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Technostress and ICT Adoption among Senior Managers in Ugandan Public Universities

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Abstract

The integration of Information and Communication Technology (ICT) in higher education has streamlined administration and teaching. However, it also creates unique stressors or technostress that can either facilitate or hinder adoption. In this study, we examined the relationship between technostress and ICT adoption among senior managers in Ugandan public universities. An explanatory sequential mixed methods design was used to collect survey and interview data from eighty-eight (88) senior managers across seven universities. Exploratory factor analysis revealed the multidimensionality of both technostress (complexity, overload, invasion, uncertainty, and insecurity) and ICT adoption (ease of use, acceptance, and usefulness). Regression analysis showed that technostress was a predictor of ICT adoption. Specifically, techno-complexity had a negative impact, while techno-overload and techno-invasion had positive impacts. Techno-insecurity and techno-uncertainty did not have a significant impact on ICT adoption. Qualitative data confirmed the quantitative findings, indicating that stressors like workload and constant connectivity promote adoption, while complexity acts as a barrier. The results contribute to theory by showing that stressors have varying effects on adoption, with some discouraging and others encouraging it. In practice, the findings highlight the need to address complexity through training and user-friendly ICT design, along with balanced policies to prevent overload and invasion of privacy.

Keywords: *ICT adoption, technostress, higher education, senior managers, Uganda, mixed methods*

1.0 Background of the Study

The use of Information and Communication Technologies (ICTs) in Higher Education Institutions (HEIs) is becoming an essential and all-encompassing way to improve efficiency, governance, and decision-making processes (UNESCO, 2023). The ICT concept includes a wide range of computer hardware and software systems, e-learning platforms, video conferencing, and online collaborative services, which are vital to learning and management functions in institutions. The speed of digitalisation in universities has increased rapidly, as the need for remote and hybrid work during the COVID-19 pandemic changed many teaching practices and operations (Dey, Al-Karaghouli, & Muhammad, 2020; Vaziri, Casper, Wayne, & Matthews, 2020). At the same time, in Uganda, local policies shape these global ICT trends by emphasising the role of ICT in advancing the government's broader social and economic development goals. For example, the National ICT Policy (2014) and the Third National Development Plan (2020/21–2024/25) framework see ICT as a powerful force for change, a catalyst for, and a critical part of, public sector reform and improved efficiency (Ministry of ICT & National Guidance, 2014; National Planning Authority, 2020). Consequently, public universities now depend on ICT for many aspects of university governance, performance monitoring, and service delivery.

The increased adoption of ICT in university work has also been accompanied by rising psychosocial pressure on users. In higher education, researchers have extensively studied and validated this phenomenon across various institutional contexts. Their findings reveal several significant negative relationships between technostress and key attitudes and behaviours, such as job satisfaction, organisational commitment, and staff performance (Jena & Mahanti, 2014; Govender & Mpungose, 2022). A recent study involving staff and faculty at Indian universities by Mahapatro et al. (2023) also found that a notable portion of participants, about one-third, experienced relatively high levels of technostress. The study further provided clear evidence of technostress's impact on individual outcomes, including reduced ICT adoption and lower job performance among staff.

In Uganda's public universities, ICTs have been generally welcomed. Studies indicate that despite widespread use of computers and the internet for teaching and administration, various individual and structural barriers often slow or even reverse the adoption process. These barriers include inadequate and overloaded ICT infrastructure, insufficient staff training and development opportunities, weak leadership and support for technology adoption, and a lack of technical expertise. The National Planning Authority (2020) highlights that underdeveloped ICT infrastructure, low investment in research and innovation, and unmet conditions for policy implementation and adoption largely cause these issues. There is a growing view that university staff, particularly senior managers, are increasingly experiencing forms of technostress during their work. Symptoms of technostress

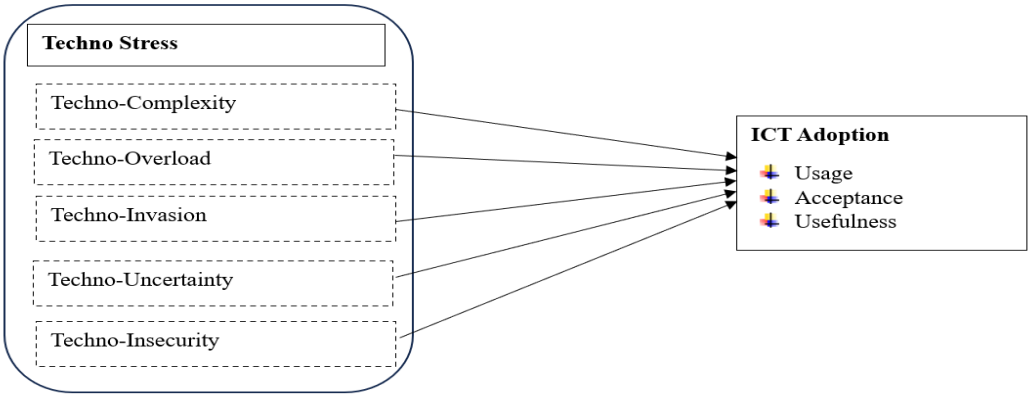
reported in Ugandan universities include constant work overload, intrusion of work into personal time, anxiety about continuous ICT system updates and learning, and fear of being replaced by younger digital generations (Muhenda, 2020). Although many studies on ICT adoption in Ugandan universities and technostress have focused on students and lecturers, little research has examined the experiences of senior managers in public universities, who play a central role in driving ICT strategy, budgeting, implementation, and leadership support. The research gap is both conceptual and practical. Theoretically, the need to integrate the technostress phenomenon with established ICT adoption models, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), has not yet been well-developed in public higher education institutions in Africa. This includes distinguishing between the hindrance nature of most technostress creators (complexity, uncertainty) and some potential challenge stressors (e.g., overload) in resource-limited public universities. Therefore, this study aims to examine the effect of technostress on ICT adoption among senior managers in Ugandan public universities.

2.0 Literature Review and Hypothesis Development

Brod (1982, 1984) defined technostress as the pressure that occurs when individuals fail to successfully adapt to new technology. The technostress construct is described as the maladaptive or dysfunctional strain and pressure that individuals experience while trying to cope with new technologies (Brod, 1982, 1984). Several scholars (Brod, 1984; Ragu-Nathan et al., 2008; Tarafdar et al., 2019; Bondanini et al., 2020) identified five common technostressors, such as techno-overload, which relates to excessive work and time pressures caused by technology; techno-invasion, the blurred boundaries between work and personal life enabled by always-on and online technologies; techno-complexity, reflecting the need to acquire digital skills to manage new technologies; techno-insecurity, the feeling of job insecurity arising from fears of being replaced by colleagues who are more digitally skilled; and techno-uncertainty, the loss of confidence in technology caused by ongoing system changes and updates (Tarafdar, Cooper, & Stich, 2019; Bondanini et al., 2020). These technostressors have been tested and shown to influence ICT usage and acceptance in various academic and corporate settings (Bondanini et al., 2020). However, there is limited evidence on how they affect ICT adoption among a specific population in the Higher Education Institute (HE) context, such as senior managers in African public universities. Senior managers play a crucial role in implementing policy, allocating resources, and guiding organisational direction.

2.1 Conceptual Framework

This study's conceptual framework is based on two digital technology adoption theories - the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), as well as on emerging technostress literature (Tarafdar, Cooper, & Stich, 2019).



Source: Adopted from Davis (1989); Venkatesh et al., (2003); Ragu-Nathan et al., 2008; Tarafdar et al., (2019); Bondanini et al., (2020) and modified by the Researchers

Figure 1: *Conceptual Framework*

Essentially, the two TAM/UTAUT models incorporate ICT adoption through rational perspectives such as perceived usefulness, ease of use, performance expectancy, and facilitating conditions. Meanwhile, technostress literature indicates that the "dark side" of digitalisation introduces stressors that can significantly influence user behaviour (Tarafdar et al., 2019). By combining these, the framework assumes that five hypothesised constructs of technostress (techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty) substantially impact the study's targeted ICT adoption outcomes (ICT use, acceptance, and perceived usefulness) among senior managers in Ugandan public universities. The TAM/UTAUT literature defines ICT adoption as both a behavioural and attitudinal outcome, specifically ICT usage, acceptance, and perceived usefulness.. Additionally, the framework aims to test the direct effects of the five TS constructs. Therefore, it provides a basis for testing hypotheses H1–H5 (Fig. 1).

2.2 Techno-Overload and ICT Adoption

The adoption of ICT is associated with pressures to manage large volumes of information and operate at high speed, a phenomenon known as overload. Shue, Tu, and Wang (2011) observed that ICT involvement in most work activities and daily life, combined with rapid technological change, leads employees to rely heavily on technologies and digital systems that dominate modern work processes. While ICT use can improve efficiency and effectiveness in decision-making and data processing (UNESCO, 2009; Berisha-Shaqiri, 2015), these benefits are often offset by the increased workload they create (Gunmala, 2005; Carlotto, Wendt, & Jones, 2017). Therefore, when senior managers in higher education adopt information and digital systems - such as enterprise resource planning and learning management systems their workload and responsibilities may increase. In many cases, these systems add new tasks instead of reducing them. The literature, however, suggests that overload can have either a negative or positive effect on ICT adoption.

On one hand, overload acts as a hindrance stressor that overwhelms a user's capacity to work (Hang, Chen, & Shah, 2022). On the other hand, when combined with performance expectations and organisational support, overload can serve as a challenge stressor that encourages adoption. As a concept within ICT adoption, overload warrants further research, especially in the context of public universities in Uganda. The first hypothesis is developed:

H1: Techno-overload significantly affects ICT adoption among senior managers in public universities.

2.3 Techno-Invasion and ICT Adoption

ICT-enabled connectivity also diminishes work–life balance as ICT blurs the lines between professional and personal life. This phenomenon is known as techno-invasion. Employees report feeling pressured to be available and connected beyond work hours, which threatens their work–life balance (Suhail & Sibichan, 2014). While mobile technologies, smartphones, and online collaboration platforms make work more flexible and responsive, they often lead to factors that can cause fatigue, burnout, and dissatisfaction. These issues can result in resistance to ICT adoption if not adequately managed (Mahboob & Khan, 2016). Senior managers in Higher Education Institutions (HEIs) face a higher risk of invasion due to their decision-making roles and interactions with many stakeholder groups. However, little empirical research examines how invasion affects ICT adoption, particularly in terms of usage and acceptance among this group.

This gap is especially relevant in the Ugandan context, which this paper aims to address.

H2: Techno-invasion has a significant effect on the adoption of ICT among senior managers in public universities.

2.4 Techno-Complexity and ICT Adoption

Techno-complexity refers to the feeling of strain that occurs when ICT systems and technologies are too complex to learn and use. Sarabadani, Carter, and Compeau (2018) and Al-Maroof, Salloum, Hassanien, and Shaalan (2020) found that a lack of knowledge or expertise in using new ICT systems causes most employees to spend long hours learning and using these systems, which negatively impacts their perceptions of how easy they are to use. Tarafdar et al. (2011) discovered that frequent ICT system upgrades create a constant demand for reskilling, leading to stress and fatigue. Marchiori, Mainardes, and Rodrigues (2018) also found that complexity hampers the ICT adoption process, with older and more experienced staff experiencing more difficulty than younger and less experienced employees, likely because they have been exposed to more new technologies. Recent studies in Uganda have highlighted a lack of ICT training, insufficient technical support, and weak ICT leadership as major contributors to complexity-related technostress (Bbuye, 2017; Muhenda, 2020). For higher education institutions (HEIs), this issue can be particularly true for

senior managers, who not only use these systems, but also need to monitor and enforce ICT use across their organisations. In this context, complexity is expected to hinder adoption by reducing perceived ease of use and usefulness.

H3: Techno-complexity has a significant effect on ICT adoption among senior managers in public universities.

2.5 Techno-Insecurity and ICT Adoption

Fear of losing one's job to younger or more technologically skilled colleagues is known as techno-insecurity. Sareen (2019) demonstrated that insecurity is most common when employees see themselves as less skilled and knowledgeable than their peers or supervisors. Previous research has linked insecurity to decreased productivity (Sarabadani, Carter, & Compeau, 2018) and lower job satisfaction (Tarafdar et al., 2011). Okolo, Kamarudin, and Ahmad (2018) also found that insecurity destabilises and demotivates staff, making them hesitant to use ICT. In higher education, insecurity may also happen when hiring young, ICT-savvy professionals who take on more responsibilities and authority than their older colleagues. In Uganda's public universities, where ICT adoption and use are key performance indicators for many senior managers, insecurity can undermine their motivation to promote ICT adoption.

H4: Techno-insecurity has a significant effect on the adoption of ICT among senior managers in public universities.

2.6 Techno-Uncertainty and ICT Adoption

Techno-uncertainty is a state where ICT users feel anxious and disoriented due to constant system upgrades, changes, and the regular introduction of new platforms. Bencsik and Csinger (2021) and Muhenda (2020) found that regularly upgrading ICT systems disrupts workflows and forces most employees to adapt to new systems and technologies constantly. Tarafdar et al. (2011) discovered that uncertainty reduces users' intention to adopt new technologies because of the strain it causes. For senior managers in HEIs, uncertainty can be especially destabilising due to limited resources, poor planning and implementation of ICT systems and platforms, and limited opportunities for training. This makes uncertainty a highly likely barrier to ICT adoption, as it undermines users' perceptions of both ease of use and usefulness.

H5: Techno-uncertainty has a significant effect on ICT adoption among senior managers in public universities.

3.0 Methodology

This study used a mixed-methods approach to examine the complex organisational phenomenon of technostress and ICT adoption. An explanatory sequential design was most suitable because it

effectively captures both the relationship and context of this connection (Creswell & Plano-Clark, 2018). This method combines quantitative data with qualitative data collected at different stages of the research. The quantitative data are followed by qualitative data collection and analysis to provide a detailed explanation of the statistical results (Creswell & Plano-Clark, 2018). The statistical findings may involve testing a theory, exploring a phenomenon, or identifying a pattern (Creswell & Plano-Clark, 2018). Additionally, scholars have shown that explanatory sequential mixed methods are more effective at establishing validity, as this design leverages the strengths of both paradigms and reduces the limitations of using only one method (Fetters, Curry, & Creswell, 2013).

3.1 Population and Sample

The study population consisted of all senior managers from nine (9) public universities accredited by the Uganda National Council for Higher Education (UNCHE). Seven (7) universities contributed to the main study sample, while two (2) universities piloted the instruments. The total study population was 118. These individuals were senior managers, including university officers, deans of faculties or schools, and heads of departments who typically use ICT tools such as laptops, PCs, iPads, and mobile phones for official work. The sample was selected using both probability and non-probability sampling techniques. The seven universities were purposefully chosen for the study because they provide top managers with ICT devices. From each of these institutions, sixty (60) senior managers were randomly selected to complete the structured questionnaire, and twenty-eight (28) were purposefully sampled for individual interviews (face-to-face or via Zoom). As a result, the total sample size consisted of eighty-eight (88) respondents, with an average response rate of approximately 70.4%, which was considered satisfactory.

3.2 Data Collection Procedures

Data were collected in two main phases. In the first phase, quantitative data were gathered using a self-administered questionnaire distributed to study participants either by mail or through research assistants. The instruments included items adapted from validated scales of technostress (Ragu-Nathan et al., 2008; Jena, 2015; Harahap & Effiyanti, 2016) and ICT adoption. The questionnaire was pilot-tested with forty (40) staff members from two universities. All items were evaluated for internal consistency using Cronbach's alpha reliability coefficient, and only items with a reliability coefficient above 0.6 were included in the main survey. In the second stage, the qualitative data were collected from twenty-eight (28) senior managers using semi-structured interview guides. The interview schedules were designed to elicit participants' lived experiences of ICT adoption and issues of technostress. They also explored participants' perceptions of how these experiences relate to ICT use. More specifically, the topics raised included techno-overload, techno-invasion, techno-complexity, confidentiality concerns related to ICT use, internet disruptions, poor data packages, and perceptions of insecurity in the workplace. The

qualitative data were used to supplement and help interpret the quantitative data.

3.3 Validity and Reliability of Instruments

The instrument's validity was confirmed through Exploratory Factor Analysis (EFA). In the technostress scale, 28 items were loaded and analysed, resulting in five (5) factors or dimensions of technostress with eigenvalues above 1 (4.03, 2.78, 1.77, 1.38, and 1.27). Thirteen (13) items with weak or cross-loadings were removed, while fifteen (15) items with factor loadings between 0.573 and 0.931 were retained. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) was .593. Bartlett's Test of Sphericity (BTOS) was significant at $p < .001$, indicating that the data are suitable for factor analysis. The ICT adoption scale also had its items loaded and analysed, resulting in three (3) dimensions with eigenvalues of 5.178, 1.99, and 1.475. Two (2) weak items were removed, leaving 13 items with loadings from 0.666 to 0.858. The KMO statistic was .765, and Bartlett's Test was significant at $p < .001$. These results confirm that the construct is valid. Regarding reliability, the findings show that the constructs have Cronbach's alpha coefficients above 0.6, which is considered acceptable. It is noteworthy that a cutoff point of 0.6 was used, as the study was exploratory in nature.

Table 1: Reliability Test Results

Technostress	Items	Cronbach alpha(α)
Complexity	7	.640
Overload	5	.846
Invasion	6	.618
Uncertainty	5	.632
Insecurity	5	.624
ICT adoption	15	.801

3.4 Data Analysis

Quantitative data were analysed using SPSS. The means and standard deviations were used to assess the level of technostress and the degree of ICT adoption.

Correlation analysis was used to assess the strength and direction of relationships between the variables. The study employed the Pearson product-moment correlation coefficient (r). It used multiple regression analysis to test the five hypotheses and explore the relationships between the creators of technostress and ICT adoption (ICT use, ICT acceptance, and ICT usefulness). The qualitative data collected from the interviews were transcribed, coded, and analysed thematically. Common themes that emerged from the data included confidentiality risks, internet disruptions, and poor data packages as likely explanations of why some creators of technostress had a significant influence on ICT adoption, while others did not. The study received approval from the relevant university authorities to be carried out at the designated institutions, and the

participants signed informed consent forms before taking part. Respondents were assured of their confidentiality and anonymity, which was very important to them given the nature of their work, including critical managerial decision-making and governance of ICT use in the universities.

4.0 Results

4.1 Respondent Bio-Data

A total of 88 respondents were considered for the study. Out of these, 60 (68.2%) responded to structured questionnaires, while 28 (31.8%) participated in in-depth interviews. The respondents include university officers, deans of faculties or schools, and department heads in seven public universities.

4.2 Factor Analysis Results

4.2.1. Techno-Stress Scale

The Exploratory Factor Analysis (EFA) of the 28 items that make up the technostress measure developed initially for this study showed that only 15 items loaded satisfactorily on five dimensions with Eigenvalues greater than 1 (4.03, 2.781, 1.769, 1.378, and 1.267). These five factors explained approximately 70.2% of the variance. The KMO measure of sampling adequacy was 0.593, which is above the Kaiser (1974) recommended lower limit of 0.50 and the more commonly used acceptable lower limit of 0.60–0.70. Bartlett's Test of Sphericity was significant ($p < .001$), indicating that the correlation matrix was not an identity matrix and was suitable for factor analysis.

The rotated factor loadings identified five dimensions of Technostress. The first dimension, complexity (Factor 1), was reflected by items such as; "new developments in technology are a burden" (.931), "technology is too complex to understand" (.868), "take a long time to get used to new technologies" (.786), and "learning new software" (.774). Users generally experience cognitive overload when they have to learn and understand ICT artifacts to apply them in their work. The second dimension, Factor 2 (Overload), includes items such as "forced to do more work than I usually handle" (.903), "makes me work harder" (.885), "makes me work faster" (.781), and "perform tasks faster" (.769). These items relate to the user's perception that the ICT compels the manager to work harder and faster. On the other hand, the third dimension, Factor 3 (Invasion), includes items such as "had to be available online most times" (.808), "internet disruptions" (.781), "often compelled me to do more work to meet deadlines" (.760), and "felt like taking work home with me" (.667). All these items relate to the general blurring of boundaries and the intrusion of ICT into the manager's personal time.

While Factor 4 (Uncertainty), which is the fourth dimension, includes items such as "internet disruptions" (.856), "power disruptions affecting connectivity" (.804), "failure to use technology

to communicate" (.782), and "power outages" (.714), these reflect the instability in the ICT environment that causes unpredictability. Finally, the fifth dimension, Insecurity (Factor 5), includes items like "forced by technology to work with very tight schedules" (.750), "internet disruptions" (.712), "failure to use technology to communicate" (.707), and "reluctance to share knowledge with other colleagues" (.690). These items highlight feelings of job insecurity and resistance to change. The factor analysis thus supported the idea that the construct of technostress is multidimensional. Reliability estimates produced Cronbach alpha values above the 0.50 threshold for each factor (ranging from .524 to .846), indicating an acceptable level of internal consistency for an exploratory study. However, further refinement of the measurement model could enhance these reliability estimates.

Table 2: Technostress Factor Loading

Items	Dimension				
	1	2	3	4	5
New developments in technology are a burden	.931				
The use of technology too complex to understand	.868				
Regular technology upgrades were complicated	.865				
The use of technology created more problems than normally experienced	.652				
Do not know enough about ICT application utilisation	.642				
Forced to do more work than I usually handle		.903			
Forced by technology to work much harder		.889			
Had to be available online to do work most times			.808		
Able to regularly upgrade my technical skills			.758		
Had to sacrifice time for technology updates			.587		
Sometimes internet connectivity disruptions				.856	
Power disruptions that affected connectivity				.804	
Frequent upgrades in computer software				.573	
Forced by technology to work with very tight time schedules					.750
Reluctance to share knowledge among coworkers					.690
Eigen values	4.03	2.781	1.769	1.378	1.267
% of variance explained	25.2%	17.4%	11.1%	8.6%	7.9%, KMO .593. Sig. 000

4.2.2 ICT Adoption

The factor analysis of the 15 items that make up the ICT adoption (usage, acceptance, and perceived usefulness) measure developed initially for this study showed that only the 13-item ICT adoption

scale produced a three-factor solution with Eigenvalues above 1 (5.178, 1.990, and 1.475), explaining a total of 56.6% of the variance. The KMO value was 0.765, which is within the acceptable range, and Bartlett's Test of Sphericity was significant ($p < .001$), indicating appropriateness.

Table 2: ICT Adoption Factor Loading

Items	Variable		
	1	2	3
Easy to perform office assignments using ICT	.848		
Comfortable conducting business transactions online	.780		
Navigating ICT assisted me complete office tasks	.770		
More control over my office tasks	.713		
Less time to do my assignments	.670		
ICT very easy to use	.666		
Easy collaboration with staff		.839	
Faster accomplishment of assignments		.811	
Completing tasks at one's own pace		.786	
Overall performance improvement		.767	
ICT useful in conducting business in a virtual environment			.858
An enabler of business continuity			.829
A new form of conducting business			.720
Eigenvalues	5.178	1.99	1.475
% of variance explained	39.827	15.308	1.475; KMO .765; Sig. .000

The loadings showed the following dimensions:

The ICT adoption had three dimensions: ICT ease of use, perceived usage, and usefulness. The first dimension, ICT ease of use (Factor 1), included items such as "easy to perform office assignments using ICT" (.848), "easy to complete tasks using ICT" (.844), "tasks completed quickly when using ICT" (.792), "accessing ICT was quick and easy" (.780), and "navigating ICT helped me complete tasks" (.770), reflecting respondents' experience of efficiency and ease of use. The second dimension, Factor 2 (Acceptance), included items like "easy collaboration with staff" (.839), "overall performance improvement" (.767), and "collaboration improvement was very high" (.758), which focus on improving teamwork and productivity. The third dimension, Usefulness (Factor 3), contained items such as "ICT useful in conducting business in a virtual environment" (.858), "ICT as an enabler of business continuity" (.829), and "enjoyed working from home as a result of ICT" (.810), highlighting the strategic importance of ICT in ensuring operational continuity. The internal consistency reliabilities of these three adoption dimensions

range from 0.727 to 0.761, indicating adequate to good consistency.

The results of the factor analyses support the multidimensionality of both the technostress and ICT adoption constructs, suggesting that they cannot be validly and reliably measured as uniform or one-dimensional phenomena. Similarly, ICT adoption is multidimensional, requiring both operational and strategic considerations in the higher education context. In light of these validated structures, regression analysis will be used to test the hypothesised relationships.

4.3 Hypothesis Testing: Effect of Technostress on ICT Adoption

Table 3 shows the model's fit for the entire sample. The R^2 and adjusted R^2 values indicate the percentage of variance in ICT adoption explained by the five technostress predictors (complexity, overload, invasion, uncertainty, and insecurity).

Table 3: Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.524[a]	.275	.203	.50329	.275	3.859	5	51	.005	1.694

a. Predictors: (Constant), Insecurity, Overload, Invasion, Uncertainty, Complexity

The five-predictor model, which includes all dimensions of technostress as predictors (complexity, overload, invasion, uncertainty, and insecurity), explains 27.5% of the significant variance in the ICT adoption scores of senior managers in public universities (R^2 = .275; Adjusted R^2 = .203). The F-test also shows that the overall model fit is statistically significant (F (5,51) = 3.859, p = .005), indicating that the combination of technostress dimensions in the regression can meaningfully predict ICT adoption. The Durbin-Watson statistic is 1.694, suggesting no concern of autocorrelation in the residuals. Although the R-squared value indicates the model explains a small portion of the variance, the results remain statistically significant. The significance of individual predictors provides valuable insights into specific factors affecting ICT adoption.

4.4 Hypothesis Testing

Table 4 presents the regression coefficients for different technostress dimensions. Both the unstandardised (B) and standardised (Beta) coefficients are listed, along with their standard errors, t-values, and significance levels.

Table 4: Regression Analysis (Coefficients[a])

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Interpretation
B		Std. Error	Beta				
1	(Constant)	3.279	.449		7.304	.000	
	Complexity	-.287	.100	-.365	-2.863	.006	Supported
	Overload	.120	.052	.288	2.332	.024	Supported
	Invasion	.169	.083	.250	2.034	.047	Supported
	Uncertainty	.059	.089	.084	.662	.511	Not Supported
	Insecurity	.073	.071	.133	1.028	.309	Not Supported

Dependent Variable: ICT Adoption

4.4.1 Techno-overload and ICT adoption

The techno-overload has a positive and statistically significant impact on ICT adoption ($\beta = 0.288$, t = 2.332, $p = .024$), indicating that techno-overload, as a facet of technostress, notably influences ICT adoption. In simpler terms, the more senior managers are required to use ICT to handle increased workloads, work faster, or feel overwhelmed by the number of ICT tools available, the more likely they are to adopt ICT. The results support the idea that overload can serve as a challenge stressor, motivating senior managers to use ICT to address efficiency stressors, such as speeding up work through technology. Therefore, H1 is supported.

4.4.2 Techno-invasion and ICT adoption

The results indicate that the relationship between techno-invasion and ICT adoption is positive and statistically significant ($\beta = 0.250$, t = 2.034, $p = .047$), demonstrating that techno-invasion, as a dimension of technostress, has a meaningful impact on ICT adoption. In other words, the more senior managers in public universities are contacted through technological means during their personal time or frequently travel for work using ICT tools (e.g., emailing during trips), the more likely they are to adopt ICT at work. Therefore, H2 is supported.

4.4.3 Techno-complexity and ICT adoption

The results show that techno-complexity has a negative and statistically significant impact on ICT adoption ($\beta = –0.365$, t = –2.863, $p = .006$), indicating that techno-complexity as a dimension of technostress significantly influences ICT adoption. In simpler terms, the more senior managers in public universities view ICT tools as too complex, difficult to learn, or requiring extra effort to update, the less likely they are to adopt ICT meaningfully. This finding aligns with expectations and previous research, which indicates that complexity acts as a barrier to ease of use and perceived usefulness key factors in most ICT adoption models (e.g., TAM, UTAUT). Therefore, H3 is supported.

4.4.4 Techno-insecurity and ICT adoption

The results show that techno-insecurity does not have a statistically significant effect on ICT adoption ($\beta = 0.133$, t = 1.028, $p = .309$), indicating that techno-insecurity, as part of technostress, does not significantly influence ICT adoption. In other words, even if some senior managers feel insecure about being replaced by younger colleagues or those with more ICT skills, this perception does not appear to lead to notably lower ICT adoption in this context. Holding managerial roles in public universities might actually shield senior managers from stress caused by insecurity, thanks to their authority and job security. Thus, H4 is not supported.

4.4.5 Techno-uncertainty and ICT adoption

Techno-uncertainty, defined as stress caused by frequent system upgrades and constant changes in ICT tools, is not a significant predictor of ICT adoption ($\beta = 0.084$, t = 0.662, $p = .511$). This shows that techno-uncertainty, as a part of technostress, does not strongly influence ICT adoption. In other words, although uncertainty emerged as one of the main challenges reported qualitatively by managers, it was not a statistically significant predictor of ICT adoption in this study. This may be because managers have become accustomed to frequent system upgrades and changes, or because the technology support systems within universities help mitigate the impact of this technostress dimension on ICT adoption. Therefore, H5 is not supported.

It is important to note that three out of the five dimensions of technostress significantly affect ICT adoption: overload, invasion, and complexity. Importantly, both overload and invasion are positive predictors, meaning these stressors serve as motivators rather than barriers. In contrast, insecurity and uncertainty, two other dimensions that can reasonably be considered harmful stressors, are not statistically significant. This indicates that both technostress creators and inhibitors exist among the individual dimensions of the construct, with the creators explaining greater variance in ICT adoption.

5.0 Discussion

This study's results show that the dimensions of technostress have unequal and opposing impacts on ICT adoption, confirming both challenge and hindrance pathways. The statistically significant negative beta value for techno-complexity indicates that its stressor is a barrier, negatively affecting ICT adoption. This confirms previous findings from Tarafdar et al. (2011) and Sareen (2019), who report that a high perception of complexity, such as learning difficulties and system changes in ICT use, undermines employees' confidence in using these systems. Similarly, Muhenda's (2020) study in Uganda demonstrated that frequent system upgrades combined with a lack of training on new platforms caused academic staff to resist their use. This, in turn, reaffirms the logic of the TAM model (Davis, 1989), which states that perceived ease of use is a key factor. It suggests that when ICT platforms become too challenging to operate, they begin to hinder adoption even among

the most senior managers at the university.

In cases of techno-overload, the beta coefficient of statistical significance ($P<0.05$) shows a positive impact on ICT adoption. This aligns with findings from Jena and Mahanti (2014), who reported that although this dimension may initially be perceived as stressful, it fosters a positive attitude toward increased ICT use as a necessary adaptation for efficiency. In the Ugandan higher education system, where senior managers often handle large volumes of administrative and academic tasks (RUFORUM, 2017), the use of ICT becomes an attractive coping mechanism to manage growing workloads. This finding is consistent with the challenge–hindrance framework (Cavanaugh et al., 2000), which views overload as a challenge stressor that prompts more effort and resource investment to achieve desired goals rather than avoiding them.

Techno-invasion was also found to have a statistically significant positive effect on ICT adoption. Prior research has shown that permanent connection and accessibility (Shue, Tu & Wang, 2011; Berisha-Shaqiri, 2015) contribute to both stress and normalisation of ICT use, as it makes ICT an integral part of private and work life. The current study's results may be explained by the fact that, during the COVID-19 pandemic, when working from home became the new normal (Vaziri et al., 2020), managers had to adapt to remote work, which required a permanent connection in most places, including Uganda. Consequently, invasion, which negatively impacts work–life balance, also begins to facilitate habitual ICT use among them.

In cases of techno-insecurity and techno-uncertainty, the results did not show a statistically significant link between these stressors and ICT adoption. This contrasts with existing studies that have found both factors to negatively affect individuals' attitudes and behaviour toward ICT. For example, Okolo, Kamarudin, and Ahmad (2018) argued that when people see their jobs as insecure due to technological changes, they find it hard to adapt. In Uganda, Muhenda (2020) found that frequent system updates made staff feel insecure about using those systems. It seems that in public universities, the job security of the managers and their coping mechanisms for network and power outages help buffer the impact of these stressors. This finding is consistent with Ergado's (2019) research in Ethiopian higher education, which showed that organisational factors and management support within the institution influence individual adoption intentions. This may explain why, when other stressors are considered, insecurity and uncertainty no longer have a significant predictive effect.

The results reveal significant contradictions with previous literature. While some studies have treated all dimensions of technostress equally (Tarafdar et al., 2019) as potentially damaging for ICT adoption, this research indicates that some dimensions negatively influence managers' attitudes and behaviors, while others have positive effects. In this context, overload and invasion, often viewed as negative, are instead sources of extra work and positive pressure here, with complexity remaining the main barrier. This aligns with Marchiori, Mainardes, and Rodrigues

(2018), who found that perceptions of technostress, whether negative or positive, vary among different employee groups based on their work experience and are not uniformly negative. How different stressors are interpreted as challenges or hindrances determines their effects. Regarding insecurity and uncertainty, their inconsistency with qualitative studies like Muhenda (2020) suggests that single-dimensional descriptions of challenges may overstate their influence as predictors of behavior if not considered alongside other factors.

5.1 Conclusion

This study aimed to explore the effect of the five technostress dimensions on ICT adoption among senior managers in public universities in Uganda. The analysis incorporated validated factor structures of technostress and ICT adoption to ensure reliability and validity. The results support the multidimensional nature of technostress, with five distinct dimensions (complexity, overload, invasion, uncertainty, and insecurity), and the three-dimensional structure of ICT adoption (perceived ease of use, collaboration, and continuity). Regression analysis revealed that three technostress dimensions (complexity, overload, and invasion) significantly predicted ICT adoption, whereas two other dimensions (insecurity and uncertainty) were not significant predictors.

The study findings have several implications. First, complexity emerged as a major barrier to ICT adoption. This underscores the importance of providing ongoing training and ensuring user-friendly ICT systems to improve perceived ease of use. Second, overload and invasion, contrary to expectations, also positively predicted ICT adoption, as managers use ICT tools to handle increased workloads and the normalization of constant connectivity. This indicates the asymmetric nature of technostress, where some stressors hinder ICT adoption, while others actually promote it. Lastly, the non-significant impact of insecurity and uncertainty may be due to the unique context of public universities in Uganda, where job security is guaranteed by structure, and the institutions are relatively resilient to infrastructural instability.

5.2 Recommendations and Future Research Areas

5.2.1 For University Management

Institutions should regularly improve the ability of university leaders and staff to handle techno-complexity. Training, peer-learning workshops, and on-demand ICT support services can make systems and processes easier to use, encouraging greater adoption. Institutions should also invest in more user-friendly systems and interfaces that are simpler to navigate. Similarly, universities need to pay more attention to managing techno-overload and techno-invasion. While these stressors can have positive effects, allowing ICT demands to grow unchecked could lead to negative long-term consequences. This might result in burnout and should be prevented. Clear communication and policies about after-hours communication and manageable ICT workloads would help institutions

manage adaptive stress without harming their well-being.

ICT adoption strategies should also focus on long-term sustainability. Besides encouraging immediate use, strategies need to support the continuous institutionalisation of ICT adoption. This includes aligning ICT policy guidelines with the institution's strategic plan. It also involves securing ongoing funding for ICT strategic priorities and integrating ICT adoption into performance management systems for university leadership. Incorporating ICT into governance and management frameworks and recognising adaptive behaviour will help embed usage and adaptive practices into the organisational culture.

5.2.2 For Policymakers and Regulators

The national education authorities and the National Council for Higher Education should develop ICT adoption guidelines that address technostress. Policy documents should emphasise not only infrastructure investment, but also stress reduction strategies. This could involve allocating funds and strategic resources for digital literacy training and psychosocial counseling. Data infrastructure and internet reliability should also be prioritised. Although techno-uncertainty was found to be non-significant in the model, this should not lessen the importance of maintaining stable digital environments and infrastructure, which remain ongoing qualitative concerns.

5.2.3 For Researchers

This study shows that technostress should be viewed as a multidimensional construct with varying effects. Future research should explore existing concepts, such as overload and invasion, to determine whether they better represent situations where technostress acts as a 'challenge' or 'hindrance' stressor. Additionally, research in different settings, such as private universities, small and medium-sized enterprises (SMEs), or various regions, is necessary to validate the broader applicability of these relationships further. Longitudinal studies would also help identify possible shifts in stressor effects as ICT systems develop and people become more accustomed to them. The analysis of other potential moderating or mediating variables, such as personal traits like innovativeness and openness to change, should also be considered.

The study emphasises the importance of using a mixed methods approach to capture both the quantitative relationships between technostress and ICT adoption and the qualitative perceptions of managers regarding these stressors in real-world settings. The modest KMO value for the technostress scale (0.593) also suggests the need to improve measurement tools within African higher education contexts. Future research should employ Structural Equation Modeling (SEM) to validate constructs and explore causal relationships. Longitudinal studies would be beneficial to understand how the impact of stressors evolves as ICT systems and organisational practices develop.

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