs to eliminate waste and support them in their research journey. It indicates that a respondent might give more than one answer as this was based on their opinions, experiences, and preferences. Every percentage was constituted from the total of 30 respondents.

Interviews were conducted with 30 respondents who are different genera in Malaysia. Some from Malaysian origins and others from different races, such as (Arabic, Sudanese, and Iran). They were focused on postgraduate students (Master and Ph.D) in Malaysian Universities that include University of Kebangsam Malaysia (UKM), University Technology Malaysia (UTM), University Of Malaya (UM), and University Tenaga National (UNITEN) in different fields of study in 2013. All interviews were conducted distantly by several methods depends on the accessibility to sample target. We used the method of face-to-face for the sample that located in the study area. While we conducted the other means to reach to remote sample such as, telephone calls and social media network (Skype call, Viper call, and Tango call). Interview questions were in English and Arabic, while answers and discussions were all translated to English by the researcher [42].

III. Steps of Value Stream Mapping for Academic Research Process

This unique research is designed specifically for guiding to the effective tools which support the academic research process on the lean journey all elements and tools of the lean approach from value stream mapping are covered. Lean is about eliminating waste through achieving researchers need. In the beginning, the wastes must be visualized and identified to target for elimination. Value Stream wastes consisting of at two levels, such as in the time loss and cost through the processes, in the setup and function of process flow and finally in the operations within each process. The steps in value stream mapping as mentioned earlier is explained below:

A. *The Waste Identification*

The purpose of this step is to identify which waste would result in the maximum researcher's productivity impact after improvement. Wastes were identified from the total time and cost of researchers at each stage of research. While any waste come out from the researcher's task is a negative effect on the other stages and researchers' productivity. The academic research stages are typically a group of researcher's tasks that share a common processing sequence (networking, collaboration, manages research, doing research, publishing research and evaluation of research) [2,4,21,22].

According to study of Kyvik and Vitae (2013) they were distinguished between six significant tasks in research stages related to the academic researcher role: **(i) Networking**: is a frequent communication with fellow colleagues through social networks and face-to-face contact, and so on. In order to exchange ideas, results or information, access to information to get consulting;**(ii) Collaboration**: is to collaborate advance knowledge and take different forms, from giving advice to colleagues in the laboratory during a single experiment, and increase in co-authored publications. It is related to good communication methods (**iii) Manage Research:** through working on a set of projects which are related to each other and tools in relation to a more or less demarcated research problem and organizing research map, attend and organize meetings and set realistic deadlines; **(iv) Doing Research**: Actual implementation of research. It is related to three sub-tasks; doing basic research, applied research, and development work. ; **(v) Publishing Research**: This is a strong task which academics should write up the results of their research and make them publicly available through scientific and scholarly publishing. These expectations come from the professional community, from institutional leaders and from state authorities; and **(vi) Evaluation of Research**: This task is of fundamental importance to the scientific system, by offering support for good research, to the detriment of poor research and improve any weaknesses. There are other sub-tasks related to the evaluator's task: Assessment of related dissertations, Assessment of overall research input and output, Assessment of manuscripts submitted for publication, and Assessment of future research strategies and priorities and priorities [4, 21]. Percentage of waste is calculated from the responses of interviews in addition from previous studies which related to academic researcher's performance.

B. *Current State Mapping*

Once the target wastes were identified, the next activity will be value stream mapping (VSM) of the researchers' current state. Current state follows an academic researcher's task path in research stages from beginning to end. Then

draw VSM tool which allows a visual representation of every task and sub-task in the research process to help identify and categorize the wastes in the current state. This map is used to plan actions to eliminate the wastes and obtain the future state [23].

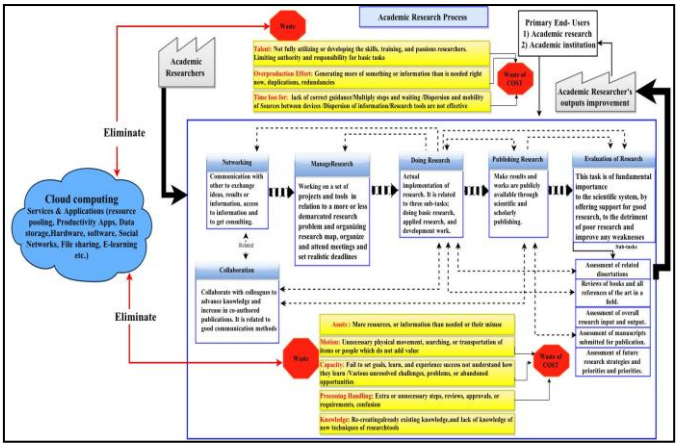

Figure 1. Current Value State Map of Academic Researcher's Task in Research Process

Figure 1 explains an ongoing process of academic researcher's tasks which clarifies standardized academic research process and application of VSM to detect the types of wastes. Cloud computing services and applications are the most comprehensible tool for reducing cost and time on the lines of researcher's task. This technology is used to reduce unnecessary steps through the elimination of wasteful motions or through the combination and simplification of targeted operations within a given process. Furthermore, it is will provide unlimited services and tools help to support education and research area. Also, it serves to eliminate motions between requirements of work performance through synchronizes all their work from any device. It's the current emerging trend in delivering IT services, can address many of the aforementioned waste. So, by using cloud technology researchers can have easy access to large distributed infrastructures and completely customize their execution environment. Thus providing the perfect setup for their experiments, and cover any specific need for their research. Moreover, by renting the infrastructure on a pay per use basis, they can have immediate access to required resources without any capacity planning and they are free to release them when resources are no longer needed.

C. *Future State Mapping*

After drawing the current (VSM) it is necessary to draw a future state map of how value should flow applying the lean tools. It also shows the tasks and research process flow without those wastes. To achieve the future state mapping - Key Performance indicators (KPI) results create some Kaizen (continuous improvement) Milestones and monitor the result periodically[1,23]. All the data has been collected and compiled, the data will be used to create a future state map that will be used by the researchers and academic institutes to develop academic research tools that better meets needs of the researchers**.**

IV. Findings And Analysis

Based-on Table I below:

TABLE I. INTERVIEWS RESULTS OF WASTES FROM TASKS OF ACADEMIC RESEARCH STAGES IN 2013

Type of Waste	Reason of Waste	Number of Percent
Time loss (Waiting and period of time that elapses before researchers receive the desired value)	Wasting time into the wrong attempts and replays due lack of correct guidance and experience.	86%
	Loss of time in searching for information or resources due dispersion and mobility of sources between devices.	94%
	Loss of time due the research tools are not effective.	67%
	Wasting time due multiply steps e.g. (office actions such a signature, printing, and scanning) and waiting for software updates or retrieve data or communication.	96%
Overproduction Effort	Generating more of something or information than is needed right now, duplications, redundancies.	86%
Talent (Unused the skills or improve learning opportunities)	Not fully utilizing researcher's creativity or developing their skills, training, and passions of researchers.	81%
Assets (More inventory, physical resources, or information than needed or their misuse)	• Not utilized well instructional resources • Use/misuse of materials or tools • Obsolete books/equipment/stored information • Not to use the services they owned.	88.9%
Motion (When a person moves their body as part of an action or task that does not directly add value)	Unnecessary physical movement, searching, or transportation of items or people which do not add value.	70.7%
Capacity (The ability or power to do, experience, or understand something for specified role or position).	Fail to set goals, set learn, and experience or understand something.	53.5%
	Fail to understand how they learn to apply or do their research.	69%
	Various unresolved challenges, problems or abandoned opportunities.	54%
Knowledge (Everything related to the development of knowledge and recreating already existing knowledge)	• Going through training you have already had. • After searching and finding information, recalling already knew it • Re-teaching previously taught courses.	73.4%
	Lack of knowledge of new techniques of research tools	87%
Process Handling	Extra or unnecessary steps, reviews, approvals, or requirements, confusion.	89.5%
Cost	All the above wastes are effected on their cost.	98%
Total		100.0 %

The results of replies of respondents in the interviews were high. We find that all the waste has a direct impact on the researchers' time and the costs for example, the wastes of capacity "fail to understand how they learn, set goals, set learn, and experience success, and various unresolved challenges, problems or abandoned opportunities". These wastes were wasted time of researchers and delayed to achieve their research, but in having specialized and expert groups enables the researchers to obtain right counselling

and guidance as quickly as possible. Wastes were the result of actions unnecessary by researcher, unnecessary steps or behaviour in a research stage that is not required to complete that process successfully. The lack of proper guidance, experience, skills, and effective tools that lead to increased presence of wastes which negatively impact on the productivity of researchers and their performance during the research journey. In the academic research process the wastes occur as a result of long queue times between operations (Batch-and Queue "B&Q") processing the conventional way to deliver services or processes. For example, processing information, documents, searching, communications, exchange information etc., whether it is research tools, resources has many serious deficiencies including long lead times, lower quality, higher cost of tools or services, customer dissatisfaction, and poor information flow [7,24].

On the other hand, the interviews revealed the important needs of researchers to help them to overcome the wastes shown in Table II. They need “less” in terms of less waste, less time, less costs, fewer batch-and queue processing and fewer research mistakes such as, writing errors and rationing keywords and related sources. However, they also need “more” in terms of more researcher empowerment, more flexibility and capability, more productivity, more quality, more satisfaction and more long-term competitive success and easier to understand and apply. In short, they need tools are focused on value-added activities [42].

TABLE II. INTERVIEWS RESULTS OF RESEARCHERS NEED IN 2013

Researchers Needs	Number of Percent
Need a tool that enables remote access to their works from any mobile device quicker and flexibility to the continuity of their works.	88%
Need tools improve their research productivity through "reference and indicators to the relevant sources and provide a huge amount of journals, books and dissertations and support the e-learning, tutorials, suggestion keywords, and so on "	89.4%
Need tools that save time and effort when they work on research activities.	95.7%
Need tools to reduce cost or cheaper than the traditional tools.	97 %
Need tools that are easier to use, understanding, and can be applied in their research activities.	85%
Need tools that are useful and effective for research activities.	97%
Total	100.0 %

V. Identify Value For Academic Researchers

Using lean techniques, the study views the academic research process as a system that adds value to the researcher through varied six significant tasks in academic research process: Networking, Collaboration, Manage Research, Doing Research, Publishing Researchers, and Evaluation of Research [4,21]. During the research process, the researchers are faced many obstacles that is considered waste in lean practice. Lean holds that wastes are any step or activity or behaviour in a process that is not required to complete that process successfully [7,25]. There are nine wastes in education sector, which are frequently within the processes of higher education and their community, such as Overproduction Effort, Talent, Motion, Time, Processing Handling, Knowledge, Assets, Capacity, and Defects in them have impact on the time and cost element [26] . Thus impact on productivity improvement [6] see Figure 2.

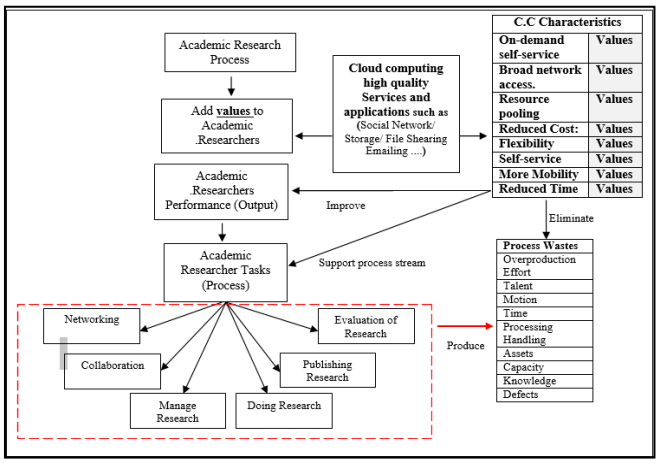

Figure 2. Identify Value in Academic Researcher Tasks

The study of academic researcher's productivity improvement decided to use lean techniques to determine the relevance and impact of the cloud computing technology on the academic researcher's outcomes. The study looks at providing ample opportunities across the academic researcher tasks where the cloud computing can support to improve knowledge, skills, quality, flexibility, searching, reduce time and costs in specific services and applications important to support researcher performance [27,29,42]. Each service of cloud achieves a set of characteristics that the user seeking to obtain them. Where each characteristic of the service is an individual value stream. Several value streams intertwined throughout the period of research performance and culminate in an appropriate capstone experience which requires researchers to improve their research performance over the course of the period of the research process.

VI. Added Value And Eliminate Wastes With Cloud Computing

Cloud computing technology can provide solutions for the above mentioned wastes in the academic researcher's task and achieve their needs [42]. Based on the previous experimental studies and literatures, where were provided positive role of cloud computing technology, this article will prove the successful results for impact of cloud computing to elimination of waste and improve productivity and academic performance see Table III.

TABLE III. THE EXPERIMENTAL STUDIES OF HIGH ABILITY OF CLOUD COMPUTING

Literatures	Academic Researcher's need	High Ability of Cloud Computing
• (Anderson, Wiles, & Young, 2008) • (Miller, 2008) • (Mircea & Andreescu,	Reduce Cost	• Free updates of software and apps. • Provide several processing, applications and bandwidth with

2011) • (Reichman, 2011) • (C. W. Taylor & D. S. Hunsinger, 2011) • (Morgan, Lero, & Conboy, 2011) • (Burke, 2012) • (Chandra & Borah, 2012) • (CISCO, 2012) • (Anjali Jain & Pandey, 2013) • (Conn & Reichgelt, 2013) • (Mavodza, 2013) • (Adi A. Maaita, Zahraa Fadhil Muhsen, & Nsour, 2013) • (Bora&Ahmed,2013) • (Milian, Spinola, Gonçalves, & Fleury, 2014) • (González-Martínez et al., 2015)		demand technology. • Ability of share servers and learning materials with other and reduced software, hardware, and launching time. • Providing free educational resource, storage and databases, emails, educational applications and tools. • Zero maintenance cost and management problems of the resource machines. • Free Software, applications, and useful tools without having to purchase, install and keep them up to date on your computers. • Provides the facility of Pay per use for some applications.
• (Mircea & Andreescu, 2011) • (C. W. Taylor & D. S. Hunsinger, 2011) • (Morgan, Lero, & Conboy, 2011) • (Agcaoili, 2012) • (Bora&Ahmed,2013) • (Adi A. Maaita, Zahraa Fadhil Muhsen, & Nsour, 2013) • (Anjali Jain & Pandey, 2013) • (Kottari, Kamath, Saldanha, & Mohan, 2013) • (Nayar & Kumar, 2015) • (González-Martínez et al., 2015)	Reduce Time	• Offline usage with further synchronization opportunities. • Provide quick and efficient communication. • Instant software updates. • Provide high quality of infrastructure (Hardware) this reduces the time of building's labs, storage etc. • Possibility of exchanging and sharing resources from anywhere, anytime. • Faster file backups and automatically updated across all devices through syncing feature. • The possibility of attending classes and conferences, and participation by remote on-demand, minimizing time loos. • Continuation of flags about useful software and related applications. • Possibility of follow up works.
• (Miller, 2008) • (Mircea & Andreescu, 2011) • (Sasikala & Prema, 2011) • (Morgan, Lero, & Conboy, 2011) • (Burke, 2012)	Quick of Remote Accessibility	• Access to applications from anywhere. • Able to control and access your data and material remotely through any device, from anywhere. • Provide quick and efficient
• (Mokhtar et al., 2013) • (Anjali Jain & Pandey, 2013) • (Yadav, 2014) • (González-Martínez et al., 2015)		communication, by allowing users to use any device. • Connected with others located all over the world from any device. • Possibility of follow up works.
• (Vecchiola, Pandey, & Buyya, 2009) • (Scale, 2009) • (Mircea & Andreescu, 2011) • (Sasikala & Prema, 2011) • (C. Taylor & D. S. Hunsinger, 2011) • (Alshwaier et al., 2012) • (Mokhtar et al., 2013) • (Adi A. Maaita, Zahraa Fadhil Muhsen, & Nsour, 2013) • (Bora&Ahmed, 2013) • (Conn & Reichgelt, 2013) • (Mokhtar et al., 2013) • (Zahraa Fadhil Muhsen et al., 2013) • (Yadav, 2014) • (González-Martínez et al., 2015)	Improves Productivity	• Increased openness of researchers to new technologies. • Able to upload class tutorials, assignments, and tests. • Allow to improve research materials, methods, and resources. • Enhancing collaboration work on projects where project team members are geographically distributed. • Provide various education services of information technology just by browsing. • Allow researchers to search, find models, make faster discoveries, assist to build and create a smarter planet, and develop and test applications immediately. • Ability to access to the amount of resources and the list of related information, articles, and keywords that with feature of the related articles.
• (Anderson, Wiles, & Young, 2008) • (Taylor & Hunsinger, 2011) • (Sasikala & Prema, 2011) • (Alshwaier, Youssef, & Emam, 2012) • (Bora & Ahmed, 2013) • (Adi A. Maaita, Zahraa Fadhil Muhsen, & Nsour, 2013) • (Mokhtar et al., 2013) • (Anjali Jain & Pandey, 2013) • (González-Martínez et al., 2015)	Easier to Use and Flexible	• Abstraction and virtualization construction since it does not require expertise or unique knowledge to manage cloud services. • Provide user friendly interface: new facility is no need to worry about the complexity. It is easy to understand and easy to operate. • Server patching, management, and backup, along with redundancy. • Easier to modify your data, sharing, reach a huge amount of communication and get resources.
• (Miller, 2008) • (Vecchiola, Pandey, & Buyya, 2009) • (Pocatilu, Alecu,	Higher Service Quality	• Providing high quality service and computing power and more efficient by consolidating data

& Vetrici, 2010) • (Sosinsky, 2011) • (Conn & Reichgelt, 2013) • (Anjali Jain & Pandey, 2013) • (Bora & Ahmed, 2013) • (Nayar & Kumar, 2015) • (González-Martínez et al., 2015)		storage, processing and bandwidth. • Provide new opportunities offered by this technology to the implementation of systems that actually make these opportunities a reality. • Clouds are being explored as a solution to some of the problems with Grid computing. • Provide the supercomputing power available to the masses, not just a relatively tiny number of skilled users. • Unlike other technology advances such as the web and the Grid, this new model of computing is being initiated in the academic sector.

Mass amount of information, knowledge, support tools, and resources are made available via cloud through any device types. In the traditional deployment model, all Information Technology resources are housed and managed in-house [13,30]. In addition, many of technologies that were previously expensive or unavailable are now becoming free to anyone with a web browser. This is true for web sites, blogs, video sharing, file sharing, social sharing, collaboration software, editing/presentation and publishing, computing platforms in the "cloud", etc [31]. Therefore, academic researchers need to identify and leverage emerging cost effective technologies which enable feasible access for data and their works from anywhere and anytime.

With cloud computing platform, researchers will have access to ubiquitous resources via web browsers. The need for hardware and software is being shifted from being on premises to being in the cloud. Software and files are no longer installed or stored in a single machine. All that is needed is a cheap access device and a web browser, broadband in anywhere, perhaps wireless hotspots [17,29,32,34]. Furthermore, by using to cloud computing applications, researchers can now gradually move both their work and used tools in the cloud, making both accessible from any computer, using tools that are free or very inexpensive. Table IV present set of useful cloud services and applications which helps academic researchers to improve their research activities and performance [41,35].

TABLE IV. CLOUD SERVICES AND APPLICATIONS TO IMPROVE ACADEMIC RESEARCHERS ACTIVITIES AND PERFORMANCE

Top Cloud Storage and File Shearing Tools to back up digital data for eliminate waste of (time loss, assets, motion, and reduce cost) The researchers able to access and manage their account and resource stored, anywhere, anytime, quickly in terms of accessibility through any mobile devices. Providing storage space out their device could be expanded besides easily exchanging and sharing files. Backup files and automatically updated across all of my devices through syncing feature [36,37].			
Service	**Site**	**Storage Size**	**Maximum File Size**
Google Drive	https://drive.google.com/drive	15 GB	250
Dropbox	https://www.dropbox.com/	2 GB up to 8 GB	Unlimited
SkyDrive or OneDrive	http://windows.microsoft.com/en-my/onedrive/skydrive-to-onedrive	15 GB	50 MB
Box	https://www.box.com/	10 GB	250 MB
Copy	https://www.copy.com/page/home;section:landing	15 GB	Unlimited
MEGA	https://mega.co.nz/#register	50 GB	Unlimited
Mediafire	https://www.mediafire.com/	10GB	Unlimited
Tresorit	https://tresorit.com/	3GB	500 MB
Amazon Cloud Drive	https://www.amazon.com/clouddrive/home	5GB	Unlimited
Spideroak	https://spideroak.com/	2GB	Unlimited
Top 100 Cloud Searching Tools (academic websites) to eliminate waste of (time loss, motion, overproduction effort, and reduce cost) Provides a mobile device anywhere. Improve researcher's productivity in terms of a continual searching for digital or physical copies of articles, dissertation and thesis, listed the searched keywords, and research writing tools [38].			
Cloud searching tools (academic websites) http://onlinephdprogram.org/thesis-dissertation/	**These are the basic sections, each section has subsections:** • Academic Directories & Databases (LexisNexis Academic, CORE, Directory of Open Access Journals, Open Thesis) • Writing & Research (Vitae, Fragment/Framework, OrganoGnosi, Organizing Creativity) • Dissertation & Thesis Tips (Dissertation Diva, Thesis Whisperer, Dissertation Research, Navigating the Dissertation) • Academic Writing & Editing Tool (WriteCheck Blog, APA Style Blog, References.net) • Writing Centers (Writing at SNL, Writing at SNL, Center for Writing Excellence) • Academic Publishing (Ashgate, Carolina Academic Press, Publishing Perspectives)		
Top Social Networking Sites for eliminating waste of (time loss, motion, assets, knowledge, talent, and reduce cost) The researchers are able to contact with others who have similar interests and expertise that who have vast experience in the research field. Possibility to communicate from anywhere, anytime, without having to meet [5,35,39].			
Social Networking Sites	http://www.ebizmba.com/articles/social-networking-websites	Facebook, Twitter, LinkedIn, Pinterest, Google Plus+, Tumblr, Instagram, VK, WhatsUp, Ask.fm, ClassMates, Tagged, Meetupp,	
Top of Video & Presentations for eliminating waste of (time loss, motion, assets, knowledge, process handling, capacity, talent, and reduce cost) Improve productivity in terms of providing a huge amount of information and opportunities for self-learning, develop skills, creative and possibility of viewing classes and conferences, and participation by remote on-demand, minimizing time spent away from their works for learning [35,41].			
Service	**Site**	**Description**	
You Tube	http://www.youtube.com	Video sharing site	
Veoh	http://veoh.com/	Server TV and movie content from major studios, along with uploaded user content.	
Yahoo Video	http://viedo.yahoo.com	Video sharing site	
Tudou	http://www.tudou.com/	Large video sharing site and full length movie	

RuTube	http://rutube.ru/	Video sharing site
Top of office applications for eliminating waste of (time loss, motion, assets, process handling, and reduce cost)		
Cloud-based office suites offer access anywhere and cost savings over traditional, desktop software or any device by Internet connecting. Support researchers to improve their productivity in terms of the possibility of preparing documents and display them without having software installation of the device [5,40,41].		
Service	**Applications**	
Google Apps, Microsoft Office 365, Zoho Office, ThinkFree office suite, and Adobe acrobat	Provide documents, Spreadsheet (Sheets), Presentation (Slides), Emails, Calendar, Site Builder (Sites), Messaging/Conferencing, Note Organizer, Storage space, Translation. A view for mobile office.	
Top Data collection and survey tools for eliminating waste of (time loss, motion, assets, process handling, overproduction effort, and reduce cost)		
Enables collect data and results quickly and easier in terms of accessibility from any devices and they can modify, understand the interface mode, select suitable style design, and easier to distribute.And improving their productivity in terms of the data can be presented in graphs or tables and transfer into specialized statistical software or spreadsheets. It is a convenient method of getting people to respond without having to meet and possibility of sending them over the social communication [5,41].		
Survey Tools and Data Collection	Survey Monkey, Typeform, Google Forms, Client Heartbeat, Zoho Survey, Survey Gizmo, Survey Planet, QuestionPro , Wu Foo, Zuhu creator, ProProfs, Zoomerang, Qualtrics, Poll Everywhere,	

In addition, there are more and more cloud services and application which supports academic research activities and help to improve productivity of researchers, such as "Online Notes, Remote Desktop, Cloud Productivity Applications, Reference Manager, My Library, and more". While researchers can able to apply them from any devices and greatly reduce the overall cost of computing and support of group work and collaboration at a distance to save their time.

VII. Conclusion

This research tries to integrate between services and applications of cloud computing technology and theory of lean system (LS) techniques to improve academic researchers' productivity. In order to identify the waste which lead to decrease of academic researchers outcomes and waste their time and cost. On the other side, know and determine the needs of researchers to overcome these wastes through interviews have been conducted. The interview's analysis shows that wastes were the result of actions unnecessary by a researcher in a research stage, unnecessary steps or behaviour, lack of proper guidance, experience, skills, and effective tools, and long queue times between operations (Batch-and Queue "B&Q"). That led to increased presence of wastes which negatively impact on the productivity of researchers and their performance during the research process. Therefore, this study adopts the theory of lean system (LS) principles and practices to eliminate waste through the tool of value stream mapping (VSM) to gather the information and process flow of the academic research process. This study shows a strong need to use cloud computing technology in the research activities as a tool to add value to researchers' productivity. Academic researchers have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand. This automatically reduces the cost and task time and offers more powerful functional capabilities, and allows them to access their work anywhere, anytime and share it with anyone. In the end, academic researchers should know more about the value offered by Cloud Computing which lead to innovation. Thus, the benefits of cloud computing to the academic community are largely unknown and many questions are being asked by domain academic researchers about the promise and the pitfalls of clouds. Additionally, very little research has been conducted in comparison with what has been done with cloud technology for the academic researchers sector.

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