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Exploring the Nexus of ICT and Social Media Tools in Revolutionizing Researcher Development Framework: A Study Among LIS Research Scholars

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Abstract:

This study examines the relationship between ICT skills, SMTs' usage, and the four domains of the Vitae Researcher Development Framework (RDF) among LIS scholars. A quantitative research approach was employed, using a census approach to collect data from 247 LIS postgraduate students (MPhil and PhD) enrolled in both public and private sector universities in Pakistan from 2015 to 2019. Out of them, 172 provided valid responses. A structured questionnaire was utilized to gather data. Data was analyzed using SPSS and AMOS software. Descriptive statistics, Pearson correlation, and structural equation modeling (SEM) were employed to examine relationships between ICT skills, SMT adoption, and RDF domains. A significant correlation was found between LIS scholars' ICT skills and SMTs' usage ($\beta = 0.72$, $p < .01$). LIS scholars' use of SMTs significantly enhanced three RDF domains: engagement influence and impact ($\beta = 0.49$, $p < .01$); research governance and organization ($\beta = 0.81$, $p < .01$); and personal effectiveness ($\beta = 0.55$, $p < .01$). However, knowledge and intellectual abilities ($\beta = 0.05$, $p > .05$) did not influence SMTs' usage among LIS scholars. This study uniquely applies the Vitae RDF framework to SMTs' adoption among LIS scholars, contributing to digital researcher development. The findings contribute to future policy recommendations on ICT integration in academia.

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Introduction

The use of social media tools (SMTs) in academic research and collaboration is growing significantly. Information communication technology (ICT) and SMTs are increasingly used in modern research to enhance dissemination, engagement, and collaboration. (Asghar et al., 2022; Greenhow & Askari, 2023). This paradigm shift supports training researchers and refining the research process across many disciplines (Vitae, 2023). Additionally, according to Vuong (2023), there are a number of models available to support the research activities (Fazal & Chakravarty, 2021). The value of the Vitae Researcher Development Framework (RDF) has increased because of the employability of leadership, early researchers, and others under different circumstances (VITAE, 2010).

This paradigm shift enhances the possibilities of developing researchers and improving the research process in various fields (Vitae, 2023). Vuong (2023) also stated that several models are available to support the research activities (Fazal & Chakravarty, 2021). Due to the employability of leadership, early researchers, and others through various contexts, the Vitae Researcher Development Framework (RDF) has gained importance (VITAE, 2010).

As supported by previous evidence, Al-Rahmi, Othman, Yusuf, and Alias (2015) asserted that the primary benefits of SMTs are for the improvement of research skills in addition to collaboration within learning environments. Along a similar line, a systematic review done in 2021 shed light on the complex ways through which SMTs facilitate scholars getting to know each other through the enhancement of networking and knowledge-sharing practices (Asghar, Smith, Johnson, Patel, & Lee, 2021). In his identification of the role of social media in the researcher's collaboration, Helm (2017) pointed out that the platform impacts visibility and engagement.

Scholars have also applied Vitae RDF to examine the enhancement of knowledge, abilities, and

attitudes of researchers in several situations. This facility has outlined a researcher development framework (RDF) to define the essential skills and qualities of patient and productive researchers, regardless of their career stages. It is imperative to create goals for researcher development, identify areas for further enhancement, and expand the impact of scholarship in higher education. Because current research is well grounded in the use of ICTs, the next logical step is to set correlations between ICT skills, SMTs, and the RDF domains to enhance the efficiency of researchers and optimize the outcome of collaborations.

According to the hypothesis, internet literacy may be compulsory for functioning in digital landscapes, but it lacks the strength to bond with the efficiency or frequency with which LIS academics engage with SMTs. At the same time, it is pertinent to find out if the integration of SMTs aligns with the fourfold goals of researcher improvement, which include research governance and organization, knowledge and intellectual abilities, personal effectiveness, and engagement influence and impact.

The current study is aligned with Vitae's Researcher Development Framework (RDF) for a better understanding of the complexity of ICT skills and SMTs' usage among LIS scholars. Specifically, the objectives of the current study are to establish the factors that define the strategic application of SMTs in developing ICT skills and to determine the effects of SMTs' usage on the various aspects of researcher development as a framework captured in the Vitae RDF. Particularly, it involves visualizing the results taken from SMTs on personal effectiveness, knowledge and intellectual abilities, research governance and organization, and engagement influence and impact in the LIS research community. Since the work of the doctoral recipients will alter institutional practice, the findings will thus create more opportunities to guarantee a future generation of scholars who are more influential and proficient with technology.



Research Objectives

Objectives of the study were:

1. To explore the relationship between ICT skills and SMTs' use among LIS research scholars
2. To explore the impact of SMTs' use on the *personal effectiveness* of LIS research scholars
3. To explore the impact of SMTs' use on the *knowledge and intellectual abilities* of LIS research scholars
4. To explore the impact of SMTs' use on the *research governance and organization* of LIS research scholars
5. To explore the impact of SMTs' use on *engagement, influence and impact* of LIS research scholars

Research Hypotheses of the Study

H₀₁: There will be no significant relationship between LIS research scholars' *ICT skills* and their use of SMTs.

H₀₂: The use of SMTs will not impact LIS research scholars' *personal effectiveness*.

H₀₃: The use of SMTs will not impact LIS research scholars' *knowledge and intellectual abilities*

H₀₄: The use of SMTs will not impact LIS research scholars' *research governance and organization*.

H₀₅: The use of SMTs will not impact LIS research scholars' *engagement influence and impact*.

Literature Review

According to the researchers, the use of social media and ICT has been mentioned in the literature as a component of researcher development because youth who use these tools have more relationships with one another and are characterised by change and the capacity to transform across disciplines (Asghar, Arif, Iqbal & Hakkarainen, 2023). Furthermore, it is noted that Higher education students are using SMTs more frequently in their studies (Nawaz & Samdani, 2021; Adeyi et al., 2024).

Development of Knowledge and Skills of Researchers

Higher education scholars are expected to increase their expertise and proficiency. The Higher Education Council of the United Kingdom developed one of the largest frameworks for higher education. This framework (RDF) was developed by an expert panel using focus groups and interviews with over 100 researchers, specialists, and stakeholders (Vitae, 2010). It was constantly reviewed, improved, and made available for online use at higher education institutions by scholars and other relevant organizations. For the objectives of this study, this framework was applied to the knowledge and skill development of LIS research scholars. The knowledge and skills of LIS researchers may be impacted by their use of SMTs in their research. In this way, LIS scholars' ratings on the Vitae Careers Research and Advisory Center's four domains were measured. Those were 1. Personal effectiveness; 2. Knowledge and intellectual abilities; 3. Research governance and organization; and 4. Engagement influence and impact.

Creation of the Study's Conceptual Framework

A conceptual framework is a graphical representation with the aim of illustrating the expected connections between the variables or components of the study. A review of the literature, which includes current research findings and theories regarding the topic being studied, is usually used to create or define the conceptual framework. One of the main objectives of the current study was to investigate relationships between the use of SMTs and the four RDF domains (Figure 1).

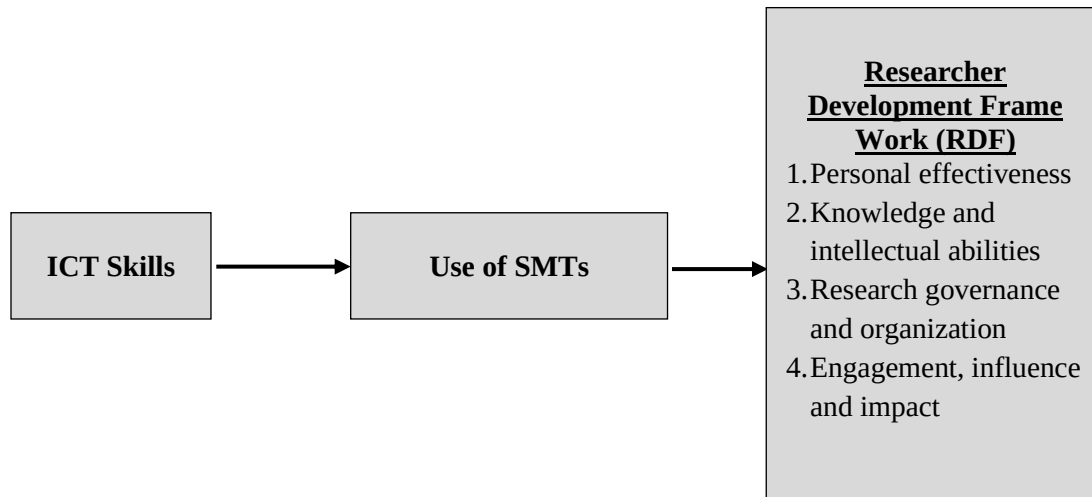


Figure 1. *ICT Skills, Use of SMTs and Researcher Development Framework (RDF)*

This study was conducted with the assumption that the use of SMTs might have an impact on the knowledge and skills of LIS research scholars. Therefore, the Vitae Researcher Development Framework (RDF), which consists of four core domains, was employed to find interrelationships among the RDF domains, ICT skills, and SMTs' usage. As a result, the effect of ICT skills and SMTs' usage among LIS research scholars was examined on four RDF domains.

Knowledge and intellectual abilities

The knowledge-based, cognitive, and creative skills that researchers need to perform successful research have been included in this RDF domain. (Vitae, 2021).

Personal Effectiveness

The soft skills related to conducting research, attitudes, careers, and self-management that are necessary to assume responsibility for and command professional development comprise the personal effectiveness domain of RDF (Vitae, 2021).

Research Governance and Organization

The domain of this RDF is establishing standards for a supportive research culture that will enhance research quality as well as safeguard the public. (Vitae, 2021).

Engagement influence and impact

The knowledge, comprehension, and abilities required to interact with, affect, and have an academic impact on social, cultural, and economic situations are included in this domain (Vitae, 2021).

Prior studies have reported that the widespread use of ICT and the internet has had a major effect on and attracted young people worldwide, especially university students (Batez, 2021; Gnambs, 2021; Gomez-Galan, Martinez-Lopez, Lazaro-Perez & Fernandez-Martinez, 2021; Paudel, 2021; Qazi, Hardaker, Ahmad, Darwich, Maitama & Dayani, 2021; Sutrisno, Andre & Susilawati, 2021). Therefore, the use of this technology has influenced every aspect of human life, particularly in educational settings. The technologies have encouraged their users to learn and use relevant skills based on their domain and situation. Because of this, earlier studies have also shown that students will utilize SMTs frequently due to their increased proficiency with ICTs and digital technologies (Perifanou, Tzafilkou & Economides, 2021). Stated differently, the utilization of SMTs in higher education has been greatly influenced by the ability to use ICTs (Alkan & Meinck, 2016; BrckaLorenz, Haeger, Nailos & Rouborn, 2013; Correa, 2016). This meant that, because modern

technologies had become a nuisance to higher education stakeholders, they needed to carefully plan for their integration. Examples of these technologies include ICT, digital devices, social media, and others (Adil, Mahmood, Hussain, & Rehman, 2021; Batez, 2021; Hussain, Rehman, Ameen & Safdar, 2021; Sutrisno, Andre & Susilawati, 2021).

Regarding the relationship between the use of SMTs and RDF domains, several studies have shown that academic SMTs, or social networking sites, help in collaborative learning (Voorn & Kommers, 2013) and support and encourage research and educational activities at the university level (Chakraborty, 2012). Moreover, the personal effectiveness of research scientists, research governance and organization, and their engagement influence and impact with regard to information practices were all improved through the use of SMTs (Veletsianos, 2012).

The SMTs linked to multimedia resources, such as audio, video, and photographs, also had an impact on students' involvement and collaboration (Othman, Al-Rahmi, & Yusuf, 2015), as well as the development of their research talents (Al-Rahmi et al., 2015; Golovchun et al., 2020). It was also found to be advantageous for the knowledge and intellectual development of researchers (Asghar et al., 2021).

Prior research has also looked at the connection between social media use and users' sense of belonging, well-being, and autonomy over their own lives. These users include children (Wilson & Stock, 2021), professionals (Dube & Scott, 2017), people who are overwhelmed with information, and research communities (Cann, Dimitriou, & Hooley, 2011). Further research was required to clarify these vaguely perceived associations. However, a few students highlighted that the use of social media in research might impact the individual efficacy of researchers in terms of developing a research culture, enhancing their communication abilities through interactive technologies, and visualizing

their data (Asghar et al., 2021; Nowell, Dhingra, Kenny, Jacobsen & Pexman, 2021).

Additionally, SMTs use empowered researchers in decision-making about crowdsourcing, government and bureaucratic financial funding, sharing research, self-promotion, avoiding fraud and cyberbullying, and other negative consequences of research (Gilani, Salimi, Jouyandeh, Tavasoli & Wong, 2019).

In addition, the usage of SMTs gave researchers the chance to engage in research in terms of networking, information sharing, and public knowledge of research breakthroughs (Asghar, Maham, Saleem, Arif, Hakkarainen, Khan & Hussain, 2021). (Helm, 2017). Furthermore, the use of SMTs improved the researchers' creativity in publishing, attending conferences, and collaborating with mentors, colleagues, and academic instructors (Cann et al., 2011; Carpenter, 2012).

The use of SMTs, in particular, facilitated the researchers' ability to review literature, collect and analyze research data, collaborate on projects, share research findings, identify research opportunities, and manage the research process (Makhdoomi, Nazir, & Jahangir, 2017; Sokhulu, 2020). Previous research studies have discussed the proposed hypothesis; however, the interactions and quantitative associations of the impact factors on the RDF domains have not been articulated clearly. Thus, the empirical investigation made these abstract conceptions more definite and concrete, and the present research gave birth to the latter hypotheses.

Research Methodology

The current study is derived from my PhD thesis. A quantitative research method was employed, using a census approach to collect data from 247 LIS postgraduate students (MPhil and PhD) enrolled in both public and private sector universities in Pakistan from 2015 to 2019. Out of those, 172 provided valid responses. A structured questionnaire was utilized, including

demographic details, ICT skills, SMTs' usage, and self-assessment of RDF domains to gather data. Data was analyzed using SPSS and AMOS software. Descriptive statistics, Pearson correlation, and structural equation modeling (SEM) were employed to examine relationships between ICT skills, SMT adoption, and RDF domains.

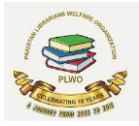
Results

The sample's demographic details are shown in Table 1. Male respondents (n = 108, or 63% of the total) comprised a greater majority than female respondents (n = 64, or 37% of the total), according to the gender distribution of the survey's nearly 73% response rate. Additionally, the results showed that n = 40 (23%) were

younger than 30, and n = 87 (51%) were between the ages of 31 and 40. The degree program outcomes showed that the majority of respondents (n = 130, or 76%) were enrolled in an MS/M.Phil program. Furthermore, a sizable percentage of respondents (n = 57, or 33%) have just completed or submitted their theses or dissertations to the appropriate LIS departments, according to the findings for the current semester. In a similar vein, MPhil and Ph.D. programs were being attended by the respondents (n = 28, 16%) who were finishing their official coursework. The remaining respondents were focusing on their third- to fifth-semester research ideas, synopses, and project works. The session intakes, spanning from 2015 to 2019, met the study's inclusion requirements.

Participant demographics (N=172)

SN	Groups	N	Percentage (%)
Gender			
1	Male	108	63
2	Female	64	37
Age			
1	30 years or less	40	23
2	31 – 40 years	87	51
3	41 – 50 years	45	26
Program for Degrees			
1	MS/M. Phil	130	76
2	PhD	42	24
Type of Program			
1	Full-Time	84	49
2	Weekend Work	88	51
Current semester			
1	First and second semester (Courses)	28	16
2	Third semester	36	21
3	Fourth semester	29	17
4	Fifth semester	22	13



5	Finalized (research work)	57	33
Intake of Sessions (Year)			
1	2015	19	11
2	2016	15	9
3	2017	22	13
4	2018	48	28
5	2019	68	40

Structural Model of the Study

The Pearson product-moment method was used in SPSS to do a bivariate correlation analysis to look at the relationship between ICT skills, SMTs' use, and RDF constructs like *personal effectiveness, knowledge and intellectual abilities, research governance and organization, and engagement influence and impact*. Except Table 2

for *knowledge and intellectual abilities*, which were not substantially correlated with any of the components, the bivariate analysis results in Table 2 showed that there was a significant connection [Pearson's $r > .28$, $p < .01$] between the model constructs.

Model Constructs Correlation Matrix

SN	Constructs	1	2	3	4	5	6
1	ICT skills	1					
2	SMTs' use	.733**	1				
3	Personal effectiveness	.286**	.312**	1			
4	Knowledge and intellectual abilities	0.056	0.091	-0.014	1		
5	Research governance and organization	.898**	.847**	.306**	0.081	1	
6	Engagement, influence and impact	.306**	.368**	.882**	0.002	.358**	1.00

** . Correlation is significant at $p < 0.01$.

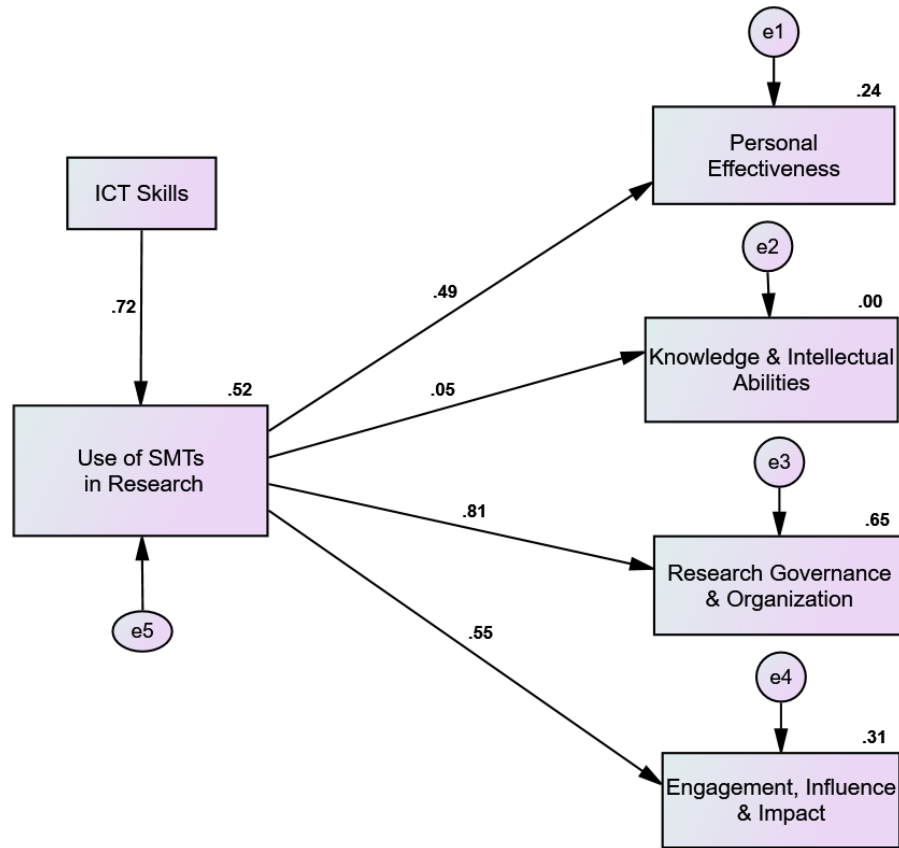


Figure 2. Study's Structural Model

Table 3
Structural Model Path Coefficients

SN	Exogenous	Direction	Endogenous	β	R^2	p
1	ICT skills	→	SMTs' Use in Research	.72	.52	.000
2		→	Personal effectiveness	.49	.24	.000
3		→	Knowledge and intellectual abilities	.05	.00	.950
4	SMTs' Use in Research	→	Research governance and organization	.81	.65	.000
5		→	Engagement, influence and impact	.55	.31	.000

Path is significant at $p < .01$.



As shown in Figure 2, the study's structural model was developed in AMOS to assess the theories related to RDF domains, ICT skills, and the use of SMTs in research. The goodness of fit index (GFI) = .681, RMSR = .123, Chi-square = 221.745, $p > .05$, and model fit index (MFI) all showed that the data yielded an underfit model. Nonetheless, the model's routes demonstrated that 52% of the

variance in the use of SMTs was explained by ICT abilities. Moreover, the usage of SMTs accounted for 31% of the variation in involvement, influence, and impact, 65% of the variation in research governance and organization, and 24% of the variation in personal effectiveness. The increased perceived utility of SMTs in RDF domains significantly increased the variance explained.

Table 4
Summary of Hypotheses

SN	Hypotheses	Result
H₀₁	There will be no significant relationship between LIS research scholars' ICT skills and SMTs' use.	Rejected
H₀₂	The use of SMTs will not impact LIS research scholars' personal effectiveness.	Rejected
H₀₃	The use of SMTs will not impact LIS research scholars' knowledge and intellectual abilities	Accepted
H₀₃	The use of SMTs will not impact LIS research scholars' research governance and organization of LIS research scholars.	Rejected
H₀₅	The use of SMTs will not impact LIS research scholars' engagement, influence and impact.	Rejected

In Figure 2, the path model demonstrated that the use of SMTs in research was statistically significantly impacted by ICT capabilities [$\beta = 0.72$, $p < .01$] among LIS research scholars. The model indicated that personal effectiveness was significantly predicted by the usefulness of SMTs at [$\beta = 0.49$, $p < .01$], research governance and organization at [$\beta = 0.81$, $p < .01$], and engagement influence and impact at [$\beta = 0.55$, $p < .01$]. As indicated in Table 4, the usage of SMTs was not able to significantly predict knowledge and intellectual capacities [$\beta = 0.05$, $p > .05$].

The structural model results, on the other hand, revealed meaningful relationships between the exogenous and endogenous variables of SMTs' use, personal effectiveness, research governance and organization, and engagement, influence and impact. As a result, the Table 4 hypotheses **H₀₁**, **H₀₂**, **H₀₄**, and **H₀₅** were rejected.

Discussion

The current study explored the correlation among ICT skills, social media tools' usage, and the Vitae Researcher Development Framework's four domains among LIS postgraduate students. The results of this study showed that male LIS research scholars (MS/M.Phil and PhD) were more likely to regularly use SMTs for research in comparison to their female counterparts.

Proposed Structural Model of the Study

According to the study's suggested structural model, there is a considerable correlation between ICT capabilities and SMTs' usage, and LIS research academics are likely to use SMTs more frequently as they are skilled in ICT. Therefore, the model shows a positive influence and impact of SMTs in facilitating the LIS research scholars' research

governance and organization, personal effectiveness, engagement influence and impact in terms of Vitae RDF. SMTs' usage, however, was not significantly explained by the knowledge and intellectual abilities, an area of RDF. As a result, the employment of SMTs has a major impact on RDF domains such as research governance and organization, personal effectiveness, engagement influence and impact, according to the current study.

ICT and internet use among youth has increased, according to several earlier studies (Batez, 2021; Gnambs, 2021; Gómez-Galán, Martínez-López, Lázaro-Pérez & Fernández-Martínez, 2021; Paudel, 2021; Qazi, Hardaker, Ahmad, Darwich, Maitama & Dayani, 2021; Sutrisno et al., 2021; Adeyi, Annune & Tsegba, 2024). This practice has been observed all over the world.

The students were able to employ their associated skills in their research processes because they routinely used these technologies in their academic pursuits. Likewise, other studies have demonstrated that increased student use of SMTs was predicted by the high capacity of ICT and digital technologies (Perifanou, Tzafilkou & Economides, 2021). ICT proficiency, or digital literacy, as a result, has aided and encouraged users to use SMTs for their research (Supardi et al., 2021).

Accordingly, the use of SMTs in higher education was greatly aided by ICT capabilities (Alkan & Meinck, 2016; BrckaLorenz, Haeger, Nailos & Rouborn, 2013; Correa, 2016). Even though some studies (Abbas, Aman, Nurunnabi, & Bano, 2019; Al-Sharqi, Hashim & Kutbi, 2015) highlighted certain concerns about the usage of ICT and SMTs because of students' unfavorable attitudes, these might be addressed by carefully evaluating these cutting-edge tools, as they are now necessary for higher education in this day and age (Batez, 2021). Despite the limitations, research students' use of ICTs and SMTs was shown to be significantly rising, which had a major impact on how valuable they perceived the use of SMTs (Anderson, 2019; Dlamini & Mngwengwe, 2020; Sadaf, 2018;

Supardi, Juhji, Azkiyah, Muqdamien, Ansori, Kurniawan, & Sari, 2021; Tyagi & Soni, 2019).

Regarding the relationship between the use of SMTs and RDF domains, earlier studies at North Eastern Hill University provided evidence that students used SMTs or SNSs for both academic and recreational purposes in addition to their research (Chakraborty, 2012). According to another study, social media can help students in higher education strengthen their collaborative learning skills and self-confidence (Voorn & Kommers, 2013).

According to a qualitative study, SMTs improved research governance and organization, engagement influence and impact in terms of information practices, as well as the individual efficacy of research scholars via SMTs (Veletsianos, 2012). In a mixed-methods study entitled the appropriation of SMTs as a reflection of Malaysian students' interaction with peers, institutions, and educational activities, Lim et al. (2014) focused on how students employed these gadgets in their learning process. Further, from the views and ability perspective, research on students' prospects of using SMTs in their daily lives and higher learning encompassing teaching and learning was examined with the findings by Duman (2015).

Knowledge and Intellectual Abilities

This research study highlighted that SMTs have not had a profound positive effect on one's level of knowledge and intellectual skills among LIS scholars. Findings of this study also align with the study findings of Junco (2019) that SMTs do not increase the knowledge or intellectual skills of scholars. In line with the findings of Veletsianos and Kimmons (2020) and Fischer and Bar-Ilan (2022), this study suggests that SMTs are more frequently utilized for communication and information exchange than for promoting the knowledge and intellectual abilities of LIS scholars. Thus, this study is consistent with many studies that establish various issues regarding the implementation of SMTs in academic settings. Some of the samples, like Wang, Chen, and Liang (2020) and Borrego and Pinfield (2020), have noted a negative correlation between SMTs' usage and

educational achievement, showing how users may lose focus and expand interest in other areas besides academic work (Dada & Oyewole, 2023; Borrego and Pinfield, 2020).

Personal Effectiveness

Based on our findings, LIS research scholars used SMTs and developed their personal effectiveness skills to a significant extent. The results of this study corroborate the study of Aharony (2022), demonstrating that LIS research scholars positively use SMTs to enhance their personal effectiveness, like teamwork and adoption, which are essential for their professional development.

Young adults' knowledge about SMTs enhanced their overall quality of life, sense of belongingness, autonomy in their health, and freedom of expression without the experience of fear and anxiety or for a healthy and normal length of time, as indicated by prior research (Wilson & Stock, 2021). Furthermore, students who are seeking careers would benefit most from the incorporation of digital technologies like social media into their educational system (Dube & Scott, 2017). According to Cann et al. (2011), the research also showed that social media assisted researchers in honing their technical skills for handling information overload, filtering content, building the ideal network for social research, and helping isolated people and communities. Additionally, the SMTs help researchers employing interactive technology, building a research culture, and developing data visualization, supporting for developing effective communication among academia (Nowell et al., 2021). It has also been found that SMTs positively impact pre-service researchers to develop their competencies in research skills, which include personal effectiveness (Asghar et al., 2021).

Research Governance and Organization

The use of SMTs has also shown to have a high impact on the research governance and organization of LIS scholars in the process of research. Previous studies reported that SMTs had been leveraged for decision-making in research projects (Wang et al., 2023). One bibliometric analysis found that SMTs had enhanced the

research governance (Gilani et al., 2019; Almeida & Martins, 2023). Conversely, some previous research found social media tools were leveraged for other purposes, such as crowdsourcing, government advertising and the bureaucratic promotion of health initiatives. This portion of the RDF of SMTs lacks research, and it needs further research to be better understood.

Engagement Influence and Impact

The results of the study revealed that SMTs are more predictive of engagement influence and impact benefits of LIS research scholars. Researchers used SMTs for research communication, such as email lists, academic social networks, and instant messaging systems. They used presentation, video, and file sharing as multimedia services with the integration of SMTs. They collaborated with each other for writing and videoconferencing. It was also revealed that research scholars were accessing academic databases, online catalogs, citation and reference management systems, and research-related surveys for the fulfillment of their required information. In order to promote greater research impact, this broad topic at the domain level requires practical knowledge through the social organisation of information distribution and communication, as well as interaction and collaboration with others. According to the study's findings, SMTs had greater influence and impact on researchers' engagement influence and impact than those discussed at the domain level. Additionally, a previous study's results aligned with our study, which was conducted on the perspective of research-engaged pre-service teachers. Its findings revealed that SMTs helped them in building their research capacities on how to engage in research (Asghar et al., 2021).

The results of another study by Gunn and Terras (2023), which looked into the role of SMTs in academic communication among LIS scholars, were consistent with our findings. The results demonstrated how SMTs are used by LIS scholars for professional interaction, teamwork, and the sharing of scholarly research. It supports our study's conclusions about the critical role SMTs

play in fostering engagement influence and impact among LIS researchers (Gunn & Terras, 2023).

The current study is also contrary to the investigation of Helm (2017) on how the roles of SMTs influence researchers' participation through networking, sharing features, and surfacing emerging research for public consumption.

A study conducted by Duman (2015), showed that graduate students regularly used SMTs, and this use had a high relationship with the impact and influence of their research. Generally, it was identified that researchers used SMTs for publishing and presenting papers at conferences, as well as perceiving and cooperating with peers, teachers, and supervisors about sharing works and ideas. Based on prior research (Cann et al., 2011; Carpenter, 2012), tasks undertaken by students in groups, research output, and conference-related preparations may prompt increased use of SMTs in the academic context. Makhdoomi et al. (2017) supported this perspective, additionally stating that the students used SMTs to review literature, gather and analyze data, engage in research and conduct it, share research results, discover new directions for research, and manage tasks and workflows. During the epidemic, postgraduates wrote their dissertations with the help of digital platforms, searched for already published material, and communicated with supervisors in an isolated manner because of the pandemic. Secondly, these e-resources were useful for students who wanted to take a problem-based approach to identify areas of study or cope with the uncertainty posed by the global pandemic (Sokhulu, 2020). In a similar vein to this examination, another investigation done by Al-Sabaawi et al. (2021) purports that SMTs are now widely accepted and may open up various academic research opportunities. Consequently, institutions of higher learning should prioritize sharing their different research outputs through various social media platforms. This is because graduate education provides essential skills and knowledge that shape individualistic collaboration among other academics (Van Noorden, 2014).

Conclusion

The study's findings provide some important new insights into the relationship between ICT proficiency, the use of social media tools (SMTs), and four key areas of research and development among scholars in the field of library and information science (LIS). Significant findings of the study include:

It was revealed that LIS academics' engagement with SMTs for research purposes did not differ significantly based on gender, age category, degree programs, program type, current semester, time spent, and number of sessions (opposite to what was hypothesized). The study revealed that ICT competency is a key variable that significantly affects LIS academics' social media tool (SMTs) usage for research. The study also revealed that SMTs' usage had a significant effect on three RDF domains, namely engagement influence and impact, research governance and organization, and personal effectiveness (as was hypothesized). Meanwhile, there is no significant effect of SMTs on knowledge and intellectual abilities. Moreover, key findings are mentioned below:

- The study found a significant relationship between the ICT skills of LIS research academics and their use of SMTs ($\beta = 0.72$, $p < .01$).
- The results of this study ($\beta = 0.05$, $p > .05$) did not find any compelling evidence that the use of SMTs is a significant factor in enhancing the knowledge and intellectual abilities of LIS academics in conducting quality research.
- The research found that SMTs' use enhances scholars' knowledge and abilities related to personal effectiveness ($\beta = 0.55$, $p < .01$) to a significant degree.
- The results of the current study supported the usefulness of SMTs in the context of predicting the academic foresight of scholars regarding research governance and organization ($\beta = 0.81$, $p < .01$).
- The study showed ($\beta = 0.55$, $p < .01$) that SMTs play a critical role in predicting academics' knowledge and abilities regarding engagement influence and impact.

Suggestions

Based on the findings, this study suggests:

- Equip students with the ICT and social media skills they need to use SMTs in all research activities effectively.
- Include social media literacy in academic programs to correspond with students' heavy use of SMTs in daily life and research.
- Encourage students to use SMTs more frequently in their research to develop and promote RDF-related knowledge and abilities.

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Future Directions

- Future studies should concentrate on how SMTs are used by Pakistani students studying other disciplines in universities and other institutions.
- Studies like this may employ the mixed method technique in the future.
- Future research may test the conceptual framework and path models employed in this study.

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