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Yogyakarta, 04 – 07 April 2017

LP3M & Faculty of Law Universitas Muhammadiyah Yogyakarta
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Message from Chairman

Yordan Gunawan

Chairman, International Conference on Law and Society 6,
Universitas Muhammadiyah Yogyakarta

Assalaamu'alaikumWarahmatullahiWabarakatuh,

In the Name of Allah, the most Gracious and the most Merciful. Peace and blessings be upon our Prophet Muhammad (S.A.W).

First and foremost, I felt honoured, on behalf of the university to be warmly welcomed and to be given the opportunity to work hand in hand, organizing a respectable conference. Indeed, this is a great achievement towards a warmers multilateral tie among UniversitasMuhammadiyah Yogyakarta (UMY), International Islamic University Malaysia (IIUM), UniversitiIslam Sultan Sharif Ali (UNISSA), Universiti Sultan ZainalAbidin Malaysia (UNiSZA), Fatoni University, Istanbul University, Fatih Sultan Mehmet Vakif University and Istanbul Medeniyet University.

I believe that this is a great step to give more contribution the knowledge development and sharing not only for eight universities but also to the Muslim world. Improving academic quality and strengthening our position as the procedures of knowledge and wisdom will offer a meaningful contribution to the development of Islamic Civilization. This responsibility is particularly significant especially with the emergence of the information and knowledge society where value adding is mainly generated by the production and the dissemination of knowledge.

Today's joint seminar signifies our attempts to shoulder this responsibility. I am confident to say that this program will be a giant leap for all of us to open other pathways of cooperation. I am also convinced that through strengthening our collaboration we can learn from each other and continue learning, as far as I am concerned, is a valuable ingredient to develop our universities. I sincerely wish you good luck and success in joining this program

I would also like to express my heartfeltthanks to the keynote speakers, committee, contributors, papers presenters and participants in this prestigious event.

This educational and cultural visit is not only and avenue to foster good relationship between organizations and individuals but also to learn as much from one another. The Islamic platform inculcated throughout the educational system namely the Islamization of knowledge, both theoretical and practical, will add value to us. Those comprehensive excellent we strived for must always be encouraged through conferences, seminars and intellectual-based activities in line with our lullaby: The journey of a thousand miles begin by a single step, the vision of centuries ahead must start from now.

Looking forward to a fruitful meeting.

Wassalamu'alaikumWarahmatullahiWabarakatuh

Foreword

Trisno Raharjo

Dean, Faculty of Law, Universitas Muhammadiyah Yogyakarta

Alhamdulillah all praise be to Allah SWT for his mercy and blessings that has enabled the Fakultas Hukum, Universitas Muhammadiyah Yogyakarta in organizing this Inaugural International Conference on Law and Society 6 (ICLAS 6).

This Conference will be providing us with the much needed academic platform to discuss the role of law in the society, and in the context of our two universities, the need to identify the role of law in furthering the progress and development of the Muslims. Muslim in Indonesia and all over the world have to deal with the ubiquity of internet in our daily lives life which bring with it the advantages of easy access of global communication that brings us closer. However, internet also brings with it the depraved and corrupted contents posing serious challenges to the moral fabric of our society. Nevertheless, we should be encouraged to exploit the technology for the benefit of the academics in the Asia region to crat a platform to collaborate for propelling the renaissance of scholarship amongst the Muslims.

This Conference marks the beginning of a strategically planned collaboration that must not be a one off event but the beginning of a series of events to provide the much needed platform for networking for the young Muslim scholars to nurture the development of the Muslim society.

UMY aims to be a World Class Islamic University and intend to assume an important role in reaching out to the Muslim ummah by organising conferences hosting prominent scholars to enrich the developmment of knowledge. This plan will only materialise with the continous support and active participation of all of us. I would like to express sincere appreciation to the committee in organising and hosting this Conference.

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Internet of Things: Investigating Its Social and Legal Implications in A Connected Society

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ABSTRACT.

The myriad of successive technological waves have affected social lives and challenged legal norms in modern societies. The Internet of Things (‘IoT’) is one of those technological waves and is considered by many as the first real evolution of the Internet. It is about the digitization of physical things and objects, which enable them to communicate information about themselves and their surrounding environment with each other. Connected environment such as this could undeniably impact various aspects of life be it trade, services, healthcare, education as well as public governance. The “Internet of Things” also challenge existing legal concepts and this has in turn led to questions about the effectiveness and ability of laws to coexist with the rapid technology. This paper attempts to investigate the social and legal implications of the Internet of Things and its impacts on both society and governance, including on issues of data privacy, data security and data ownership. It is an introductory, descriptive and hypothetical analysis. It is also a preview to many more legally substantive questions surrounding the deployment of IoT in both commercial and non-commercial activities. This study is timely as it precedes the ongoing discussions about IoT from legal and social perspectives.

Keywords: *Internet of Things, Law and Regulations, Privacy, Security, Ownership*

I. Introduction

As an evolving technology, the Internet of Things (IoT) is expected to play an important role in daily life and to have an effect on social lives as well as to challenge legal norms in modern societies. The IoT is one of the successive technological waves and it is considered by many as the first real evolution of the Internet that will leave its imprint on most segments of modern life from little to big aspects.¹ Even though the IoT was defined by many, there is no agreed concrete definition to the term IoT. However, the whole notion of the IoT is about digitization of physical things and enabling them to communicate information about themselves and their surrounding environment. Currently, there are countless of devices connect to the Internet, generate and process information

about themselves and their neighbours. In 2010, as an example, around 12.5 billion devices were estimated to be connected to the Internet and the number increased dramatically to 25 billion in 2015 and the waves of connectivity seem to grow as statistics estimate that in 2020 about 50 billion devices will be connected to the Internet.²

Connected environment such as this is likely to impact almost all aspects of life such as business, services, healthcare, fitness and wellbeing as well as consumer’s lifestyle. In the business sector, the IoT cheap technologies could be employed to reduce cost and to improve services and productivity in manufacturing industries and agriculture, as an instance. In the healthcare area too, the IoT could help health professionals to serve more patients and detect diseases. Nevertheless, the endless connectivity may challenge existing legal concepts and this in turn could lead to question their effectiveness and ability to coexist with the rapid technology. Questions

such as 'who owns the information streamed in the IoT environment?' and 'who will legally be responsible in case of damage to people or property?' are among the challenges brought by the IoT.

This paper attempts to investigate the social and legal implications of the IoT and its impacts on both society and legal governance. Firstly, the current and foreseeable role that the IoT play in people lives will be discussed in order to present an idea about IoT penetration into modern life. Secondly, the paper will take three main areas into account when examining the IoT challenges to legal systems namely: data security, individual privacy and data ownership. This paper is an introductory study into many more legally substantive questions that arise due to the deployment of IoT in both commercial and non-commercial activities of people today. This study is arguably critical as it contributes to the ongoing discussion about the IoT from legal and social perspectives. It is a legal and doctrinal study, employing statutory interpretations, library work and case studies. In accordance with the notion of the IoT as a worldwide service, the jurisdiction involved is cross-jurisdictional but certain countries may be taken as an example. To achieve this, the paper will structurally be divided into four parts: the concept of the IoT, the IoT and its social implications, the legal challenges and the conclusion.

II. Discussion

1. The Concept of IoT

It is worthy to note that there is no precise single agreed definition to the term "Internet of Things" the definition differs depending on the approach and perspective taken.³ Semantically, the phrase "Internet of Things" consists of three words; Internet, of, and things. The Internet can be defined as "a global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols", while the thing is "an object that one need not, cannot, or does not wish to give a specific name to."⁴ In the IoT context, "things" can include almost everything such as computers, sensors, TV, refrigerators, vehicles, clothes, food, books, trees, utilities infrastructure, etc.

Citing some of the existing definitions could be a useful introduction to understand the concept of the IoT. For example, the International Telecommunication Union (ITU) through its Telecommunication Standardization Sector (ITU-T) defines the IoT from the perspective of technical standardization as "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies".⁵ Another definition that focuses on the factions states that the IoT "connects devices such as everyday consumer objects and industrial equipment onto the network, enabling information gathering and management of these devices via software to increase efficiency, enable new services, or achieve other health, safety, or environmental benefits."⁶

Looking into the existing definitions of the IoT, one can conclude that the whole concept of the IoT is about digitization of physical things and enabling them to communicate information about themselves and their surrounding environments in order to provide advanced services. The next passage will analyse penetration of the IoT into modern activities by looking its implications in some sectors.

2. The Social Implications

As anticipated, IoT technology is going to play an essential role in modern life as it is being

used in many ways including, but not limited to, business, healthcare, fitness and wellbeing and consumers' lifestyle or in other words "IoT is in your home, in your car and phone, and, increasingly, on your body."⁷ In the subsequent sections we highlight the penetration of IoT on several aspects of life, namely business, healthcare and wellbeing, and consumers life.

2.1 The IoT in Business

The IoT is predicted to benefit the business sector in many ways such as reducing cost, creating values, facilitating new business models, opening new revenue doors, improving existing services and productivity in manufacturing, retail, agriculture, etc. For example, studies showed that 65% of organizations who employed IoT reported potential cost savings by an average of 28%, while 53% of them reported increased productivity and efficiency by 29%, in addition to the 38 percent of the organizations who said their revenues raised by an average of 33% due to the deployment of IoT.⁸

According to reports, IoT advantages include (1) cost saving – through improving asset utilization, enhancing process efficiency and boosting productivity; (2) increasing return on R&D investment; and (3) opening new business models and opportunities.⁹ It is also mentioned that every business will get three major benefits from the IoT namely: communication, control and cost savings.¹⁰ As an illustration, IoT solution can communicate the state of equipment (e.g. on, off, full or empty) and locate assets as well as persons within an organization. Regarding control and automation, the IoT enables business, as well as consumers, to remotely control assets through shutting down, turning equipment or closing/opening automated doors, etc. On top of that, the incomes accumulated or generated from IoT are huge. The International Data Corporation (IDC) estimated that IoT technology and services revenue will increase from US\$1.9 trillion in 2013 to US\$7.1 trillion in 2020.¹¹ The above statistics and reports are a clear evident that the positive impact of the IoT in the business and organization is enormous.

2.2 Healthcare and Wellbeing

The health and fitness of human-being are among the sectors that have been benefiting from the IoT deployment. For instance, the global economic impact of the IoT in health and wellness could range from US\$170 billion to US\$1.6 trillion in 2020.¹² Most of these values will come from using IoT devices for monitoring and treating illness and improving wellness by using data collected by those devices. IoT devices used in health and wellness can be divided into three categories: (1) ingestible, implantable, and injectable devices, (2) wearable devices worn or carried by people, and (3) non-wearable measurement devices used to transmit and collect health data periodically from the body.¹³ Using IoT technologies in healthcare could transfer healthcare from curing to preventing levels, improve clinical outcomes, and enable delivery of remote health-related services.¹⁴ In this regard, IoT devices can be used to manage chronic diseases and prevent diseases at other scenarios, in addition to the safeguards of the elderly.¹⁵

For instance, patients can be monitored and treated through using IoT devices. In return, this will improve the quality of care and lower its cost. For assisting the elderly, IoT devices that can detect a fall or other interruption can be used to monitor the ageing people's well-being and activities and then report any abnormality to those who are responsible for care such as family members.¹⁶ Taking into account the aforementioned, and the estimation by some that within a decade a third of U.S. population will have implantable devices inside their body, there is strong indication that that IoT health and fitness technologies will play a vital role in people life in the near future.¹⁷

2.3 Consumer Lifestyles

The impact of the IoT on consumers might be enormous as it has already presented in their surrounding environment such as homes, cars and even in their physical bodies such as wearable health and fitness devices, as mentioned in the previous paragraph. It was estimated that by 2020, half of the global consumers will own one or more IoT connected devices.¹⁸ These devices will offer consumers more personal and personalized products and services, based on their actual needs and locations.¹⁹ At home, for example, the IoT can help in terms of energy use, identifying deficiencies in home appliances, security and controlling home remotely.²⁰

It could be true that the consumers will probably gain a lot of benefits from the IoT but in the same way they should also be aware that the IoT could bring a lot of harm to them too, especially in terms of security, privacy and so forth. The next passage will discuss some of those probable risks and response of laws to them.

3. IoT Legal Implications

Like the societal aspect, the legal side is also expected to be affected by the implementations of the IoT. Thus, the IoT might challenge the traditional rules that usually protect information such as data privacy and intellectual property laws.

The nature of the IoT as a cross-border service necessitates identification of the model laws that could efficiently regulate it. In this regard, some argue that self-regulation and international agreements can be considered more suitable for IoT as a global system, than the state law which is not appropriate due to its territorial limitations.²¹ The above could be true but this paper argues that combination of both international agreements and state laws that derived from them could be the most proper approach to regulate a worldwide system like the IoT. Talking about IoT specific regulation may be premature at this stage, however, highlighting some of the IoT challenges to the existing laws could be useful. This paper will examine IoT challenges to individual privacy, data security, and data ownership as selected examples on the difficulties of applying traditional rules in the information age.

3.1. Individual Privacy

The term 'privacy right' is a term that has its roots in international²² and national levels. However, the concept of privacy and its scope are fuzzy probably because privacy "is a time-honoured concept which manifest, in religion, philosophy and law."²³ Thus, the nature of privacy depends on the norms of a given society and the value which is attached to it by that society.²⁴ While there are some aspects of physical and territorial privacy, this paper focuses on the aspect of informational privacy which was defined as the individual's ability to control the circulation of information relating to them²⁵ and also the claim of individuals... to determine for themselves when, how and to what extent information about them is communicated to others.²⁶ Needless to say that protecting individual's privacy is potential for the growth and development of IoT services because distrust might lead users to partly or wholly abandon the usage of these services.²⁷

Privacy laws generally seeks to protect individuals from unjustified surveillance or observation. The digital age effects on individuals' privacy can be seen in: (1) the ease of collecting data that leads to accumulation of massive personal information via recording almost every modern communication, (2) the digital revolution that flourishes the data market globally and gives every interested stakeholder an opportunity to examine and collect such data, and (3) that there is no means or mechanisms that can sufficiently protect data in the digital age.²⁸

This becomes a serious issue in the IoT environment where everything can reveal everything and where generating, collecting recording and transmitting data about persons is easier done than said. As examples, some IoT smart devices such as smart TV and video game devices have voice recognition and vision features and so they can listen to conversations or watch activities and then transmit them to a cloud service for further processing²⁹ – or to third parties without consent or even knowledge of users of such devices.³⁰ Moreover, IoT devices such as cameras, sensors, and smart glasses can identify the location of persons and what they are doing at any-time.³¹

Legally speaking, the findings of IoT impacts on personal data protection principles³² pertaining to the processing of personal data in the electronic environment could be negative. For example, the principle of notice and choice aims to give affected individuals a chance to read policies and conditions of the services and then to freely agree or disagree with them before the data users, i.e. the industry, could ever collect and use the personal data. However, the IoT practically precludes the exercise of choices because the notice is predominantly absent by design. Often now the data processing is done without means to display privacy notices and/or to “provide fine-tuned consent in line with the preferences expressed by individuals.”³³

Needless to say, that scenarios such as the above do not give individuals the ability to control the circulation of information relating to them and therefore it violates data protection principles which grant data subjects the rights of knowing why and how the data will be used. Similar concerns apply to the inefficiency of data protection law in protecting data from unwanted disclosure, sharing or unjustifiable long retention after the use. Other IoT challenges can be observed in the security of data streamed in the IoT environment. The next section will elaborately discuss this issue.

3.2. Security of Data in the IoT

Security of data in the IoT environment is essential as IoT-based products and services are anticipated to penetrate into most societal settings. In the linguistic meaning, security is “the state of being or feeling secure”.³⁴ Not far from this, in the information technology environment security aims to ensure the confidentiality, integrity and availability of data.³⁵

Security in the IoT environment is a problematic because a lot of IoT devices are technically susceptible to security breach and therefore they may be employed for launching attacks on other networks or computers; facilitating unlawful access to computers or systems, and modifying data which may put people’s lives in danger.³⁶ As an instance, criminals might take IoT vulnerabilities as an advantage and then use it for starting denial of service attacks or distributing hateful emails. As for endangering life and safety of individuals, unsecured IoT systems or devices could be used by criminals to remotely control smart cars, health or fitness devices etc., and modify their programs and data putting riders of such cars and those who use devices in hazard.

The challenges that the IoT brought to law could be seen in terms of difficulty of ensuring that the security principle relating to processing data has appropriately been observed. This principle in the Malaysian and the EU perspectives will be mentioned here. Article 32 of the EU Regulation 2016/679 which repealed the EU Directive 95/46/EC with effect from 25 May 2018³⁷ mentions that “the controller and the processor shall implement appropriate technical and organizational measures to ensure a level of security appropriate to the risk.”³⁸ The Malaysian PDPA 2010 also imposes this principle by stating that “A data user shall, when processing personal data, take practical steps to protect the personal data from any loss, misuse, modification, unauthorized or accidental access or disclosure alteration or destruction.”³⁹

The above texts demand those who process personal data to take suitable measures to protect such data. In the EU perspective where the application of data protection rules is concerned with processing of personal data⁴⁰, applicability of the data protection rule on the data streamed in the IoT environment is unlikely to be problematic. However, in the Malaysian side, applicability of PDPA to some IoT data is uncertain because the Act only applies to personal data in respect of commercial transactions.⁴¹ Hence, data processed in or by an IoT-enabled processing out of the commercial atmosphere will not be subject to the Act. And this can be a serious loophole in Malaysian legal landscape. In addition, the Malaysian Act also precludes data processed by the Federal and State governments from its application.⁴² The scope of application could restrict the ability to protect personal data flowed in new technologies such as the IoT one if such processing is initiated or controlled by the Government entities.

Regardless of the applicability of security principle rules to some IoT data, it is argued that complying with this principle is indispensable to protecting personal data streaming in the turbulent techno-waves particularly in the IoT environment. In the IoT security may include controlling what things can do to themselves or to their surrounding environment as well as security of data which is processed (stored, sent or generated, etc.) by such things.⁴³ However, the nature and functions of the IoT devices and systems make such controlling difficult if not impossible. Broadly speaking, IoT devices are technically insecure and so they can be susceptible to failure and compromise in themselves not only that but they can also be used to attack other systems.⁴⁴ Additionally, securing IoT devices which may be positioned in different places also complicates and expands the obligation of securing personal data.

3.3. The IoT and Ownership of Data

Another issue related to the IoT is the ownership of data flowing in the IoT atmosphere. The issue of data ownership is important because of the increase of data volumes, the real-time nature of the data, and the growing awareness of data value.⁴⁵ Accordingly, knowing the owner(s) of data and the scope of that ownership become an urgent issue.⁴⁶

While investigating the state of information ownership in the cloud environment, Chris Reed mentioned however that the term "ownership" may not be accurate as digital information is not a personal property. But he added that information is nevertheless subject to laws such as intellectual property, privacy, confidentiality, contract laws, etc. These laws give the enterprise a level of control over information like owning a physical property.⁴⁷ Other researchers use the ownership term and insists that its meaning extends from the narrow sense of ownership to include the rights of controlling the use of data.⁴⁸ Still, some argue that data ownership can be used as a means to protect rights of data owners.⁴⁹

Regrettably, laws that protect personal data in the information age do not usually deal with the issue of ownership as they largely concentrate on how to process data, who authorized to do so, the meanings of personal data, and so on. Nevertheless, personal data protection laws include provisions that suggest propertisation such as the provisions on data subjects rights and the need of their consent.⁵⁰ It is argued that the absence of specific legislation about this issue plus the importance of data and the controversy over it in the information age could cause a dispute, uncertainty and failure of important services such as the IoT.

III. Closing

As it is outlined in the beginning of this paper, this study is a preview and introduction to many more substantial research areas in near future. While many countries, public and private

sectors alike, are increasingly reliant on the connectivity of data in their works and business processes, legal challenges on the issue of data privacy, data security and data ownership still unlikely be resolved in near future. Developing countries who adopt the IoT-based products and services should also review their legal readiness in relation to the above matters. Failure to prepare an appropriate legal and policy framework of the IoT may likely mean the failure of the IoT itself to deliver the full benefits expected by the society, or worse, may mean to trigger more social and legal problems in future.

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Endnotes

- 1 Dave Evans, (2011). *The Internet of Things – How the Next Evolution of the Internet is Changing Everything*. Cisco Internet Business Solutions Group (IBSG).
- 2 *Ibid.*
- 3 Stephan Haller. *The Things in the Internet of Things*. (paper were presented as a poster at the Internet of Things Conference 2010, Tokyo, Japan. <http://www.iot2010.org/>), p. 1. And Eric A. Fischer. *The Internet of Things: Frequently Asked Questions*. (Congressional Research Service: 2015.) p. 1
- 4 *The Concise Oxford English Dictionary* (Electronic version). Oxford University: 11th Edition.
- 5 International Telecommunication Union (ITU), Recommendation ITU-T Y.2060: Overview of the Internet of things. The Author: 2013. P 2.
- 6 Goldman Sachs Global Investment Research *The Internet of Things: Making sense of the next megatrend*. (Goldman Sachs: 2014) p 2.
- 7 Verizon. *State of the Market: Internet of Things 2016 Accelerating innovation, productivity and value*. (The Author: 2016), 3.
- 8 A report sponsored by Microsoft. *Cut through: How the Internet of Things is sharpening Australia's competitive edge*. The author: 2015. P 5.
- 9 Aala Santhosh Reddy, "Reaping the Benefits of the Internet of Things". *Cognizant Reports: 2014*, p 2.
- 10 Lopez Research. "An Introduction to the Internet of Things (IoT)", Part 1. of "the IoT Series". (Lopez Research LLC: 2013. P 4.
- 11 Denise Lund et al. "Worldwide and Regional Internet of Things (IoT) 2014–2020 Forecast: A Virtuous Circle of Proven Value and Demand." (IDC: 2014.) P 21.
- 12 McKinsey Global Institute (MGI), *The Internet of Things: Mapping the Value Beyond the Hype*. (McKinsey & Company: 2015) at 37.
- 13 *Ibid.* at. 38.
- 14 A report by the UK Government Chief Scientific Adviser, *The Internet of Things: Making the Most of the Second Digital Revolution*. (UK: The Government Office for Science: 2014) at 29.
- 15 David Niewolny. *How the Internet of Things Is Revolutionizing Healthcare*. Freescale Semiconductor, Inc. 2013.
- 16 Sidi Mohamed Sidi Ahmed and Sonny Zuhuda. "The Concept of Internet of Things and Its Challenges to Privacy." *South East Asia Journal of Contemporary Business, Economics and Law*, Vol. 8, Issue 4 (Dec.) ISSN 2289-1560.2015, at 3.
- 17 Scott R. Peppet "Regulation the Internet of Things: First Steps Toward Managing Discrimination, Privacy, Security, and Consent" *Texas Law Review*, Vol. 93, at 104.
- 18 Robin Murdoch and Paul Johnson. *Digital Trust in the IoT Era*. (Accenture: 2015.) p. 2.
- 19 Ron Davies, *The Internet of Things Opportunities and challenges*, European Union, 2015, p 3.
- 20 The FTC Staff Report. (2015). *Internet of Things Privacy & Security in a Connected World*. P. 9
- 21 Rolf H. Weber, Romana Weber (2010). *Internet of Things – Legal Perspectives*. Berlin: Springer.
- 22 See, Article 12 of the Universal Declaration of Human Rights (UDHR).
- 23 Paul J. Clarke, "The Market for Privacy: A Transactional Viewpoint". In Abdul Rahman Saad,

- Personal Data & Privacy Protection, Kuala Lumpur: Lexis Nexis Malaysian Law Journal: 2005.), 246.
- 24 *Ibid.* 246.
- 25 As quoted by Abu Baker Munir & Siti Hajar Mohd Yasin, in *privacy & Data Protection*, (Malaysia: Sweet & Maxwell Asia, 2002) at 6.
- 26 As quoted by Privacy Incorporated Software Agent (PISA), *Handbook of Privacy and Privacy-Enhancing-Technologies- The case of Intelligent Software Agents*, ed. G.W. van Blarkom, J.J. Borking, and J.G.E. Olk (The Netherlands: College beschermingpersoonsgegevens, 2003), 8.
- 27 Blanca Escribano and Olswang, "Connected Cars and Other Challenges in the EU IoT Privacy Ecosystem" (*Communication Law News Letter*: June 2016) at 20.
- 28 William Thomas DeVries, (2003). *Protecting Privacy in the Digital Age*. *Berkeley Technology Law Journal*, Volume 18 (1 Article 19), 284-311.
- 29 *Ibid.*
- 30 Karen Rose et al. "The Internet of Things: An Overview. Understanding the Issues and Challenges of a More Connected World." *The Internet Society (ISOC)*. 2015 at 26-7.
- 31 Samuel Greengard, (2015). *The Internet of Things*. Massachusetts Institute of Technology. At 158.
- 32 See, for example, sections 5-12 of the Malaysian Personal Data Protection Act 2010, which govern the processing of personal information in the whole life-cycle of data use in commercial activities.
- 33 Lilian Edwards. *Privacy, Security and Data Protection in Smart Cities: a Critical EU Law Perspective*. (RCUK Centre for Copyright and New Business Models in the Creative Economy: 2015) at 18.
- 34 *Concise Oxford English Dictionary*. (11th Edition- Electronic Version).
- 35 Nick Gillord, *Information Security Management the Legal Risks*, CCH Australia Limited, 2009.
- 36 The FTC. P. 10.
- 37 Article 95 (1) of the EU Regulation 2016/679.
- 38 Article 32 (1) of the Regulation.
- 39 Section. 9 of the PDPA
- 40 Article 29 Data Protection Working Party, *Opinion 8/2014 on the on Recent Developments on the Internet of Things*. (2014) pp 10-13.
- 41 Section 2 of the PDPA 2010.
- 42 Section 3 of the PDPA 2010.
- 43 W Kuan Hon, Christopher Millard, and Jatinder Singh. *Twenty Legal Considerations for Clouds of Things* (Queen Mary University of London, School of Law Legal Studies Research Paper No 216/2016) at 9.
- 44 Lilian Edwards, at 10.
- 45 *Ownership of Customer Data*. (2016). Retrieved March 19, 2016 from the URL: <http://www.professionalsecurity.co.uk/news/interviews/ownership-of-customer-data/>
- 46 *The World Economic Forum*. *The Emergence of a New Asset Class*. (Geneva: the author. 2011) p. 16-17,
- 47 Chris Reed. *Information "Ownership" in the Cloud*. (Queen Mary University of London, School of Law Legal Studies Research Paper No. 45/2010.) p 1.
- 48 W Kuan Hon et al. *Legal Studies Research Paper No 216/2016*. *Twenty Legal Considerations for Clouds of Things*. (Queen Mary University of London, School of Law: 4 January 2016) p. 15.
- 49 Barbara J. Evans, "Much Ado About Data Ownership" *Harvard Journal of Law and Technology*. Vol. 25, no. 1 Fall 2011, pp- 70-130.
- 50 Nadezhda Purtova. *Property Rights in Personal Data A European Perspective*. (The Netherlands: Kluwer Law International, 2012), at 195-205.

References

1. A report by the UK Government Chief Scientific Adviser, *The Internet of Things: Making the Most of the Second Digital Revolution*. (UK: The Government Office for Science: 2014).
2. A report sponsored by Microsoft. *Cut through: How the Internet of Things is sharpening Australia's competitive edge*. The author: 2015.
3. Aala Santhosh Reddy, "Reaping the Benefits of the Internet of Things". *Cognizant Reports*: 2014.
4. Abu Baker Munir & Siti Hajar Mohd Yasin, in *privacy & Data Protection*, (Malaysia: Sweet & Maxwell Asia, 2002).
5. Article 29 Data Protection Working Party, *Opinion 8/2014 on the on Recent Developments on the Internet of Things*. (2014) pp 10-13.

6. Barbara J. Evants, "Much Ado About Data Ownership" *Harvard Journal of Law and Technology*. Vol. 25, no. 1 Fall 2011, pp- 70-130.
7. Blanca Escribano and Olswang, "Connected Cars and Other Challenges in the EU IoT Privacy Ecosystem" (*Communication Law News Letter*: June 2016).
8. Chris Reed. Information "Ownership" in the Cloud. (Queen Mary University of London, School of Law Legal Studies Research Paper No. 45/2010.).
9. Dave Evans, (2011). *The Internet of Things – How the Next Evolution of the Internet is Changing Everything*. Cisco Internet Business Solutions Group (IBSG).
10. David Niewolny. *How the Internet of Things Is Revolutionizing Healthcare*. Freescale Semiconductor, Inc. 2013.
11. Denise Lund at.al. "Worldwide and Regional Internet of Things (IoT) 2014–2020 Forecast: A Virtuous Circle of Proven Value and Demand." (IDC: 2014.).
12. Goldman Sachs Global Investment Research *The Internet of Things: Making sense of the next megatrend*. (Goldman Sachs: 2014).
13. International Telecommunication Union (ITU), *Recommendation ITU-T Y.2060: Overview of the Internet of things*. The Author: 2013.
14. Karen Rose at. al. "The Internet of Things: An Overview. Understanding the Issues and Challenges of a More Connected World." *The Internet Society (ISOC)*. 2015.
15. Lilian Edwards. *Privacy, Security and Data Protection in Smart Cities: a Critical EU Law Perspective*. (RCUK Centre for Copyright and New Business Models in the Creative Economy: 2015).
16. Lopez Research. "An Introduction to the Internet of Things (IoT)", Part 1. of "the IoT Series". (Lopez Research LLC: 2013).
17. McKinsey Global Institute (MGI), *The Internet of Things: Mapping the Value Beyond the Hype*. (McKinsey & Company: 2015).
18. Nadezhda Purtova. *Property Rights in Personal Data A European Perspective*. (The Netherlands: Kluwer Law International, 2012), at 195-205.
19. Nick Gillord, *Information Security Management the Legal Risks*, CCH Australia Limited, 2009.
20. *Ownership of Customer Data*. (2016). Retrieved March 19, 2016 from the URL: <http://www.professionalsecurity.co.uk/news/interviews/ownership-of-customer-data/>
21. Paul J. Clarke, "The Market for Privacy: A Transactional Viewpoint". In Abdul Rahman Saad, *Personal Data & Privacy Protection*, Kuala Lumpur: Lexis Nexis Malaysian Law Journal: 2005).
22. *Privacy Incorporated Software Agent (PISA), Handbook of Privacy and Privacy-Enhancing Technologies- The case of Intelligent Software Agents*, ed. G.W. van Blarckom, J.J. Borking, and J.G.E. Olk (The Netherlands: College beschermingspersoonsgegevens, 2003).
23. Robin Murdoch and Paul Johnson. *Digital Trust in the IoT Era*. (Accenture: 2015.).
24. Rolf H. Weber, Romana Weber, (2010). *Internet of Things – Legal Perspectives*. Berlin: Springer.
25. Ron Davies, *The Internet of Things Opportunities and challenges*, European Union, 2015.
26. Samuel Greengard, (2015). *The Internet of Things*. Massachusetts Institute of Technology.
27. Scott R. Peppet "Regulation the Internet of Things: First Steps Toward Managing Discrimination, Privacy, Security, and Consent" *Texas Law Review*, Vol. 93.
28. Sidi Mohamed Sidi Ahmed and Sonny Zuhuda. "The Concept of Internet of Things and Its Challenges to Privacy." *South East Asia Journal of Contemporary Business, Economics and Law*, Vol. 8, Issue 4 (Dec.) ISSN 2289-1560.2015.
29. Stephan Haller. *The Things in the Internet of Things*. (paper were presented as a poster at the Internet of Things Conference 2010, Tokyo, Japan. <http://www.iot2010.org/>), p. 1. And Eric A. Fischer. *The Internet of Things: Frequently Asked Questions*. (Congressional Research Service: 2015.).
30. *The Concise Oxford English Dictionary (Electronic version)*. Oxford University: 11th Ed.
31. *The FTC Staff Report*. (2015). *Internet of Things Privacy & Security in a Connected World*.
32. *The World Economic Forum. The Emergence of a New Asset Class*. (Geneva: the author. 2011).
33. Verizon. *State of the Market: Internet of Things 2016 Accelerating innovation, productivity and value*. (The Author: 2016).
34. W Kuan Hon, Christopher Millard, and Jatinder Singh. *Legal Studies Research Paper No 216/2016. Twenty Legal Considerations for Clouds of Things*. (Queen Mary University of London, School of Law:4 January 2016).
35. William Thomas DeVries, (2003). *Protecting Privacy in the Digital Age*. *Berkeley Technology Law Journal*, Volume 18 (1 Article 19), 284-311.