
Abstract

Specifically, in the wake of the novel coronavirus pandemic, Covid-19, the usage of video conferencing tools is increasingly prevalent among mankind from all walks of life. Moreover, it is unbeknownst to many that the human population has escalated to an unsustainable proportion, silently sending the environment into an unfathomable state and potentially irreversible decline. Therefore, this paper aims to determine the factors of the adoption of video conferencing tools among heterogeneous groups in Malaysia. Factors from the technology acceptance framework, TAM and UTAUT have been modified into integrative framework which consists of 4 factors including Perceived Usefulness (PU), Perceived Ease of Use (PEU), Social Influence (SI) and Facilitating Conditions (FC). Questionnaire has been distributed and data from 390 respondents are analysed using SPSS. Analysis has shown that the percentage of responders that utilise video conferencing tools decreases progressively over all generations, from Generation Z (97.8%) to Millennials (83.7%), to Generation X (57.4%), with a minor uptick beyond Generation X, as Baby Boomers are more involved with video conferencing (68.4%). Although there are growing patterns that are suggesting younger generations would be the first to adopt technology, however, it is currently the older demographic group that is adopting technology at the fastest pace. Based on the hypotheses derived, all the factors contribute towards the adoption of video conferencing tools while it has been identified that Perceived Usefulness (PU) has the greatest influence on the adoption of video conferencing tools. And overall, all the factors in the conceptual framework demonstrate significant positive relationship towards the adoption of video conferencing tools.

Keywords: *video conferencing tools, heterogeneous groups in Malaysia, TAM, UTAUT, perceived usefulness*

1. Introduction

In particular, in the aftermath of the novel coronavirus pandemic, Covid-19, the use of video conferencing tools is becoming more common among people from all areas of life. When face-to-face interaction was dangerous, educational institutions, businesses, and even domestic households quickly adjusted to the new normal by going digitally and electronically, as the wildly spread of the mighty Covid-19 virus compelled governments all over the world to lock down cities and close national borders (Waizenegger et al., 2020). As a result of the crisis-induced shutdown, video conferencing systems have seen an increase in demand (Wiederhold, 2020). This represents a massive shift in consumption patterns as schools (Iivari et al., 2020; Moorhouse & Beaumont, 2020; Murai & Muramatsu, 2020) and businesses (Harvard Business Review, 2020; Wang & Roubidoux, 2020) shift to online learning and meetings where video conferencing tools have surpassed face-to-face meetings that were geographically limited (Olsen et al., 2020; Shah et al., 2020).

The natural world is claimed to be altered in a number of ways by the Covid-19 pandemic attack, making it a mixed gift at best. According to recent reports by Global Carbon Project, (2020), global daily emissions of carbon dioxide have decreased by 17 percent from January to early April of this year (Le Quéré et al., 2020).

The same holds true for Malaysia, where residents have cut back on their travel, or stopped going at all, throughout the duration of the Movement Control Order (MCO). However, the widespread changes brought about by the Covid-19 outbreak have the potential to reduce emissions in the long run (United Nations Development Programme in Malaysia, 2020).

Actually, not too long ago, before the unprecedented changes and uncertainties resulting from the outbreak of Covid-19 virus, people generally rely on face-to-face meeting over the employment of video conferencing tools. In addition to the irony that air pollution, increasing temperatures, and even climate change are all exacerbated by travelling long and small distances to meet in person, another disadvantage of face-to-face meetings is their impact on the environment (Glover et al., 2018). UNICEF Malaysia (2014) notes that despite Malaysia's ambitions to become a developed nation by 2020, improving the country's Internet traffic and infrastructure remains a tough achievement. Furthermore, individuals generally despise having to get up early in the morning or sit in traffic (Eliasson, 2014; Terrill, 2017) because of the time and effort it requires. But if one's school or company had adopted video conferencing capabilities, they wouldn't have had to get up so early in the morning for preparation or get caught in traffic. In addition, one can have their online seminars or meetings pretty much anywhere they like (Fernandez, 2020) It's up to the individual to determine the setting that best suits their needs, whether it's their home, a favourite coffee shop, a park, or the beach. Fundamentally, individuals all over the world have realised that they can utilise video conferencing solutions to digitally study, organise meeting electronically, and work from home, and some of them may even desire to continue doing so (Centre for International Governance Innovation, 2020). As a result, if people were encouraged to alter some of their lockdown habits, it might have helped the world out by lowering emissions of a potentially harmful gas while also making life easier. It's a win-win situation.

In recent years, it has become clear that video conferencing tools are good for society, especially in Malaysia where the number of Covid-19 cases has gone up. But Malaysians still tend to like meeting people in person. When everyone goes back to school and work during a recovery movement control order (RMCO), this is proof. Thus, the purpose of this research is to fill in the knowledge gaps and give an overall assessment by studying the factors affecting the adoption of video conferencing tools among heterogeneous group of people in Malaysia. This is because most research is done outside of Malaysia, and only a small amount of research has been done in Malaysia to investigate the adoption of video conferencing tools among heterogeneous group of people in Malaysia.

2. Literature Review

The review of previous study literature provides a better understanding of how the influences of perceived usefulness, perceived ease of use, social influence, and facilitating conditions influence heterogeneous groups' adoption of video conferencing tools in Malaysia. As a result, the factors influencing video conferencing adoption among heterogeneous have been examined.

2.1 Adoption of Video Conferencing Tools

According to Straub (2009), adoption theory is concerned with the individual and their decisions regarding whether or not to embrace a given innovation. As study by Sahin's (2006) stated that examination of Rogers' theoretical work, adoption occurs when people decide that utilizing a new innovation is the best alternative. On the other hand, he pointed out that the antithesis of adoption is not adoption of innovation. "an antagonism to the phrase refuse and signifies the positive decision to employ an innovation," as described by Taherdoost (2018). Lai (2017) stated that the rate at which consumers adopt new technologies is influenced by a variety of factors, including the ease with which they may use the technology, the satisfaction of their needs, their perception of its safety, and so on. Video conferencing, which Chang et al. (2010) define as

"visual communication and data interchange simultaneously," is becoming increasingly popular among businesses and individuals alike. The most obvious benefit of videoconferencing for regular people is the time and money saved on travel, as well as the elimination of wasteful resources like paper and fuel.

2.2 Factors Affecting Adoption of Video Conferencing Tools among Heterogeneous Groups

2.2.1 Perceived Usefulness

Perceived usefulness, as defined by Gibson and O'donnell (2009), is the degree to which an individual user or group of users believe that a given technology will benefit them and enable them to accomplish their goals. Perceived usefulness is a key factor in whether or not consumers adopt new technologies, as discussed by He et al., (2018). According to Comber and Lawson (2013), the perceived usefulness and relevance of video conferencing as a learning technology emerges as a central determinant of sustainability when studying the use of video conferencing in schools in England using a multiple case-study approach upon returning to schools with a reputation for demonstrating innovative policy and practise in video conferencing. The research conducted by Liao et al. (2015), on the other hand, broadened these definitions by defining perceived usefulness as when users have subjective, positive ideas that the usage of the social network website would improve their learning attitudes and usage effects in examining the antecedents of collaborative learning performance over social networking sites in a ubiquitous learning context. Considering the acceptance of these video conferencing tools, it is identified that there is a link between perceived usefulness and the intention to use, but no relationship established between level of acceptance and the required efforts, according to the study conducted by Fallery et al., (2010) in a French company to compare the acceptance of two video conferencing mediated training systems of virtual classes and remote classes.

On the other hand, Keržič et al., (2019) research shows that e-learning is seen as useful when the teacher is involved and active in an e-course. This is because the student's attitude toward the subject matter and the lecturer's performance in the classroom have a direct effect, while technology acceptance has an indirect effect. Thus, it can be summarised where the technology acceptance has an indirect impact in perceiving usefulness in the context of e-learning.

H1: There is a significant effect between perceived usefulness and the adoption of video conferencing tools.

2.2.2 Perceived Ease of Use

According to Davis (1989), a system's perceived ease of use is the extent to which its users expect minimal effort to accomplish a task while using it. For Web-based education, Chiu and Wang (2008) found that a learner's expectation of how simple the learning platform will be to use correlates favourably with their desire to stick with it. Ameer (2015) mentioned that a video conferencing tools adoption and use will increase if its users find it simple to operate. Referring to He et al. (2018), people's confidence and competence in adopting new technology rises when they consider it as easy to use (perceived ease of use). The characteristics of individuals that have an impact on their perspectives are also explored. When it comes to technology, some people are self-motivated and ready to learn more, while others are more cautious. Managers can identify strategies to promote people's use of technology by gaining insight into the features and personalities that impact individual views. These studies suggested that perceived ease of use may associate with or increase the chances of the adoption of technology.

However, the traditional TAM and prior studies on the effects of perceived ease of use and perceived

usefulness towards continuing intention to use Cloud e-Learning application were not supported by the study conducted by Wang et al. (2019). That perceived ease of use is relatively unimportant, taken as a whole, shows that resistance to new technology may not be as crucial as formerly thought. Perceived ease of use increases an end user's beliefs about one's ability to undertake the advised behaviour (i.e. self-efficacy) and, in turn, affects adoption, as identified by the theoretical model intended by He et al., (2018).

H2: There is a significant effect between perceived ease of use and the adoption of video conferencing tools.

2.2.3 Social Influence

The term social influence refers to the extent to which friends and family members can sway an individual's decision on whether or not to adopt a new technology (Venkatesh et al., 2003). Additionally, social influence is the extent to which the user thinks the technology is significant for other people in their social circle, which in turn influences the user's behavioural intention and the degree to which the user makes use of the technology (Martins et al., 2018). Social influence terms, such as subjective norm, social factors, and images, are used to characterise the extent to which an individual's perceptions are influenced by the perceptions of those in their immediate social context (Lin, 2019). When discussing a social learning platform in a higher education setting, social influence refers to the recommendations of peers, professors, friends, and family (Khechine & Augier, 2019). According to Godin and Leader's (2013) research into what factors influence people's willingness to use virtual teamwork training technologies, social influence is the extent to which people believe that influential people think they should utilise such tools themselves.

Khechine et al. (2014) found that social influence has a major impact on the adoption of webinar systems to facilitate blended learning, with the conclusion that the more favourable the influencers, the more probable it is that students will adopt the system. Therefore, persuading influential individuals such as professors to promote the efficiency and efficacy of tools such as webinar systems for university students' learning is the way to a more successful integration of blended learning.

When it comes to the introduction of desktop video conferencing in online academic courses, social influence is one of the elements that influences the behavioural intention of undergraduate business students to use desktop video conferencing technology (Lakhal et al., 2013). In addition, Godin and Leader (2013) found a significant relationship between social influence and students' intentions to use collaboration technology. The results also indicate that students who believe future employers believe they should be able to use virtual collaboration technologies will be more likely to use the technology in the future. Consequently, based on the notion that individuals seek to conform to others' expectations, the theory of social influence predicts that members conforming to group norms will have similar perceptions of a new technology, and that over time, groups will develop their own norms regarding technology, which may influence how individuals perceive the technology's ease of use and usefulness (Guo et al., 2006).

H3: There is a significant effect between social influence and the adoption of video conferencing tools.

2.2.4 Facilitating Conditions

Facilitating conditions are the user's view that appropriate technical and organisational infrastructure is available to facilitate the usage of a certain technology (Venkatesh et al., 2003). The supply of the necessary facilitating conditions, such as adequate Information and Communication Technology (ICT) infrastructure,

low-cost Internet bundles, and reduced cost of connecting devices to e-government services, will boost the use of e-government services (Mensah, 2019).

According to the research of Khechine et al. (2014), there is a significant relationship between facilitating conditions and the adoption of webinar systems by students. The findings indicate that an effective implementation of a webinar system in any learning environment would be impossible without adequate support from technicians or documentation that can assist students in mastering the technology and overcoming any challenges they may encounter. Furthermore, facilitating conditions in the study by Godin and Leader (2013) found that training and available resources have a significant effect on intention to use collaboration technology. This has been demonstrated by the significance of incorporating virtual teamwork training into the college curriculum and providing students with tools, such as Webex or similar collaboration technology, which will influence their intention to use the technology. In addition, the findings of Ameer (2015) indicate that supportive conditions are highly related to the usage of video conferencing. Employees are less likely to adopt the use of video conferencing if they are unaware of the technology's application or lack a solid understanding of it.

H4: There is a significant effect between facilitating conditions and the adoption of video conferencing tools.

3. Methodology and Analysis

This study employs a quantitative research methodology. There are 390 sets of questionnaires delivered to the heterogeneous groups respondents. This study's target group consists of those who utilise video conferencing tools, while the sampling frame consists of Malaysian students, teachers, and employees. In recent years, particularly in the aftermath of the Covid-19 outbreak, the global use of video conferencing software has increased dramatically among those who study and work remotely to prevent and minimise the spread of the virus. This survey was given to respondents via Google's social survey platform.

4. DATA ANALYSIS

4.1 Descriptive analysis

Data were acquired from 390 questionnaires delivered to heterogeneous groups in Malaysia. This study considers gender, age, occupation, and have you ever used video conferencing tools (Zoom, Webex, Google Meet, Microsoft Teams, and Blackboard, among others). The responders consist of 182 males (46.7%) and 208 females (53.3%). The ages of the respondents range from 15 to 75 years old. Student (43.3%), part-time worker (4.4%), full-time worker (30.3%), self-employed (11%), homemaker (5.4%), unemployed (1.8%), and retired (3.8%) are the occupations represented. 328 respondents (84.1%) have previously utilised video conferencing tools. Nevertheless, only 62 respondents (15.9%) never utilise video conferencing.

4.2 Cross tabulation between age and Utilisation of Video Conferencing Tools

Table 1: Cross tabulation

| Age | Have you ever used video conferencing tools (Zoom, Webex, Google Meet, Microsoft Teams, Blackboard etc.) before? | | | | Total | |
|-------|--|------------|-----------|------------|-----------|------------|
| | Yes | | No | | | |
| | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| 15-24 | 176 | 97.8 | 4 | 2.2 | 180 | 100 |
| 25-40 | 87 | 83.7 | 17 | 16.3 | 104 | 100 |
| 41-56 | 39 | 57.4 | 29 | 42.6 | 68 | 100 |
| 57-75 | 26 | 68.4 | 12 | 31.6 | 38 | 100 |
| Total | 328 | | 62 | | 390 | |

The results of a cross tabulation based on various age groups and their respective use of video conferencing tools are presented in Table 1. It was determined what proportion of respondents have ever utilised a video conferencing tool. When these heterogeneous groupings are delineated by generational breakpoints, the utilisation of video conferencing tools between them becomes more apparent. By 2021, those aged 57 to 75 born between 1946 and 1964 will be labelled as "Baby Boomers," while those aged 41 to 56 born between 1965 and 1980 would be classified as "Generation X." Not to mention, individuals born between 1981 and 1996 (ages 25 to 40 in 2021) are referred to as "Millennials," while those born in 1997 and later (ages 24 and younger) belong to a new generation, "Generation Z." (Colby & Ortman, 2014; Dimock, 2019). Generation Z comprises the biggest proportion of respondents (97.8%), followed by Millennials (83.7%), and then Generation X (57.4%). However, there is a minor increase beyond Generation X, as Baby Boomers are increasingly engaged with video conferencing tools, recording 68.4%.

4.3 Correlation analysis

Perceived usefulness, perceived ease of use, social influence, and facilitating conditions were all tested as independent variables, and their correlations with the dependent variable (adoption of video conferencing tools) were analysed using the Pearson Correlation test. The outcome of the correlations is summarised in Table 2.

Table 2: Correlations

| | | | | | |
|--|-----------------------|----------------------|------------------|-------------------------|-------------------|
| | Perceived ease of use | Perceived usefulness | Social influence | Facilitating conditions | Adoption of video |
|--|-----------------------|----------------------|------------------|-------------------------|-------------------|

| | | | s | | | conferencing tools |
|--------------------------------------|---------------------|--------|--------|--------|--------|--------------------|
| Perceived ease of use | Pearson Correlation | 1 | .584** | .588** | .688** | .607** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 |
| Perceived usefulness | Pearson Correlation | .584** | 1 | .550** | .544** | .608** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 |
| Social influence | Pearson Correlation | .588** | .550** | 1 | .599** | .536** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 |
| Facilitating conditions | Pearson Correlation | .688** | .544** | .599** | 1 | .555** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 |
| Adoption of video conferencing tools | Pearson Correlation | .607** | .608** | .536** | .555** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | |

As demonstrated in Table 2, all variables have a significant relationship with the adoption of video conferencing tools. Therefore, it was determined that perceived usefulness has the highest correlation value with 0.608, which is statistically significant at the 0.01 level (2 tailed). In contrast, social impact has the lowest correlation value of 0.536, which is statistically significant at the 0.01 level.

4.3 Multiple Regression analysis

This study uses multiple regression analysis to examine the effects of independent variables (perceived usefulness, perceived ease of use, social influence, and facilitating condition) on the dependent variable (adoption of video conferencing tools).

Table 3: Model Summary

| Model | R | R ² | Adjusted R ² | Std. Error of the Estimate |
|-------|-------------------|----------------|-------------------------|----------------------------|
| 1 | .700 ^a | .490 | .484 | .50097 |

Table 3 summarises the results of a multiple regression study of the adoption of video conferencing tools. The R-square value was 0.490, indicating that the four independent variables can account for 49% of the variance in video conferencing tool adoption. Other variables not investigated in the study affected the remaining 51%.

4.4 Empirical Results

The adoption of video conferencing tools is significantly influenced by all of the proposed determinants, as shown in Table 4. The coefficient estimates for perceived usefulness (Beta=0.328; p=0.000), perceived ease of use (Beta=0.233; p=0.000), social influence (Beta=0.122; p=0.006), and facilitating conditions (Beta=0.128; p=0.020) are all significant at the p-value of 0.000. The direction of the regression standardised estimate (Beta) indicates whether the predictors had a positive or negative effect on the dependent variable. The adoption of video conferencing tools can therefore be said to be positively influenced by all of the factors (perceived usefulness, perceived ease of use, social influence, and facilitating conditions). The regression equation, with reference to Table 4, is as follows:

$$\text{Adoption of E-wallet} = 0.728 + 0.328 (\text{perceived usefulness}) + 0.233 (\text{perceived ease of use}) + 0.122 (\text{social influence}) + 0.128 (\text{facilitating conditions})$$

Table 4: Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|-------------------------|-----------------------------|------------|---------------------------|-------|-------|
| | | B | Std. Error | Beta | | |
| 1 | Constant | .728 | .181 | | 4.025 | .000 |
| | Perceived usefulness | .328 | .050 | .315 | 6.594 | .000 |
| | Perceived ease of use | .233 | .050 | .256 | 4.672 | .000 |
| | Social influence | .122 | .044 | .137 | 2.782 | .0006 |
| | Facilitating conditions | .128 | .055 | .125 | 2.329 | .020 |

5. Discussion and Research Implications

This study aims to determine the influence of perceived usefulness, perceived ease of use, social influence and facilitating conditions on adoption of video conferencing tools. The result of this reveals that perceived usefulness, perceived ease of use, social influence and facilitating conditions influence adoption of video conferencing tools.

The cross tabulation between heterogeneous age groups and their respective utilisation of video conferencing tool based on Table 1, it had been found that there are growing patterns that are suggesting younger generations would be the first to adopt technology, however, it is currently the older demographic group that is adopting technology at the fastest pace where there is a possibility that the rise in technology usage is attributable to older generations wanting to connect with younger generations (Digital Media Solutions, 2019; Pew Research Center, 2019). Due to Covid-19, consumer attitudes around digital technology have shifted dramatically and baby boomers also engage with digital technology by bringing their businesses online (Mobiquity, 2020). In one way or another, technology has been embraced by all generations especially during the pandemic.

Next, it has been identified that perceived usefulness has the greatest influence on the adoption of video

conferencing tools. Deducing from the results, digital age has made things easier where everything now is at our fingertips. Malaysians perceived video conferencing tools to be useful for communication, enable them to achieve their goals and accomplish things more efficiently. Therefore, perceived usefulness is crucial in determining the adoption of video conferencing tools as this could be due to its usefulness for communication and ability to facilitate the achievement of meeting goals and enable ones to accomplish things more efficiently.

The use of video conferencing tools has become part and parcel of almost everyone lives as we have taken digital lessons, worked, attended meetings or interviews by talking to our digital devices on a continuous basis. The need for digitalisation has been catapulted with much intensity for the past few decades but it is the pandemic that brought us into the emerging digital era more than anything else where everything about our lives has changed, perhaps for the better. Thus, this study provides a better understanding related to the factors of acceptance of video conferencing tools. From the business point of view, the findings may serve as a basic guideline for the developers and engineers in order to enhance the shortcomings or create a more user friendly, comprehensive, and effective video conferencing tools towards a greater good and a more environmentally sustainable world as it is able to reduce cost, travelling times while providing greater flexibility for the users.

From the perspective of academic, this study provides an understanding of several factors including perceived usefulness, perceived ease of use, social influence and facilitating conditions as well as the effect between these factors towards the adoption of video conferencing tools among heterogeneous groups in Malaysia. Although considerable studies to identify the connections between various factors that lead towards the adoption of various technologies have been published, but much less have been focused on the adoption of video conferencing tools, particularly in Malaysia. Hence, this research has integrated the factors from two of the most widely used framework for the acceptance of technology, namely, perceived usefulness and perceived ease of use from the TAM model, social influence and facilitating conditions from the UTAUT model, respectively. Therefore, the results from this research may provide some valuable insights to those who are interested in studying the factors that affect the adoption of video conferencing tools among heterogeneous groups by examining different factors for different target respondents.

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