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Relationship Among Technostress Productivity and Role Stress

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Abstract

The present research is an attempt to explore the relationship among technostress, role stress and individual productivity displayed by the employees at workplace. Based on the concept of role theory, role overload and role conflict have been considered as two factors leading to role stress. It's a unique attempt made by the researcher to investigate the impact that information technology created stress, called technostress may have on the role stress and individual productivity in Indian context. A survey was conducted with the help of reliable and validated questionnaires from 233 employees working at different levels in seven organizations belonging to northern parts of the country (Delhi NCR and Chandigarh regions). After analyzing the randomly collected primary data, it was found that technostress impacts role stress positively and productivity negatively, while role stress and productivity are inversely related. It was also further established that technostress impacts individual productivity via role stress i.e. role stress works as a mediator to the relationship of technostress individual productivity. Further implications can be that strategies used to tackle role stress may be used to tackle technostress too.

Keywords: *Technostress, Information Communication Technology (ICT), Role Stress, Productivity, Role Conflict.*

Introduction

The usage of technology especially Information Technology (IT) has markedly shown its impact in the form of benefits that organizations have extracted from it in the past few decades. Though nothing comes without a cost and scholars do agree that its effects have been very broad and indirect, which are also in both directions, positive as well as negative(Cartwright & Cooper, 1997; Santos & Sussman, 2000; Kudyba and Diwan, 2002). The positives are quite prevalent and for everyone to witness here. Though, the working professionals who work directly with them experience the dark side of it that include tension and anxiety which leads to discomfort and hence reduced confidence and comfort with information technology(Hudiburg and Necessary, 1996; Atanasoff and Venable, 2017; Wang & Bo Li, 2019). These after a prolonged use may lead to stress which technically is termed as technostress, which is a result of inability of an individual to cope with ever evolving ICTs (Nelson, 1990, Nelson and Kletke, 1990).

Such technologies are bound to change and often in ways that are difficult to predict and thus endangering the position and hence survival of employees by causing a threat to their expertise, position poweretc. (Marcoulides, 1989; Hudiburg and Necessary, 1996;Abdul-Gader and Kozar, 1995;Tarafdar et. al., 2019). Further to this, the work pressure and the all-pervasive nature of modern technology leads to constant connectivity of individuals to their work via phone, e-mail etc. and thus a feeling of being always 'on call'(Brood, 1984;Weil and Rosen, 1997; Atanasoff and Venable, 2017). Another impact that the frequent change in technology brings with it is the restructuring/reengineering of the organisational

social and work structure that in turn may change the existing power relationships and thus contribute to increased stress and hence negative effects on the personal performance and overall productivity(Barley, 1990; Zuboff, 1988;Joshi, 1989;Eason and Damodaran, 1981).

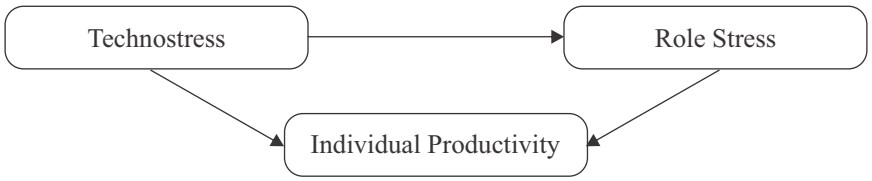
The impact of ICTs on stress among employees is a crucial area of research but it has not been sufficiently studied (Cartwright & Cooper, 1997;Cooper, Dewe and O'Driscoll, 2001; 76, Tarafdar et. al., 2019) except a few (Brillhart, 2004; Matteson and Ivancevich, 1985; Nelson and Kletke, 1990). There are studies that have focused attention on the information systems personnel experiencing stress (Ivancevich, 1983;Li and Shani, 1991; Sethi et. al., 2004; Thong and Yap, 2000). Though the concept of Technostress was first proposed in the year 1984, and is considered as a dark side of ICT, it is still a relatively lesser explored area, as compared to the benefits associated with ICTs (Atanasoff and Venable, 2017, Tarafdar et al., 2015).But we will find very little systematic research trying to look into the aspects of ICT creating stress and its influence on those working with it. Since there is no alternative to ICT and it looks as it is here to stay, thus creating a requirement for studying it. Especially, in India there are very limited number of researches that have focused its attention towards technostress and those that have, are mostly been limited to studying of factors causing technostress (Jenna & Mahanti, 2014) or metanalysis (Mahapatra, Pillai, 2018, Wang & Bo Li, 2019). It has also been said in the Indian context that there has been a status quoon the research related to technostress (Mahapatra, Pillai, 2018).

This paper deals with exploring the relationship among factors of technostress, role stress and productivity by utilizing the concepts from role theory (Gross and McEachern, 1998) and sociotechnical theory (Trist and Bamforth, 1951). Specifically, how factors of technostress affect productivity and role stress and further how it affects individual productivity through role stress i.e. role stress as a mediator to the relationship of technostress and productivity. To sum this up, we have first be explained how ICTs can cause stress and then identified the factors that cause technostress. Then, it has been established that how technostress and productivity are inversely related and also that technostress does influences role stress. Finally, the mediation role of role stress in between the relationship of technostress and productivity has been established. The study was conducted on primary data collected with the help of a survey method from different organisations of the country including the capital of the country.

Conceptual Framework and Hypotheses Development

The present section describes the theoretical framework and then the different hypotheses framed. We begin by explaining how the use of ICTs cause stress, which in turn is inversely associated with productivity. Then we move on to the concept of role stress, which again in turn is inversely associated with productivity. Then we look at the role theory and sociotechnical theory to understand the mediation role of role stress to the relationship of technostress and productivity. The model proposed has been shown in figure 1.

Figure 1: Conceptual Model



Technostress and Productivity

Stress is caused when an individualis unable to respond adequately to the demands exerted on him/her by the environment (work in this case) in a given situation, which are accompanied by a negative consequence. It may also be rightly described as an individual's cognitive response to the imbalance between demand of the situation and the individual's response (Cooper et. al. 2001; Wang & Bo Li, 2019), especially when the individual perceives that the work required to be done requires more than the knowledge, abilities and skills possessed by the individual(52). Previous studies display that high levels of stress are associated with dissatisfaction, absenteeism, low performance, commitment and involvement (Jackson and Schuler, 1985;Jex and Beehr, 1991; Kahn et. al. 1964;Tarafdar et. al. 2019).

Moving along the similar lines, there are studies that suggest that stress has technology as one of its antecedent (Cooper et. al. 2001;McGrath, 1976; Mahapatra, Pillai, 2018). Keeping in view the rate at which technology has grown and hence become an integral part of work life in almost every kind of industry further can explain how stress gets different passages to enter an organization and shoot up its level among employees using them. Recent literature has dubbed these stresses caused because of technology as *technostress* (Brod, 1984;Weil and Rosen, 1997; Mahapatra, Pillai, 2018). Technostress in an organisational context may be understood as the maladjustment or adaptation problem of an individual while working with constantly changing technology or a technology that he/she is unable to cope with or get used. It also includes individual's struggle with constant evolving social, cognitive and physical requirements related to their use. It has been found to be associated with factors like as anxiety, fatigue, dissatisfaction and overwork, which in turn affects productivity negatively (Nelson and Kletke, 1990; Sainfort, 1990; Wang & Bo Li, 2019). The reasons for the same can be multi-folds.

First, the work pressure and the all-pervasive nature of modern technology leads to constant connectivity of individuals to their work via phone, e-mail etc. and thus a feeling of being always 'on call' (Brod, 1984; Weil and Rosen, 1997; Mahapatra, Pillai, 2018). Second, is the peer pressure to remain up to date with the latest changes to avoid the feeling of being left out and in professional life also the technology keeps changing and often in ways that are difficult to predict, thus continues upgrade is also imperative and that too with little time in between (Fisher and Wesolkowski, 1999;Weil and Rosen, 1997). Third, the ever-emerging technology often results in the replacing technology being more complex as compared to the one being replaced and the terminology associated too is more complex and often intimidating (Weil and Rosen, 1997) (especially ERP systems) which results in fear and anxiety (DeMaagd, 1983;Zuboff, 1988). All this results into dissatisfaction which in turn negatively affects performance and productivity (Fisher and Wesolkowski, 1999). Fourth, because of the all-pervasive nature of ICTs, it results into creation of multiple channels of information input, which may cause information overload which employees may

find difficult to handle and use (Brillhart, 2004; Brood, 1984;Weil and Rosen, 1997 & 1999; Mahapatra, Pillai, 2018).Hence, we can hypothesize that,"Technostress affects productivity negatively"

Role Stress and Productivity

Every individual play different role in one's life whether personal or professional. Thus, employees play different roles in their organisational life which are defined as specific set of responsibilities or tasks associated with one's position in the organisation. Thus, roles define how an employee behaves in the organization (Graen, 1976; Perrone et. al. 2003;Cooper et. al. 2001). When different roles are given to an employee, which are conflicting in nature may lead to stress, especially when there is a communication gap or clarity of thought associated with any aspect of any task or responsibility or when the different tasks call for requirements that are contradictory. It has been reported that the major causes of role stress are *role conflict* and *role overload*(Kahn et. al. 1964;McGrath, 1976; Wang & Bo Li, 2019).

Role conflict occurs when an individual has to fulfill requirements that are incompatible contradictory, or incongruent(Kahn et. al. 1964;Rizzoet. al. 1970). This is not a very strange thing to happen in an organisational context and the reason for this to happen is when that individual is required to fulfill the requirements of more than one role, which are incompatible in nature and hence the expectations from both the roles are at odds, making compliance with both at a time is very difficult (Katz and Kahn, 1978; McGrath, 1976; Wang & Bo Li, 2019). An instance, for the same can be a situation where a person is expected to lead organizational innovation. Now, this employee has to simultaneously push for change to implement new ideas without disturbing the existing working practices which are required to carry on day to day operations. If we talk of role conflict in terms of technostress then it may occur when different colleagues in the social network of an individual have contradictory expectations from him(Graen, 1976;Kahn et. al. 1964;McGrath, 1976). Though the chances of occurrences of such incidence is more when the individual is performing some role that crosses departmental ororganizational boundaries called as "boundary" roles(Stamper and Johlke, 2003; Veloutsou and Panigyrakis, 2004).

Role overload is the term associated with the work amount or even difficulty level that has been assigned to an individual is more than his/her capacity to perform (Abdel, 1981; Kahn et. al. 1964; McGrath, 1976). In case of role expectations being too much for an individual to perform it is termed as quantitative role overload. If the role expectations from the job are too difficult to be performed then we term it as qualitative role overload(Ivancevich and Matteson, 1980; Katz and Kahn, 1978). In another case, if the number of roles assigned are too much or too many for someone to handle and he/she feels overwhelmed, this too is termed role overload(Kahn et. al. 1964).

These two (role conflict and role overload) together lead to role stress. Role stress have been found to be negatively associated with performance (Abdel, 1981; Jackson and Schuler, 1985;Nygaard and Dahlstrom, 2002; Siegall, 2000;Veloutsou and Panigyrakis, 2004). It has also been found inversely related to dissatisfaction, productivity and work quality as it hampers an individual's task performing ability badly(Cooper et. al. 2001). Hence, we hypothesize that "Role stress is inversely related to individual productivity".

Technostress and Role Stress

Sociotechnical theory opines that an organisation

is a sociotechnical system that consists of two aspects, which are social and technical aspects; social aspect is related to the skills, values, behaviours, roles, structure and reward systems. On the other hand, by technical system it means the actual work performed, technologies used and the related processes. (Fensham and Hooper, 1964; Rice, 1958; Trist and Bamforth, 1951).

Roles performed by individuals in an organisation are either related to tasks that individual performs directly along with the technical systems associated with it or the social systems with which the individual interacts i.e., the hierarchy, the structures (reporting, departmental, authority etc.) (Graen, 1976;Katz and Kahn, 1978). There are studies that opine that technology affects organisational roles as it responsible for shaping the span of control, coordinating mechanism, organisational structures, rules, policies and procedures etc(Perrow, 1967;Thompson, 1967;Woodward, 1965;Emery and Trist, 1965;Zuboff, 1988). It has been propounded that roles are dynamic and not static and as the technology change is introduced it gradually moves from changing tasks & skills to structures and processes (Perrone et. al. 2003;Barley, 1990). Thus, it can be said that technology have a bearing on the roles performed (Barley, 1990; Giddens, 1984; Heintze and Bretschneider, 2004;Huber, 1990; Lau et. al. 2001;Leavitt and Whisler, 1958;McCall and Simmons,1978;Nelson, 1990;Orlikowski,1992; Zuboff, 1988).

As technology has a bearing on the roles, similarly many reasons which explain technostress impacts role stress. First, technology these days are relatively complex, which may lead to role overload because it requires more hard work to comprehend the changes and command them (Beehr, 1976; Miles and Perreault, 1976;Tosi, 1971). As already stated, that in modern times technology changes vey frequently and often in ways that are difficult to predict making it more difficult for the employees to get accustomed to it and by the time, they get used to it, another change occurs (Parson et. al. 1991). This role overload creates role stress. Second, with the introduction of new technology the organisation expects improvement in productivity(Arnetz and Wiholm, 1997; Brod, 1984;Weil and Rosen, 1997). Also, the requirement of speed at which tasks are to be performed increases and thus employees are expected to work faster, thus adding to role overload and hence role stress. Third, new ICTs also are capable of multitasking functions, thus putting more pressure on employees to manage many tasks at the same time, giving rise to the feeling of solving many problems at the same time (Clark and Kalin, 1996;Weil and Rosen, 1999). Fifth, with the increase in the number of tasks, the time required to manage these also increases which results in longer working hours at work or work even on weekends (Cooper, 2001). These further increases role overload and causes role stress.

Further to creating role overload, technology by many ways also creates role stress by creating conditions that lead to load conflict. First, technology along with-it considerable capabilities which requires process modifications. Applications like ERP are bought and implemented, to understand them and adjust, employees usually take time and sometimes may even not accept it. In both the cases they finally have to adjust and work as per the new system which may no longer make them feel in control of their role as they are being forced here (Brod, 1984;Johansson and Aronsson, 1984). This results into role stress because of role conflict. Second, the use of ERP, CRM and other such systems which make the employees from different department of the organisation work in an integrative manner which creates interdependencies among departments and as a result requires interaction and collaboration among individuals from different

departments who may different in their perspective and cultures giving rise to chances of role conflict and hence role stress. Third, the modern ICTs add to the individual's role set. The all-pervasive ICTs in addition to adding roles also increases overall communication among its members (Foster and Flynn, 1984;Sproull and Kiesler, 1984). This leads to employees working in different teams which also may be cross functional and often employees having more than one superior and receiving commands from them at the same time that may even be contradictory and hence causing role conflict and thus role stress (Huber, 1990;Culnan and Markus, 1987). Grounding on this discussion,the following hypotheses may be proposed, "Technostress is positively related to role stress" and "Role stress mediates the relationship of technostress and individual productivity".

Research Methodology

Statement of the problem

India is one of the prime destinations for firms which are into providing IT enabled services to the world as it contributes a lot of IT related workforce to these firms across countries. The use of technology especially Information Technology (IT) has markedly shown its impact in the form of benefits that organizations have extracted for it in the past few decades in the form of enhances process efficiency, reducing cost and time, analyzing chunks of data and forming new strategic alternatives based on it and innovating too only to name a few. Though nothing comes without a cost and scholars do agree that its effects have been very broad and indirect, which are also in both directions, positive as well as negative. To be specific, along with generating the mentioned benefits, it has caused some undesirable reactions in employees that require some serious attention and hence adjustments.

As these negative impacts are already alarming and need some serious preventive measures to secure the efficiency of its workforce, we need to look for causes and hence measures/policy that can be used to negate/reduce such impacts that have become a serious cause for concern. Thus, the present research will be quite helpful in guiding develop some effective policy regarding the same.

Objectives of the Study

The present study emphasizes on the following: -

(a) To examine the relationship between stress created due to technology (technostress) and productivity of employees working in IT enabled sector.
(b) To establish relationship between role stress and productivity.
(c) To explore the relationship of technostress to productivity mediated by role stress, which in Indian context hasn't been exploredyet.

Research design

The present research has been designed to be descriptive as well as exploratory in nature. As the present study is about finding the facts and describing them and also at the same time exploring something new that has not been explained in the past. The present research has tried to explore the role of role stressas a mediator between individual productivity of an employee and the technostress. The research is also more quantitative work compared to qualitative.

Conceptual framework

This research work proposes a research model that has been tested with the primary data (Fig. 1). The model identifies that Technostress and role stress

(role overload + role conflict) directly affects individual productivity. Further, it has been checked that technostress affects productivity via role stress, i.e., role stress plays the role of a mediator in the relationship of technostress and productivity.

Research Hypotheses

Based on the past literature work presented above and the conceptual framework the following four logical hypotheses have been framed that would try to address the problem presented above and also logically justified:

1. There is a positive association between technostress and role stress.
2. Role stress impacts individual productivity negatively.
3. Technostress impacts individual productivity negatively.
4. Role stress mediates the relationship of technostress and individual productivity.

Method Used

There have been various methodologies used in the past ranging from case studies to predictive analysis but the present study utilizes mediation technique to study and analyze the relationships. Sample, procedure, measures and data analysis have been discussed in this section.

Sample and Procedure

Data were collected from employees working in private sector ITes organisations of Chandigarh and Delhi-NCR region through a field survey with the help of information technology management department of the organisations. A local and well-educated salaried staff was employed to carry out this data collection work. Different questionnaires have been used against different variables of study for the different level of workers. Such a multiple-source design helps in reducing the common method biases and the systematic measurement error (Zhou et al. 2008). In total 7 organizations were approached via e-mail and direct contact for their responses and all 7 were interested in participating in the process. A sample size of 312was approached and 252 were received back. However, after checking the questionnaires a total of 233 questionnaires werefound to be eligible for analysis. Random sampling method was used to collect the data. The detailed sample profile has been shown below.

Sample Profile

	Frequency	Percentage
Gender		
Male	154	66.1
Female	79	33.9
Experience		
Less than 2-year	19	8.1
2-4 years	109	46.8
More than 4 years	105	45.1
Education		
UG	130	55.8
PG	80	34.3
PhD	18	7.7
Others	5	2.1

Measures

The survey has utilized questionnaires based on Likert type format and has been developed by adopting measures from the prior studies and include questionnaires on
Technostress, Role Stress (Role Overload + Role Conflict) and Individual Productivity. Questionnaires were framed based on a large list of past items available (Tarafdar et. al., 2007, Ragu-Nathan, et al., 2008,Rizzo et al., 1970, Katz and Kahn, 1978, Imoisili, 1985, Torkzadeh and Doll, 1999) and were then confirmed with the experts from different institutes of repute for the face validity. Post this a pilot study was conducted with a small sample of 52 responses and the reliability of these questionnaires were checked with the help of Cronbach-Alfa which was found to be 0.91, 0.85 and 0.92 respectively for all three questionnaires.

This study has utilized the following technique for the analysis purpose: Cronbach-Alfa, ANOVA and mediation analysis using regression analysis with the help of the software such as SPSS, MS Excel etc.

Analysis and Interpretation

This section reproduces the results of the analysis done on the primary data collected with the help of the questionnaire developed to find out the factuality of the objectives framed for the present study via the subsequent hypothesis framed. We have produced, interpreted and discussed the results here as per the model and hypotheses framed in order to understand the output of the analysis conducted on the primary data collected for this research work.

The model shown in figure 1 has been proposed by the present research work and has been tested with data. To test the model four hypotheses were framed and tested for their significant acceptance. We have been checked here one by one.

As per the first hypothesis, Technostress impacts role stress positively. To test the relationship, correlation and regression analysis were conducted and the result obtained has been displayed in the tables. The correlation coefficient came out to be 0.569 (Table 1) and was also found significant. Though the correlation coefficient being significant is a positive sign but correlation does not guarantee a confirmed relationship as these may even be coincidental. To confirm the relationship, we need to check for functional relationship via regression analysis. It was conducted and the related outcomes of it have been displayed in the tables 2, 3 & 4.

Table 1: Correlation Coefficients

Correlation	Technostress	Role Stress	Individual Productivity
Technostress	1	0.569	-0.661
Role Stress	0.569	1	-0.919
Individual Productivity	-0.661	-0.919	1

Table 2: Model Summary (Regression of Technostress on Role Stress)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.569	.324	.319	5.84227

Table 3: ANOVA (Regression of Technostress on Role Stress)

Model	Sum of Squares	Mean Square	F	Sig
Regression	2159.367	2159.367	63.265	.000
Residual	4505.439	34.132		
Total	6664.806			

Table 4: Coefficients (Regression of Technostress on Role Stress)

Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
Constant	14.742	2.923		5.044	.000
Technostress	.666	.084	.569	7.954	.000

Table 2, represents the model fit. And displays the strength of association among concerned variables and the model. The value of R (correlation coefficient), shows a linear correlation that exists between the observed and the predicted values of the dependent variable; the closer the value is to 1 stronger the relationship. In the present case R's value is mid-range indicating a significantly moderate relationship. R^2(coefficient of determination), shows the strength of the relationship in percentage which too as expected comes out to be moderate enough and equals 32.4 %. Model's complexity is compensated by the adjusted R-square when there are two or more independent variables to be considered and hence provides for a fair comparison of model performance. In this case since there was only one independent variable being considered for the model, this value is of not much significance.

Table 3 shows the next element in the output which is an ANOVA table. As we know that the slope of a regression line represents the relationship between independent and dependent variable which would come out to be zero in case of no relationship between these two. Table 3 tests for the null hypothesis that the true slope of our regression line equals zero. Here, with an F statistic on a higher side (63.265) with a significance level of almost zero, we reject our null hypothesis and confirm that the slope of our regression line is nonzero. ANOVA from statistical perspective can test the model's validity as the first row of its table displays the variation accounted for by the model and the second row displays variation not accounted for by the model. F statistic here is less than 0.05, indicating that the variation explained is not due to chance.

The next table in this series of tables is table 4, which is the main piece of output of a regression model and is called as table of coefficients. We now have one intercept (constant) and one slope. The intercept represents the value of dependent variable (role stress) when the independent variable (Technostress) equals zero. The slope represents that by how much a one-unit change in the independent variable (Technostress) will change the corresponding dependent variable (role stress). For example, in our case, if Technostress were to increase by one unit, then role stress would increase by 0.666 units, on average.

The coefficient table further reports the beta coefficient (standardized coefficient) for independent variable. This value reports the relative importance of each variable (independent) in the model on the dependent variable, the greater the value for an independent variable, greater its impact on the dependent variable. It represents by

how much one-unit standard deviation change in the independent variable (Technostress), changes the standard deviation of the corresponding dependent variable (role stress). But it is not of much importance in this case as we have only one independent variable.

In the last two columns of the table we have t-ratios and their significance level. Since the change in Technostress brings a statistically significant change in role stress, hence indicating a significant relationship between the two. Thus, approving our first hypothesis and hence we may induct that our first hypothesis i.e., Technostress positively impacts role stress is accepted. Hence, we move to our second hypothesis.

Our second hypothesis states that role stress impacts individual productivitynegatively. We move in the similar fashion as in the case of first hypothesis and go for correlational as well as regression analysis. The correlation coefficient came out to be -0.919 (Table 1) and was also found significant. Next, we went for the regression analysis and the outputs have been displayed in table 5, 6 and 7.

Table 5: Model Summary (Regression of Role Stress on Individual Productivity)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.919	.845	.844	.61537

Table 6: ANOVA (Regression of Role Stress on Individual Productivity)

Model	Sum of Squares	Mean Square	F	Sig
Regression	476.279	476.279	1257.721	.000
Residual	87.476	.379		
Total	563.755			

Table 7: Coefficients (Regression of Role Stress on Individual Productivity)

Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
Constant	9.029	.150		60.039	.000
Role Stress	-0.179	.005	-.919	-35.464	.000

Table 5 represents the model fit. In the present case the value of R is on a higher side indicating a strong relationship. The negative sign shows an inverse association. R^2 too as expected comes out to be on the higher side and equals 84.5%. Adjusted R-square compensates for model complexity when there are two or more independent variables to be considered and hence provides for a fair comparison of model performance. In this case since there was only one independent variable being considered for the model, this value is of not much significance.

Table 6 shows the next element in the output which is an ANOVA table. This table tests for the null hypothesis that the true slope of our regression line equals zero. Here, with an F statistic on a higher side (1257.721) with a significance level of almost zero, we reject our null hypothesis and confirm that the slope of our regression line is nonzero. The significance value of the F statistic is less than 0.05, which means that the variation explained by the model is not due to chance.

The next table in this series of tables is Table 7, which is called as table of coefficients. We now

have one intercept (constant) and one slope. The intercept represents the value of dependent variable (Individual Productivity) when the independent variable (Role Stress) equals zero. The slope tells us that by how much the dependent variable (Individual Productivity) will move in case the independent variable (Role Stress) changes by one unit. For example, in our case, if Role Stress were to increase by one unit, then Individual Productivity would decrease by 0.179units, on average.

The coefficient table also reports beta values (standardized coefficient) for independent variable. But it is not of much importance in this case as we have only one independent variable.

In the last two columns of the table we have t-ratios and their significance level. The significance level tells us that the Role Stress has a statistically significant relationship to Individual Productivity. Thus, approving our second hypothesis too and hence we may conclude that the second hypothesis i.e., 2. Role stress impacts individual productivity negatively is accepted. Now, moving ahead in the sequence we have the third hypothesis.

Our third hypothesis states that Technostress impacts individual productivity negatively. We move in the similar fashion as in the previous hypothesis and go for correlational as well as regression analysis. The correlation coefficient came out to be -0.616 (Table 1) and was also found significant. Next, we went for the regression analysis and the outputs have been displayed in table 8, 9 and 10.

Table 8: Model Summary (Regression of Technostress on Individual Productivity)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661	.436	.434	1.17280

Table 9: ANOVA (Regression of Technostress on Individual Productivity)

Model	Sum of Squares	Mean Square	F	Sig
Regression	246.027	246.027	178.870	.000
Residual	317.729	1.375		
Total	563.755			

Table 10: Coefficients (Regression of Technostress on Individual Productivity)

Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
Constant	7.387	.272		27.113	.000
Role Stress	-.051	.004	-.661	-13.374	.000

Table 8 represents the model fit. In the present case the value of R comes out to be moderate in value moderate to strong relationship. The negative sign of correlation coefficient shows an inverse relationship. R^2 which too as expected comes out to be moderate and equals 43.6%. Adjusted R-square compensates for model complexity when there are two or more independent variables to be considered and hence provides for a fair comparison of model performance. In this case since there was only one independent variable being considered for the model, this value is of not much significance.

Table 9 shows the next element in the output which is an ANOVA table. This table tests for the null hypothesis that the true slope of our regression line equals zero. Here, with an F statistic on a higher

side (178.870) with a significance level of almost zero, we reject our null hypothesis and confirm that the slope of our regression line is nonzero. The F value is significant and hence indicatesan association that is not by chance.

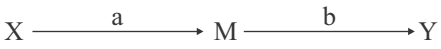
The next table in this series of tables is Table 10, which is called as table of coefficients. We now have one intercept (constant) and one slope. The intercept represents the value of dependent variable (Individual Productivity) when the independent variable (Technostress) equals zero. The slope tells us that by how much the dependent variable (Individual Productivity) will move in case the independent variable (Technostress) changes by one unit. For example, in our case, if Technostress were to increase by one unit, then Individual Productivity would decrease by 0.051 units, on average.

The coefficient table also reports beta values (standardized coefficient) for independent variable. But it is not of much importance in this case as we have only one independent variable.

In the last two columns of the table we have t-ratios and their significance level. The significance level tells us that the Role Stress has a statistically significant relationship to Individual Productivity. Thus, approving our second hypothesis too and hence we may conclude that the third hypothesis i.e., Technostress impacts individual productivity negatively is accepted. Now, moving ahead in the sequence we have the fourth hypothesis.

Our fourth hypothesis states that, Role Stress works as a mediator to the relationship between Technostress and Individual Productivity. The present hypothesis involves a mediator to establish the stated relationship. Mediation is a hypothesized causal chain in which one variable (Technostress) affects a second variable (Role Stress) that, in turn, affects a third variable (Individual Productivity). The intervening variable, M (Role Stress), is the mediator (Figure 2).

Figure 2: Mediation Effect



As per Newsom (2018), the paths shown as a and b are called direct effects. While indirect effect is the one, in which X leads to Y through M, called the mediator. The indirect effect represents the portion of the relationship between X and Y that is mediated by M. An approach that calculates the indirect effect for measuring the role and strength of mediation proposes to multiply two regression coefficients obtained from two different regression models utilizing the variables present in the relationship (Sobel, 1982). The two coefficients are obtained from two regression models which may are as follows:

Model 1: $Y = B0 + B1X + B2M + e$
Model 2: $M = B0 + BX + e$

The first model establishes the relationship between dependent variable Y and the independent variable X as well as the mediator. Not considering the relationship between dependent variable and the mediator i.e., how much mediator affects the dependent variable Y in presence of the independent variable X. In model 2 it tries to find how much the independent variable X affects the mediator in isolation i.e., in the absence of the dependent variable Y. Thus, we have two coefficients of interest here viz., B2 from model 1 and B from model 2, which help us in establishing the indirect effect (BI) X on Y and thus helping to predict the role of mediator in the relationship model.

BI = (B2) * (B)

Once the regression coefficient for the indirect effect is calculated, it needs to be tested for significance. In the present context Sobel test calculator has been used to find out the significance of the value of BI.

Coming back to our original variables of the study, we have Technostress as the independent variable (X), Individual Productivity as the dependent variable (Y) and Role Stress as the mediator (M).

Thus, going by the above concept two separate regression analysis were run as per model 1 (table 11) and model 2 (table 12). The scores of all the variables were also standardized as it has been advised in the methodology itself. Following are the output of the two regression models:

Table 11: Model 1 for Mediation with Individual Productivity as Dependent Variable

	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
(Constant)	12.775	2.955	--	4.323	.000
Technostress	-.043	.094	-.035	-.458	.648
Role Stress	.748	.081	.712	9.283	.000

Table 12: Model 2 for Mediation with Role Stress as Dependent Variable

	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
(Constant)	14.742	2.923	--	5.044	.000
Technostress	.666	.084	.569	7.954	.000

The significance of the mediation effect was tested with the help of Sobel Test calculator which is available online. The values of unstandardized coefficients from both the models along with the values of standard errors were provided and it came out with the values as displayed in table 13.

Table 13: Sobel Test for Mediation

Name of the Test	Value of Test Statistic	P-Value
Sobel Test	6.25	0.00
Aroian Test	6.23	0.00
Goodman Test	6.26	0.00

Since the values are significant hence, we can say that the mediation effect is present and it can be said that our third hypothesis that 'Role Stress works as a mediator to the relationship between Technostress and Individual Productivity' is true and hence is accepted.

Limitations and Future Research Directions

The present research has been done with full sincerity to make sure that the findings of the work are valid and reliable for future works to be based upon it. Yet, the present research was done in only a limited time frame and was only limited to a specific geographic area making its non-generalizable. Further to this, the individual productivity is self-reported and hence is perceptual, thus direct measures may be adopted. Also, the instruments used for measuring different stress differ according to the field of work, thus,

using different scales may produce different results. The present research has also not checked the impact of demographics on technostress which may be studied as moderators to refine the results.

Conclusion

It has been defined that in the work context stress is inability of an individual to manage multiple and usually conflicting demands put on the individual or the complexity and difficulty of the job at hand. The serious outcome of stress at work may include a long list but name a few and most prevalent one, they are fatigue, mental issues and physical illness that results into some unwanted outcomes like degraded performance, turnover, absenteeism etc. According to estimates by the Business Insider on Stress (2019, Sep 25), job anxiety results in low productivity which costs nearly $1 trillion, every year to the global economy.

Though there can be many reasons associated with work ranging from work itself to the relationships that may cause stress. In the last couple of decades' technology has also contributed in this direction and can be considered to be as ignificant factor behind high stress level called technostress. The present work focusses on the same and is an attempt to identify how ICTs can cause role stress and also affect individual productivity directly as well as indirectly via role stress. There are various factors that lead to technostress and also determine the level of technostress among individuals.

It can be concluded from this work that ICTs cause technostress among employees and if not checked and controlled may lead to a decline in productivity. Technostress also contributes to other organisational role stresses too, like role stress (role overload and role conflict) that too hampers the individual productivity and hence the overall productivity. With ICTs getting complex day by day and often changing frequently that in ways that are difficult to predict the paper throws some light on the critical issues related to stress especially technostress that must be addressed in order to understand the required adjustments to be made for ICT's effective utilization.

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