Factors Influencing Continuance Intention of Using New IT System: A Meta-analysis of Technostress Perspective.

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Abstract: *The purpose of this paper is to undertake a meta-analysis and find the research gap in published researches on the continuance intention and technology induced stressed among employees on new IT system implementation. A total of 29 papers were reviewed where Expectation- Confirmation Theory and Technostress Theory were used. Traditional literature reviews often lack research gaps and future direction. This paper discusses literature review as a methodology and also identifies gaps for future research. This paper also acknowledges the theoretical contribution, the limitations of this study, and suggests further research directions for the continued work.*

Keywords: *Technostress, Meta-analysis, Continuance Intention and Using New IT System.*

1. Introduction

The frenetic pace of advances in the field of information and communication technology (ICT), coupled with accelerating demand from a knowledge-driven society, has significantly increased pressure on higher education institutions regarding new technological initiatives and diffusion (Dennison, 2014). Diffusion is defined as the regular use and ownership by stakeholders of technological innovations (Dillon & Morris, 1996). The speed at which technology is moving, along with the ever-increasing use of technology for teaching and learning in research, pedagogy, and academic administration, ensures that universities focus ever more single-mindedly on techno-innovation and diffusion efforts. According to Alenezi et al., (2015), the Ministry of Higher Education in Asia region invests a significant amount in projects of the higher learning institutions, but the success rate is still limited. The 2018 PMI Pulse of the Profession report, for example, notes that about 10% of every dollar invested in a new project is wasted because the project fails to meet its present goals in terms of time, budget, quality, or expectations. This translates into the frightening statistic of about one in three projects being written off as a "failure." According to a study by McKinsey & Company in 2012 with collaboration with the University of Oxford: "On average, large IT projects run 45% over budget and 7% over time, while delivering 56% less value than predicted." When it comes to higher education, these numbers are optimistic. The most important aspect of

the research is discovering why projects fail. To this end, Lehtinen et al., (2014) reported that McLeod and MacDonell (2011) listed factors that affect the outcome of software systems development projects.

Table 1. Reasons for project failures (McLeod and MacDonell, 2011).

People	Method
- Social interaction - Skill - Motivation	- Development work - Users - Top management - External agent - Project team - Cooperation
Task	**Environment**
- Sales - Customer - Requirements - Contracting - Project management - Quality control - Development work - Software testing	- Project complexity - Available assets - Policies - Business domain - Organizational structure - Technology

The table 1 shows that among 23 factors, 34.7% of the factors focused on users. The literature suggests that there are serious negative corollaries of advancements in IT and their implementation in higher education institutions, but these have not received much attention to date. An example could be the cost of ensuring continuous internet connectivity (in the form of smartphones and laptops). This means that, while most students benefit from increased access to information, those without the means to pay for hi-tech devices are left behind (Hawkins et al., 2002). This is especially the case in a low-middle-income country like Bangladesh, where many students struggle to make ends meet while pursuing higher studies. Other drawbacks range from a lack of preparedness in students' IT education for sophisticated use of new technologies, whether in developed nations (Moore et al., 2010) or developing ones (Nyamu-pangedengu, 2017), to IT illiteracy among administrative staff and faculty in higher education institutions (Elmes, 2017).

In another perspective, technology-related stress among employees is one such challenge that universities and other tertiary education institutions need to consider in assessing their preparedness for IT-based solutions to greater access to information. Technology-related stress among employees might occur due to the rapid spread of information technology (IT), the pressure to adapt to new ways of working, along with additional procedures at work (Weil & Rosen, 1997). Technostress has been defined as a stress related to IT use (Ayyagari et al., 2011). This might have a deleterious impact on

employee performance and the implementation of new ways of working with data. In this digital age, unnecessary stress in the workplace might, for instance, cause lower productivity and high turnover among employees (Tennant, 2001). About 80% of the respondents to a 2011 survey in this area indicated that workplace requirements for increased use of technology had made their work more stressful (Tarafdar et al., 2011).

In order to understand adoption and continuance intention of using intelligent system in industry, the aim of this study is to perform a literature review reported in existing researches of continuance intention and technostress. The success of this study is achieved by representing the Meta data from both literature and identifying the research gaps.

2. Expectation-Confirmation Theory

The foundation of the proposed research model is based on the Expectation-Confirmation Theory (ECT) formulated by Oliver (1977). Oliver's original model focuses on customer satisfaction and its impact on repurchase intention. The theory states that the key factor influencing customer behaviour toward products and services is customer satisfaction. Aligned with this concept, in the case of IT usage, Bhattacherjee (2001) has claimed that ECT can be used to measure post-usage behavior. In ECT, satisfaction focuses on the attention of users on a system. The author also suggests that if a system can maintain satisfaction, ensuring the system remains attractive to users. Based on the meta-analysis of Anbalov (2018), the concept matrix of the expectation-confirmation theory is given below in table 2.

Table 2. A summary of literature on ECT theory

Authors	Technology	Type	Additional Variable
Shih et al., (2018)	Smartphone	Voluntary	Perceived usefulness Perceived ease of use Self-efficacy Flow Cognitive age
Yang (2019)	Social Media	Voluntary	Subjective norm Group norm Social identity Personal attitude
Carillo et al., (2017)	Ubiquitous media systems	Mandated	Dependency Perceived ease of use
Jia et al., (2017)	Information system	Mandated	Firm scope Firm size Competitive pressure

Shang and Wu (2017)	Mobile shopping	Voluntary	Perceived value Value for money Social value Emotional value
Sun and Choi (2014)	Library resource	Voluntary	Resource quality
Lin et al., (2017)	Social network services	Voluntary	Low-carbon attitude Low-carbon subjective norm Low-carbon perceived behaviour control
Oghuma et al., (2016)	Mobile instant messaging	Voluntary	Service quality Perceived usability Perceived security
Alraimi et al., (2015)	E-learning	Voluntary	Perceived openness Perceived reputation Perceived Enjoyment
Baker-Eveleth and Stone (2015)	Electronic textbook	Voluntary	Usability
Yoon and Roland (2015)	Social network Services	Voluntary	Subjective norm Enjoyment
Bhattacherjee and Lin (2015)	Information system	Mandated	Subjective norm habit
Bonson et al., (2014)	Social network services	Voluntary	Social influence attitude
Cheng (2014)	E-learning	Voluntary	Information quality System quality Support service quality Flow
Hsu et al., (2014)	Social network services	Voluntary	Flow Subjective norm Perceived behaviour control Disconfirmation
Lee and Chen (2014)	M-commerce	Voluntary	Perceived quality
Chen et al., (2013)	Mobile service	Voluntary	Technology readiness

Table 2 shows that Carillo et al., (2017) tested the relationship between dependency and the perceived ease of use of media systems and found a significant relationship with the ECT theory. From an organizational point of view, the influence of firm size, scope, and competitive pressure has been tested with ECT theory by Jia et al., (2017). The focus of these two works lay on mandated technology where you must continue the system whether you like it or not. In the context of voluntary usage, the ECT theory was tested in various mobile-and social media-based systems. Shu et al., (2011) emphasized perceived value, value for money, social value, and emotional value for mobile shopping. Joo and Choi (2016) tested resource quality for library systems. Oghuma et al., (2016) and Baker-Eveleth and Stone (2015) focused on usability issues concerning users' continuance intention. Cheng (2014) and Lee and Chen (2014) investigated the influence of information quality, system quality, and service support quality on the ECT theory. Several studies also revealed a significant impact of subjective norm or social influence on the ECT theory (Yoon & Roland, 2015; Bhattacherjee & Lin, 2015; Bonson et al., 2014).

3. Technostress Theory

Stress at and outside work, organizational commitment, and turnover rates are related to stress created by IT usage (Ayyagari et al., 2011). A career-focused employee can work in the office as well as at home, using IT devices to increase their productivity. This uninterrupted connection with technology removes the distinction between work and home (Mann &Holdsworth, 2003). In terms of stressors, Ayyagari et al., (2011) have proposed five in the context of IT usage. First, work overload includes users' perception of IT as beyond their ability. Second, owing to the availability of the internet at home, work–life conflict occurs, as users need to work with IT after office hours to meet professional deadlines. Third, role ambiguity occurs if the work of users does not relate to IT, but users still need to deal with IT-induced problems. Fourth, the introduction of new ICT tools might make older or technically less capable users feel insecure about their jobs. Finally, users might perceive new IT tools as an invasion of their privacy.

In the context of social network services (SNS), Maier et al., (2015) applied the theory of technostress to explain the negative effects of technology and its psychological impact on human behavior. Their research showed that technostress encourages users to discontinue using SNSs and that this happens because of techno-exhaustion. Fuglseth and Sørebø (2014) have tried to identify the effects of technostress on employee intentions implementing IT in the working area. They defined those factors responsible for technostress affecting user satisfaction with ICT and the stress levels of users including their impact on organizational performance. In the study "Understanding the impact of management factors on technostress in ERP adoption and use", Hayashi (2011) uses the Technostress Theory to explain the user effect caused by management influence while implementing ERP systems in the healthcare industry. He claims that elements of

technostress affect the adoption of ERP systems in the pre-implementation phase. In explaining the adaptation to the transactional theory of stress (TTS) in a technostress context, Lei and Ngai (2014) have extended the technostress theory itself. They define technostress as positive and negative appreciation and the outcome of that approach to work performance. They also delineate several types of technostress that can be appraised. This study helps the manager of an organization to build strategies and policies to minimize the effect of these factors.

Technostress is observed when users adopt a new system (Ragu-Nathan et al., 2008). The authors also claim that this phenomenon leads to dissatisfaction among new users with their job roles and reduced their productivity, besides negatively affecting commitment to the organization. The authors also identify some demographic factors, like age, gender, and experience of using IT, affecting technostress. Interestingly, they maintain that older employees tend to suffer from less stress than their younger counterparts, perhaps because they are more experienced in dealing with stress in general. Nevertheless, this finding runs counter to the findings of earlier studies which suggest that age is not a factor in the onset of techno stress (Hudiburg & Necessary, 1996). By contrast, gender is a determinant of stress according to Ragu-Nathan et al., (2008) with men being more adept at managing this than women. Mahmud et al., (2017), combined technostress with status quo bias theory to measure end user grumbling at pre-implementation stage of ERP system.

Table 3: Previous work on Technostress

Author	Year	Country	N	IV	DV
Ayyagari	2012	USA	661	Usefulness Complexity Pace of change Presenteeism Anonymity WO WHC RA IOP JI	Strain
Tarafdar et al.,	2007	USA	233	Technostress Role stress	Productivity
Wang and Shu	2008	China	285	Technostress POS (Moderator)	RO RC

Ragu-Nathan et al.,	2008	Canada	608	Technostress- creators Technostress-inhabitor	JSAT OC CC
Tarafdar et al.,	2011	USA	233	IS IF TC	EUS EUP
Ayaagari et al.,	2011	USA	661	Usefulness Complexity Reliability Pace of change Presenteeism Anonymity WO WHC RA IOP JI	Strain
Shu et al.,	2011	China	289	TD CSE	Technostress T_O T_I T_C T_IS T_U
Walz	2012	USA	661	Memory Loss Impatience with others Difficulty sleeping Back pain Increase heart rate Headaches	
Fuglseth and Sorebo	**2014**	**Norway**	**216**	**T_O T_I T_C T_IS T_U TS Facility**	**Satisfaction Intention**

Maier et al.,	2015b	Germany	227	Usefulness Complexity Reliability Pace of change WO WHC RA	Exhaustion
Tarafdar et al.,	2015	USA	237	Inhibitors Creators Competence Innovation Performance Self-efficacy	Tech-Performance Sales
Mahmud et al.,	2017	Bangladesh	221	Switching cost Switching benefit Perceived value	End user grumbling

Abbreviations
CC- Continuance commitment
CSE- Computer Self Efficacy
EUP- End user productivity
EUS- End user satisfaction
IF- Innovation facilitation
IOP- Invasion of Privacy
IS- Innovation support
JI- Job Insecurity
JSAT- Job satisfaction
JST- job stress
OC- Organization commitment
POS- perceived organizational support
RA- Role ambiguity
RC- role conflict
RO- role overload
SC- Segmentation culture
T_C- Techno Complexity
T_I- Techno Invasion
T_IS- Techno Insecurity
T_O- Techno overload
T_U- Techno Uncertainty
TC- Technostress creators
TCA- Technology challenged appraisal
TD- Technology Dependence
TTA- Technology threat appraisal
UR- user resistance
WHC- work home conflict
WO- work overload

4. Research Gaps

Table 2 showed that most research dealing with the ECT theory focused on voluntary usage settings like e-learning, social network services, and m-commerce, where users can choose to use or not to use the system. However, in mandatory IS settings, users' behavior could be different. In mandatory settings, measuring continuance intention is crucial, because if users reject the system, it would lead to failure and damage the development cost and time.

From the meta-analysis of Anbalov (2018), among 16 papers published in the last five years, we identified two gaps in research:

Table 4. Addressing research gap

Gaps	Context	Description	Addressing Gap
1	IS usage settings	82.35% of studies were conducted in voluntary information system settings	Limited research on mandatory usage of IT for employees to use.
2	Factors	Limited investigations were conducted using negative stimulus.	Research need to add new variables from technostress theory. These are work overload, work–life conflict, role ambiguity, and exhaustion.

Based on the literature review, it can be said that there is not much research on negative stimuli. This study also categorized all the variables based on positive and negative stimuli. A clear research gap is seen regarding the impact of negative stimulus on information system continuance intention.

5. Conclusion

The purpose of this study was to undertake a meta-analysis of findings reported in existing research on continuance intention of new IT usage. The aim of the study was achieved by representing the research gaps in this area. This study offers several implications for research and practice. The researchers can gain an idea about the type of variables to be selected for analyzing the user's perspective of new IT adoption research. Second, from a technostress point of view, the proposed literature could be used as a diagnostic tool to assess the stressful impacts of technology and their causes in organizations. It also provides guidance on the interventions that could reduce costs of stressed individuals to organizations. The management should also focus on expectations about the job from end users to reduce stressors like work–life conflict and work

overload. Managers should also be prepared to discuss with end users the need for the new IT and drum up their support in order to reduce confusion (role ambiguity) regarding the new system.

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