When Technology Does Not Meet Expectations: A Cognitive Dissonance Perspective

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Abstract

The utilisation of innovative technology beyond its initial trial is an underresearched area. The current research on technology acceptance provides little insight into the behaviour of users after the performance of innovative technology falls short of initial expectations. However, it is important to understand the consequences of negative disconfirmation in order to explore the predictors of user satisfaction with technology and the decision to purchase technology. Given the gaps in the literature, this study adopted the Cognitive Dissonance Theory perspective in order to 1) examine the effect that the disconfirmation has on the arousal of psychological discomfort, 2) explore whether psychological discomfort triggers behavioural coping mechanisms, and 3) examine how coping mechanisms correlate with user satisfaction with technology performance and decisions. To test the research model, 474 former and current users of smart homes were employed to participate in the online survey. The results of the study confirmed that the disconfirmation of initial expectations induces psychological discomfort, which in turn translates into two behaviour coping mechanisms. To cope with psychological discomfort, users withdraw the behaviour causing psychological discomfort and seek consonant information to reaffirm the decision to purchase the technology. In addition, the study found that satisfaction with the technology performance and the decision is determined by the positive effect of the consonant information seeking, but not the behaviour change. The results contribute to the technology acceptance literature by providing evidence about the behaviour of users when technology performance does not meet expectations.

Keywords: Expectation-confirmation, Disconfirmation, Satisfaction, Dissatisfaction, Smart Home, Psychological discomfort, Technology adoption, Technology Acceptance

1. Introduction

The development of smart home technology is bringing into reality applications in the domains of healthcare, education, manufacturing, supply chain and marketing and sales among others (Hill et al., 2015, Marikyan et al., 2019b, Wang et al., 2018, Zhou et al., 2015, Edwards et al., 2016, Marikyan et al., 2019a, Papagiannidis and Marikyan, 2019). Ubiquitous connectivity makes innovative technologies overcome human intellectual and physical capability boundaries (Dwivedi et al., 2019). Innovative technologies are aimed at bringing the benefits and user experience that traditional devices cannot provide. For example, connected devices in a household bring convenience and assist in independent living by delivering services, such as constant health monitoring, virtual consultancy and drug-supply management (Marikyan et al., 2019b). In addition, smart home technologies are capable of delivering financial, environmental and psychological benefits (Balta-Ozkan et al., 2013, Ehrenhard et al., 2014, Chen et al., 2017, Muse et al., 2017). On the other hand, innovative technologies promise opportunities that raise unrealistic expectations, which undermines post-performance evaluation (Dwivedi et al., 2019, Sun and Medaglia, 2019, Fan and Suh, 2014). Understanding users' perception of technology performance is important to predict the utilisation of innovative technology beyond the initial trial (Susarla et al., 2003, Oliver, 1980, Qazi et al., 2017). Therefore, there is a need to examine the user perspective when it comes to the utilisation of smart homes following post-performance evaluation.

There are two main gaps in the research on the acceptance and adoption of innovative technology by users. First, the majority of the acceptance literature uses well-established acceptance models (e.g. TAM, UTAUT) and their constructs to examine the predictors of users' attitude, intention and use behaviour (Al-Qeisi et al., 2014, Min et al., 2008, Foon and Fah, 2011). A few papers focused specifically on the factors underpinning the acceptance of smart home technologies (Park et al., 2017, Yang et al., 2017, Mulcahy et al., 2019, Marikyan et al., 2019a). Still, there is a lack of insight into the user behavior following the perception of actual technology performance, although this may play an important role in predicting user satisfaction and even continuous intention to use (Bhattacherjee, 2001, Bhattacherjee and Premkumar, 2004, Rogers, 1995, Huang et al., 2013). The research on the expectation-(dis)confirmation domain focuses on the outcomes of performance evaluation in terms of (dis)satisfaction (Hsieh et al., 2010, McKinney et al., 2002), without, though, examining the processes which may mediate the relationship between disconfirmation and satisfaction. Secondly, the expectation-confirmation literature postulates that the disconfirmation of initial beliefs about the technology leads to dissatisfaction (Bhattacherjee, 2001, Bhattacherjee and Premkumar, 2004). However, drawing on the Theory of Cognitive Dissonance, the disconfirmation may trigger processes aimed at reducing the perceived discrepancy between expectations and perceived performance, thus leading to satisfaction (Festinger, 1962). Given the above, the objective of this paper is two-fold: a) to examine the behaviour of users after the performance of innovative technology falls short of initial expectations, and b) to examine the role of coping mechanisms that people employ in achieving satisfaction.

2. Theoretical Foundation and Hypothesis Development

The theoretical model of this study is drawn from the Theory of Cognitive Dissonance and Cognitive Consistency (Festinger and Carlsmith, 1959, Festinger, 1962, Cooper, 2007). Festinger (1962) proposed that when an individual holds two or more contradictory beliefs/cognitions, they start experiencing cognitive dissonance. The state of cognitive dissonance triggers psychological discomfort, which acts as a strong motivator to resolve or minimise the aroused dissonance (Ehrlich et al., 1957, Festinger and Carlsmith, 1959, Festinger, 1962). In the IS context, dissonance can be triggered when the performance of technology falls short of the initial expectation (Park et al., 2012, Park et al., 2015, Festinger, 1962) due to the discrepancy between the two types of cognitions (i.e. expectation and perceived performance). Following the Theory of Cognitive Dissonance, we argue that discrepancy can lead to psychological discomfort and motivate an individual to reduce it and achieve satisfaction. The model of cognitive dissonance arousal and reduction in this study can be presented as a three-stage process (Figure 1). First, negative experience leads to the disconfirmation of initial expectations, which results in psychological discomfort. The second phase is when individuals experience physical discomfort, which motivates the use of cognitive dissonance reduction strategies (Cooper, 2007), such as changing behaviour (discontinue technology usage) or searching for consonant information favouring the use of the technology. The last stage is the outcome of cognitive dissonance reduction, such as overall satisfaction and decision satisfaction. In the context of the smart home technology use, negative incidents (e.g. connectivity issues) trigger cognitive dissonance, which can be manifested by psychological discomfort, motivating users to reduce discomfort and leading to satisfaction.

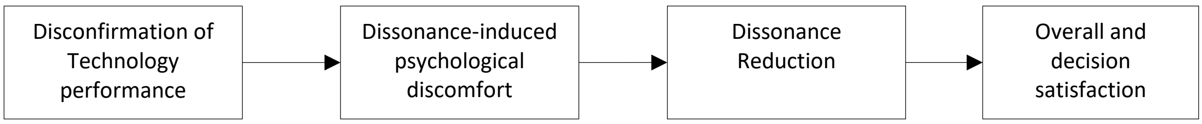

Figure 1: Overview of the model

The Theory of Expectation-Confirmation postulates that individuals hold a certain level of initial expectation about the performance of the technology before the actual purchase and usage (Bhattacherjee, 2001, Dai et al., 2015). At the post-usage stage, individuals start comparing the initial expectation with the actual performance of the technology. The assessment of the pr- and post-usage expectations can result in disconfirmation or confirmation of the expectations (Bhattacherjee, 2001, Dai et al., 2015). The confirmation of initial expectations indicates that users are satisfied and will continue using the product. In the case of disconfirmation, users experience the arousal of cognitive dissonance, which is manifested in the form of psychological discomfort (Festinger and Carlsmith, 1959, Festinger, 1962, Cooper, 2007). In the IS domain, the positive relationship between disconfirmation and dissonance has been confirmed by the study by Park et al. (2015). The study empirically supports the idea that the discrepancy of pre- and post-service performance can result in cognitive dissonance. Thus, we hypothesise that the disconfirmation of initial expectations about smart home technologies will lead to psychological discomfort.

H1: *The disconfirmation of innovative technology performance with prior expectations has a positive effect on psychological discomfort.*

Given that the arousal of cognitive dissonance is manifested as psychological discomfort (Festinger, 1962, Cooper, 2007), the discrepancy of cognitions (e.g. beliefs, expectations) motivates individuals to engage in behavioural activities to reduce psychological discomfort (Festinger and Carlsmith, 1959, Festinger, 1962). There are four cognitive dissonance reduction avenues falling into the two categories of cognitive and behavioural coping mechanisms: trivialisation, attitude change, behaviour change and consonant information seeking (Cooper, 2007, Festinger, 1962, Simon et al., 1995, Adams, 1961, Sheth, 1970, Hunt, 1970, Cooper, 1980). In the case of trivialisation, individuals tend to downplay the importance of the product/service or incident (Simon et al., 1995). Attitude change occurs when individuals adjust (lower) their initial expectation to eliminate disappointment (Cooper, 2007). In the case of consonant information search, individuals start looking for an argument supporting the behaviour to decrease the discrepancy between cognitions (Adams, 1961). For instance, in the case of smart home technology use, individuals encountering negative experience, such as connectivity issues, might start searching for information online to confirm that the fault is related to the internet speed. When it comes to behaviour change, individuals withdraw the use of the product/service or the situation that is causing cognitive dissonance (Cooper, 2007). For example, individuals facing issues with smart home technology discontinue using it. For this paper we focus on the behavioural coping mechanisms, which are consonant information search and behaviour change (Cooper, 2007). Hence, we hypothesise that individuals experiencing psychological discomfort attempt to reduce it by searching for consonant information or they change their behaviour.

H2: *Psychological discomfort has a positive effect on a) the consonant information search and b) behaviour change.*

The justification of the hypothesised relationships between the reduction of psychological discomfort, overall satisfaction and decision satisfaction is rooted in the Theory of Expectation-Confirmation, the Theory of Cognitive Dissonance and the Theory of Cognitive Consistency (Bhattacherjee, 2001, Bhattacherjee and Premkumar, 2004, Festinger and Carlsmith, 1959, Festinger, 1962, Cooper, 2007). Theories postulate that the discrepancy between initial expectations and actual performance results in dissatisfaction (Shahin Sharifi and Rahim Esfidani, 2014, Dutta and Biswas, 2005). Hence, we can argue that the reduction of psychological discomfort through consonant information search has positive effects on overall satisfaction and decision satisfaction. Individuals engaging in consonant information-seeking behaviour attempt to find information that could justify negative incidents with technology use and eliminate disappointment. In contrast, the reduction of psychological discomfort through behaviour change has a negative effect on overall satisfaction and decision satisfaction. By changing behaviour, users do not reduce the magnitude of the discrepancy between the conflicting cognitions but make sure that similar negative incidents will not happen in the future. Therefore:

H3: *Reduction of psychological discomfort through consonant information search has a positive effect on a) overall satisfaction and b) decision satisfaction.*

H4: *Reduction of psychological discomfort through behavior change has a negative effect on a) overall satisfaction and b) decision satisfaction.*

Figure 2 presents all the hypothesised relationships between the variables.

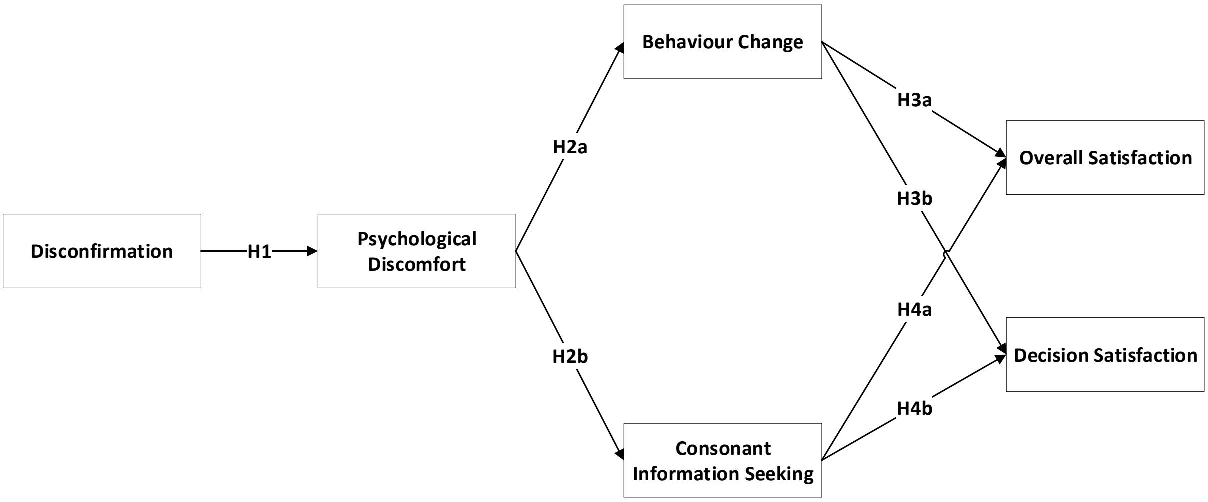

Figure 2: Research Model

3. Methodology

The paper employed a cross-sectional research design. For the data collection, we used an independent research company. Initially, we collected 800 responses. However, given the objective of this paper, we introduced two filtering questions. The first one aimed at selecting respondents who had experience with the use of smart home technology. The second filtering question was aimed at recruiting respondents who had had a negative experience with smart home technology. We provided a list of potential negative experiences that users could have faced (e.g. issues with connectivity, potential threat to privacy). In addition, respondents had the opportunity to type incidents that were not on the list. The rest of the survey was designed in such a way that the selected incidents automatically popped up in the questions regarding the psychological discomfort, coping strategies and the final outcome. After excluding ineligible responses, our final sample comprised 474 valid responses. Following the guidelines by Hair (2014), the number of collected responses were appropriate to perform structural equational modelling. 47.9% of respondents were male, 45.6% were female and 5.6% preferred not to say. 59.7% of respondents were single between 18 and 34 (68.1%) years old, with an annual income equal to or less than 34,999 US dollars (44.5%).

Previous studies found that at least 5 per cent of respondents carelessly reply to questionnaires (Johnson, 2005, Hauser and Schwarz, 2016). Using attention checks may help filter out careless respondents (Kung et al., 2018). The use of attention check filters was proved to increase the quality of data in prior studies (Bowling et al., 2016, Huang et al., 2015). Hence, we used two attention check filters (e.g. please select colour-orange) to eliminate careless responses (Berinsky et al., 2014) and improve the robustness of the findings (Bowling et al., 2016).

The questionnaire consisted of six multi-item scales validated by prior studies (Table 1). Disconfirmation was measured by the scale developed by Bhattacherjee and Premkumar (2004). Items to measure psychological discomfort were adopted from Liang (2016) and Elliot and Devine (1994). The behaviour change and consonant information seeking scales were adapted from studies by Keng and Liao (2009), Cho (2015), Chen et al. (2019) and Maier et al. (2015). Overall satisfaction was measured by the scale proposed by McKinney et al. (2002) and the decision satisfaction scale derived from the study developed by Heitmann et al. (2007) and Fitzsimons (2000). All items utilised in this paper were measured using a 7-point Likert scale (ranging from “1 – strongly disagree” to “7 – strongly agree”).

Measurement Item	Loading	C.R.	AVE	α
Disconfirmation:		0.906	0.764	0.901
When compared to my initial expectations, smart home technologies involved in that incident…				
DISC1	0.785			
DISC2	0.920			
DISC3	0.910			
Psychological Discomfort:		0.869	0.628	0.866
After using smart home technologies in that incident, I felt…				
PDISC1	0.841			
PDISC2	0.912			
PDISC3	0.771			
PDISC4	0.614			
Behaviour Change		0.842	0.644	0.834
After using smart home technologies in that incident…				
BCHAN1	0.817			
BCHAN2	0.916			
BCHAN3	0.652			
Consonant Information Seeking		0.786	0.551	0.786
After using smart home technologies in that incident…				
CIS1	0.755			
CIS2	0.752			
CIS3	0.719			
Satisfaction		0.944	0.738	0.943
Overall, after using smart home technologies, I felt…				
SAT1	0.934			
SAT2	0.951			
SAT3	0.877			
SAT4	0.826			
SAT5	0.808			
SAT6	0.738			
Decision Satisfaction		0.865	0.682	0.858
Overall, after using smart home technologies, I felt…				
DSAT1	0.819			
DSAT2	0.894			
DSAT3	0.758			

Note: 7-point Likert scale was employed to measure the items

Table1: Measurements

4. Results, Findings and discussion

To perform descriptive statistical analysis, SPSS v.25 software was used. For confirmatory factor analysis and structural equational modelling, SPSS Amos v.25 was utilised. The results of the confirmatory factor analysis showed that the model had satisfactory fit: ($\chi 2(194)$ = 564.323, CMIN/DF = 2.909, CFI = 0.948, RMSEA = 0.064). Convergent validity (table 1), factor loading (> 0.7), Cronbach's α (>0.7), average variance extracted (AVE > 0.5) and construct reliability (C.R. > 0.7) confirmed the reliability and validity of the measurements (Hair, 2014, Gaskin, 2016) (table 2).

	1	2	3	4	5	6
CINFS	**0.742**					
DISC	-0.257	**0.874**				
BCH	0.309	0.215	**0.802**			
SAT	0.130	-0.449	-0.494	**0.859**		
DSAT	0.119	-0.199	-0.159	0.370	**0.826**	
PDIS	0.265	0.115	0.414	-0.237	-0.175	**0.792**

Note: CFA Model fit, ($\chi 2(194)$ = 564.323, CMIN/DF = 2.909, CFI = 0.948, RMSEA = 0.064)

Table2: Convergent Validity

The model fit indices for the proposed theoretical model were satisfactory ($\chi 2(202)=732.509$, CMIN/DF=3.626, CFI=0.925, RMSEA=0.075). The satisfactory model fit made it possible to proceed with testing the proposed paths in the research model (Hair Jr and Lukas, 2014). The results of the path analysis are provided in table 3 and figure 3. The results of the path analysis showed that all the hypothesised relations were significant. The direction of the paths and significance illustrated the robustness and explanatory power of the proposed research model.

H	***Path***			***Coef.***	***(t-test)***
H1	Disconfirmation	--->	Psychological discomfort	0.117	(2.321*)
H2a	Psychological discomfort	--->	Behaviour change	0.431	(7.875***)
H2b	Psychological discomfort	--->	Consonant information search	0.256	(4.719***)
H3a	Behaviour change	--->	Overall Satisfaction	-0.571	(-9.987***)
H3b	Behaviour change	--->	Decision Satisfaction	-0.242	(-4.355***)
H4a	Consonant information search	--->	Overall Satisfaction	0.296	(6.031***)
H4b	Consonant information search	--->	Decision Satisfaction	0.204	(3.588***)

Note: SEM (H1-4): Model fit $\chi 2(202)=732.509$, CMIN/DF=3.626, CFI=0.925, RMSEA=0.075

Table 3: The results of hypothesis testing

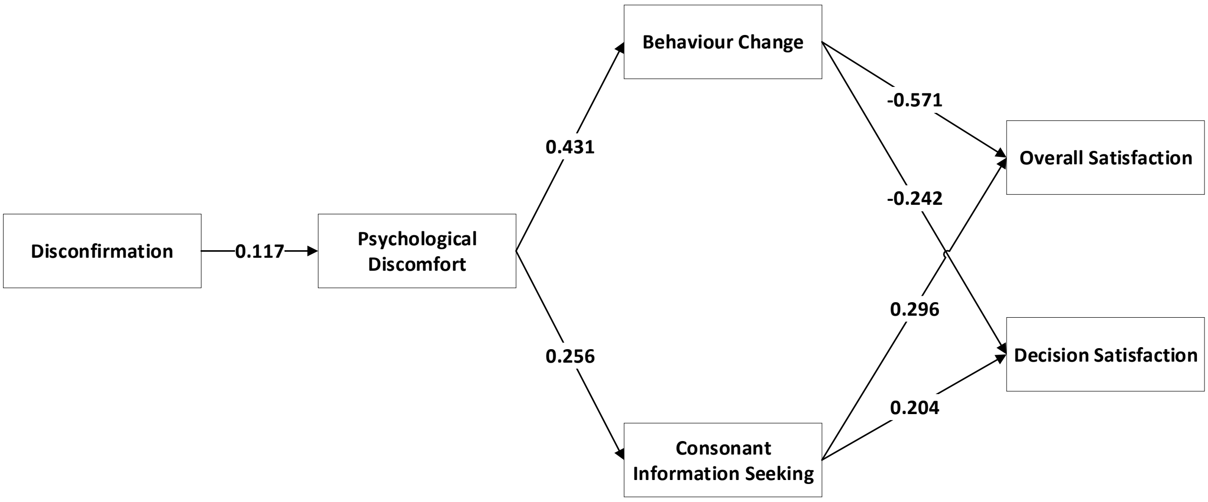

Figure 3: Results of path analysis

The results of path analysis made it possible to validate the use of the Cognitive Dissonance Theory for examining the behaviour of smart home users following the post-performance evaluation. In particular, the first hypothesis about the effect of the disconfirmation of prior expectations on psychological discomfort was positive and significant. This finding is in line with the Theory of Expectation-Confirmation and Cognitive Dissonance Theory, which postulate that the disparity between pre- and post-performance evaluation may result in the disconfirmation of expectations and subsequent psychological discomfort (Bhattacherjee, 2001, Dai et al., 2015). Prior technology acceptance literature postulated that the inconsistency between perceived the pre and post-service performance results in dissonance (Park et al., 2015). The result of this study made it possible to suggest that the performance of smart home technology that falls short of expectations induces psychological discomfort.

The second hypothesis was also confirmed by establishing a positive and significant effect of psychological discomfort on behaviour change and consonant information search. The significant relationships between the variables are consistent with prior research (Festinger and Carlsmith, 1959, Festinger, 1962), which argued that the discrepancy of cognitions (e.g. beliefs, expectations) motivates individuals to engage in behavioural activities in order to reduce psychological discomfort. We focused only on the behavioural strategies aimed at reducing dissonance, though having different motivational roles in carrying on the behaviour that causes dissonance. Individuals who start searching for consonant information aim to support the purchase decision, decrease the negative affective state after the performance evaluation and stick to the behaviour (Adams, 1961). Individuals who change behaviour try to eliminate the cause of dissonance and psychological discomfort (Cooper, 2007) and withdraw the use of smart homes. These findings add to the literature on the smart home utilisation by providing evidence about the behaviour of users following poor technology performance.

The third and fourth hypotheses were supported too, which enabled us to conclude that the reduction of psychological discomfort through a search for consonant information has a positive effect on both overall satisfaction and decision satisfaction. In contrast, the reduction of psychological discomfort through behaviour change has a negative effect on user satisfaction with overall technology performance and the decision to purchase the technology. The findings confirmed the assumptions, drawn from the Theory of Expectation-Confirmation, the Theory of Cognitive Dissonance and the Theory of Cognitive Consistency (Bhattacherjee, 2001, Bhattacherjee and Premkumar, 2004, Festinger and Carlsmith, 1959, Festinger, 1962, Cooper, 2007). Based on those theories, the reduction of the discrepancy between contradictory cognitions is more likely to result in satisfaction. That means that smart home users who search for consonant information are more likely to experience satisfaction, as they reduce psychological discomfort by adding more information favouring the technology. This finding provides evidence on the indirect effect of the negative disconfirmation of initial expectations about innovative technology performance on satisfaction through the behavioural coping mechanism.

5. Conclusion, contributions and future research

The study examined the behaviour of the users of smart homes following the negative disconfirmation of initial expectations and the relationship of user behaviour with satisfaction. The analysis of the theorised model produced results that enabled us to confirm that the poor performance of technology which is worse than expected induces a negative psychological state - i.e. psychological discomfort. Secondly, psychological discomfort is positively associated with two behavioural coping mechanisms, which are a) the withdrawal of the use of technology and b) the search for consonant information with the purpose of getting reassured that the decision to buy the technology was right. The two established coping mechanisms have a distinctive role in user satisfaction with technology and decisions. The results of the study make a theoretical contribution to the literature on the utilisation of innovative technology. First, the findings provide insight into the behaviour of users when technology performs not as expected and contribute to an are that has so far been under-researched. Secondly, this study adds to the expectation-confirmation literature, which is lacking evidence about the positive outcomes (e.g. satisfaction) that negative disconfirmation of expectations may bring. Thirdly, by focusing on smart home users, the study adds to the literature in the smart home domain, which is lacking insight into the user perspective on the utilisation of technology. In addition, the findings of the study provide practical implications too. The understanding of the relationship between user satisfaction and behavioural coping mechanisms may help practitioners develop post-purchase communication strategies aimed at reaffirming users' purchase decisions.

The study has some limitations that may serve as a starting point for future research. First, future studies could examine the relationship between psychological discomfort, behavioural coping mechanisms and satisfaction longitudinally. A longitudinal approach would provide a dynamic picture of the change in the behaviour of users and behavioural outcomes. The measurement of variables at several points in time would increase the accuracy of the relationships. Second, future research could test the effect of psychological discomfort on cognitive coping strategies, like the change of attitude. That would make it possible to explore cognitive processes predicting user satisfaction with technology performance and decisions. Third, future studies could potentially examine the different dimensions of affective reactions mediating the disconfirmation of expectations and coping mechanisms. For example, future research could examine the relationship between different types of negative emotions and their role in user behaviour following disconfirmation. Fourth, future research could also test the moderation effects of the attribution of causality to examine which coping mechanism people employ depending on the degree to which a user feels responsible for poor technology performance. This would give a more precise picture of the contingency of coping mechanisms on situational factors.

Reference List

ADAMS, J. S. 1961. Reduction of cognitive dissonance by seeking consonant information. *Journal of Abnormal and Social Psychology,* 62**,** 74-78.

AL-QEISI, K., DENNIS, C., ALAMANOS, E. & JAYAWARDHENA, C. 2014. Website design quality and usage behavior: Unified Theory of Acceptance and Use of Technology. *Journal of Business Research,* 67**,** 2282-2290.

BALTA-OZKAN, N., DAVIDSON, R., BICKET, M. & WHITMARSH, L. 2013. The development of smart homes market in the UK. *Energy,* 60**,** 361-372.

BERINSKY, A. J., MARGOLIS, M. F. & SANCES, M. W. 2014. Separating the shirkers from the workers? Making sure respondents pay attention on self-administered surveys. *American Journal of Political Science,* 58**,** 739-753.

BHATTACHERJEE, A. 2001. Understanding information systems continuance: an expectation-confirmation model. *MIS quarterly***,** 351-370.

BHATTACHERJEE, A. & PREMKUMAR, G. 2004. Understanding changes in belief and attitude toward information technology usage: A theoretical model and longitudinal test. *MIS quarterly***,** 229-254.

BOWLING, N. A., HUANG, J. L., BRAGG, C. B., KHAZON, S., LIU, M. & BLACKMORE, C. E. 2016. Who cares and who is careless? Insufficient effort responding as a reflection of respondent personality. *Journal of Personality and Social Psychology,* 111**,** 218.

CHEN, J. V., TRAN, A. & NGUYEN, T. 2019. Understanding the discontinuance behavior of mobile shoppers as a consequence of technostress: An application of the stress-coping theory. *Computers in Human Behavior,* 95**,** 83-93.

CHEN, S., LIU, T., GAO, F., JI, J., XU, Z., QIAN, B., WU, H. & GUAN, X. 2017. Butler, Not Servant: A Human-Centric Smart Home Energy Management System. *IEEE Communications Magazine,* 55**,** 27-33.

CHO, I. H. 2015. Facebook discontinuance: discontinuance as a temporal settlement of the constant interplay between disturbance and coping. *Quality & Quantity,* 49**,** 1531-1548.

COOPER, J. 1980. Reducing fears and increasing assertiveness: The role of dissonance reduction. *Journal of Experimental Social Psychology,* 16**,** 199-213.

COOPER, J. 2007. *Cognitive dissonance: 50 years of a classic theory*, Sage.

DAI, H., LUO, X. R., LIAO, Q. & CAO, M. 2015. Explaining consumer satisfaction of services: The role of innovativeness and emotion in an electronic mediated environment. *Decision Support Systems,* 70**,** 97-106.

DUTTA, S. & BISWAS, A. 2005. Effects of low price guarantees on consumer post-purchase search intention: The moderating roles of value consciousness and penalty level. *Journal of Retailing,* 81**,** 283-291.

DWIVEDI, Y. K., HUGHES, L., ISMAGILOVA, E., AARTS, G., COOMBS, C., CRICK, T., DUAN, Y., DWIVEDI, R., EDWARDS, J. & EIRUG, A. 2019. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*.

EDWARDS, A., EDWARDS, C., SPENCE, P. R., HARRIS, C. & GAMBINO, A. 2016. Robots in the classroom: Differences in students' perceptions of credibility and learning between "teacher as robot" and "robot as teacher". *Computers in Human Behavior,* 65**,** 627-634.

EHRENHARD, M., KIJL, B. & NIEUWENHUIS, L. 2014. Market adoption barriers of multi-stakeholder technology: Smart homes for the aging population. *Technological Forecasting and Social Change,* 89**,** 306-315.

EHRLICH, D., GUTTMAN, I., SCHÖNBACH, P. & MILLS, J. 1957. Postdecision exposure to relevant information. *The Journal of Abnormal and Social Psychology,* 54**,** 98-102.

ELLIOT, A. J. & DEVINE, P. G. 1994. On the Motivational Nature of Cognitive Dissonance: Dissonance as Psychological Discomfort. *Journal of Personality and Social Psychology,* 67**,** 382-394.

FAN, L. & SUH, Y.-H. 2014. Why do users switch to a disruptive technology? An empirical study based on expectation-disconfirmation theory. *Information & Management,* 51**,** 240-248.

FESTINGER, L. 1962. Cognitive dissonance. *Scientific American,* 207**,** 93-102.

FESTINGER, L. & CARLSMITH, J. M. 1959. Cognitive consequences of forced compliance. *Journal of Abnormal and Social Psychology,* 58**,** 203-210.

FITZSIMONS, G. J. 2000. Consumer response to stockouts. *Journal of consumer research,* 27**,** 249-266.

FOON, Y. S. & FAH, B. C. Y. 2011. Internet banking adoption in Kuala Lumpur: an application of UTAUT model. *International Journal of Business and Management,* 6**,** 161.

GASKIN, J. 2016. Excel StatTools. Stats tools package.

HAIR, J. F. 2014. *Multivariate data analysis*, Harlow, Essex : Prentice Hall.

HAIR JR, J. F. & LUKAS, B. 2014. *Marketing research*, McGraw-Hill Education Australia.

HAUSER, D. J. & SCHWARZ, N. 2016. Attentive Turkers: MTurk participants perform better on online attention checks than do subject pool participants. *Behavior research methods,* 48**,** 400-407.

HEITMANN, M., LEHMANN, D. R. & HERRMANN, A. 2007. Choice goal attainment and decision and consumption satisfaction. *Journal of marketing research,* 44**,** 234-250.

HILL, J., FORD, W. R. & FARRERAS, I. G. 2015. Real conversations with artificial intelligence: A comparison between human–human online conversations and human–chatbot conversations. *Computers in Human Behavior,* 49**,** 245-250.

HSIEH, C.-C., KUO, P.-L., YANG, S.-C. & LIN, S.-H. 2010. Assessing blog-user satisfaction using the expectation and disconfirmation approach. *Computers in Human Behavior,* 26**,** 1434-1444.

HUANG, J. L., LIU, M. & BOWLING, N. A. 2015. Insufficient effort responding: Examining an insidious confound in survey data. *Journal of Applied Psychology,* 100**,** 828.

HUNT, S. D. 1970. Post-transaction communications and dissonance reduction. *Journal of Marketing,* 34**,** 46-51.
JOHNSON, J. A. 2005. Ascertaining the validity of individual protocols from web-based personality inventories. *Journal of research in personality,* 39**,** 103-129.
KENG, C.-J. & LIAO, T.-H. 2009. Consequences of postpurchase dissonance: The mediating role of an external information search. *Social Behavior and Personality: an international journal,* 37**,** 1327-1339.
KUNG, F. Y., KWOK, N. & BROWN, D. J. 2018. Are attention check questions a threat to scale validity? *Applied Psychology,* 67**,** 264-283.
LIANG, Y. J. 2016. Reading to make a decision or to reduce cognitive dissonance? The effect of selecting and reading online reviews from a post-decision context. *Computers in Human Behavior,* 64**,** 463-471.
MAIER, C., LAUMER, S., ECKHARDT, A. & WEITZEL, T. 2015. Giving too much social support: social overload on social networking sites. *European Journal of Information Systems,* 24**,** 447-464.
MARIKYAN, D., PAPAGIANNIDIS, S. & ALAMANOS, E. Smart Home Technology Acceptance: An Empirical Investigation. Conference on e-Business, e-Services and e-Society, 2019a. Springer, 305-315.
MARIKYAN, D., PAPAGIANNIDIS, S. & ALAMANOS, E. 2019b. A systematic review of the smart home literature: A user perspective. *Technological Forecasting and Social Change,* 138**,** 139-154.
MCKINNEY, V., YOON, K. & ZAHEDI, F. M. 2002. The measurement of web-customer satisfaction: An expectation and disconfirmation approach. *Information systems research,* 13**,** 296-315.
MIN, Q., JI, S. & QU, G. 2008. Mobile commerce user acceptance study in China: a revised UTAUT model. *Tsinghua Science and Technology,* 13**,** 257-264.
MULCAHY, R., LETHEREN, K., MCANDREW, R., GLAVAS, C. & RUSSELL-BENNETT, R. 2019. Are households ready to engage with smart home technology? *Journal of Marketing Management,* 35**,** 1370-1400.
MUSE, E. D., BARRETT, P. M., STEINHUBL, S. R. & TOPOL, E. J. 2017. Towards a smart medical home. *Lancet,* 389**,** 358.
OLIVER, R. L. 1980. A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research***,** 460-469.
PAPAGIANNIDIS, S. & MARIKYAN, D. 2019. Smart offices: A productivity and well-being perspective. *International Journal of Information Management*.
PARK, E., KIM, S., KIM, Y. & KWON, S. J. 2017. Smart home services as the next mainstream of the ICT industry: determinants of the adoption of smart home services. *Universal Access in the Information Society***,** 1-16.
PARK, I., CHO, J. & RAO, H. R. 2012. The effect of pre-and post-service performance on consumer evaluation of online retailers. *Decision Support Systems,* 52**,** 415-426.
PARK, I., CHO, J. & RAO, H. R. 2015. The Dynamics of Pre-and Post-purchase Service and Consumer Evaluation of Online Retailers: A Comparative Analysis of Dissonance and Disconfirmation Models. *Decision Sciences,* 46**,** 1109-1140.
QAZI, A., TAMJIDYAMCHOLO, A., RAJ, R. G., HARDAKER, G. & STANDING, C. 2017. Assessing consumers' satisfaction and expectations through online opinions: Expectation and disconfirmation approach. *Computers in Human Behavior,* 75**,** 450-460.
SHAHIN SHARIFI, S. & RAHIM ESFIDANI, M. 2014. The impacts of relationship marketing on cognitive dissonance, satisfaction, and loyalty: the mediating role of trust and cognitive dissonance. *International Journal of Retail & Distribution Management,* 42**,** 553-575.
SHETH, J. N. 1970. Are there differences in dissonance reduction behavior between students and housewives? *Journal of Marketing Research,* 7**,** 243-245.
SIMON, L., GREENBERG, J. & BREHM, J. 1995. Trivialization: the forgotten mode of dissonance reduction. *Journal of personality and social psychology,* 68**,** 247.

SUN, T. Q. & MEDAGLIA, R. 2019. Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare. *Government Information Quarterly,* 36**,** 368-383.

SUSARLA, A., BARUA, A. & WHINSTON, A. B. 2003. Understanding the service component of application service provision: empirical analysis of satisfaction with ASP services. *MIS quarterly,* 27**,** 91-123.

WANG, J., MA, Y., ZHANG, L., GAO, R. X. & WU, D. 2018. Deep learning for smart manufacturing: Methods and applications. *Journal of Manufacturing Systems,* 48**,** 144-156.

YANG, H., LEE, H. & ZO, H. 2017. User acceptance of smart home services: an extension of the theory of planned behavior. *Industrial Management & Data Systems,* 117**,** 68-89.

ZHOU, L., CHONG, A. Y. & NGAI, E. W. 2015. Supply chain management in the era of the internet of things. *International Journal of Production Economics,* 159**,** 1-3.