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Technology Management Competencies as Predictor of Job Satisfaction

[1]Asad Khan and [2]Fuziah Mohd Nadzar

[1]Department of Library and Information Science, University of Peshawar, Pakistan
Accounting Research Institute, Universiti Teknologi MARA, Malaysia
[2]Faculty of Information Management, Universiti Teknologi MARA, Malaysia

Abstract: Regardless of the emergent literature advocating the implications and value of technology management competencies for library professionals, empirical studies focusing on the topic is exceptionally limited. In particular, the research on technology management competencies of Pakistani university librarians is also nonexistent. To cover this gap, the present article reports the results of a study examining technology management competencies and job satisfaction of Pakistani university librarians. This study utilized survey research methodology involving 225 samples, randomly selected from population of 540. The survey response rate was calculated as 84%. The result of this study suggests that four dimensions of technology management competencies, namely information technology skills, information assurance and security skills, library content management skills and social media skills significantly predict job satisfaction of Pakistani university librarians. The findings of this study evidently showed the importance and contributions of technology management competencies towards job satisfaction.

Key words: Technological competencies · Librarians competencies · Job satisfaction and competencies · Relationship of job satisfaction · Empirical study · Pakistan

INTRODUCTION

The significance of job performance dictates employees to be competent and perform contemporarily. It necessitates understanding of workers' level of job satisfaction because organizations always need competent and satisfied workers for effective performance [1]. Job satisfaction (JS) is extensively researched area due to its relationship with job performance and success of organizational goals. Numerous research findings have demonstrated a satisfied worker as an effective job performer [2]. Therefore, job satisfaction of university librarians is one of the considerable dynamics in augmenting their job performance. Job satisfaction is portrayed as an attitude of persons towards their job [3]. It denotes the insight of potentials, prospects and aptitude [4] and people's emotional and mental retorts to their work [5]. On the other hand, like a satisfied worker, a competent employee is a prerequisite for any organizations. Hoffmann [5] argued that different scholars conceptualized the term competencies in their own individual perspectives such as psychologists termed competencies as the measurement of capabilities; HR managers called competencies as individual performance and instrument of strategic management while educationists define competencies as work preparation and professional recognition To avoid any conceptual ambiguities, this empirical study describes the term competencies as the knowledge, skills and attitude of an individual [6,7]. Further, these three terms are elaborated as; 1) knowledge- person range of information, 2) skill is the level to utilize knowledge, 3) attitude is the job-related thoughts, feelings and motivation [8].

In the contemporary period of innovations, university libraries like other organizations demand technologically competent workforce for information management. FLICC [9] define technology management competencies (TMC) as "management of innovations as a product or process from its conception to its diffusion and therefore to its implementation". Numerous research findings have reported an association between job performance, satisfaction and technology such as Long [10] reported

Corresponding Author: Fuziah Mohd Nadzar, Faculty of Information Management, Universiti Teknologi MARA, Malaysia

the utilization of technology in workplaces is an indicator of quality of job. Danziger and Dunkle [11] reported a negative relationship of computer technology with job satisfaction. Attar and Sweis [12] reported a positive relationship between IT adoption skills and job satisfaction. Martinez [13] reported a significant relationship between technology skills and job satisfaction.

However, in the context of Pakistani university librarians, a limited number of studies have empirically investigated the relationship of technology competencies with job satisfaction. The objective of this study is to fill the gap by empirically exploring the relationship between four dimensions of TMC with general job satisfaction of Pakistani university librarians.

Review of the Literature: Technology has brought incredible innovations in the composition of university libraries. These innovations insist librarians to acquire desired technological competencies. Nonetheless, limited research has been carried out to examine the association of Pakistani university librarians' technological competencies with job satisfaction. Irrespective of fields of knowledge, the construct job satisfaction has received substantial consideration from researchers. Somvir [14] pointed out that job satisfaction has been of interest to organizational researchers because of its association with job performance and commitment. Lock [15] reported more than 4793 published research works on job satisfaction while Ghazzawi [16] discovered more than 12000 published works on job satisfaction. The motivation behind such a huge research endeavors is the pivotal contributions of job satisfaction towards enhancing workforce efficiencies and productivity [17]. Further, Mitchel and Larson [18] elaborated that even though more than 3000 research investigations have been carried out on job satisfaction but still the term job satisfaction lack a comprehensive definition.

However, job satisfaction is an attitude of person towards the job [3]. It indicates an insight of potentials [19] emotional and mental responses to job [4]. Lock [15] delineated job satisfaction as positive emotional response of individuals when their jobs' skills and abilities are respected. The dimensions of job satisfaction are pay, promotion, supervision, job conditions and benefits [15, 20 and 21] which were afterward classified as; 1) intrinsic satisfaction- based on kind of work that structure the job such as skills and; 2) extrinsic job satisfaction- based on work conditions such as pay, co-worker [22]. In LIS literature, several researchers examined librarians' job satisfaction. Some of these studies emphasized on general aspects of job satisfaction while other conceptualized satisfaction with respect to some specific aspects of job such as technology [23].

FLICC [9] competencies model operationally define technology management competencies as "assistive technology, enterprise information technology, information assurance and security, library and content management systems, social media, collaborative and mobile technologies". Arshad and Ameen [24] attributed expansions in technology as a catalyst behind the growing demands of library users. They informed librarians to perform traditional as well as skill-based services. Further Sridhar [25] interpreted that prevalent technological innovations have altered the execution of library services, but there is no persuasive technology adoption among librarians. Methew and Baby [26] criticized that librarians are not providing computer based services, as they do not have IT skills nor have attitude towards getting these skills. Thus, technological innovations are missing from the competencies profile from academic librarians [27]. Similarly, Safahieh [28] revealed that university librarians' technology skills are unsatisfactory. Ullah [29] predicted scarcity of technologically qualified staff personnel in medical science libraries of Pakistan. He concluded that existing workforce has low attitude towards the adoption of ICT skills. Agnihotri and Troutt [30] indicated technology utilization and job nature as predictors of positive relationship between technological instruments and employees' performance. Exploring librarians' satisfaction with current competencies, Kaya [31] revealed university librarians dissatisfaction with job environment and level of abilities.

Similarly, research investigation also established the provision of technological skills as predictor of job dissatisfaction. Danziger and Dunkle [11] pointed out a negative relationship of computer technology with job satisfaction. Attar and Sweis [12] reported a positive relationship between IT adoption skills and job satisfaction. Martinez [13] identified a significant relationship between technology skills and job satisfaction. Somvir [14] research findings summarized a strong association of job satisfaction with librarians' job environment. Likewise, Leyson and Boydston [32] study indicated that a small percentage of university cataloguers' are satisfied with cataloguing skills. Hart [4] research findings demonstrated a state of inertia and hopelessness among librarians due to inappropriate skills and tools for job operations. Lim [33] findings established

a positive relationship of qualification, skills, wages, job recognition and professional development with job satisfaction.

Further, a study by Aracil and Velden [34] interpreted deficit and surplus in acquired competences as predictors of job satisfaction and dissatisfaction. They reported a positive relationship of perfect match in acquired and required competencies with job satisfaction. Additionally, Pan and Hovde [35] emphasized that professional development is mandatory for library professionals to acquire the needed skills for effective performance. Similarly, Block and Kelly [15] recommended in-service training to cover deficit in existing level of skills and to diminish job pressure. Consequently, this will enhance workers competencies and ultimately escalate job satisfaction.

The status of LIS literature on job satisfaction and technological competencies demonstrates that there is a need of technologically skilled workforce in libraries. However, the impact of these demands on librarians' job satisfaction is unknown. Thus, there is a wide gap in research on the relationship of job satisfaction and technological competencies in the context of Pakistani university librarians. The objective of the present study is to cover this gap.

Based on the above literature review, this research study hypothesizes a relationship of four variables/dimensions of TMC with JS and as a result formulates four hypotheses. In research model of this study, job satisfaction is the dependent variable capturing Pakistani university librarians' level of job satisfaction about technology management competencies. Several researchers employed job satisfaction as dependent variable [36, 37, 38 and 39]. Similarly, the research model has four independent variables identified as information technology (IT) skills, information assurance and security (IAS) skills, library content management (LCM) skills and social media (SM) skills. These variables were chosen from the FLICC [9] competencies model which globally a dominant competencies model in librarianship. Each independent variable incorporates competencies statements identified from literature review and FLICC [9] competencies model. FLICC [9] competencies model operationally define these four variables as; 1) information technology refers to computing technology concerned with issues related to advocating for users and meeting their needs; 2) library and content management system refer to creation, storage, modification, retrieval and display of data or content, 3) information assurance and security refers to activities protecting information and information systems for reliability and privacy; 4) social media is online media sharing characteristics like participation, community, openness, connectedness example are blogs, wikis, podcasts, forums, Face book, etc.

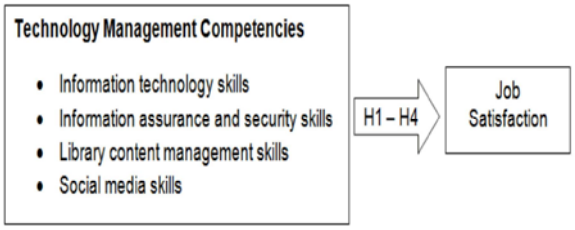

Fig. 1: Research Model of the Study

Based on research model of the study, the following four hypotheses between four constructs of TMC and JS in the context of Pakistani university librarians are formulated.

H1: Information technology skills positively predicts job satisfaction of Pakistani university librarians

H2: Information assurance and security skills positively predicts job satisfaction of Pakistani university librarians

H3: Library content management skills positively predicts job satisfaction of Pakistani university librarians

H4: Social media skills positively predicts job satisfaction of Pakistani university librarians

Research Methodology, Data Analysis and Results: This research study was carried out in three stages namely 1) questionnaire development for measuring construct in the research model; 2) development and validation of four constructs of technology management and; 3) testing of relationship of conceptual model. All these stages are discussed below.

Development of Measurement Scale: Because of lack of measurement scale on technology management competencies, we adopted the strategy identical to other researchers [40] employed for the development of questionnaire. In developing the scales for technological management competencies, we first conceptualized the competencies statements summarized in FLICC [9] competencies model by Library of Congress as corporate author. Based on FLICC [9] competencies model, the entire procedure generated four constructs.

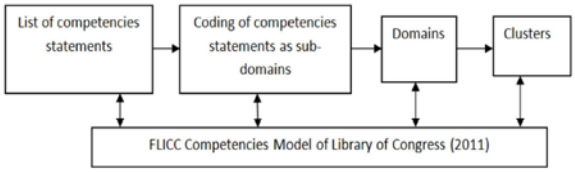

Fig. 2: Clustering model based on FLICC (2011) competencies model

Each construct incorporates competencies statements provided in the literature review after its comparison with the descriptions outlined in FLICC [9] competencies model. This practice was not merely valuable to eliminate ambiguities in the conceptualization, contextual interpretation and clustering of constructs but was equally significant in bringing homogeneity and coherence in items.

Figure 2 is the schematic view of identification and selection mechanism of technological competencies' constructs where one has to move horizontally. All these steps emerged from a tentative list of competencies and terminate with a single encompassing cluster compatible with FLICC [9] competencies model. The content validation involved pretesting on ten library and information management experts in both Malaysia and Pakistan. During this procedure, experts were invited to comment on the relevance and precision of items within the context of technology management competencies situations in Pakistani university libraries. Based on their feedback, a list of items was designed for large scale data collection. A five-point Likert scale anchored as 1= very low in competencies, 2= low in competencies, 3= Moderate in competencies, 4= high in competencies, 5= very high in competencies was utilized to measure the questions.

Similarly, overall job satisfaction of Pakistani university librarian was measured using a 3-item scale from the Michigan Organizational Assessment Questionnaire. Previous research studies have employed this scale widely. A meta-analytic assessment of the construct and reliability validity of this scale demonstrates acceptable levels of reliability and provides evidence of construct validity based on a pattern of relationships consistent with that predicted by past research. The advantage of this scale is length (three items) and its focus on the affective component of job satisfaction. The scale is widely used in a variety of research settings and shown to be internally consistent with reliability ranging from.77 to.87 [41]. In the context of the present study, following procedures of this scale, the three items were averaged to yield an overall job satisfaction score (α =.855). All the three questions were assessed on a five-point Likert scale anchored as 1= strongly disagree, 2= disagree, 3= not sure, 4= agree, 5= strongly agree. The full item description of measurement scale is in provided in the Appendix.

Table 1: Demographic characteristics of the respondents

Variable	Categories	Frequency	%age
Age of the respondent	21 – 29	92	40.5
	30 – 39	73	32.2
	40 – 49	47	20.7
	More than 49 years	15	6.6
Gender of the respondent	Male	142	62.6
	Female	85	37.4
Experience of the respondent	Up to 5 years	82	36.1
	6 – 10	57	25.1
	11 – 15	47	20.7
	16 – 20	25	11.0
	21 – 25	10	4.4
	More than 25 years	6	2.6
Type of university	Public	196	86.3
	Private	31	13.7
	Total	227	100

Data Collection and Demographics: Data was collected from Pakistani university librarians in Khyber Pakhtunkhwa (KPK), Punjab and Islamabad. These university librarians were master degree holders in library and information science as minimum qualification for participation in this research study. Survey method was utilized to collect data regarding the demographic profile, level of technological competencies and job satisfaction of Pakistani university librarians. The target population was composed of 670 librarians working in 72 private and public sector universities of Punjab, Khyber Pakhtunkhwa (KPK) and Islamabad. Using simple random sampling technique, 225 respondents were drawn as sample of the study. Krejcie and Morgan [42] table of population and sample was used to ensure that the sample size of the target population would be able to generalize the study findings. Also, Raosoft online sample calculator (http://www.raosoft.com/samplesize.html?nosurvey) was used to confirm the sample size. For maximum response rate, 300 self-administered questionnaires were distributed among Pakistani university librarians. Only 252 questionnaires were returned, however, after initial data screening, 227 questionnaires were found appropriate for data analysis. Response rate was calculated as 84%.

Sample characteristics are given in Table 1. Out of 277 respondents, 142(63%) were male while 85 (37.4%) were female librarians. The distribution of employment

indicates 196(86%) librarians in public universities while 31(13.7%) librarians as respondents from private sector universities. Respondent's age-wise distribution indicates 92(41%) respondents in the range of 21-29 years while 73(32%), 47(21%) and 15(7%) respondents in the range of 30-39 years, 40-49 years and above 49 years respectively. The distribution of respondents' qualification specifies 217(96%) respondents as master degree holders, 9(4%) and 1(0.4%) respondents as MPhil and PhD degree holders in library and information science respectively. Similarly, 173(76%) respondents had permanent jobs while 54(24%) respondents were serving on contract basis.

Development and Validation of Research Constructs: In case of job satisfaction, exploratory factor analysis (EFA) was also used to develop constructs. Principal axis factoring (PAF) with varimax (orthogonal) rotation was performed on three items measuring overall job satisfaction of Pakistani university librarians from a sample of 225 Pakistani university librarians. The KMO score is 0.655 greater than 0.6 [43] and Bartlett's Test of Sphericity is significant (x^2 = 191.278, p <.000). This supported the factorability of correlation and established the sample adequacy for conducting exploratory factor analysis. In addition, the determinant value (.454) is greater than 0.00001 which indicate no multicollinearity [44]. Based on Kaiser's criterion of eigenvalues equal to or greater than 1, PAF analysis extracted one factor explaining a total of 52.622% of variance for the entire set of variables. Table 2 displays factor loadings for exploratory factor analysis on three items measuring overall job satisfaction.

In case of TMC, EFA was used to develop constructs. Principal axis factoring (PAF) with varimax (orthogonal) rotation was performed on sixteen items measuring four dimensions of technology management competencies identified as IT, IAS, LCM and SM from a sample of 225 Pakistani university librarians. Before running PAF, the appropriateness of data was examined. The scrutiny of correlation coefficients provided several coefficients of 0.398 and beyond. The KMO score is 0.939 greater than 0.6 [43] and Bartlett's Test of Sphericity [52] is significant (X^2 = 2804.011, p <.000). This supported the factorability of correlation and established the sample adequacy for conducting exploratory factor analysis. In addition, the determinant value (7.58) is greater than 0.00001 which indicate no multicollinearity [44]. Based on Kaiser's criterion of eigenvalues equal to or greater than 1, PAF analysis extracted four factors explaining a total of 59.92% of variance for the entire set of variables. However, one item" infosecu_78A- ability and knowledge of handling and dissemination of information processes" did not meet the specified cut-off loading size of 0.45 and dropped in factor analysis and therefore expelled from advanced analysis. Table 3 displays factor loadings for exploratory factor analysis on sixteen items measuring four dimensions of technology management.

Table 2: Factor loading for Job satisfaction

Items	Factor 1
All in all I am satisfied with my job	.837
In general, I don't like my job	.762
In general, I like working here	.546

Table 3: Factor loading for technology management competencies

	Factor			
Items	1	2	3	4
Able to develop technological solutions for access	.771			
Able to utilize social media for library services and programs	.753			
Able to implement content management technologies	.749			
Knowledge of principles of library content management	.732			
Able to organize training in the use of social media		.729		
Build performance procedures for library technology functions		.720		
Able to integrate social media in library plan		.692		
Able to implement library's social media policies		.541		
Assess library applications to information assurance needs			.530	
Able to create and explain library's IT policies			.753	
Able to solve technological issues in library			.736	
Ability to develop library staff technology training			.700	
Knowledge of library's information security polices				.687
Knowledge of hardware and software applications				.678
Able to comply with continuous monitoring rule				.627
Knowledge of handling of information processes				

Table 4: Reliability score of the measurement scale

Variables	Items	Cronbach's alpha coefficient
Information technology skills (IT)	4	.719
Information assurance and security skills (IAS)	4	.754
Library content management system skills (LCM)	4	.818
Social media skills(SM)	3	.778
Job satisfaction (JS)	3	.855

Reliability of the Measurement Scale: In the context of this study, the Cronbach's alpha coefficient as indicator of internal consistency and reliability was calculated and is depicted in Table 4. The reliability of the four TMC constructs (IT, IAS LCM and SM) and job satisfaction was calculated on a sample size of 225 Pakistani university librarians. The Cronbach's alpha score is between 0.818 and 0.719 greater than 0.7 [45].

RESULTS AND ANALYSIS

Correlation Test: Descriptive analysis was conducted to examine the background of research participants as shown in Table 1. Pearson correlation test was employed to explore the association of four dimensions of TMC with JS. Multiple regression was used to investigate the hypotheses and overall influence of these four dimensions of TMC on JS. Before running parametric tests, it is appropriate to examine data distribution assumptions of normality through linear regression plots. A scatter plot was used to verify that relationship is linear, to detect outliers and to graphically depict the relationship [46]. A scatter plot depicted linear distribution of data points which implies that there is a linear relationship between the predictors and outcome. A histogram of residuals illustrated normal distribution of data. A P-P plot of residuals indicated that residuals fell close to the straight line, which indicated normality in the population. A violation of unequal variances or linearity does not exist. Thus, the results of normality tests allow us to proceed with calculating Pearson product-moment correlation and run multiple regression analysis.

In the context of Pakistani university librarians, to explore the correlation, its direction and magnitude between technology management competencies and job satisfaction, Pearson-product-moment correlation coefficient was calculated. Based on Cohen's guidelines [47,48], the results indicated a positive and statistically significant correlation between the four constructs (Table 5). The Pearson correlation matrix indicated a significant positive correlation between job satisfaction and all the four independent variables of technology management competencies at.01 alpha-level among Pakistani university librarians. All these significantly correlated variables were later on utilized in the multivariate linear regression as predictors of job satisfaction for Pakistani university librarians. The correlation analysis matrix indicated the range of strength of relationship between 0.216 and 0.379 and none scores higher than 0.90. Hence, the problem of multicolinearity does not exist.

Based on Cohen's guidelines [48], the Pearson's correlation matrix values ranging from r = 0.216 to r = 0.379 indicated a medium but statistically significant and positive correlation. The coefficient of determination was calculated to explore the variances shared by job satisfaction with the independent variables [49]. These coefficients of determination are provided in Table 6 indicating the highest variances (14.36%) explained by information assurance and security in respondents scores on job satisfaction while the lowest variance explained by library content management system (4.6%) in respondent scores on job satisfaction.

Regression Analysis: For testing the hypotheses, multiple regression analysis was performed. Before running multiple regressions, it is essential to test assumptions of normality because their violation is misleading [46]. For testing the assumption of sample size, Tabachnick and Fidell [46] sample size formula (N>50+8m, where N=sample size, m=number of IVs) was adopted and obeyed (225>50+8×4? 225>82). For testing multocollinerity, Pearson correlation coefficients (see in Table 5) were utilized indicating no values higher than 0.90 and hence, there is no issue of multicolinearity. The Variance Inflation Factor (VIF) for each explanatory variable was also examined to test multicollinearity and was found less than 5 and greater than 1 (Table 7) indicating no multicollinearity. Furthermore, tolerance values were also examined (Table 7) and found greater than.10 [48] indicating no collinearity.

In addition, condition index values are in the range of 12 and 16 which shows weak collinearity (Table 7). The Mahalanobis distance measuring method was used to detect multivariate outliers [46]. A total of three cases were detected having multivariate outliers (Table 8).

Table 5: Mean, SD and Pearson correlations for various factors of TMC and JS

	Variable	M	SD	1	2	3	4	5
1	Job satisfaction	3.91	0.49	1				
2	IT	3.23	0.69	.364**	1			
3	IS	3.18	0.74	.379**	.581**	1		
4	LCMS	3.13	0.79	.216**	.552**	.584**	1	
5	SM	3.19	0.76	.333**	.535**	.500**	.565**	1

**. Correlation is significant at the 0.01 level (2-tailed)

Table 6: Correlation coefficient of determination

Variables	r (245)	r^2 (245)	Variance %
IT	0.364	0.1325	13.25
IS	0.379	0.1436	14.36
LCMS	0.216	0.0466	4.6
SM	0.333	0.1108	11.08

Table 7: Test of Multicollinearity

Constructs	Condition Index	Tolerance	VIF
Information technology	12.527	.556	1.800
Information assurance and security	13.512	.550	1.817
Library content mgt. system	14.870	.534	1.874
Social media	16.055	.596	1.678

Table 8: Mahalanobis distance measuring method to detect multivariate outliers

Mahalanobis distance from Residual Statistics	Critical Chi-square value Table	(α =.001)	Cases ID	Cases with exceeding values
24.142	18.47	14	24.14164	
		150	24.43957	
		31	21.46882	

Table 9: Overall Model Summary

Model	R	R^2	Adj. R^2	F	F change	Sig. F change	Sig.
1	.446	.199	.185	13.806	13.806	.000	.000

Table 10: Relationship of TMC with JS

	Unstandardized Coefficients		Standardized Coefficients		
Model/ Predictors	B	Std. Error	Beta	t	Sig.
Constant	2.828	.160	.000	17.673	.000
Information technology	.141	.057	.198	2.454	.015
Information assurance and security	.173	.054	.260	3.218	.001
Library content mgt. system	.092	.051	.147	1.794	.074
Social media	.117	.050	.181	2.320	.021

a. Dependent variable: Job satisfaction

These three cases were excluded from the data set and normality of the data was re-checked, but no significant improvement in the normality of the data was observed. Hence, cases were retained. In order to test the assumption of normal distribution of data, Kolmogorov-Smirnov's tests of normality were conducted ($p>0.05$ indicates normal data distribution while $p<0.05$ indicates the data are not normal) which reported that distribution of data was not normal. This is not astonishing as Kline [48] argued that these tests of normality may not be very useful in large samples because even slight departures from normality may be statistically significant. An alternative was to interpret the absolute values of skewness or kurtosis indices. The values of skewness and kurtosis were examined and found close to zero. Hence, the data set of this study was quasi normal and was considered appropriate to proceed with multiple regression analysis.

To determine the impact of four correlates of TMC on JS of Pakistani university librarians, multiple linear regression analysis was utilized. The results of regressing the correlates of TMC on JS are shown in Table 9 and 10. Table 9 shows that all four correlates of TMC have predictive relationship with JS of Pakistani university librarians. The results of enter method analysis was significant at F (1,222) = 13.806, where p =.000. This indicated that a linear combination of four predictor variables significantly predicted job satisfaction level for Pakistani University librarians. The coefficient matrix indicated that beta values were significantly different from zero. The correlation coefficient (R = 0.446) indicated correlation of four independent variables with dependent variable and thus model has moderate effect on job satisfaction prediction. The R^2 = 0.199 signifies that approximately 20% of variance is explained in the model for job satisfaction using four predictors. Similarly, the adjusted R^2= 0.185 only reduced the variance explained by 1.4%. The influence by technology management competencies in variance of job satisfaction (â = 0.453) is significant at 0.000 level and confirm that technology management competencies as independent variable is significant. The positive â explains that if job satisfaction of Pakistani university librarians is to be increased, it is essential to enhance the level of technology management competencies of these librarians. The results of regression analysis (see Table 9) indicated that all four hypotheses (H1, H2, H3 and H4) are supported. As in regression analysis beta values of each independent variable indicate the individual contribution of each variable, thus information assurance and security has the highest standardized beta value (0.260) followed by information technology (0.198), social media (.181) and library content management system (.147) respectively[49].

The equation utilized to predict for job satisfaction variable was Y = a + b1x + b2x + b3x + b4x interpreted as Y = 2.828 + 0.141(IT) + 0.173(IAS) +.092(LCM) + 0.117(SM). Y represented job satisfaction as dependent variable. Each predictor supplied a regression coefficient that presented the value of how much change

is predictable in the outcome variable when values on predictor variable increased. An analysis of each independent variable incorporated a paired sample t-Test, which described that all variables were significant. The findings explained that likelihood of beta values which is equivalent to zero is expected in the population. The weighted beta values confirmed that all independent variables contributed to model for predicting values for job satisfaction of Pakistani university librarians. Thus, all the four hypotheses are supported.

DISCUSSION AND CONCLUSION

Using Pearson correlation coefficient and multiple regression analysis, the results of this research study indicated a positive and significant relationship of four variables of TMC with JS of Pakistani university librarians. Multiple regression analysis determined that all four hypotheses are supported. Further, multiple regression analysis demonstrated that technology management variables together explained approximately 20% (R^2 = 0.199) of variance in job satisfaction of Pakistani university librarians. Furthermore, the F value (13.806) with significance level of p =.000 determined the regression model as statistically significant. Results further explained that information assurance and security is the strongest contributor of job satisfaction while LCM is the weakest contributor of job satisfaction in the overall model. Thus, findings of this study confirmed that technological management competencies have a significant effect on job satisfaction of Pakistani university librarians. It is derived that technology management competencies is a predictor of job satisfaction [50].

Thus, Pakistani university librarians who have technology management competencies such as general information technology management skills, information assurance and security skill, library content management system skills and/or social media skills may have job satisfaction. The results indicate that Pakistani university librarians are satisfied because they may be able to utilize technology applications in the domain of library services. They may be capable to work out technological issues in their libraries. Similarly, Pakistani university librarians are satisfied with their jobs because they may be able to apply information security polices and best practices or may ensure compliance with information continuous monitoring policies or able of handling and dissemination of information processes and/or able to assess library specific applications to information assurance.

Likewise, Pakistani librarians are satisfied with their jobs because they may have competence in understanding of practices of library content management system, implementation of library content management technologies and perhaps utilize social media for the promotion of library services and products, staff training and may integrate all applications of social media in the practices of university librarianship. However, this is interesting to note that in the context of technology management competencies Pakistani university librarians are satisfied with their job but even though they have poor attitude towards the implementation of technology- based services in university libraries [50]. However, the present empirical investigation may generalize that in the context of Pakistani university librarians all the four variables of technology management are the predictors of job satisfaction. It may be asserted that the more the technology management competencies of university librarians is, the more will be their job satisfaction.

The results of this study are parallel with the results of various researchers [10, 12, 13, 30] who reported a significant relationship between technology skills and job satisfaction. Their research findings confirmed that technology management competencies have affect on job satisfaction. Agnihotri and Troutt [30] indicated technology utilization and job nature as predictors of positive relationship between technological instruments and employees' performance. Attar and Sweis [12] reported a positive relationship between IT adoption skills and job satisfaction. Martinez [13] reported a significant relationship between technology skills and job satisfaction. Long [10] reported the utilization of technology in workplaces is an indicator of quality of job. However, these results are inconsistent with the findings of Danziger and Dunkle [11] whose findings reported technological skills and its role as a non-contributor towards employees' job satisfaction. Similarly, these findings are not supporting the results of Estabrook *et al* [51] who established the provision of technological skills as predictor of job dissatisfaction[52].

CONCLUSION

This research study empirically investigated the relationship between technology management competencies and job satisfaction among Pakistani university librarians. The correlation test determined a positive and statistically significant relationship between these two constructs. Furthermore, the multiple regression

analysis established all the four variables of technological management competencies as predictors of job satisfaction of Pakistani university librarians. In conclusion, the study findings generalized that enhancement in technological competencies may enhance job satisfaction level of Pakistani university librarians and vice versa. Thus it is recommended that Pakistani university leadership should focus on technology management competencies of their librarians to have satisfied workforce. They must not ignore the significance of these technology related skills as it has predicted satisfaction in terms of Pakistani university librarians. It has been established by numerous research findings that satisfied worker is an effective performer. Thus enhancement in the technology management competencies of Pakistani university librarians may prompt them to job satisfaction and ultimately lead them to optimal performance and successful productivity.

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