Working in a Smart Home-office: Exploring the Impacts on Productivity and Wellbeing

Davit Marikyan[1], Savvas Papagiannidis[1], Rajiv Ranjan[2] and Omer Rana[3]
[1]*Newcastle University Business School, 5 Barrack Road, Newcastle Upon Tyne, NE14SE, U.K.*
[2]*Newcastle University, School of Computing, 1, Urban Sciences Building, Science Square, Newcastle Upon Tyne, NE4 5TG, U.K.*
[3]*School of Computer Science and Informatics, Cardiff University, Cardiff CF24 3AA, U.K.*

Keywords: Digitalisation, Smart Home, COVID-19, Pandemic, Remote Work.

Abstract: Following the outbreak of the Coronavirus (COVID-19) pandemic, many organisations have shifted to remote working overnight. The new reality has created conditions to use smart home technologies for work purposes, for which they were not originally intended. The lack of insights into the new application of smart home technologies has led to two research objectives. First, the paper aimed to investigate the factors correlating with productivity and perceived wellbeing. Second, the study tried to explore individuals' intentions to use smart home offices for remote work in the future. 528 responses were gathered from individuals who had smart homes and had worked from home during the pandemic. The results showed that productivity positively relates to service relevance, perceived usefulness, perceived ease of use, hedonic beliefs, control over environmental conditions, innovativeness and attitude. Task-technology fit, service relevance, attitude to smart homes, innovativeness, hedonic beliefs, perceived usefulness, perceived ease of use and control over environmental conditions correlate with perceived wellbeing. The intention to work from smart home-offices in the future is determined by perceived wellbeing. Findings contribute to the research on smart homes and remote work practices, by providing the first empirical evidence about the new applications and outcomes of smart home use in the work context.

1 INTRODUCTION

The Coronavirus (COVID-19) pandemic is one of the worst emergency events in modern history, having adverse implications for people and economies (Papagiannidis et al., 2020; Venkatesh, 2020). Measures imposed by the government to cope with the virus forced companies to adapt to new working conditions to ensure business continuity (Barnes, 2020). In such contingency events, the digitalisation of work practices has been carried out regardless of companies' resources and capabilities. The pandemic emergency set the conditions for examining the viability of remote working in the new context, in which employees have been confined to their home environment. On the one hand, such conditions entail pressure both on organisations and employees. On the other hand, the situation has erased the boundaries between home and work practices and spaces. With the blending of work and home spaces into a hybrid environment, the usage of smart homes has increased exponentially (Maalsen & Dowling, 2020). Due to intelligent functionality and the ability of smart homes to enhance users' comfort and efficiency, the technology has become useful in accommodating the needs of workers from home. The accidental applications of smart homes in the work context creates new unexplored use experiences, potentially contributing to the employees' psychological state and work performance. In light of debates about the future of work after the pandemic and the lack of research on that front (Barnes, 2020; Venkatesh, 2020), it is important to examine the spillover of smart home utilisation into remote work practices and its job- and individual-related outcomes. Hence, the study pursues two objectives. The first objective is to investigate the impact of smart home application in the work context by examining the factors that could contribute to the quality of work and life in a smart home-work environment. The study aims to explore the relationship of three groups of factors referring to work and work environment characteristics, smart

Marikyan, D., Papagiannidis, S., Ranjan, R. and Rana, O.
Working in a Smart Home-office: Exploring the Impacts on Productivity and Wellbeing.
DOI: 10.5220/0010652200003058
In *Proceedings of the 17th International Conference on Web Information Systems and Technologies (WEBIST 2021)*, pages 275-282
ISBN: 978-989-758-536-4; ISSN: 2184-3252

technology and individual factors with individuals' productivity and wellbeing. The second objective of the research is to explore the willingness to use smart home technologies in the work environment in the future by exploring the correlation of use outcomes – productivity and wellbeing – on intention to use smart homes in the home-office settings.

2 LITERATURE REVIEW

2.1 Smart Home

The literature on the utilisation of smart home technologies is relatively scarce (Marikyan et al., 2019). The majority of prior research investigated smart home technology through technical lenses (Ford et al., 2017; Yang et al., 2018). Scholars focused on the development and deployment of a particular technology, such as smart meters and smart sensors (Warkentin et al., 2017; Yang et al., 2018). They also examined the architecture, connectivity and the algorithms that transform technologies into smart ones (Yang & Cho, 2016). The other stream of research revolved around the services that smart home appliances can deliver, such as comfort, monitoring, health therapy, support and consultancy, and the benefits that they realise (Marikyan et al., 2019). Comfort can be delivered by creating an intelligent environment, whereby home residents rely on smart devices to automate and manage their daily routine (Balta-Ozkan et al., 2014). The embeddedness of smart sensors in homes makes it possible to monitor individuals' behaviour, the consumption of natural resources and health metrics (Marikyan et al., 2019). Health therapy services are realised through remote connectivity of home residents with health-care centres, which can provide virtual medical consultancy (Yang et al., 2016). The above services deliver the benefits concerning psychological and health-related assistance, environmental sustainability, a reduction of financial costs, wellbeing and social inclusion (Chan et al., 2008; Marikyan et al., 2020). The provision of remote medical care ensures a better quality of life and improvement of health conditions (Talal et al., 2019; Yang et al., 2016). The reduction of water, gas and electricity consumption brings financial benefits to users and positively contributes to environmental sustainability (Ford et al., 2017). The capability of smart homes to connect home residents with the world outside can facilitate social inclusion (Marikyan et al., 2019), which is especially important in an emergency event, such as the pandemic, as this aggravates the feeling of isolation and loneliness. Smart homes can facilitate the subjective perception of wellbeing, by automating the control over the home environmental conditions, such as lighting, temperature and air quality (Marikyan et al., 2019). When it comes to the consequences of smart home utilisation, it has been shown that smart home usage contributes to satisfaction and wellbeing (Marikyan et al., 2020; Shin et al., 2018). While the smart home literature postulates the capability of technology to improve living conditions and the performance of household tasks (Marikyan et al., 2019; Talal et al., 2019), there is no evidence about the applications of smart homes to remote work and their impact on work related outcomes. Following the literature, three groups of factors were identified: a) work and the work-environment, b) smart technology and c) individual factors.

3 HYPOTHESIS DEVELOPMENT

3.1 Work and the Work Environment

The work and work environment factors include task technology fit, service relevance and control over the work environment conditions. These factors reflect new work characteristics, practices and the conditions brought about by the new work context and tools. The examination of task-technology fit is important as the utilisation of technology can be discontinued if users find a lack of fit between task requirements and the capabilities of technology to implement them (Goodhue & Thompson, 1995; Marikyan et al., 2021). The perception that technology matches tasks improves the perception of the usefulness of the technology. The use of smart homes can help manage the environment in which people work and improve job outcomes in two ways. First, smart homes appliances, such as voice-controlled assistants, ensure seamless connectivity and automation, facilitating the adaptability to virtual collaborations. Secondly, smart homes increase the effectiveness of the implementation of personal tasks (Marikyan et al., 2019). Therefore, the first hypothesis states that:

H1: Task-technology fit positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

Service relevance could be conceptualised as the degree to which the services offered by the system are applicable to individuals' jobs (Venkatesh & Davis, 2000). In the smart home-office context, service relevance refers to individuals' beliefs regarding the relevance of services made possible by smart home technology for remote work purposes, such as controlling the workplace conditions. Therefore, it is assumed that the creation of a comfortable environment while working from home is relevant to individuals' tasks implementation, in turn, having positive implications for job outcomes and satisfaction with life. Given that, we hypothesise the following:

H2: Smart home service relevance positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

As the pandemic forced many individuals to work from home, smart home technology can be used to control environmental factors, which otherwise was not possible (Balta-Ozkan et al., 2014; Marikyan et al., 2020). Smart homes can enable remote workers to control temperature and lighting to ensure optimal thermal and visual conditions. Individuals working from home can regulate the noise level by ambient sounds using voice-controlled devices. Also, the use of smart appliances can help design ergonomic space to ensure comfort and accommodate job-related needs. Hence, this study proposes the following hypotheses:

H3: Control over the workplace environment using smart home technologies positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

3.2 Smart Technology

Smart technology factors include individuals' beliefs about technology performance and capabilities, which are important while working from home in emergency situations. The factors include perceived usefulness, perceived ease of use and social presence. According to the research on technology acceptance, perceived ease of use and perceived usefulness are the beliefs which can translate into technology use behaviour (F. D. Davis, 1989). Given the benefits of smart homes in creating comfort in the home environment (Marikyan et al., 2019; Papagiannidis & Marikyan, 2019), their application therefore can be useful in improving the conditions of remote work, which are so much needed for higher job productivity and wellbeing (Papagiannidis & Marikyan, 2019). Therefore, we hypothesise that:

H4: Perceived usefulness of smart home technology positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

H5: Perceived ease of use of smart home technology positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

3.3 Individual Factors

The group of individual factors includes individual attitudes, beliefs and personality traits, facilitating the utilisation of the technology. Attitude is an individual's disposition towards a specific behaviour resulting from their overall evaluation of that behaviour. Through attitude, scholars have explored individuals' purchasing intention, technology adoption, satisfaction, as well as the likelihood of job-related outcomes (Dawkins & Frass, 2005; Minton et al., 2018). Therefore, we assume the following:

H6: Attitude towards the smart home-office positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

Innovativeness is a personality trait which explains individuals' inclination to engage in a new behaviour. It has been shown that innovative individuals tend to be early adopters of technology (Agarwal & Prasad, 1998). Individuals with a high innovativeness trait tend to be more experienced and knowledgeable about new technologies, services and potential performance (Agarwal & Prasad, 1998). It can be assumed that they are more open to experimentation, such as employing smart home technology to improve personal productivity in a home-office space and ensure satisfaction with conditions while working remotely. Therefore, we suggest the following hypothesis:

H7: Individual innovativeness positively correlates with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

Hedonic value refers to individual factors, as it measures the level of perceived enjoyment, playfulness and fun resulting from the interaction with smart home technologies in the home-office setting. Several studies have empirically confirmed the direct and indirect relationships of hedonic values with technology adoption (Atulkar & Kesari, 2017; Kim & Hwang, 2012). For instance, it was found that hedonic beliefs has a direct positive effect on individuals' intention to use mobile applications

(Ozturk et al., 2016) and influences outcome satisfaction and use behaviour through task-technology fit (Marikyan et al., 2021). Given the above evidence, the next hypothesis states that:

H8: Hedonic values positively correlate with a) productivity in a smart home-office environment and b) wellbeing in a smart home-office environment.

3.4 Intention to Use Smart Home Technologies

The relationship between productivity in a smart home-office environment, wellbeing and intention to work in a smart home-office in the future is rooted in evidence that individuals tend to continue the behaviour that produces positive outcomes (Anıtsal, 2005; Kim et al., 2014). In a similar vein, it is expected that the positive implications of the technology use for individuals' wellbeing will induce the desire to continue using the technology to receive similar benefits in the future. Given the above, this study postulates that if the work from home using smart home technologies brings positive results, such as productivity and wellbeing, individuals will have the intention to work in a smart home-office in the future.

Hypothesis 9: a) Productivity in a smart home-office environment and b) wellbeing in a smart home-office environment positively correlate with intention to use smart home technologies in the future when working from home.

4 METHODOLOGY

4.1 Data Collection and Sample

A cross-sectional research design and a survey data collection tool were employed. The survey consisted of questions about the socio-demographic profile and measurement items of 11 constructs (table 1). A research company was employed to recruit respondents, working from home during the pandemic and with experience of using smart home devices. 528 valid responses were collected.

Table 1: Measurement items of constructs.

Measurement Items	Loading	α
TTF (Lin & Huang, 2008; Yen et al., 2010)		0.929
TTF1	0.894	
TTF2	0.928	
TTF3	0.886	
Service relevance (Venkatesh & Bala, 2008)		0.918
SR1	0.889	
SR2	0.903	
SR3	0.874	
Control (Venkatesh, 2000)		0.924
CON1	0.909	
CON2	0.905	
CON3	0.875	
Perceived usefulness (F. D. Davis, 1989)		0.967
PU1	0.932	
PU2	0.932	
PU3	0.955	
PU4	0.932	
Perceived ease of use (F. D. Davis, 1989)		0.929
PEU1	0.894	
PEU2	0.920	
PEU3	0.894	
Attitude towards smart homes (Elliott et al., 2007)		0.933
ATT1	0.864	
ATT2	0.904	
ATT3	0.852	
ATT4	0.908	
Innovativeness (Agarwal & Prasad, 1998)		0.925
INN1	0.831	
INN2	0.809	
INN3	0.916	
INN4	0.920	
Hedonic benefits (Voss et al., 2003)		0.937
HBEN1	0.900	
HBEN2	0.878	
HBEN3	0.884	
HBEN4	0.890	
Productivity in a smart home-office (Goodhue & Thompson, 1995)		0.946
PROD1	0.859	
PROD2	0.884	
PROD3	0.884	
PROD4	0.898	
PROD5	0.884	
Wellbeing (El Hedhli et al., 2013)		0.852
WELL1	0.838	
WELL2	0.757	
WELL3	0.846	
Future intention to use (Venkatesh & Goyal, 2010)		0.965
FINT1	0.927	
FINT2	0.962	
FINT3	0.958	

5 RESULTS

5.1 Data Analysis

As a first step, confirmatory factor analysis (CFA) and construct reliability analysis were conducted. The results showed that Cronbach's α values (>0.7), factor loadings (>0.7), the average variance extracted (AVE > 0.5) and construct reliability results (C.R. > 0.7) were above the acceptable threshold. That showed that there were no validity and reliability issues (Hair et al., 2014).

5.2 Path Analysis

We made sure that structural model fit indices were satisfactory to proceed with path analysis, as follows: $\chi 2(656) = 1537.485$, CMIN/DF = 2.344, CFI = 0.962, RMSEA = 0.050. The model explains 78% of the variance in perceived wellbeing, 59% in productivity and 70% in intention to work from a smart home-office in the future. Out of 18 hypothesised paths, 4 were found to be not significant (Table 2).

Table 2: The results of the tests of hypotheses.

H	*Path*	*Coef.*	*t-test, sig*
H1a	TTF→PROD	0.145	(1.676ns)
H1b	TTF→WELL	0.218	(2.975**)
H2a	SR→PROD	0.340	(5.417***)
H2b	SR→WELL	0.150	(2.855**)
H3a	CON→PROD	-0.521	(-5.195***)
H3b	CON→WELL	-0.291	(-3.463***)
H4a	PU→PROD	0.575	(6.616***)
H4b	PU→WELL	0.362	(4.963***)
H5a	PEU→PROD	-0.050	(-0.707ns)
H5b	PEU→WELL	0.195	(3.216**)
H6a	ATT→PROD	0.011	(0.195ns)
H6b	ATT→WELL	0.107	(2.247*)
H7a	INN→PROD	0.121	(3.069**)
H7b	INN→WELL	0.126	(3.765***)
H8a	HB→PROD	0.201	(3.882***)
H8b	HB→WELL	0.188	(4.273***)
H9a	PROD→FINT	-0.076	(-1.826ns)
H9b	WELL→FINT	0.881	(17.415***)

6 DISCUSSION AND CONCLUSION

The analysis showed that work and work environment factors correlate with productivity in a smart home-office and wellbeing, except for perceived task-technology, which is important only in relation to wellbeing. The positive effect of service relevance on both productivity and wellbeing suggests that the ability of smart home technologies to create comfortable conditions while working at home is important for ensuring good performance at work and improving the quality of life. The negative path between control over environmental conditions, productivity and perceived wellbeing was rather surprising. The finding goes against the opinion that the application of smart technologies in the work context could potentially increase individuals' overall performance and satisfaction (Papagiannidis & Marikyan, 2019). The potential explanation is that respondents do not have the right configuration of devices to ensure the full connectivity between the devices that help efficiently manage the quality of air, noise, temperature and other environmental factors. The significant path between task-technology fit and wellbeing is consistent with prior literature (Marikyan et al., 2020). The non-significant role of task-technology fit on productivity could be due to smart home technologies being originally designed and developed for a private context. In such a context, the integration of smart homes fits the purpose of making daily routine tasks more comfortable to improve the quality of life while being in the house, rather than improve the productivity of work-related tasks (Balta-Ozkan et al., 2014). Such an explanation is supported by the significant path between task-technology fit and wellbeing.

The analysis of smart home factors showed that, compared to other predictors, perceived usefulness is the strongest determinant of productivity in a smart home-office environment and wellbeing. This finding is in line with technology acceptance research, postulating that perceived usefulness facilitates technology adoption behaviour (Fred D Davis, 1989), which can, in turn, result in productivity and wellbeing. When it comes to perceived ease of use, the analysis showed a correlation with wellbeing, but not with productivity. These results indicate that respondents find it easy to use smart home devices for controlling their home-office environment. A possible explanation for the insignificant correlation between perceived ease of use and productivity is that the role of the factor varies depending on knowledge and the experience of using technology.

Individual factors include attitude towards smart homes, personal innovativeness and hedonic beliefs. The analysis made it possible to conclude that productivity in a smart home-office is not dependent on the individuals' attitude towards smart homes. Technology is utilised in the home-office environment to improve job performance, irrespective of personal beliefs about technology.

However, when it came to wellbeing, the importance of attitude towards smart homes was confirmed. This result suggests that people holding positive beliefs about technology have a perception that they have a better quality of life in their household. The findings are in line with prior literature, which argued that the use of smart home technologies results in satisfaction (Marikyan et al., 2020, 2021). Positive relationships between innovativeness, productivity and perceived wellbeing are consistent with the assumptions of this research rooted in evidence that individuals with a high innovativeness trait tend to be early adopters of new applications (Agarwal & Prasad, 1998). Positive relationships between perceived hedonic benefit, productivity and wellbeing mean that the enjoyment that individuals experience while using smart home devices for controlling their work environment facilitates employees' performance at work and satisfaction. The finding is consistent with prior research, which found that hedonic benefit enhances the perception of the fit between technology services and tasks, subsequent technology adoption and satisfaction (Marikyan et al., 2021).

Finally, the analysis of the predictors of intention to work from a smart home-office showed that only wellbeing correlates with the dependent variables. The data suggests that the benefit of smart homes for enhancing wellbeing could potentially underpin willingness to work from a smart home-office in the future. However, productivity does not enhance the intention to continue using smart home technologies in remote work. Although the pandemic facilitated the use of smart home technology for work purposes, the work-related benefit of such technology is rather a spillover effect, which does not encourage the intention to use it in the future.

6.1 Theoretical and Practical Contributions

This study makes two important theoretical contributions. First, the paper contributes to the literature on remote workers' behaviour. The findings complement the research on the consequences of remote work, which has mostly examined technologies that are designed for the delivery of work tasks distantly and collaborations between employees (Drumea, 2020; Hafermalz & Riemer, 2021). Secondly, the paper contributes to the smart home literature by bringing a novel insight into the role that technology can have in the workplace, which has not been explored before. By examining the relationships between the determinants and dependent variables, the study provides evidence with regards to whether office spaces, equipped with capabilities similar to those of smart homes, can help individuals manage their workload by controlling the environment, improving their comfort and productivity. Also, the findings of the research bring practical implications for organisations and smart home developers. The paper informs managers about the conditions enabled by smart home technologies that favour better performance at work and higher employee satisfaction with their life.

6.2 Limitations and Future Research Suggestions

There are several limitations in this study, which future research could address. First, the sample was based on users located in the United Kingdom. Given that in other countries, especially in emerging markets, the technological infrastructure is different, the perception and experience of individuals towards smart home-offices could be different. Another limitation is that we focused on a wide scope of smart technologies, which made it impossible to evaluate which technology plays the most important role in enhancing productivity in a smart home-office and individuals' satisfaction with life. Therefore, future research could test the implications of a particular smart technology (e.g. digital assistants) for remote workers' life and work performance.

ACKNOWLEDGEMENTS

1. This project was partly funded by the Engineering and Physical Sciences Research Council (EPSRC): PACE: Privacy-Aware Cloud Ecosystems (Project Reference: EP/R033293/1).
2. The work reported here was part-sponsored by Research England's Connecting Capability Fund award CCF18-7157 – Promoting the Internet of Things via Collaboration between HEIs and Industry (Pitch-In).

REFERENCES

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research*, *9*(2), 204-215.

Anıtsal, İ. (2005). Technology-based self-service: From customer productivity toward customer value.

Atulkar, S., & Kesari, B. (2017). Satisfaction, loyalty and repatronage intentions: Role of hedonic shopping values. *Journal of Retailing and Consumer Services*, *39*, 23-34.

Balta-Ozkan, N., Boteler, B., & Amerighi, O. (2014). European smart home market development: Public views on technical and economic aspects across the United Kingdom, Germany and Italy. *Energy Research & Social Science*, *3*, 65-77.

Barnes, S. J. (2020). Information management research and practice in the post-COVID-19 world. *International Journal of Information Management*, *55*, 102175.

Chan, M., Estève, D., Escriba, C., & Campo, E. (2008). A review of smart homes—Present state and future challenges. *Computer Methods and Programs in Biomedicine*, *91*(1), 55-81. https://doi.org/http://dx.doi.org/10.1016/j.cmpb.2008.02.001

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly: Management Information Systems*, *13*(3), 319-339.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Dawkins, C. E., & Frass, J. W. (2005). Decision of union workers to participate in employee involvement: An application of the theory of planned behaviour. *Employee Relations*.

Drumea, C. (2020). Work-related Stress and Subsequent Productivity in a Teleworking Environment Induced by Pandemic-related Confinement. Evidence from the Public Organizations. *Ovidius University Annals, Economic Sciences Series*, *20*(1), 337-341.

El Hedhli, K., Chebat, J.-C., & Sirgy, M. J. (2013). Shopping well-being at the mall: Construct, antecedents, and consequences. *Journal of Business Research*, *66*(7), 856-863.

Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2007). Using the theory of planned behaviour to predict observed driving behaviour. *British Journal of Social Psychology*, *46*(1), 69-90.

Ford, R., Pritoni, M., Sanguinetti, A., & Karlin, B. (2017). Categories and functionality of smart home technology for energy management. *Building and Environment*, *123*, 543-554.

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS quarterly*, 213-236.

Hafermalz, E., & Riemer, K. (2021). Productive and connected while working from home: what client-facing remote workers can learn from telenurses about 'belonging through technology'. *European Journal of Information Systems*, *30*(1), 89-99.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). Multivariate data analysis: Pearson new international edition. *Essex: Pearson Education Limited*.

Kim, D. J., & Hwang, Y. (2012). A study of mobile internet user's service quality perceptions from a user's utilitarian and hedonic value tendency perspectives. *Information Systems Frontiers*, *14*(2), 409-421.

Kim, T., Kim, M. C., Moon, G., & Chang, K. (2014). Technology-based self-service and its impact on customer productivity. *Services Marketing Quarterly*, *35*(3), 255-269.

Lin, T.-C., & Huang, C.-C. (2008). Understanding knowledge management system usage antecedents: An integration of social cognitive theory and task technology fit. *Information & Management*, *45*(6), 410-417.

Maalsen, S., & Dowling, R. (2020). Covid-19 and the accelerating smart home. *Big Data & Society*, *7*(2), 2053951720938073.

Marikyan, D., Papagiannidis, S., & Alamanos, E. (2019). A systematic review of the smart home literature: A user perspective. *Technological Forecasting and Social Change*, *138*, 139-154.

Marikyan, D., Papagiannidis, S., & Alamanos, E. (2020). Cognitive Dissonance in Technology Adoption: A Study of Smart Home Users. *Information Systems Frontiers*. https://doi.org/10.1007/s10796-020-10042-3

Marikyan, D., Papagiannidis, S., & Alamanos, E. (2021). "Smart Home Sweet Smart Home": An Examination of Smart Home Acceptance. *International Journal of E-Business Research (IJEBR)*, *17*(2), 1-23.

Minton, E. A., Spielmann, N., Kahle, L. R., & Kim, C.-H. (2018). The subjective norms of sustainable consumption: A cross-cultural exploration. *Journal of Business Research*, *82*, 400-408.

Ozturk, A. B., Nusair, K., Okumus, F., & Hua, N. (2016). The role of utilitarian and hedonic values on users' continued usage intention in a mobile hotel booking environment. *International Journal of Hospitality Management*, *57*, 106-115.

Papagiannidis, S., Harris, J., & Morton, D. (2020). WHO led the digital transformation of your company? A reflection of IT related challenges during the pandemic. *International Journal of Information Management*, *55*, 102166.

Papagiannidis, S., & Marikyan, D. (2019). Smart offices: A productivity and well-being perspective. *International Journal of Information Management*.

Shin, J., Park, Y., & Lee, D. (2018). Who will be smart home users? An analysis of adoption and diffusion of smart homes. *Technological Forecasting and Social Change*.

Talal, M., Zaidan, A., Zaidan, B., Albahri, A., Alamoodi, A., Albahri, O., Alsalem, M., Lim, C., Tan, K. L., & Shir, W. (2019). Smart home-based IoT for real-time and secure remote health monitoring of triage and priority system using body sensors: Multi-driven systematic review. *Journal of medical systems*, *43*(3), 42.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, *11*(4), 342-365.

Venkatesh, V. (2020). Impacts of COVID-19: A research agenda to support people in their fight. *International Journal of Information Management*, *55*, 102197.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, *39*(2), 273-315.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V., & Goyal, S. (2010). Expectation disconfirmation and technology adoption: polynomial modeling and response surface analysis. *MIS quarterly*, 281-303.

Voss, K. E., Spangenberg, E. R., & Grohmann, B. (2003). Measuring the hedonic and utilitarian dimensions of consumer attitude. *Journal of Marketing Research*, *40*(3), 310-320.

Warkentin, M., Goel, S., & Menard, P. (2017). Shared benefits and information privacy: what determines smart meter technology adoption? *Journal of the Association for Information Systems*, *18*(11), 3.

Yang, H., Lee, W., & Lee, H. (2018). IoT smart home adoption: the importance of proper level automation. *Journal of Sensors*, *2018*.

Yang, K., & Cho, S. B. (2016). Towards Sustainable Smart Homes by a Hierarchical Hybrid Architecture of an Intelligent Agent. *Sustainability*, *8*(10). https://doi.org/ARTN 102010.3390/su8101020

Yang, M. G., Huang, H., Yuan, H. Z., & Sun, Q. C. (2016). Interaction Design of Products for the Elderly in Smart Home Under the Mode of Medical Care and Pension. *Human Aspects of It for the Aged Population: Healthy and Active Aging, Itap 2016, Pt Ii*, *9755*, 145-156. https://doi.org/10.1007/978-3-319-39949-2_14

Yen, D. C., Wu, C.-S., Cheng, F.-F., & Huang, Y.-W. (2010). Determinants of users' intention to adopt wireless technology: An empirical study by integrating TTF with TAM. *Computers in Human Behavior*, *26*(5), 906-915.