

The influence of Internet of Things on employee's engagement among generation Y at the workplace

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Abstract—This study provides the analysis of the influences Internet of Things (IoT) have towards employee engagement among generation Y in the workplace. Due to the declining levels of engagement among employees, especially among generation Y, a study of the influences towards the engagement levels are crucial. IoT is used for our daily activities thus, it acts as an influencer. Using the Technology Acceptance Model (TAM), United Theory of Acceptance and Use of Technology (UTAUT) and employee engagement model, the conceptual model for the research is developed. A total of 384 respondents are targeted for the research. The responses will be analyzed using the Statistical Package for Social Sciences (SPSS) Software. The aspects of performance expectancy of IoT, effort expectancy of IoT, facilitating conditions for IoT, attitude towards using IoT and the perceived enjoyment towards IoT are the focus of this research. The use of IoT has a mediating role in the model. The research will contribute towards the development and performances of organizations.

Keywords—*Internet of Things (IoT); Employee Engagement; TAM; UTAUT*

1 Introduction

The business world is often the target for problems ranging from competitions, growth of information and technology, economic problems, dynamic changes (Veleva, Bodkin, & Todorova, 2017) and many more. The challenges have demanded changes to be implemented by organizations. Price cuts, downsizing and re-structuring are examples of changes that have been implemented in the organizations to adapt to the challenges (Hernaus & Vokic, 2014). However, organizations need to realize the importance of re-structuring the way the organization work, from the production management, human resources department and all the other departments. Retaining employees and ensuring the engagement levels of employees will change the performances of the organizations without the need to implement other drastic changes (Bakker, 2015).

However, employee engagement has always been an issue in the world. In 2016, the trend showed a decrease from 65% to 63% (Hewitt, 2017b). Based on the reports done by Gallup regarding the state of the American Workplace, as high as 51% out of almost 32 million employees surveyed are not engaged in their work while 16% were reported to be actively disengaged (Gallup, 2017). The trend is similar in Asia where the levels of employee engagement decreased from 65% to 62% (Hewitt, 2017b). As for the levels of engagement in Malaysia, the results of the report recorded that Malaysia has one of the lowest engagement rates among other Asian countries for the year 2017 (Hewitt, 2017a). The overall levels of engagement in Malaysia dropped by 2 points from 61% to 59% and generation Y employees recorded the lowest engagement levels (Hewitt, 2017b). Factors influencing the engagement levels should be researched further to overcome the issue of disengagement.

For generations that are born in the world of technology, they are described as technically adaptable; this includes the generation Y individuals. Thus, technology plays an important role in the lives of the generation groups (Hernaus & Vokic, 2014). The use of internet and social media (Jones, Borgman, & Ulusoy, 2015) enables the users to find any information within seconds and stay updated anywhere, anytime. A study reported that with the adaptation of technology, the organization might be able to retain their employees (Dijkman, Sprenkels, Peeters, & Janssen, 2015).

Internet of Things is the latest concept of technology (Lee & Lee, 2015). Internet of Things is the interconnection of the electronic devices that are currently present in the world, made possible with the internet (Dijkman et al., 2015). Thus, Internet of Things is a concept that need to be researched further and the influences towards organizations need to be analysed to study the impact on the engagement levels among the employees.

The research questions being addressed for the study would be:

1. How Internet of Things influences the engagement levels among Generation Y employees?
2. How Internet of Things influences the engagement levels among Generation Y employees with the mediating role of employees' acceptance and usage of Internet of Things?

The study starts by analysing the relevant literatures to propose an integrated an integrated model. The model will be used to study the factors influencing employee engagement with the mediating role of IoT adoption and usage in the workplace.

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The remainder of the study will discuss on the literature review based on the study done by past researchers, the research model and the developed hypotheses; Section 3 will describe the research methods; Section 4 analyses the findings and the results and Section 5 provided the explanation and conclusion to the findings of the research with future recommendations.

2 Literature Review

2.1 Generation Y

The differences in generations are the same as cultural differences. The ways the generations' individuals were brought up, the environment and members of the society are the factors influencing the differences between the generations. Many researchers agree that the characteristics of generation Y are unique and different from the past generations (Fernandez, 2009).

Generation Y have many resources, are energetic and action oriented, follows trends and are dependent on media and internet for information. Other than that, Generation Y individuals are more open towards diversity, technology, online communication (Fernandez, 2009), open to flexibility, new inputs and possibilities (Choi, Kwon, & Kim, 2013). Some aspects that are demanded by Generation Y individuals are a career that is challenging, interesting, rewarding, satisfying and provides them with good salary. According to (PrincetonOne & Hobart, 2013), generation Y individuals demands for their work to be meaningful and interesting.

Since generation Y is a technology savvy generation, the use of technology in the organization will benefit both the organization and the employees with proper usage (Fernandez, 2009) and (Choi et al., 2013). The characteristics and demands of generation Y is thus a very important aspect to study in order to ensure the performances in the workplace.

2.2 Employee Engagement

Employee engagement has been shown to increase employee performances in an organization. Employee engagement is more than the aspect of job satisfaction that has been researched in the past few years by many researchers (Özçelik, 2015). According to the research done by Schneider & Macey, (2008), employee engagement can be defined as having an organizational purpose, being involved, passionate, enthusiastic and having the energy to perform work. Further reported by Schneider & Macey's, (2008), engagement can be referred to as a psychological state of an individual where emphasis is given on absorption, passion and affection towards the job. When the needs of an individual are met, individuals will be emotionally and cognitively engaged. Thus, employees that receive sufficient continuous growth opportunities in any organization will feel a sense of belonging, involvement and growth towards the organization. Individuals will tend to stay loyal with the organization.

There are many claims that engagement is important to ensure high performance and high productivity of an organization. Higher employee engagement will lead to higher job satisfaction, retention, profitability, performances customer loyalty and organizational citizenship behaviour (Veleva et al., 2017). Engaged employees will have the interest to devote their selves to the organization (Caesens & Stinglhamber, 2014) while enjoying their work. Organizations with engaged employees will increase the individual's outcomes, organizational success and financial performances.

Employee engagement has been shown to improve the levels of employee retention, quality of product and an increased in the levels of satisfaction among customers (Schullery, 2013). High engagement will reduce absenteeism, increase in employee effort and productivity, increased in productivity and many more (Fernandez, 2009). Employees who are engaged in their work tend to make personal sacrifices for the organization. Other than that, these employees will relate themselves to the organization. They will feel that they belonged to the organization.

As for the measurement of engagement levels among individuals and employees, many models have been developed. One of the models focused on the psychological state of individuals. For employees to be engaged there are three main psychological conditions that are important which are meaningfulness, safety and availability (Akbar, 2013). Engagement can also be categorized into vigour, dedication and absorption (Bakar, 2013). Vigour is the feeling of an individual when they experience physical strength, emotional energy and cognitive liveliness (Bakar, 2013). Dedication is the feeling of giving an impact, inspire and the pride in doing a task while absorption in the other hand, is the level of concentration an individual give towards their tasks (Caesens & Stinglhamber, 2014).

The current levels of engagement among generation Y is the lowest compared to the other generations (Hewitt, 2017b). This shows that generation Y individuals are not comfortable with the structure of the organizations they are working in. Misunderstandings, miscommunications and unproductivity that occurs in the organization when the demands of the new generations entering the workforce are not acknowledged are some of th reasons (Silva, Dutra, Velosa, Fischer, & Trevisan, 2015).

A research has been done studying the effects of new ways of working towards employee engagement. The results of the research stated that new ways of working improves employee engagement levels. The report also stated that the new way of working selects employees that are open to change and are exposed to technology. Generation Y are the ones suited to the description. Creating this new working environment where employees will be engaged, communicative, and interactive other than enjoying and feeling fulfilled with their work will enhance the services and experiences stakeholders obtain from the organizations (Kueh & Voon, 2007).

2.3 Internet of Things

Internet is considered as a vital part in life of any individual. Internet is a way to connect and share thoughts, words, information, experiences and many more to anyone around the world (Isaac, Abdullah, Ramayah, & Mutahar, 2017).

Internet of Things involves interconnected objects that harvest information from the environment, interacts with the environment and by using the internet, provide information, analytics and communications to the users (Gubbi, Buyya, Marusic, & Palaniswami, 2013) and (Lee & Lee, 2015). The Internet of Things, thus, connects people and provides them with access to valuable information that is necessary and vital for their everyday lives easily (Gubbi et al., 2013). Hence, it is vital to study on the influences Internet of Things have on individuals and the aspects of these influences.

The connectivity between the internet and the devices will make life easier for people by anticipating and fulfilling the needs of users and individuals (Sarin, 2016). Other than that, Internet of Things made it possible to integrate and communicate between the current devices and even future devices to ensure that users will receive all the data that are necessary from all of their devices (Agrawal & Vieira, 2013). In the perspective of suppliers, connected products will provide the suppliers with constant updates and access to the data on the application, wear and tear the different features and other necessary information. With these data, suppliers will be able to gather the information needed in order to develop better products in the future. Other than that, connected devices will enable the organizations to develop a better product and services where maintenance and development can be done based on actual requirements. The software of the connected devices can also be updated easier compared to when it is not connected (Saarikko, Westergren, & Blomquist, 2017).

Connected devices allow the collection of information and easier identification of the problem that has occurred. Information collected can range from the performance, energy usage and the environment of the devices (Lee & Lee, 2015). Another benefit of Internet of Things is the ability in locating devices that is faulty or in good shape. Since the devices are connected, the technicians will be aware of which devices and where the faulty devices are located (Saarikko et al., 2017). Internet of Things gives organization benefits in terms of monitoring and controlling devices, services, products, decision making other than assisting in sharing and collaboration of information (Lee & Lee, 2015). With the improvement in the processes involved in an organization, the performances of the individual employees and their feelings towards their work will be influenced.

Based on some past researchers, internet technology have the potential to improve the economy, social life, culture and enhance the performance of organizations (Isaac et al., 2017). Currently, smart devices have been changing our daily lives making it more interactive and informative (Gubbi et al., 2013). By being aware of the information that is crucial, individuals will be able to react and ensure the performance of their work and tasks (Kafle, Fukushima, & Harai, 2015), improving the performance of the organization they are in, at the same time.

2.4 Theoretical Framework

TAM and UTAUT models are chosen for this research due to their emphasis on user behaviours towards the system. Other models focused on the individuals' psychology instead of behaviours and experiences with the use of the system.

Employee engagement can be measured by using several models. The model that will be utilised in this research is the model comprising of the cognitive, emotional and physical factors of engagement. There is a need to drive personal energies into the aspects of cognitive, emotion and physical labours to attain the state of engagement (May, Gilson, & Harter, 2004).

2.5 Conceptual Framework

Table 2.5.1 – Conceptual Framework

Factors	Reasons
Performance Expectancy (TAM & UTAUT)	Determine whether IoT helps in improving performances (Venkatesh, Thong, & Xu, 2012).
Effort Expectancy (TAM & UTAUT)	Identify whether IoT is easy to use and free of effort (Wu & Wang, 2005).
Facilitating Conditions (UTAUT)	Determine the levels of effect on the availability of resources have towards the acceptance, adoption and usage of IoT
Attitude towards using IoT (UTAUT)	Determine how the respondents feel towards the adoption and usage of IoT (Venkatesh, Morris, Davis, & Davis, 2011).
Perceived Enjoyment (UTAUT)	Determine the levels of enjoyment felt by the users of IoT
Employee Engagement	Identify the levels of attachment an employee has towards the job.
Acceptance, Adoption and Use	Adoption will change and improve the organization, thus, increase the engagement among employees.

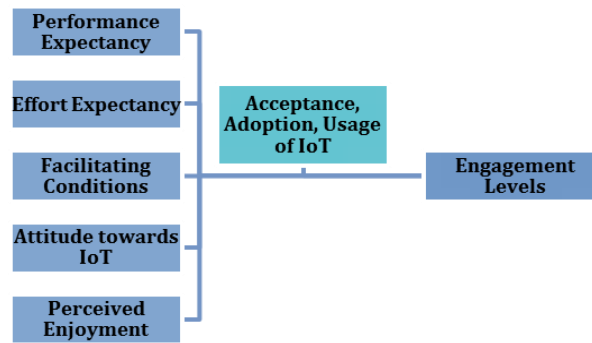


Figure 2.1- Conceptual Framework

2.6 Hypotheses Development

In order to ensure the adoption of technology is a success for personal usage or for work, there must be gains in using the certain technology (Wu & Wang, 2005).. Thus, in order for IoT to successfully increase the engagement levels among employees, it is crucial that IoT can improve the employees performances in the organization (Venkatesh et al., 2012). Thus, the following hypothesis is proposed.

H1. There is significant relationship between Performance Expectancy of IoT and employee engagement

To ensure that IoT receives the support of the users, IoT will need to be easy to use, free of effort (Wu & Wang, 2005). When the system is easy to use, users will be interested and will be able to adapt to the usage easily. Based on this factors and reasons, the second hypothesis is proposed :

H2. There is significant relationship between Effort Expectancy of IoT and employee engagement

Facilitating conditions, the third factor selected for this study is the degree of availability of resources, knowledge and support that is essential in the acceptance, adoption and use of IoT systems (Venkatesh et al., 2012). These aspects are important for the adoption of IoT and for the success of IoT in improving the levels of engagement among the employees. therefore, the following is proposed:

H3. There is significant relationship between Facilitating Conditions for IoT and employee engagement

The feelings experienced while using a system is as important as the usefulness of the system (Venkatesh et al., 2012). The feeling experienced will affect the users' perception and acceptance towards the system. If the user dislikes the system, thus, the acceptance level of the user will be low and this will further impact the engagement level of the individual. Thus :

H4. There is significant relationship between Attitude towards using IoT and employee engagement

Feeling of enjoyment and fulfilment in doing work will improve the feeling of engagement among the employees (Kueh & Voon, 2007). Thus, the feelings of users while using IoT systems will influence their feeling of enjoyment while performing their work (Heijden, 2016). Therefore :

H5. There is significant relationship between Perceived Enjoyment towards IoT and employee engagement

Failure in adoption of technology is disruptive towards organization (Bakar, 2013). Successful adoption will change and improve the organization, and in this study, it will be in terms of the levels of engagement among employees. Thus, the levels of engagement will be influence by this factor of adoption and the usage of IoT. This factor will act as the mediator for the study. Thus, the following is hypothesized:

H6. There is significant relationship between Performance Expectancy, Effort Expectancy, Facilitating Conditions, Attitude towards using IoT and Perceived Enjoyment towards IoT and employee engagement with the mediating role of the acceptance, adoption and usage of IoT.

3 Methodology

3.1 Quantitative Method

The study utilized quantitative method. Quantitative research involves the collection of numerical data that are collected from the participants of the research and analysed through techniques that ranges from statistical and counting (Alshehri, 2012). By using quantitative research that utilizes questionnaires, the same data can be collected from large groups of people (Alshehri, 2012). Data analysis of quantitative research is less time consuming as well since the Statistical Package for the Social Sciences (SPSS) can be utilised (Rahman, 2017).

3.2 Data Collection

The research is based on primary and secondary data collection. Primary data will be from questionnaires distributed to obtain the results of the research. Secondary data will be from the past literatures that are relevant to the research.

Simple random sampling is the method chosen for this research. This method allows the population to have an equal chance of being selected. The results gathered using this sampling technique reduces the chances of any bias results, reduces systematic errors from occurring and the inference that is drawn from the results of the study can represent the population for the research.

3.3 Questionnaire Construct

Questionnaires utilized the Likert scale as a way to measure the responses from the respondents. 5 points Likert scale was used. The scale ranged from one (strongly disagree) to five (strongly agree). With the scales, the acceptance levels of the respondents was collected and analysed.

The questionnaire consisted of two main parts; demographic profile and the construct items, namely the variables performance expectancy (Venkatesh et al., 2011), effort expectancy (Akbar, 2013), facilitating conditions (Akbar, 2013), attitude toward using IoT (Venkatesh et al., 2011), perceive enjoyment towards IoT (Heijden, 2016), the employee engagement (May et al., 2004) and the acceptance, adoption and usage of IoT (Al-Momani, Mahmoud, & Ahmad, 2016). The questionnaires were modified and adapted from past researchers to suit the context of this study.

3.4 Sample Size

The number of population for Generation Y individuals is estimated to be around 10,744,181 individuals. This group is the largest when compared with the other generational groups. The percentage of working generation Y individuals would be around 85%. 85% of the number of population of generation Y would be 9,132,554 people. This number would be the total population size for this study. Sample size will be calculated using the sample size table method. Thus, the sample size of the research would be 384 respondents.

The unit of analysis for the research would be the individuals that respond to the questionnaire. The responds will be recorded and analysed to determine the influences that are present on the subject of the research (Schneider & Macey, 2008).

4 Conclusions and Recommendations

This study aims to enhance the understanding on the benefits IoT can provide towards the levels of engagement among the employees. This area of study should be researched further and thoroughly to ensure that the factors and attributes discussed in this study can be implemented and adopted well to reap the benefit from it, thus improving the performances of many organizations.

The success of the research will contribute to various parties that includes :

Contribution to the managers

Managers will know where to invest in order to improve the levels of engagement among their employees and at the same time retain the talents that they have in the organization.

Contribution to the company

Understanding the ways Internet of Things influence the levels of engagement among employees will enable the company to strategize and improve the employees' engagement levels.

Contribution to the stakeholders of companies

Having a company with engaged employees will ensure that the employees are able to service the customers better. Stakeholders will be more satisfied with the services that they received.

Contribution to the employees

Being engaged, employees will be able to perform at their best and ensure that the services they provide to the stakeholders of the organization are of high standards.

Contribution to future researchers

The study can act as a platform and as a basic guide for future researches.

4.1 Limitations

4.1.1 Limited sample

The survey will be limited to generation Y employees only. The other generation will have a different view on the usage and influences of IoT in the workplace. This limitation reduces the view the researchers will have on the study.

The research should be conducted among other generations, generation X, baby boomers and the current generations to differentiate the needs and wants of the various generations. This will enable the researchers to compare the views of the different generations.

4.1.2 Cross sectional study

Time changes the perceptions of the respondents towards the benefits of IoT in the workplace. This research should utilize the use of longitudinal research method to identify the influences IoT have on the levels of engagement better. The study can be done to research on whether there is significant impact of IoT adoption in the workplace on the levels of employee engagement, before and after the implementation of IoT in the workplace.

4.1.3 Study is generalized

Different roles will have different perspectives on the influences of IoT. Different organization will also have different views on the aspects that is being researched. An organization that have successfully implemented IoT systems in the organizations will have a different view from organizations that are not utilising any IoT systems.

Researches that are segregated and specialized into the different job roles that are available will enable the researchers to determine the impacts and influences IoT have on the different job roles. The different work positions

will give the researchers a wider view on the influences IoT might have on the levels of engagement among all the different job levels in an organization.

Other than that, the research should also target and differentiate the organizations that are implementing IoT in the workplace with those which have yet to adopt IoT in the organizations. This segregation will enable the researchers to differentiate the perspectives of employees that are using IoT systems in their workplace with those who are not using IoT systems.

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