Identification and Analysis of Factors Influencing Turnover Intention of Pakistan IT Professionals: An Empirical Study

HASSAN FAROOQ[1], **UZAIR IQBAL JANJUA**[1], **TAHIR MUSTAFA MADNI**[1],
ABDUL WAHEED[2,3], **MAHDI ZAREEI**[4], **(Senior Member, IEEE),**
AND FAISAL ALANAZI[5]

[1]Department of Computer Science, COMSATS University Islamabad, Islamabad 44000, Pakistan
[2]Department of Computer Science, Northern University, Nowshera 24100, Pakistan
[3]School of Electrical and Computer Engineering, Seoul National University, Seoul 08826, South Korea
[4]School of Engineering and Sciences, Tecnológico de Monterrey, Zapopan 45201, Mexico
[5]Department of Electrical Engineering, College of Engineering, Prince Sattam Bin Abdulaziz University, Al-Kharj 16278, Saudi Arabia

Corresponding author: Faisal Alanazi (faisalanazi@pasau.edu)

ABSTRACT Information Technology (IT) is one of the fast-growing industries. On the one hand, IT organizations get benefits from their skilled and talented employees to increase their annual growth and productivity. On the other hand, IT and software organizations are facing a lot of challenges because of high employee turnover intention. The main causes of high employee turnover intention are lack of management support, low level of compensation plans, poor relationship with supervisors, limited development and training programs, and work stress. Therefore, the current study aims to identify and empirically evaluate the factors of turnover intention in Pakistan's software and IT industries. For this purpose, a systematic literature review is conducted to identify turnover intention factors from the literature. For the empirical evaluation, a survey is conducted to evaluate these identified factors. In the survey, a total of two hundred and fifty professionals from Pakistan's IT and software industry participated either through online Google Form or printed survey questionnaires. The collected data were analyzed using regression analysis performed in SPSS and Warp-PLS. The findings of this study illustrate that the recruitment & section, team & management support, performance & career management, salary & compensation, employee commitment, job security, recognition, organizational demographics, and personal demographics with mediating the role of job satisfaction have a significant impact on IT professionals' turnover intention except for age and gender. The current study also depicts that there was a significant correlation between SLR and empirical results ($r = 0.627$, $P = 0.039$). It has been concluded that IT professionals prefer to work long tenure in the organization if they are offered better facilities in terms of compensation plans, career growth, and management support. The practical implication of this study is helpful for IT and software organizations' top management to retain skilled employees and reduce their loss in annual revenue.

INDEX TERMS Employee commitment, empirical study, employee turnover intention, IT professional turnover, job satisfaction, job security, recruitment, systematic literature review, team management.

I. INTRODUCTION

Employee turnover is defined as *"the number of employees is reduced by leaving the organization"* [1]. One of the most reported factors in recent studies that impact turnover is *"Turnover Intention"*. Turnover Intention is defined as *"the deliberate and conscious willingness to leave the organization"* [2], [3]. The significant loss faces by the organization due to turnover intention is the decline in performance and low level of productivity. These losses decrease the intention of employees to stay longer in the same organization. Many recent studies focus on employee turnover intention in different organizations and sectors, such as the hotel industry [4], hospital management [5], banking sectors [6] and airline industry [7], due to the shortage of talented employees, high competition, sustainable competitive

advantages. One of the highest turnover intentions has to be seen in Information Technology (IT) and software industry.

More than 30% of significant growth has witnessed $150 billion in the IT and software industry in the last few years [8]. IT and software professionals are tremendously mobile and interconnected with the world. Due to internet connection, they can change or switch their jobs efficiently and work from one industry to another [9]. According to the Pakistan Software Engineering Board (PSEB) report, the annual revenue of the IT industry is projected from $1.23 billion in a Fiscal Year (FY) 2019-20 to $1.64 billion in FY 2020-21 [10]. Due to these remarkable growths, Pakistan and India's IT services have rapidly improved in internetworking and communication technologies and become the world's most prominent market leader [11]. The recently reported growth of increased revenue in the nation's industry is the US $74 billion FY in 2010 to the US $167 billion FY in 2018 and estimated to hit the US $350 billion by 2025 [12]. Due to the tremendous growth of the IT industry, IT professionals have a crucial role in their success.

According to National Account Committee [13], Pakistan's Gross Domestic Product (GDP) growth has been estimated from 5.74% in FY 2020-21 to approximately 5.97% in FY 2021-22, with a key contribution from agricultural, industrial, and service sectors. Moreover, from the services sector, the GDP growth of Pakistan's IT and communication industries have increased from 7.49% in FY 2020-21 to 11.90% in FY 2021-22. Due to tremendous growth, Pakistan's IT industries face high employee turnover intention. According to A. Louie, the average employee turnover rate is about 21.3% in the IT sector, the third-highest turnover rate among the other industries [14]. Due to the shortage of skilled and talented employees, IT organizations have to bear the projected financial loss in revenue, such as China $147.1 billion, the United States $435.7 billion, and the United Kingdom $90 billion in 2020. Therefore, it has been observed that small and medium-size IT organizations also face annual revenue loss due to high employee turnover.

IT industry's success merely depends upon retaining valuable skilled and talented employees [15]. However, it is difficult to retain skilled employees for longer tenure and achieve the organization's benefits [16]. Numerous studies have addressed this issue by investigating the retaining strategies to fill this gap [17]–[19]. Many other factors impact the failure of skilled employees and increase turnover intention, such as lack of job security and satisfaction, high workload and stress, unclear career path, inefficient compensation plans, and poor relationship with the team member and management [17], [20]. These affecting factors are considered in various studies; however, less attention has been given to organizational and personal demographic factors that highly influence the turnover intention of IT professionals. Furthermore, several studies investigate the high turnover intention in the IT sector due to the low level of productivity, the substantial direct or indirect cost in terms of recruitment and selection process, delay in project completion and loss of skilled employees, etc., [18], [21].

This study aims to fill these gaps by investigating the impact of the turnover intention of IT professionals in the IT and software industry. Turnover intention is one of the most explored and related topics because it is the major facing issue in growing industries. According to our best knowledge, none of the studies considered all these influencing factors of turnover intention for Pakistan's IT and software industry. Therefore, the conceptual framework is proposed to gain insight into IT professional challenges and retaining strategies. A Systematic Literature review (SLR) is conducted to identify the affecting factors related to IT professionals in the IT industry. Finally, an empirical investigation has been performed to evaluate the conceptual framework of the Pakistan software and IT industry. The main research objectives of this study are to identify the affecting factors of turnover intention from existing literature and to evaluate the impact empirically. The novelty of the current study is that we have also illustrated and emphasized a few other turnover intention factors, such as employee commitment, job security, recognition, personal and organizational demographics, which have not been considered as independent variables in the existing framework [17], [24]. In the end, the proposed conceptual framework has been empirically evaluated by IT and software organizations in Pakistan to assess the impact of these influencing factors and to reduce the high employee turnover intention.

The remainder of the current research study is organized as follows. Section II discussed the literature review cited in recent related work. It provides recent literature on employee turnover intention and influencing factors that impact IT professional turnover, along with the proposed hypotheses. In Section III, the research methodology that has been used to resolve the research queries of the current study. A SLR was conducted to investigate the factors influencing the turnover intention of IT professionals. A conceptual framework was proposed based on SLR containing extracted factors from literature. The proposed framework was empirically evaluated from Pakistan's small and medium-sized IT and software industries. Section IV describes the detailed empirical evaluation and results of SLR. A detailed discussion has been provided based on the results regarding each research question in Section V. Finally, the current study's conclusion, limitations, and future directions are presented in Section VI.

II. RELATED WORK
In this section, the recent research studies on employee turnover intention along with influencing factors such as recruitment and selection process, teamwork and management support, performance and career management, salary and compensation, employee commitment, job security, recognition, organization demographics, and personal demographics, are presented in detailed.

A. EMPLOYEE TURNOVER INTENTION

In recent studies, employee turnover intention has been investigated widely in different organizations, such as hospital management, airline industry, banking industry, hotel industry, and IT industry [4]–[6]. In the IT and software industry, the high turnover intention of employees has been observed due to different challenging issues such as lack of management support, inefficient compensation plans, and lack of job satisfaction [17], [19]. In the IT industry, talented IT professionals strive to keep looking for new opportunities in high brand name organizations that provide better salary and compensation plans. However, retaining skilled IT professionals is challenging because rival companies merely search for and attain these employees [22]. Many IT industries build new policies and strategies to control the turnover intention that are unavoidably for them because their growth and performance are directly linked to the retention of high-tech key employees [21].

The authors in [3] proposed a conceptual framework to investigate the relationship between onboarding success and turnover intention of IT professionals by mediating the role of job satisfaction and workplace relationship quality. However, the authors in [3] have not considered other important factors that influence IT professional turnover intention, such as job security, employee commitment, and organizational commitment. Moreover, the employee retention strategies that significantly influenced the IT sector were missing. In another recent study, the authors in [23] proposed a conceptual model that elaborates the antecedents of employee intention to leave South African IT industries. The authors have only considered the limiting factors and specific areas of employees in their study. However, their study did not investigate the other affecting factors such as recruitment & selection, performance & career management, and salary & compensation considered by [24]. The authors in [25] proposed a conceptual model to investigate the impact of professional commitment on turnover intention by mediating the role of job satisfaction. The IT employees are more committed to their job if the organization provides challenging tasks and learning opportunities. The effect of job satisfaction on employee commitment increases the intention of IT professionals to stay long in their current organization. As a result, the IT professionals' turnover intention is decreased. The authors have considered only these two essential factors that significantly affect turnover intention. However, job security, compensation plan, and other important factors were missing, as discussed in [3], [24], and [23].

In Figure 1, the author [24] proposes the conceptual framework to investigate the factors affecting IT employee turnover and retention intention. The affecting factors are recruitment & selection, teamwork & management support, performance & career management, and salary & compensation plans. These factors mediate job satisfaction, employee commitment, job security, and recognition. The author [24] has not considered other factors of turnover intention, such

as personal demographics and organizational demographics. Furthermore, the turnover measures such as job satisfaction, employee commitment, job security, and recognition were considered dependent variables. However, in literature, most researchers investigate them as an independent variable having a negative effect on turnover intention [3], [17], [23], [25], [26]. Furthermore, the items to measure turnover intention are also missed [24]. This study considers these missing factors and measures to fill the investigated research gap.
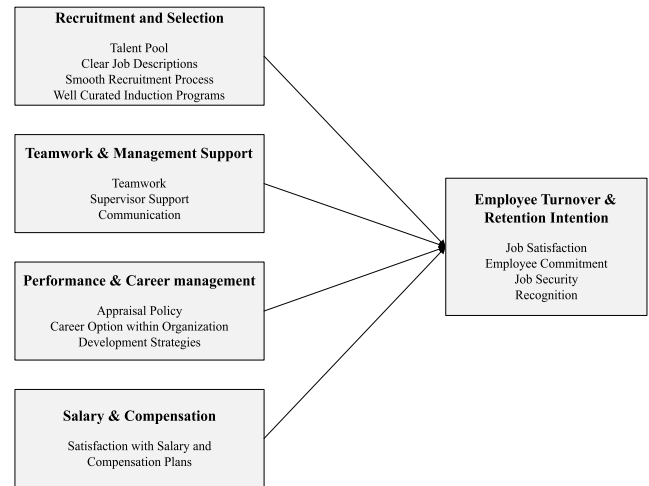

FIGURE 1. Existing framework [24].

B. RECRUITMENT AND SELECTION PROCESS

The *recruitment process* explores the right skilled employee, whereas the *selection process* hires shortlist recruiters based on their talent and skills [1]. The primary concern of HRM is to retain their talented employee for a long tenure, have better revenue growth, and increase their productivity [27]. After hiring skilled IT employees, training is provided to meet the organizational task's requirement and polish a new skill. If the recruitment and selection process is well organized, the right skilled IT professional will stay long. Some organizations tried different strategies to retain them. However, IT employees are not satisfied with their learning skills or career path [28]. As a result, they search for new opportunities and employment to achieve their career goals. A well-managed recruitment and selection process positively influences employee commitment to the firm and employees' performance. So, we hypothesize that IT professionals' turnover intention is based on the recruitment and selection process.

Hypothesis 1: The high degree of recruitment and selection process, the lower the turnover intention of IT professionals.

C. TEAMWORK AND MANAGEMENT SUPPORT

Teamwork is a collaborative task in which multiple individuals work together on a specific job to achieve common

goals. In the IT industry, most professionals work long-term if they accomplish tangible benefits such as a high salary, efficient compensation plan, higher job role, and high job satisfaction [24]. *Management support* plays an essential role in the retention intention of IT professionals. In some recent studies, authors argue that relationships between employees and employers play a vital role. In some cases, IT professionals leave the organization due to poor relationships with supervisors, co-workers, and management [29]. When the satisfaction level of IT professionals increases with their supervisors or managers, they feel comfortable sharing their issues and problems. Such a supportive environment encourages professionals to keep doing their job and not leave the organization [19], [30]. After evaluating the recent literature, we hypothesize as follows:

Hypothesis 2: Teamwork and management support negatively affect the turnover intention of IT professionals.

D. PERFORMANCE AND CAREER MANAGEMENT

The retention of skilled employees broadly impacts on organizational and workplace environment. The working environment where career growth, training, and learning opportunities for IT employees are high helps them increase their performance and productivity [2], [26]. The authors in [17] investigate that the job satisfaction of IT staff has a positive influence on the organizational environment. The IT employees strive to find new career opportunities in their working organization or some high brand name companies. Furthermore, they were also looking for a friendly work environment that increases their stay for a long tenure. Most IT organizations provide different career opportunities within their organizational departments that help to increase IT professionals' growth and job engagement. IT organizations develop several strategies and policies, such as equal opportunities, unbiased appraisal, efficient bonuses plan, and full autonomy, that help their employees to engage with them and increase their intention to stay longer [23], [31]. After reviewing that, we hypothesize as follows:

Hypothesis 3: The IT professional's performance and career management negatively influence turnover intention.

E. SALARY AND COMPENSATION

Compensation plays a critical role in IT professionals' turnover intention [32]. A compensation plan refers to the promotion, rewards system, social benefits, basic allowances, and retirement savings plan. IT professionals are constantly trying to obtain better compensation plans within or outside their organization. Organizations mostly give high compensation plans to skilled employees based on their performance, which must be enough to retain them [1]. In recent studies, the authors investigate that the primary cause of high employee turnover is a lack of an efficient compensation system or salary growth [16]. Reasonable compensation and salary growth plan attract talented and skilled employees to remain in the same organization. Most experienced and potential IT professionals always look at compensation plans while

joining and selecting a new organization [24]. Therefore, we hypothesize that fair salary and compensation enrich the IT professionals and decrease turnover intention.

Hypothesis 4: There is a positive relationship between salary and compensation and a negative impact on IT professionals' turnover intention.

F. EMPLOYEE COMMITMENT

Employee commitment refers to the relationship between employees' involvement and experience with their working organization. The IT employees' commitment plays a critical role in the industry's success. In recent studies, the authors [25] argue that highly committed employees stay longer due to the perceived cost of leaving the firm and emotional attachment to their organization. According to the human capital theory, the high skilled employees have less intention to leave the current organization or search for a job elsewhere if the organization has provided efficient development and training skills [33]. In the past few studies, most researchers have investigated the impact of employee commitment on turnover intention [2], [25], [27].

When an employee is committed to their career or profession, they start searching for better opportunities and compensation plans in other organizations; as a result, they stay short tenure in the current organization [34]. Furthermore, the authors [26] investigate that a high level of organizational commitment increases employee commitment; as a result, employees' turnover intention will reduce. In a recent study, the authors [34] emphasized that when employees' goals are fulfilled in the current working organization, they are highly committed to their profession. So, it would be difficult for them to leave the organization. Therefore, we hypothesize that employee commitment has an impact on turnover intention.

Hypothesis 5: Employee commitment negatively affects the IT professionals' turnover intention.

G. JOB SECURITY

Job security is defined as an employee's perception that their current job, or essential jobs feature, is secure. It is also described as the assurance of a job that employee will continue their employment or same profession in the current organization [17]. In a recent study, the authors [35] investigate that the employees who feel secure about their job or profession, their productivity and satisfaction level increase; as a result, they have less intention to seek new jobs or opportunities. However, if employees perceive threats to their job, they merely search for new employment and leave the organization. In the most recent management literature [19], [36], the researchers explore the impact of high job security on employee turnover intention. The authors [19] examine that job insecurity influences employees to find alternate job offers or new opportunities in other organizations. However, high job security may be decreased if the current organization provides high employment stability or efficient development programs [36]. Therefore,

we hypothesize that the high significance of job security influences the IT professionals' turnover intention.

Hypothesis 6: The high level of job security has a negative impact on the turnover intention of IT professionals.

H. RECOGNITION

Recognition refers to caring for and appreciating the employees' contributions. Employees need to increase their motivation level; as a result, their association will increase the benefit of organizational goals [37]. In recent studies, most researchers discovered that employees need better compensation plans and want to be appreciated by their supervisors or managers [32], [37], [38]. Recognition is the most effective method for rewarding key employees. The author [38] suggests that employees should be appreciated for their achievements or achieved objectives. As a result, they have confidence in their job and work roles.

Furthermore, highly valued employees have less intention to leave or find new opportunities. A recent study explored that most professionals leave the organization because they feel unsatisfied and unappreciated by management due to a lack of proper recognition and reward system [38]. In another study, the authors [32] stated that the organization or firm must ensure employees' job security, provide good compensation and full autonomy and improve their skills. As a result, they committed to their profession and stayed long tenure with the organization. So, we stated the following hypothesis that the recognized IT professionals have a negative impact on turnover intention:

Hypothesis 7: The high degree of recognition negatively influences the turnover intention of IT professionals.

I. ORGANIZATION DEMOGRAPHICS

Organization demographics refers to the number of employees in the IT department within the organization. In the past few studies, several authors have investigated that high brand and larger organizational employees have a low level of turnover intention as compared to small or medium enterprises [17], [23], [28]. Furthermore, the IT employees are concerned that their organization provides new training skills, high salaries, job security, and recognition for their performance [28]. The employees working in small or medium-sized companies have not appreciated their performance by the organization. These employees have a high turnover intention, and therefore they start looking for new employment in large enterprises to achieve their career goals [17]. The author [23] stated that high portfolio employees have high demand in their working organization due to top management roles, high talents, and skill sets. Rival brand organizations are always searching for these talented employees to increase their productivity and annual revenue cost [24]. Therefore, we hypothesize that the higher the organizational demographics, the lower the IT professional turnover intention.

Hypothesis 8: Organizational demographic factors negatively affect the turnover intention of IT professionals: (a) Organizational Size, (b) Department Size.

J. PERSONAL DEMOGRAPHICS

Personal demographics refers to employee age, gender, education level, and work experience. Employee age is an essential factor that plays a vital role in turnover intention [39]. In recent studies, authors investigated that young employee significantly impact turnover intention compared to employees above 45 years because young employees voluntarily change their job due to fast learning and training skills [39]. However, employees above 45 have more retention intention to remain in the same organization [40]. The employee gender gap has another factor that influences the high employee turnover. According to the past few studies [28], [41], female employees in the IT sector leave the industry 2.5 times more than male employees due to work-family conflict, lack of proper role and personal preference, etc. Women employees also have a high turnover intention when the rival organization offers better opportunities or higher salaries. According to [28], those female IT staff who has more than 10 years of work experience have a great tendency to leave their job as compared to male IT staff. According to [42], the employees whose education is low level (secondary school, diploma holders); have lower turnover intention compared to employees with a high level of education (bachelor's or master's degree holder). Therefore, HRM must maintain and develop a flexible compensation plan and working environment for male and female employees [41]. So, we hypothesize that personal demographic factors play an essential role in employee turnover intention.

Hypothesis 9: Personal demographic factors negatively influence turnover intention of IT professionals: (a) Age, (b) Gender, (c) Experience, and (d) Education level.

In recent studies, several authors investigate that job satisfaction mediates turnover intention and personal demographic factors [17], [23]. They also suggest that women employees have high job satisfaction when the organization appreciates their performance and provides efficient compensation plans. Furthermore, it has been seen that job satisfaction has a strong negative impact on turnover intention when IT employees feel satisfied with their firm [17]. Therefore, we also hypothesize that job satisfaction has a mediator role as follows:

Hypothesis 10: Job satisfaction has a mediating relationship between personal demographics and turnover intention of IT professionals: (a) Age, (b) Gender, (c) Experience, and (d) Education level.

K. PROPOSED CONCEPTUAL FRAMEWORK

In this section, the proposed conceptual framework is presented along with its hypothesis. The following proposed framework is motivated by [24] and re-designed to investigate the affecting factors that influence the IT professional turnover intention in the IT and software industry.

The IT professional's turnover is relatively high as compared to other sectors. The core construct factors such as recruitment and selection process, teamwork & management support, performance & career management, and salary & compensation plan are considered independent variables. These variables have a direct impact on the turnover intention of IT professionals. In the previous proposed conceptual framework [24], all these factors positively affect employee turnover and retention intention by considering the mediating role of job satisfaction, employee commitment, job security, and recognition. However, recent research studies consider these variables as independent, whereas job satisfaction has a mediating relationship between personal demographics and turnover intention. Therefore, the given proposed conceptual framework considered job satisfaction as a mediator role. Employee commitment, job security, recognition, and organizational demographics are independent variables that directly impact turnover intention. Personal and organizational demographic factors are extracted from SLR. By considering all these factors, the study is helpful for the top management of IT industries by providing deeper insight concerning factors. In Figure 2, the proposed conceptual framework is highlighted.
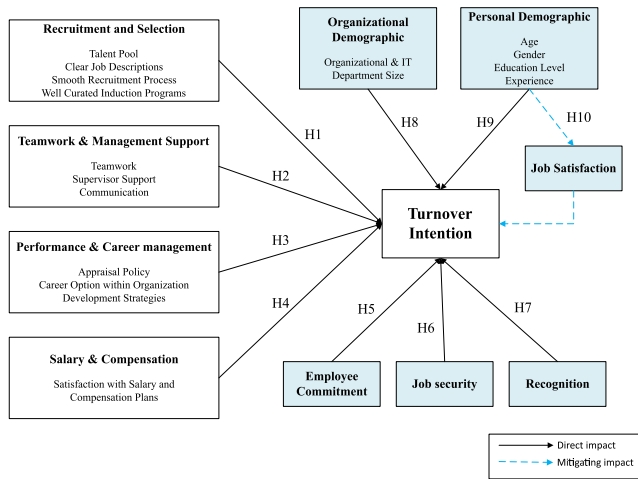

FIGURE 2. Proposed conceptual framework.

III. RESEARCH METHODOLOGY

This section presents the research methodology used in this research study. Initially, SLR was performed to identify the turnover intention factors of IT professionals in the IT industry. By following the SLR findings, a conceptual framework was proposed. The empirical analysis is used to validate the conceptual framework. Figure 3 presents the overall research methodology of the current research study.

A. SYSTEMATIC LITERATURE REVIEW

SLR is an assessment of research questions used as an overt approach to collect and critically analyze data from the currently available studies related to a particular research
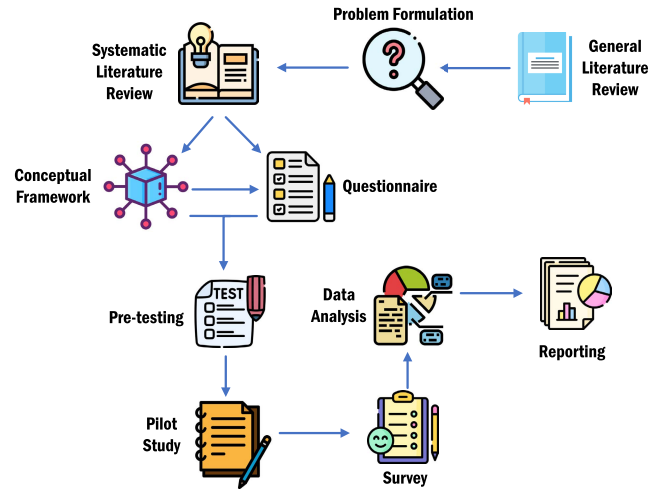

FIGURE 3. Proposed methodology.

topic [43]. SLR is also used for finding and extracting data from recent literature in a transparent, unbiased, and reproducible way. The most relevant data is obtained by applying different criteria to recent research studies. Furthermore, all these procedures of SLR are well organized and documented. Different proposed studies have been following the different ways of conducting SLR. Barbara Kitchenham's guidelines [44] recommendations are followed in this study. This guideline includes three review phases: planning, reporting, and conducting. These SLR phases are shown in Figure 4. The following upcoming sections briefly discuss these phases.
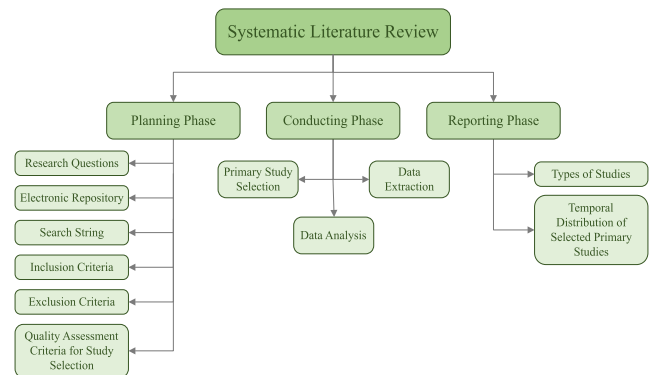
FIGURE 4. Phases of SLR.

1) PLANNING THE REVIEW

In the planning phase, two research questions were addressed to achieve the objectives of our study. Relevant studies are searched and identified from appropriate electronic repositories to answer research questions. Furthermore, search string, inclusion, and exclusion criteria are well-defined, and quality assessment criteria were selected for primary studies.

a: RESEARCH QUESTIONS

A research question is the primary step of the SLR process. The current research study aims to identify the factors

that impact IT professionals' turnover intention. The following research questions are addressed to give motivation to our research: **RQ1:** What are the turnover intention factors addressed in existing literature? **RQ2:** How to evaluate the impact of identified factors on turnover intention of IT professionals in the IT and software industry?

b: ELECTRONIC REPOSITORIES

The primary studies published between 2016 to 2021 in the following electronic repositories are considered for further research.

- Google Scholar
- IEEE Xplore
- ACM Digital
- Science Direct

The other electronic repositories are not included in our research study due to accessibility issues.

c: SEARCH STRING

The search string is a sequence of keywords in which Boolean operators; AND & OR are used to create concatenation between keywords. All the search results were carried out based on title, abstract, and keywords. The digital repositories were searched against the following search string:

("turnover" OR "attrition" OR "job change" OR "turn away" OR "job mobility" OR "job movement" OR "job flow" OR "career change") AND ("software developer" OR "IT professional" OR "IT personnel" OR "software engineer" OR "software coder") AND ("software industry" OR "IT industry").

A modified search string was used in each publication repository because of their attributes and distinct features to query for the selected primary study. The above search sting defines the intersection of articles that include job turnover intention, related factors, type of profession, and domain, either the software or IT industry.

d: INCLUSION CRITERIA

The following inclusion criteria are formulated in this study:

- The selected studies were published in a conference or journal.
- The selected studies were written in the English language.
- The time duration of selected studies lies between 2016 to 2021.
- The selected study referred to turnover factors in the software or IT industry.

e: EXCLUSION CRITERIA

The following exclusion criterion is used:

- Those studies were excluded, not written in the English language.
- Blog, slides, technical reports, book chapters, white papers, and workshop papers were excluded.
- Studies that were inaccessible or unavailable online.
- Reluctant or duplicated studies were excluded.

- The studies were not relevant to the turnover intention of IT professionals.

f: QUALITY ASSESSMENT CRITERIA FOR STUDIES SELECTION

Eight quality assessment questions presented in Table 1 are used to identify the significance of selected studies. It also helps to obtain reliable results.

TABLE 1. Quality assessment criteria.

SR No.	Quality Assessment Questions
QA1	Are the proposed study states objectives?
QA2	Is the proposed study clearly defining scope and context?
QA3	Is the proposed research discussed factors that influence job turnover intention?
QA4	Does the proposed study propose a conceptual research model?
QA5	Is the proposed solution validating by an empirical study?
QA6	Are the stated research questions well answered?
QA7	Does the conclusion of the study clearly define the aim and objectives?
QA8	Does the proposed research provide future work and limitations?

The preliminary studies are included based on the quality evaluation for quality assessment. Table 2 depicts the above studies' score criteria as follows. A score of 1 is for those research studies that have appropriately answered the quality assessment questions. A score of 0.5 is for those research studies that partially answered the quality assessment questions. A score of 0 is for those research studies which have not answered the quality assessment questions.

2) CONDUCTING THE REVIEW

In this section, following steps are considered for conducting the review:

- Primary studies selection.
- Data Extraction.
- Data analysis.

All these steps are discussed below in detail.

a: PRIMARY STUDIES SELECTION

A Tollgate approach has been used to refine the identified relevant studies through the primary study selection process. This approach includes five levels as follows:

- Level 1: Search the appropriate studies based on the search string.
- Level 2: Selected studies' inclusion and exclusion criteria based on title, keywords, and abstract.
- Level 3: Inclusion and exclusion criteria of selected studies based on duplication, content accessibility, and language.
- Level 4: Selected studies' inclusion and exclusion criteria based on full content and relevance to the topic.
- Level 5: Total number of primary studies based on the final selection in SLR.

TABLE 2. Score for quality assessment questions.

Ref	QA1	QA2	QA3	QA4	QA5	QA6	QA7	QA8	Total Score
[1]	1	1	0.5	0	1	1	0.5	0.5	4.5
[2]	1	0.5	1	1	1	0.5	0.5	1	6.5
[3]	0.5	1	1	1	1	1	1	1	7.5
[8]	1	1	0.5	0	1	1	0.5	0.5	5.5
[15]	1	0.5	0.5	0	0.5	0.5	0.5	0	3.5
[16]	1	1	1	1	1	0.5	1	1	7.5
[17]	1	1	1	1	1	1	1	1	8
[19]	0	1	1	1	1	1	1	1	7
[20]	0	1	1	0	0	0	1	0.5	3.5
[21]	0	1	1	0	0	1	1	1	5
[23]	0.5	0.5	0.5	1	1	0.5	0.5	0.5	5
[24]	1	1	1	1	1	1	1	1	8
[25]	0	1	1	1	1	1	1	0.5	6.5
[26]	1	0.5	1	1	0.5	1	1	1	7
[27]	1	1	1	1	1	1	1	0	7
[28]	0.5	0.5	1	1	1	1	0.5	0.5	6
[30]	1	1	1	1	0	0	1	1	6
[32]	1	1	0.5	0	0.5	0.5	0	0	3.5
[35]	0	1	1	1	1	1	1	1	7
[38]	0.5	1	1	1	1	0.5	0.5	1	6.5
[45]	0	0.5	0.5	1	1	0.5	0.5	1	6
[46]	0	1	1	1	1	1	0.5	1	6.5
[47]	0	1	1	1	1	1	0	1	6
[48]	0.5	1	1	1	0.5	0.5	1	1	6.5
[49]	0	1	1	1	1	1	0.5	1	6.5
[50]	1	1	0.5	0	1	1	1	1	6.5
[51]	0.5	0.5	1	1	1	1	0.5	0.5	6
[52]	0.5	0.5	1	1	1	1	0	1	6
[53]	0.5	1	0.5	1	1	0.5	0.5	1	6
[54]	0.5	0.5	0	1	0	0.5	0.5	1	4
[55]	0	0.5	0.5	1	1	0.5	0.5	0	4
[56]	1	0.5	0.5	0	0.5	0.5	0.5	0.5	4
[57]	0	0.5	0	0	0.5	0.5	0.5	0	2
[58]	0.5	0.5	0.5	0	0	0.5	0.5	0.5	3
[59]	0	0.5	0.5	0	0	0	0.5	0.5	2
[60]	0	0.5	1	1	1	0.5	0	0.5	4.5
[61]	0.5	0.5	0.5	0	0	0.5	0.5	1	3.5
[62]	0.5	0.5	0.5	0	0	0	0.5	0.5	2.5
[63]	1	0.5	0	0	0	0	1	1	3.5
[64]	0.5	0.5	0.5	0.5	0.5	0.5	0	0	3
[65]	1	1	1	0	0	0.5	0.5	1	5
[66]	0	1	0.5	0	0	0	1	1	3.5
[67]	0	0.5	0.5	0	0.5	0.5	0.5	0	2.5
[68]	1	1	0.5	0	0.5	0	0.5	0	3.5
[69]	0	0.5	1	1	0	0	0.5	1	4
[70]	0	0.5	0.5	0	0	0	1	1	3
[71]	0.5	1	1	1	1	1	1	1	7.5

Table 3 represents the primary studies selected from relevant repositories.

TABLE 3. Tollgate approach for primary studies selection.

Repository	Level 1	Level 2	Level 3	Level 4	Level 5
IEEE Xplore	157	140	35	7	5
Science Direct	158	123	15	6	6
ACM Digital	206	181	21	11	9
Google Scholar	7270	6032	83	30	27
Total	7791	6476	154	54	47

Figure 5 depicts the primary study selection based on the tollgate approach. By using the search string, 7791 studies

were obtained from relevant repositories. Initially, the screening process was performed to exclude those studies which were duplicated or irrelevant. The inclusion and exclusion criteria were performed on the remaining 6476 studies. Furthermore, those studies were excluded whether full content was inaccessible or not in English. The remaining 154 studies were assessed for the further process. After that, inclusion and exclusion criteria were performed on the remaining studies based on the relevance of the research topic. Finally, out of 54 studies, employees' turnover intention in different sectors was influenced. The remaining 54 studies were then assessed, out of which seven were excluded and did not identify IT employees' turnover intention in the IT or software industry. Finally, 47 selected papers were included in our data extraction process.
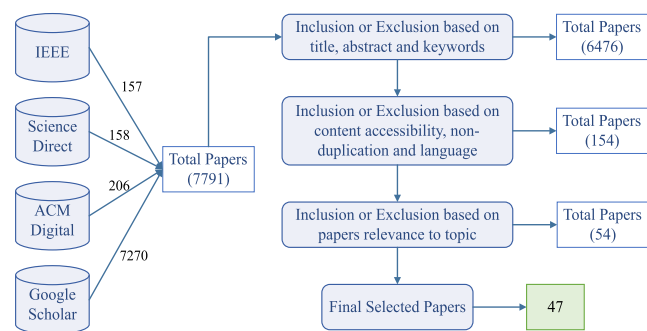

FIGURE 5. Study selection criteria using tollgate approach.

b: DATA EXTRACTION

Relevant data is extracted from the primary studies to achieve the research objectives. Those factors that impact on turnover intention of IT professionals, such as recruitment and selection, teamwork, supervisor support, salary and compensation, appraisal policies, and career management, are extracted. Job satisfaction is a mediator variable between personal demographics factor and turnover intention. Job security, recognition, and employee commitment are independent variables. Turnover intention is extracted as a dependent variable.

c: DATA ANALYSIS

Different employee turnover intention factors were extracted from 47 final studies. According to the recent literature, these employee turnover intention factors impact IT professionals staying or leaving the IT industry. Some of these factors have great significance in IT organizations. Moreover, the organizations have to face many critical challenges without them, i.e., high loss of revenue cost, low-level of productivity, etc. The most significant critical factors are the recruitment and selection process, team and career management, job satisfaction, employee commitment, job security, and turnover intention. The research questions were analyzed against the data collected from the literature.

3) REPORTING THE REVIEW

In this section, reporting the review is performed after conducting the review phase of SLR. There are two steps in reporting the phase as follows:

- Types of studies
- Temporal distribution of studies

a: TYPES OF STUDIES

In this phase, reporting of the review was performed. A total of 47 studies were selected from SLR. These studies were categorized into six types. Of these studies, 55.32% studies are empirical studies, 2.13% studies are literature reviews, 8.51% are systematic literature review studies, 12.77% are survey studies, 4.26% are multi-case study based, and 17% are case studies. This categorization helps to select the appropriate data collection technique. The type and percentage of primary selected studies are shown in Figure 6.
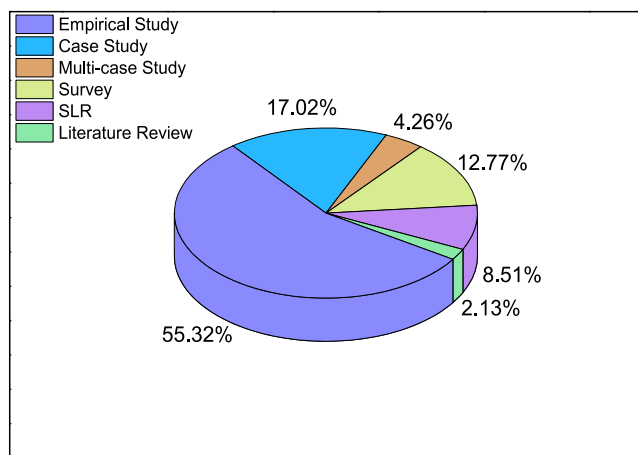

FIGURE 6. Types of studies.

b: TEMPORAL DISTRIBUTION

The selected primary studies were published between 2016 to 2021. Out of forty-seven studies, seventeen studies (36%) were published in 2016, three studies (6.3%) were published in 2017, and five studies (10%) were published in 2018. Nine studies (19%) were published in 2019. The number of studies published in 2020 and 2021 was seven and six. Figure 7 presents the temporal distribution trend.

B. EMPIRICAL ANALYSIS OF CONCEPTUAL FRAMEWORK

In this section, an empirical investigation of the conceptual framework has been carried out using the quantitative research method. A survey method has been used to collect the data as it is a more convenient method to gather data. In the survey method, it is crucial to determine the target population. The targeted population was data analysts, programmers, developers, testers, designers, project managers, and CEOs in Pakistan's small and medium-size IT organizations.

From the results of SLR, a survey questionnaire was formulated to evaluate the proposed framework. Close-ended
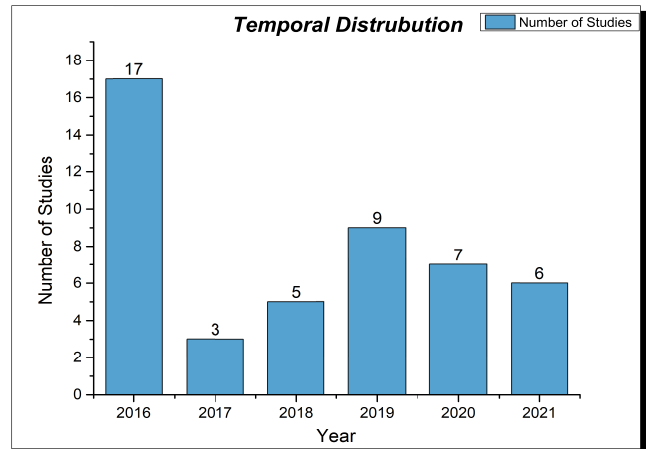

FIGURE 7. Temporal distribution.

questions were selected to collect data from the target population. The current study questionnaire consists of two main sections. The first section focuses on the respondents' personal and organizational demographic information. While the second section provides the factors affecting IT professionals' turnover intention in the IT industry. The five-point Likert scale was used which starts from 1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree" and 5 = "strongly agree". It is essential to pre-test the questionnaire before distributing it as it helps to investigate the questionnaire's credibility and reliability. Four steps are included in pre-testing a survey questionnaire, i.e., content validity, questionnaire readability, pilot study, and final review [72].

The content validity of the survey questionnaire was performed to evaluate its authenticity and validity. It also involves observing the questionnaire's items by experts and confirming whether the target respondents could understand the questions or not. The questionnaire readability was necessary before conducting the survey. To evaluate the readability of the questionnaire, the grammar, fonts, sentence clarity, engagement, etc., were reviewed. The pilot study was conducted after reviewing the survey questionnaire's readability. Two expert team members of an IT organization reviewed the survey questionnaire to evaluate its validity.

Moreover, the survey questionnaire was revised, and changes were applied based on the experts' opinions. The convenient sampling technique was adopted in this study because it was most valid and frequently used in recent studies. Furthermore, Partial Least Square - Structural Equation Modeling (PLS-SEM) analysis technique was used to evaluate the collected data statistically. The data collection process started in July 2021. Initially, the targeted organizations were visited, and a consent form was collected to confirm their participation in a survey. The printed survey was distributed to collect data. Meanwhile, the online Google Form was used to target the population that was engaged through emails and LinkedIn. A total of 122 responses were received at

the start of August 2021. The Statistical Package for the Social Science (SPSS) was used to validate the questionnaire reliability by considering these responses. The data collection process was continued until the total required sample size was gathered.

According to J. F. Hair Jr et al. [73], the sample size sufficient for conducting PLS-SEM is 200 or above. The actual data collection process was started from September 2021 to October 2021. The survey was circulated to approximately 490 targeted respondents. From these respondents, 96 (19.59%) survey responses were collected through online Google Form, and 184 (37.55%) survey responses were gathered through a printed survey questionnaire. Finally, the duplicate 37 (7.55%), redundant 49 (10%), missing 66 (13.46%), and unfilled questionnaires 88 (17.95%) were excluded. The refined and unique 250 responses were used for data analysis.

IV. RESULTS AND FINDINGS

In this section, the findings of SLR are discussed in detail. The extracted data from SLR contains the affecting factors that impact employee turnover intention. After that, the proposed conceptual framework is evaluated by performing an empirical investigation. Finally, a comparison of SLR and empirical study is highlighted.

A. SLR RESULTS

This section extracted a comprehensive list of affecting factors influencing employee turnover intention. By conducting the SLR, 54 studies were selected as primary studies. The quality assessment and tollgate approach was applied to refine SLR results. So, a total of 47 primary studies were finally selected. A total of ten factors were extracted from these primary studies after performing the data analysis process. The number of occurrences was obtained for each extracted factor to calculate their frequency. Table 4 shows the identified factors along with their frequencies and rank.

B. DEMOGRAPHICS ANALYSIS OF RESPONDENT

In this section, the demographic analysis of survey respondents was conducted using descriptive statistics. In this study, the participants' personal and organizational demographics information is gathered through a survey. All the respondents have experience in the IT or software industry. Table 5 depicts the participants' personal and organizational demographic information.

According to survey results, the male respondents were 210 (84%), and the female respondents were 40 (16%) who are currently working in the IT and software industries. According to [74], the female employees in the tech industry were about 25% as compared to male employees. The age difference of participants was reported in five categories as displayed. The results depict that the high rate of employees working in the IT or software industries was between 21-29 years of age. Furthermore, the educational level of each participant is identified to examine the level of personal

TABLE 4. Employee turnover factors and their frequencies.

Factor	Frequency (%)	References	Rank
Turnover Intention	35 (73.00%)	[1] [2] [3] [8] [17] [19] [20] [21] [23] [24] [25] [26] [28] [30] [35] [38] [46] [47] [49] [50] [51] [52] [53] [55] [58] [59] [60] [62] [63] [68] [69] [70] [71]	1
Job Satisfaction	21 (43.75%)	[3] [17] [19] [21] [23] [24] [25] [26] [27] [28] [35] [45] [48] [50] [51] [52] [55] [63] [67]	2
Employee Commitment	17 (36.17%)	[1] [8] [16] [20] [21] [24] [25] [27] [28] [30] [45] [46] [48] [63] [66] [70] [71]	3
Job Security	15 (31.91%)	[1] [17] [19] [20] [23] [24] [28] [32] [35] [38] [45] [46] [47] [48] [51]	4
Recognition	14 (29.79%)	[1] [2] [15] [16] [24] [25] [26] [28] [32] [38] [57] [58] [66] [69]	5
Salary and Compensation	12 (25.00%)	[15] [19] [24] [25] [27] [28] [32] [38] [45] [55] [57] [63]	6
Personal Demographic	11 (23.00%)	[1] [17] [19] [23] [28] [35] [53] [55] [59] [67] [69]	7
Teamwork & Management	10 (20.83%)	[3] [24] [25] [26] [27] [28] [30] [45] [53] [57]	8
Recruitment & Selection	9 (18.75%)	[3] [15] [16] [19] [24] [26] [27] [32] [65]	9
Performance & Career Management	8 (16.67%)	[2] [24] [27] [48] [54] [56] [65] [69]	10
Organization Demographic	2 (4.00%)	[17] [23]	11

knowledge. Out of 250 respondents, (1.2%) respondents passed the high school degree, (2.4%) diploma holders, bachelor's degree holders were (73.6%), master's degree holders and Ph.D. were (22.4%) and (0.4%) respectively. The result indicates that most respondents were bachelor's degree holders among their team members.

The work experience of each respondent is also identified. (78.8%) respondents had 0-4 years of work experience, (17.6%) respondents had 5-9 years of work experience, and (3.6%) IT employees had 10-19 years of work experience. The respondents' roles are categorized as developers (63.6%), tester (8.4%), designers (5.6%), analysts (7.6%), test managers (3.2%), project managers (8.4%), CEO (0.8%), and others (2.4%) to analyze participants' positions.

In this study, the targeted organizations are the small and medium-sized enterprises in Pakistan's IT or software industry. Therefore, the organizations which contained the number

TABLE 5. Personal and organizational demographic information of respondents.

Demographics	Respondent	Frequency
Gender	Male	210 (84%)
	Female	40 (16%)
Age	18-20 years	6 (2.4%)
	21-29 years	210 (84%)
	30-39 years	32 (12.8%)
	40-49 years	2 (0.8%)
	50-59 years	0 0
Education	High School	3 (1.2%)
	Diploma	6 (2.4%)
	Bachelor's degree	184 (73.6%)
	Master's degree	56 (22.4%)
	Ph.D	1 (0.4%)
Work Experience	0-4 years	197 (78.8%)
	5-9 years	44 (17.6%)
	10-19 years	9 (3.6%)
	20-29 years	0
	> 30 years	0
Role	Developer	159 (63.6%)
	Tester	21 (8.4%)
	Designer	14 (5.6%)
	Analyst	19 (7.6%)
	Test Manager	8 (3.2%)
	Project Manager	21 (8.4%)
	CEO	2 (0.8%)
	Others	6 (2.4%)
Organization Size	0-10 employees	17 (6.8%)
	11-25 employees	40 (16%)
	26-50 employees	74 (29.6%)
	51-100 employees	62 (24.8%)
	101-200 employees	57 (22.8%)
	201-500 employees	0
	More than 500 employees	0
Department Size	0-10 employees	110 (44%)
	11-25 employees	82 (32.8%)
	26-50 employees	32 (12.8%)
	51-100 employees	17 (6.8%)
	101-200 employees	9 (3.6%)
	201-500 employees	0
	More than 500 employees	0

of employees between 0-10 were (6.8%), (16%) between 11-25, (29.6%) between 26-50, the number of employees between 51-100 and 101-200 was (24.8%) and (22.8%) respectively. The department size of organizations contains the number of employees between 0-10 (44%), employees between 11-25 (32.8%), the number of employees between 26-50 and 51-100 was (12.8%), and (6.8%), and between 101-200 employees were (3.6%). Table 5 shows the organizational demographic information of respondents. It also shows no respondents whose organizational size is more than 200 employees.

C. RELIABILITY ANALYSIS

The reliability of the questionnaire and the internal consistency of items were identified through the instruments' reliability analysis. The internal consistency of items was measured to check the association of items with their construct and other construct items within the scale. There are several statistical tests to measure internal consistency. Cronbach's alpha test has been applied to evaluate the internal

consistency. It generally depicts the lower and upper bound value of reliability. In exploratory research, the values of Cronbach's alpha lie between 0.6 to 0.7 are acceptable, and a value below 0.6 is considered poor [73]. However, in the advanced stages of research, values between 0.7 to 0.9 are considered good [3]. Moreover, the value of Cronbach's alpha 0.8 is also suggested as good. If Cronbach's alpha value is greater than 0.95, it indicates a chance of duplication; therefore, the value is not accepted. The Cronbach's alpha value of the individual construct was separately explored for reliability analysis. The current study results are statistically significant because all the constructs' values of Cronbach's alpha are within the range. Table 6 shows the significant results of the reliability analysis of each construct.

TABLE 6. Reliability analysis results.

Construct	No. of Items	Cronbach Alpha
RAS	4	0.785
TAMS	4	0.884
PACM	5	0.875
SAC	3	0.834
EC	3	0.879
JSE	4	0.906
REC	4	0.814
JSA	4	0.890
TI	3	0.716

D. DESCRIPTIVE ANALYSIS

This section discusses the descriptive analysis of the survey study in detail. Descriptive statistics of each construct item are measured using mean, standard deviation, skewness, and kurtosis. Each statistics score shows each item's level of satisfaction and summarizes the survey data.

Each construct instrument is measured in this study through two research questions observed by a 5-point Likert scale. Recruitment and Selection (RAS), Team and Management Support (TAMS), Job Security (JSE), Recognition (REC), and Job Satisfaction (JAS) constructs were measured by four items. Salary and Compensation (SAC), Employee Commitment (EC), and Turnover Intention (TI) constructs were measured by three items. In addition, the Performance and Career Management (PACM) construct was measured using five items. The Likert scale extends from strongly disagree to strongly agree. The means score of each item should be in the range of 2.0 to 3.99. According to Kim *et al.* [75], the range score of skewness is -1.96 to $+1.96$; otherwise, it is viewed as unacceptable. In contrast, kurtosis's accepted range score value is -3 to $+3$. The individual items' statistics of each construct are given in Table 7.

E. CORRELATION ANALYSIS

Before performing SEM, the correlation analysis was performed and analyzed among the constructs. It helps to assess the association between dependent and independent variables. In this study, Pearson's Correlation Coefficient was

TABLE 7. Descriptive analysis of items.

Items	Mean	Std. Deviation	Skewness	Kurtosis
RAS1	3.23	1.284	-.246	-.908
RAS2	3.14	1.215	-.195	-.802
RAS3	3.13	1.190	-.272	-.805
RAS4	3.18	1.198	-.303	-.778
TAMS1	3.94	1.164	-1.093	.401
TAMS2	3.74	1.128	-.821	-.009
TAMS3	3.88	1.192	-1.023	.239
TAMS4	3.94	1.099	-1.115	.705
PACM1	3.48	1.213	-.561	-.591
PACM2	3.57	1.211	-.717	-.392
PACM3	3.67	1.160	-.751	-.222
PACM4	3.32	1.272	-.333	-.968
PACM5	3.65	1.181	-.720	-.283
SAC1	3.26	1.188	-.377	-.724
SAC2	3.11	1.186	-.284	-.724
SAC3	3.22	1.367	-.373	-1.063
EC1	3.94	1.024	-1.094	1.058
EC2	3.96	1.104	-.985	.342
EC3	3.94	1.114	-1.082	.627
JSE1	3.67	1.104	-.595	-.386
JSE2	3.74	1.088	-.818	.235
JSE3	3.86	1.054	-1.014	.699
JSE4	3.82	1.037	-.846	.392
REC1	3.63	1.026	-.585	.009
REC2	3.34	1.109	-.437	-.436
REC3	3.76	1.045	-.879	.459
REC4	3.80	1.018	-.719	-.017
JAS1	3.52	1.148	-.651	-.247
JAS2	3.83	1.117	-.882	.036
JAS3	3.89	1.101	-1.039	.596
JAS4	3.76	1.125	-.855	.137
TI1	3.31	1.232	-.301	-.818
TI2	2.72	1.220	.376	-.748
TI3	3.31	1.150	-.161	-.755

used to determine the correlation among the proposed conceptual framework constructs. According to [76], the correlation coefficient was interpreted by the following guidelines:

- The coefficient value lies at ±1; it shows a strong positive or negative linear relationship – both variables have linearly increased or decreased.
- The coefficient value lies between 0 and ±0.3; it shows a weak positive or negative linear relationship.
- The coefficient value lies between ±0.3 and ±0.7; it shows a moderately positive or negative linear relationship.
- The coefficient value lies between ±0.7 and ±1; it shows a strong positive or negative linear relationship.
- The coefficient value lies at 0; it shows no linear relationship.

Table 8 depicts the correlation analysis matrix among dependent and independent variables' constructs in the proposed conceptual framework. According to the results, all these construct variables have a strong correlation coefficient value.

F. RESULT OF STRUCTURAL EQUATION MODELING

PLS-SEM is used in this study to analyze the proposed conceptual framework using SPSS and Warp-PLS. PLS-SEM is an inclusive multivariate analysis method containing two sub-models: measurement and structural model. The measurement model indicates the interrelation between the latent variables and collected data from the survey. The structural model shows the relationship among the latent variables. PLS-SEM is especially considered when the conceptual framework is complex, has many latent variables, and gives more reliable results [77]. SEM helps evaluate the relationship between exogenous and endogenous variables rather than taking them separately. Significantly, it helps to analyze the proposed conceptual model correctly and the respective proposed hypothesis with acceptable value [78]. The measurement model analysis and structural model analysis are discussed in detail.

1) MEASUREMENT MODEL ANALYSIS

There are two types of construct measurement models; formative and reflective. The construct variables influence all the indicators in the formative measurement model. While in the reflective measurement model, all the construct variables are influenced by the indicators [79]. The proposed conceptual framework is a reflective type in this study. According to [80], path modeling is a generally developed system used for cause & effect relationships between latent variables. The measurement model analysis was conducted to evaluate the relationship between construct and indicators. It assesses the collinearity between these constructs. There are two ways to validate the measurement model analysis; convergent validity and discriminant validity.

a: CONVERGENT VALIDITY

Convergent validity determines how well different indicators of construct correlate positively or negatively. Two metrics are crucial for evaluating convergent validity: Average Variance Extracted (AVE) and standardized outer-loading of constructs' indicators. Table 9 represents the cross-loading of the constructs' indicators variables. According to [3], a standardized outer-loadings value should be greater than 0.70; however, it does not mean the outer-loadings values below this threshold must be removed. If the range value of outer-loading is between 0.40 to 0.70, the removal effect on the AVE should be considered. If the AVE significantly improves, remove the items; otherwise, retain them in the model. In this empirical analysis, all the standardized outer loading values of constructs are greater than 0.70 given in Table 9.

The composite reliability values between 0.80 to 0.90 represent the high correlation of construct variables [3]. In Table 10, all the composite reliability values of the construct are within the range and acceptable. In addition, the AVE is measured to assess the average variance shared between the construct and indicators. The AVE value of each construct is between 0.50 to 0.80. Moreover, the value of AVE should be higher than 0.50 [3]. Results have shown in Table 10 that all the constructs' AVE values are greater than a threshold value.

TABLE 8. Correlation analysis and discriminant validity of constructs.

	RAS	TAMS	PACM	SAC	EC	JSE	REC	JSA	TI
RAS	**.769**								
TAMS	.678**	**.793**							
PACM	.751**	.724**	**.786**						
SAC	.633**	.574**	.738**	**.764**					
EC	.663**	.672**	.729**	.603**	**.808**				
JSE	.645**	.601**	.712**	.659**	.781**	**.787**			
REC	.666**	.693**	.750**	.648**	.753**	.746**	**.778**		
JSA	.644**	.698**	.772**	.697**	.806**	.785**	.774**	**.771**	
TI	-.739**	-.785**	-.784**	-.658**	-.707**	-.685**	-.703**	-.735**	**.781**

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

TABLE 9. Cross-loadings and outer-loadings of the constructs' indicators.

Items	RAS	TAMS	PACM	SAC	EC	JSE	REC	JSA	TI
RAS1	**.742**	.273	.160	.150	.272	.047	.057	.193	-.032
RAS2	**.775**	.167	.094	.193	.185	.125	.010	.164	-.053
RAS3	**.721**	.126	.222	.061	.132	.068	.155	.192	-.081
RAS4	**.836**	.263	.111	.146	.113	.109	.005	.045	-.063
TAMS1	.314	**.879**	.084	.209	.114	.024	.123	.154	-.024
TAMS2	.220	**.741**	.063	.120	.149	.029	.190	.169	-.019
TAMS3	.232	**.756**	.067	.010	.132	.306	.069	.135	-.046
TAMS4	.221	**.767**	.074	.277	.174	.233	.121	.172	-.024
PACM1	.298	.497	**.802**	.409	.152	.129	.242	.206	-.021
PACM2	.320	.546	**.761**	.403	.120	.172	.047	.304	-.018
PACM3	.275	.401	**.831**	.302	.075	.243	.097	.256	-.030
PACM4	.289	.351	**.771**	.621	.021	.121	.153	.189	-.062
PACM5	.218	.400	**.776**	.541	.115	.295	.254	.172	-.096
SAC1	.019	.276	.125	**.742**	.221	.276	.003	.102	-.023
SAC2	.175	.138	.161	**.763**	.201	.142	.171	.143	-.052
SAC3	.275	.207	.231	**.785**	.275	.159	.069	.156	-.007
EC1	.288	.541	.352	.173	**.776**	.489	.180	.326	-.091
EC2	.148	.614	.269	.096	**.794**	.493	.154	.334	-.096
EC3	.321	.419	.313	.185	**.854**	.421	.276	.325	-.123
JSE1	.262	.171	.348	.280	.114	**.711**	.002	.048	-.190
JSE2	.120	.166	.363	.120	.214	**.796**	.133	.092	-.320
JSE3	.140	.276	.373	.010	.154	**.834**	.128	.106	-.170
JSE4	.122	.279	.274	.277	.151	**.801**	.096	.172	-.050
REC1	.220	.380	.548	.349	.321	.309	**.720**	.054	-.241
REC2	.055	.413	.631	.136	.392	.129	**.861**	.196	-.291
REC3	.125	.456	.627	.214	.312	.477	**.772**	.035	-.314
REC4	.146	.435	.574	.271	.244	.440	**.752**	.173	-.224
JAS1	.134	.511	.248	.482	.314	.349	.090	**.744**	-.324
JAS2	.068	.572	.237	.331	.249	.289	.019	**.703**	-.291
JAS3	.086	.655	.326	.238	.321	.468	.009	**.873**	-.361
JAS4	.041	.535	.275	.490	.237	.400	.54'	**.756**	-.394
TI1	-.228	-.023	-.138	-.081	-.234	-.008	-.078	-.045	**.735**
TI2	-.034	-.166	-.156	-.035	-.341	-.114	-.075	-.119	**.833**
TI3	-.122	-.107	-.215	-.122	-.213	-.070	-.038	-.151	**.755**

b: DISCRIMINANT VALIDITY

In discriminant validity, different constructs of conceptual framework describe different concepts or phenomena. In addition, it measures the distinct behavior of each construct with other constructs. It also implies that each construct of the conceptual framework has unique and unrepeated characteristics which are not determined by other constructs. There are two common methods to evaluate the discriminant validity.

Firstly, the value of all outer-loadings and cross-loadings of each indicator of the latent variables is investigated. The outer-loading value of each construct's indicator should be greater than any other construct variables. Suppose the indicator of latent variable loads a higher value onto any other constructs. In such a case, one is a problematic measure because it indicates that an outer-loading value of the indicator is a good measure for other constructs. Ones suggested [81]

TABLE 10. Construct reliability and validity.

Construct Variable	Cronbach Alpha	Composite Reliability	AVE
RAS	0.786	0.853	0.592
TAMS	0.886	0.870	0.628
PACM	0.877	0.890	0.619
SAC	0.836	0.808	0.583
EC	0.880	0.850	0.654
JSE	0.905	0.866	0.620
REC	0.816	0.859	0.605
JSA	0.891	0.854	0.595
TI	0.717	0.824	0.611

that remove the indicator that does not measure respective construct loadings- measuring higher standardized loading of any other construct. Table 9 depicts that all the standardized loading of construct's indicator loads highest onto their particular construct.

Secondly, the discriminant validity is evaluated using the Fornell-Larcker criterion. It states that the value of each respective square root of construct' AVE should be higher than the construct correlation with other constructs. In simple terms, the individual construct shares high variance with its latent variable than other constructs. Table 8 presents the constructs correlation matrix with the square root of AVEs on the diagonals. Each construct value on the diagonal is higher than the other constructs' correlation value, which validates the Fornell-Larcker criterion.

2) STRUCTURAL MODEL ANALYSIS

The structural model analysis is applied to evaluate this study's proposed conceptual framework and hypothesis. Figure 8 presents the structural model with outer loadings and path estimation coefficients. Blue circles represent the independent variables, red circles show independent control variables, and a white circle presents the dependent variable. The blue dotted line depicts the mediation effect between independent and dependent variables, discussed in detail.

The multiple regression analysis is performed to investigate the relationship between dependent and independent variables. Before giving the results, it is essential to evaluate the correlation of regression coefficient among construct variables, which shows the impact of the relationship. Equation 1 demonstrates the multiple regression model [24]; where 'y' is dependent variable, 'c' is constant, '$x_1, x_2, \ldots, x_n$' are independent variables, and '$b_1, b_2, \ldots, b_n$' are regression coefficients.

$$y = c + x_1 b_1 + x_2 b_2 + \ldots + x_n b_n \qquad (1)$$

To evaluate the path estimation coefficient, R-square value, beta coefficient value, standard error, t-statistics, and p-value of significance level, have been analyzed. The range value of R-square is -1 to $+1$. If the R-square value is close to $+1$, show the strong correlation among variables. R-square value close to 0 shows a weak positive

correlation, and -1 represents a strong negative correlation among variables. R-square value demonstrates how much variance in the dependent variable is affected by the independent variable [24]. The beta coefficient depicts the strength of each independent variable on the dependent variable. The t-stats for two-tail significance were considered to measure whether the relationship among variables was significant or not. The acceptable value of t-stats for two-tail are to t > 1.96 at p < 0.05, t > 2.567 at p < 0.01, and t > 3.29 at p < 0.001 [82]. The R-square for turnover intention is 0.775, indicating 77.5% variance predicted by all independent variables. Hence, the structural measurement model presents statistically significant results. In Table 11, the beta coefficient, std. error, t-statistics, p-value, and hypothesis supported or not supported are presented.

3) HYPOTHESIS EVALUATION

In the current study, ten hypotheses were proposed to investigate the influence of independent variables on a dependent variable. The multiple regression analysis and PLS-SEM were used to test the hypothesis using SPSS and Warp-PLS. Table 11 presents the direct impact of individual independent variables on dependent variable (turnover intention).

The Recruitment and Selection (RAS) process has a high impact on the IT professional Turnover Intention (TI). The survey results show the high collinearity of RAS with IT professionals' TI. A strong negative impact of RAS on TI with beta coefficient value (-0.739), std. error (0.037), t-stats at -17.284, and p-value<0.0001, respectively. The results show a significantly negative relationship between RAS and TI, supporting our hypothesis 1. The regression analysis was performed to predict the influence of Team and Management Support (TAMS) on the TI of IT professionals. The survey results establish the relationship between TAMS and TI with a beta coefficient value (-0.785), std. error (0.034), t-stats at -19.946, and p-value<0.0001, respectively. The results demonstrate that TAMS has a significantly negative relationship with TI. So, hypothesis 2 is accepted in this study.

The negative relationship between Performance and Career Management (PACM) and TI was observed using beta coefficient value and std. error, given as -0.784 and 0.032 with t-stats -19.888. As the PACM increases, the employees' intention to stay long-tenure in their organization. The results show a significant relationship between PACM and TI at p-value<0.0001. Therefore, hypothesis 3 is supported in this study. According to our findings, the beta coefficient and std error values were obtained as -0.658 and 0.039, which shows the moderate negative impact of Salary and Compensation (SAC) on TI. The two tail significance level was supported with t-stats and p-value as -13.775 at < 0.0001. Hence, hypothesis 4 is accepted and supports our finding results.

The Employee Commitment (EC) has a negative impact on TI with a beta coefficient value (-0.707), std. error (0.034), t-stats -15.749 at p-value<0.0001, respectively. As the
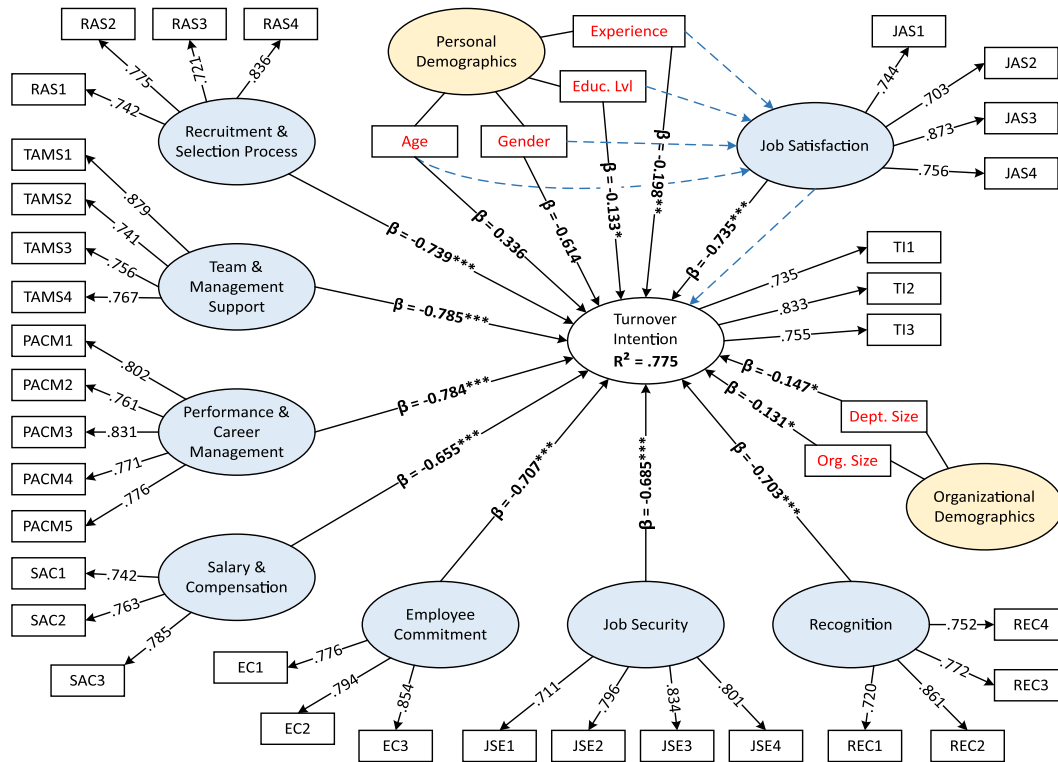
FIGURE 8. Structural model with outer loadings and path coefficient (at p>0.05, *p<0.05, **p<0.001, ***p<0.0001).

TABLE 11. Evaluation of structural model.

Hypothesis Testing	Beta-Value	Std. Error	T-Stats	P-Value	Result
H1: RAS→TI	-0.739	0.037	-17.284	p<0.0001	Supported
H2: TAMS→TI	-0.785	0.034	-19.946	p<0.0001	Supported
H3: PACM→TI	-0.784	0.032	-19.888	p<0.0001	Supported
H4: SAC→TI	-0.658	0.039	-13.775	p<0.0001	Supported
H5: EC→TI	-0.707	0.034	-15.749	p<0.0001	Supported
H6: JSE→TI	-0.685	0.039	-14.825	p<0.0001	Supported
H7: REC→TI	-0.703	0.041	-15.576	p<0.0001	Supported
H8: Organizational Demographics (OD)					
H8a: Org_Size→TI	-0.131	0.025	-2.082	p<0.038	Supported
H8b: Dept_Size→TI	-0.147	0.038	-2.344	p<0.020	Supported
H9: Personal Demographics (PD)					
H9a: Age→TI	-0.061	0.120	-0.965	p>0.335	**Not Support**
H9b: Gender→TI	-0.032	0.135	-0.505	p>0.614	**Not Support**
H9c: Exper→TI	-0.137	0.038	-2.176	p<0.031	Supported
H9d: Edu_Lvl→TI	-0.198	0.025	-3.185	p<0.002	Supported

EC increases, the intention of IT professionals decreases to leave the organization. The results support our findings that EC negatively influences the TI of IT professionals. So, hypothesis 5 is supported in this study. The Job Security (JSE) negatively influences employee TI with a beta coefficient value (−0.685), std. error (0.039), t-stats −14.825 at p-value<0.0001, respectively. The IT employees who feel secure about their job have less intention to leave the industry. So, the finding shows that hypothesis 6 supports our research study. The IT employees whom their supervisors or team

leaders have appreciated; have more commitment to their job. Our survey results depict that the Recognition (REC) has a negative impact on the TI of employees. The beta coefficient value is −0.703, std. error is 0.041, t-stats is −15.576 at significant p-value<0.0001 respectively. As the REC of IT professionals increases, the intention of employees decreases, which results in staying a long time in their working organization. Hence, hypothesis 7 is accepted in this study.

The Organizational Demographics variable has two sub-categorical control variables; Organizational Size

(Org_Size) and Department Size (Dept_Size). The direct impact of Org_Size and Dept_Size are investigated with TI. Our survey results represent the beta value (−0.131), std. error (0.025), t-stats −2.082 at p-value<0.038 for Org_Size and beta value (−0.147), std. error (0.038), t-stats −2.344 at p-value<0.020 for Dept_Size. Both variables have a negative influence on the TI of IT professionals. Hence, the hypothesis H8a and H8b are significantly satisfied in this study.

The Personal Demographics variable has four sub-categorical control variables; Age, Gender, Experience (Exper), and Education Level (Edu_lvl). Firstly, the direct impact of Age and TI was measured with a beta value (−0.061), std. error (0.120), t-stats (−0.965) at p-value >0.335 (>0.05) respectively. The results show that Age has a non-significant impact on TI of IT employees, which does not support our hypothesis H9a. Secondly, the direct impact of Gender was evaluated with TI. The beta and std. error values were given as −0.032 and 0.135, showing a weak negative relationship. The t-stats and p-value were also measured to check the significance level as −0.505 at >0.614 (>0.05). The results show a non-significant relationship between Gender and TI, which rejects hypothesis H9b. Thirdly, the direct impact of the Exper and TI was observed. The beta and std. error values were given as −0.137 and 0.038, which shows the weak negative relationship between them. The t-stats and p-value were obtained as −2.176 at <0.031, which presents the relationship's significance level. Hence, hypothesis H9c is accepted with a significance level (<0.05). Finally, the direct impact of the Educ_lvl was measured with TI to investigate their negative relationship. The beta coefficient value −0.198, std. error (0.025), t-stats −3.185 at p-value <0.002 respectively. The results show that Educ_lvl of IT professionals increases, their TI to leave the organization decreases. So, hypothesis H9d is supported in the current study.

A bootstrapping method was adopted to evaluate the mediating effect of Job Satisfaction (JSA) between Personal Demographics and TI using SPSS Process Macro [83] as shown in Figure 9(a). First, the regression analysis was performed using Age to predict the significant effect on JSA. The results show the beta value = .039, t-stats = .260, p>.795, respectively. Next, the second regression analysis was performed while controlling the JSA (as mediator) between Age and TI. The result predict the Age has a non-significant impact on TI (beta value = −.139, t-stats = 1.709, p>.080). Based on 5000 bootstrapping samples, a result of the indirect effect show a non-significant relationship between Age and TI mediated by JSA (a*b = −.023, Bootstrap CI$_{95}$ = −.185 and .142). Similarly, there was non-significant direct effect between Age and TI (beta = −.139, t-stats = 1.709, p>0.05). Table 12 shows the evaluation of mediation model between Age, JSA and TI. Hence, hypothesis 10a is rejected and does not support this study.

In Figure 9(b), the mediation effect between Gender and TI was investigated by controlling JSA. First, the regression analysis was performed using Gender to predict the
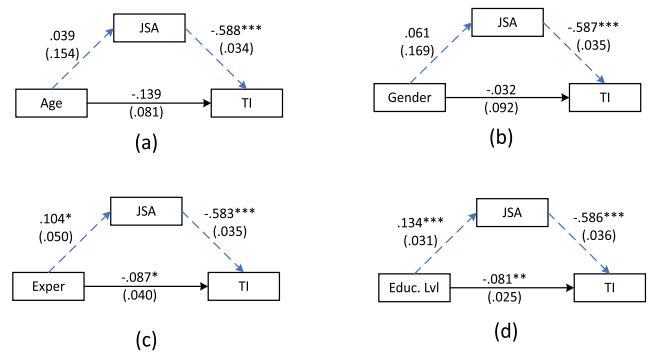

FIGURE 9. Mediation model with beta coefficients and standard errors: (a) Age, JSA, and TI, (b) Gender, JSA, and TI, (c) Exper, JSA, and TI, (d) Educ. Lvl, JSA, and TI.

significant effect on JSA. The results show a non-significant relationship with beta value = .061, t-stats = .361, p>.719, respectively. Next, the second regression analysis was performed between Gender and TI by mediating JSA. The result predict the Gender has a non-significant impact on TI (beta value = −.032, t-stats = −.353, p>.724). Based on 5000 bootstrapping samples, a result of the indirect effect show a non-significant relationship between Gender and TI mediated by JSA (a*b = −.036, Bootstrap CI$_{95}$ = −.196 and .132). Similarly, there was non-significant direct effect between Gender and TI (beta = −.032, t-stats = −.353, p>0.05). Table 13 shows the evaluation of the mediation model between Gender, JSA, and TI. So, hypothesis 10b is not supported in this study.

The mediation effect between Exper and TI was investigated by controlling JSA presented in Figure 9(c). First, the regression analysis was performed using Exper to predict the significant effect on JSA. The results show a weak positive significant relationship with beta value = .104, t-stats = 2.087, p<.038, respectively. Next, the second regression analysis was performed between Exper and TI by mediating JSA. The result predict the Exper has a non-significant direct impact on TI (beta value = −.026, t-stats = −.945, p>.345). Based on 5000 bootstrapping samples, a result of indirect effect show a significant negative relationship between Exper and TI mediated by JSA (a*b = −.061, Bootstrap CI$_{95}$ = −.118 and −.080). The total effect on TI [P_M = (−.061) / (−.087)] was approximately 70.1% affected by mediator JSA and Exper. Similarly, there was a negative significant direct effect between Exper and TI (beta = −.087, t-stats = −2.176, p<0.05). Table 14 shows the evaluation of the mediation model between Exper, JSA, and TI. So, hypothesis 10c is supported in this study.

Figure 9(d) shows the investigated results of the mediation effect between the Educ_lvl and TI by controlling JSA. First, the regression analysis was performed using Educ_lvl to predict the significant effect on JSA. The results show a weak positive significant relationship with beta value = .134, t-stats = 4.282, p<.000, respectively. Next, the second regression analysis was performed between Educ_lvl and

TABLE 12. Evaluation of mediation model: Age, job satisfaction and turnover intention.

Variables	Beta-Value	Std. Error	T-Stats	P-Value	95% CI
Age→JSA	.039	.154	.260	p>.795	[-.257, .335]
Age→JSA→TI	-.588	.034	-17.143	p<.000	[-.656, -.521]
Direct Effect	-.139	.081	1.709	p>.088	[-.021, .299]
Indirect Effect	-.023	.081	-	-	[-.185, .142]
Total Effect	.115	.120	.965	p>.335	[-.120, .352]

TABLE 13. Evaluation of mediation model: Gender, job satisfaction and turnover intention.

Variables	Beta-Value	Std. Error	T-Stats	P-Value	95% CI
Gender→JSA	.061	.169	.361	p>.719	[-.272, .394]
Gender→JSA→TI	-.587	.035	-17.008	p<.000	[-.655, -.519]
Direct Effect	-.032	.092	-.353	p>.724	[-.021, .299]
Indirect Effect	-.036	.085	-	-	[-.196, .132]
Total Effect	-.068	.135	-.505	p>.614	[-.334, .198]

TABLE 14. Evaluation of mediation model: Experience, job satisfaction and turnover intention.

Variables	Beta-Value	Std. Error	T-Stats	P-Value	95% CI
Exper→JSA	.104	.050	2.087	p<.038	[.060, .202]
Exper→JSA→TI	-.583	.035	-16.776	p<.000	[-.651, -.514]
Direct Effect	-.026	.027	-.945	p>.345	[-.080, .028]
Indirect Effect	-.061	.028	-	-	[-.118, -.080]
Total Effect	-.087	.040	-2.176	p<.030	[-.165, -.078]

TABLE 15. Evaluation of mediation model: Education level, job satisfaction and turnover intention.

Variables	Beta-Value	Std. Error	T-Stats	P-Value	95% CI
Educ_lvl→JSA	.134	.031	4.282	p<.000	[.072, .196]
Educ_lvl→JSA→TI	-.586	.036	-16.387	p<.000	[-.656, -.515]
Direct Effect	-.002	.018	-.131	p>.896	[-.038, .033]
Indirect Effect	-.079	.018	-	-	[-.118, -.044]
Total Effect	-.081	.026	-3.185	p<.002	[-.131, -.031]

TI by mediating JSA. The result predict the Educ_lvl has a non-significant direct impact on TI (beta value = −.002, t-stats = −.131, p>.896). Based on 5000 bootstrapping samples, a result of the indirect effect show a significant negative relationship between Educ_lvl and TI mediated by JSA (a*b = −.079, Bootstrap CI_{95} = −.118 and −.044). The total effect on TI [P_M = (−.079) / (−.081)] was approximately 16% affected by mediator JSA and Educ_lvl. Similarly, a direct negative significant impact was significantly between Educ_lvl and TI (beta = −.081, t-stats = −3.185, p<0.05). Table 15 shows the evaluation of the mediation model between Educ_lvl, JSA, and TI. So, hypothesis 10d is supported in the current study.

Finally, the multiple regression analysis was performed to predict the model fit using independent, control, and dependent variables. The R-square value was calculated, explaining the percentage of variance and strength of the relationship between independent and dependent variables. The range of R-square values is between 0 to 1. The R-square value of 0.75 shows a strong effect, 0.50 shows a moderate effect, and 0.25 shows a weak effect [3]. The structural model in Figure 8 indicates the R-square value of 0.755 that predicts the 75.5% variance in turnover intention by using the independent and control variables.

4) TRIANGULATION OF SLR AND EMPIRICAL STUDY

This section discusses the triangulation results of the SLR study and empirical study. Figure 10 depicts the comparison of identified influencing factors through SLR and empirical study. Two types of datasets are used to evaluate the likeness and variations. In Table 16, the ranking of identified affecting factors through SLR and survey are shown. In this empirical study, a close-ended survey questionnaire was formulated to investigate and identify the affecting turnover intention factors in the IT and software industries. The positive occurrence responses were chosen from the collected survey data, i.e., agree and strongly agree.

Using SPSS, spearman's rank-order correlation was used to assess the significant difference between the SLR and empirical ranking of identified affecting turnover intention

TABLE 16. Triangulation of identified affecting factors of IT professionals' turnover intention from SLR and empirical study.

S. No.	Affecting Factors	Occurrence in SLR (N=47)		Occurrence in Survey (N=250)		Average Rank
		%	Rank	%	Rank	
RAS	Recruitment & Selection	19	9	57	5	7
TAMS	Team & Management Support	21	8	52	8	8
PACM	Performance & Career Management	17	10	51	9	10
SAC	Salary & Compensation	25	6	49	10	8
EC	Employee Commitment	36	3	54	7	5
JSE	Job Security	32	4	61	2	3
REC	Recognition	30	5	59	3	4
JSA	Job Satisfaction	44	2	56	6	4
PD	Personal Demographics	23	7	58	4	6
OD	Organizational Demographics	4	11	21	11	11
TI	Turnover Intention	73	1	64	1	1
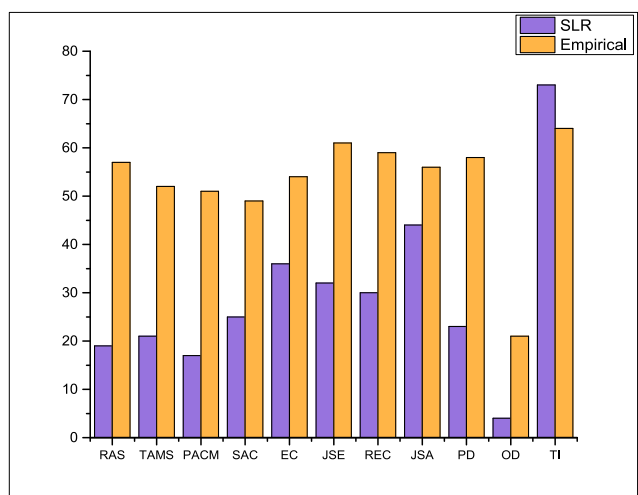
FIGURE 10. Comparison of SLR and empirical study.

TABLE 17. Rank order correlation between SLR and empirical study.

		SLR Rank	Empirical Rank
Spearman's rho	**SLR Rank**	1.000	.627*
		-	.039
	Empirical Rank	.627*	1.000
		.039	-
*. Correlation is significant at the 0.05 level (2-tailed).			

factors. The spearman's correlation coefficient value was obtained as 0.627, which indicated that the SLR and survey ranking were moderately correlated. The p-value was given as 0.039 ($<$.05); it demonstrates that the obtained correlation was statistically significant as implied in [84]. The spearman's correlation between the SLR rank and empirical rank is presented in Table 17.

This study compares the SLR and empirical study ranking results to investigate the critical affecting factors that impact the turnover intention of IT professionals.

According to [84], the criticality of affecting factors was measured through the proposed criteria. If the frequency of affecting factors is $>=$50% in both SLR and empirical study, it is considered a critical factor. The current study results demonstrate that only one critical influencing factor in SLR and empirical study is TI (turnover intention). The findings also identified that eight affecting factors are considered critical except salary & compensation and organizational demographics among Pakistan's IT and software industries.

Therefore, the comparison results help the top management of IT and software organizations pay attention to these critical factors while developing new retaining strategies. Furthermore, the finding also highlights which critical factor has the most influencing impact and non-significant impact on IT professionals' turnover intention.

V. DISCUSSION

In this study, it has been observed that IT professionals have a critical role in the tremendous growth of Pakistan's IT and software industry. IT organizations have to face several challenging issues such as lack of skilled employees, decrease in production growth, the high turnover intention of skilled employees, high loss of annual revenue, etc. Among these challenges, one of the most cited challenging issues [21], [24], [27] is the high turnover intention of IT professionals in recent research studies. Therefore, it is necessary to explore the affecting factors of the turnover intention of IT professionals. In recent literature, several authors have developed different types of conceptual frameworks and strategies in the IT and software sector to identify the factors that impact the turnover intention of employees [18]–[20], [24]. However, according to our best findings, none of the studies has addressed these challenging issues. Moreover, no one has empirically investigated the impact of turnover intention factors in the Pakistan software and IT industries. The current study aims to identify and investigate the influencing factors of IT professionals in the IT or software industry to fill this gap.

A SLR was conducted to answer the RQ1. A total of 47 primary research studies were selected by applying inclusion, exclusion, and quality assessment criterion. After that, ten important affecting factors have been identified that impact turnover intention. Recent literature has investigated the different influencing factors of turnover intention in their specific area or region. Although some factors were considered common in all studies, several factors differed from one region to another region. In this study, the primary purpose is to identify all these factors and propose a conceptual framework model. Furthermore, the hypotheses were proposed to evaluate the conceptual framework.

The empirical analysis was performed to analyze the proposed hypothesis and answer RQ2. A survey was conducted to target IT professionals in the Pakistan software and IT industries. Out of 490 respondents, 96 survey responses were collected through online Google Form, and 184 survey responses were gathered through a printed survey questionnaire. Finally, the missing and unfilled questionnaires were excluded, and the remaining 250 responses were used for data analysis.

In the proposed conceptual framework, a total of ten independent variables were identified to explore the direct impact on turnover intention. In this study, we argue that the recruitment and selection process has a negative impact on the turnover intention of IT professionals. According to [27], the HR management strives to build a friendly working environment for new talented employees to increase the productivity growth of the organization. The past studies explore that the well-organized recruitment and selection process increases the interest of employees to stay connected with their organization. As a result, employees' intention to leave the organization was decreased. The new internees were focused on their learning new skills and induction programs that help in the growth of career path [3]. According to our results findings, the recruitment and selection process negatively affects turnover intention (b $= -.739$, p-value $< .0001$), which supports our hypothesis 1. So, the result benefits the organization in developing new induction programs that engage the new employees to stay long.

The team and management support plays a significant role in the turnover intention of IT professionals. According to [29], the relationship of IT professionals with their supervisor, team members, HR management has a critical impact on turnover intention. Several studies argue that a strong relationship would encourage the IT professional to feel secure and satisfied with their job [19], [30]. Supervisor behavior has positively increased the intention of team members to stay with their organization; as a result, their intention to leave the organization is negligible. Our research shows that team and management support is negatively influenced by the turnover intention of IT professionals (b $= -.785$, p-value $< .0001$). Therefore, hypothesis 2 is significantly supported by the recent literature findings. Above mentioned results highlight that IT organizations pay attention to team management and supervisor support for a better future.

According to [2], [26], the career growth, training, and learning opportunities of IT professionals decrease their intention to leave the organization. Several organizations did not pay attention to performance and career management, resulting in the loss of skilled employees. The management should acknowledge their key employees and increase the career opportunities within their department so that the job engagement of these key employees increases [23], [31]. Our survey results satisfied the literature findings that team and management support negatively impacts IT professionals' turnover intention (b $= -.784$, p-value $< .0001$). So, the proposed hypothesis 3 is accepted in this study. The authors in [38] explored that the lack of salary and compensation plans has been one of the most common reasons for the high turnover intention of IT professionals. Organizations have to concentrate on salary and compensation plans for talented employees to reduce turnover intention. Most employees highly consider compensation plans before joining a new firm. According to recent studies [1], [24], [32], salary and compensation have a positive relationship between them and a negative impact on turnover intention. Our findings significantly support the hypothesis 4 (b $= -.658$, p-value $< .0001$).

According to the Human Capital theory, the highly committed employees stay long tenure when their organization provides efficient development and training programs [33]. In the past few studies [2], [25], [27], many researchers explored the influence of employee commitment on turnover intention. They argue that when the employee commitment has increased, a decrease in turnover intention has been observed. In the current study, the survey result supports our proposed hypothesis 5, which states that employee commitment negatively affects the IT professionals' turnover intention (b $= -.707$, p-value $< .0001$). In [35], the authors investigate that the IT professionals who feel secure about their job, their satisfaction level increases; as a result, they have less intention to leave their working organization. In management literature, the authors investigate the impact of job security on the turnover intention of IT professionals [19], [36]. They argue that high job security provides high employment stability, which reduces employees' turnover intention. The result predicts that job security has a negative impact on turnover intention (b $= -.685$, p-value $< .0001$), which supports our proposed hypothesis 6. Therefore, the given results help the organizations to develop a comfortable and secure environment for their valuable employees.

According to [37], the IT employees not only need a better salary and compensation plans from their organization but also want to be appreciated by their management. The valuable employees stay connected to their organization and have less intention to find a new job somewhere else. The authors in [38] highlight the important aspect that proper recognition and reward system decreases the professional's intention to leave their job. The findings of this study observed that the recognized IT professionals have a negative impact on turnover intention (b $= -.703$, p-value $< .0001$). Therefore, the proposed hypothesis 7 significantly supports this study.

In recent literature [17], [23], [28], the authors argue that the employees working in high brand and large enterprises have a low level of turnover intention. The IT staff working in small size organizations has less intention to leave. The findings of our survey results suggest that organizational demographics (organization size and department size) has negative impact on turnover intention of IT professionals (b = −.131 with p-value < .038 and b = −.147 with p-value <.020). So, the proposed hypotheses 8a and 8b are statistically significant.

The direct and indirect impact of the personal demographics on turnover intention has been observed in this study. In the past few studies [39], [40], authors investigated that the young IT professionals have high intention to leave or change their job as compared to employees above 40 years. In this study, our results depict a non-significant impact of age on the turnover intention of employees (b = −.061, p-value >.335). Therefore, hypothesis 9a is rejected and not supported in this study. The mediation effect of job satisfaction is also evaluated between age and turnover intention. In literature, the age factor has a small weak impact on turnover intention [35]. However, our study result does not support the mediation effect of job satisfaction between age and turnover intention (b = −.023, p-value >.05). Therefore, hypothesis 10a is also rejected. The gender gap of IT professionals has another aspect that impacts on turnover intention of IT professionals in recent literature [28], [41]. According to [28], the female employees in the IT sector leave the organization 2.5 times higher as compared to male employees. In our survey result, the male respondents were 84%, which shows that male respondents were higher than females. The direct impact of gender has non-significant effect on turnover intention (b = −.032, p-value >.614). So, the proposed hypothesis 9b is not supported. Furthermore, the mediating effect of job satisfaction is measured between gender and turnover intention (b = −.036, p-value >.05). The results depict that hypothesis 10b is rejected due to the non-significant effect on turnover intention.

The employees' experience has been gathered from survey data. According to [17], [23], the IT professionals having high experience have less intention to leave the organization. In our results, most employees work in small and medium-sized organizations. Moreover, these employees have less intention to leave the organization. The results show that employee experience has been negatively influenced by turnover intention (b = −.137, p-value <.031) and accept hypothesis 9c. Furthermore, the indirect relationship between employee experience and turnover intention was evaluated by controlling the job satisfaction as a mediator. The results show the significantly full mediation effect between experience and turnover intention (b = −.061, p-value <0.05) and support our proposed hypothesis 10c as shown in Table 14. The education level of employees was measured through survey data. In our results, most of the employees completed their bachelor's degree, as shown in Table 5. The regression analysis was performed to assess the direct impact of education level and turnover intention. The result illustrates a weak significant effect between education level and turnover intention (b = −.081, p-value <.002). Finally, the mediating effect of job satisfaction between education level and turnover intention is also evaluated. The result shows the significant impact on turnover intention (b = −.079, p-value <0.05). Therefore, our proposed hypotheses 9d and 10d are significantly supported.

Conclusively, the current research study satisfied all relationships among dependent and independent variables except age and gender control variables. Furthermore, this study aims to identify the affecting factors of IT professionals' turnover intention in Pakistan's IT and software industry. Moreover, the evaluation of these affecting factors was done using the recent literature review and data analysis. The results of this study help the top management of IT and software development organizations pay attention to these affecting factors.

VI. CONCLUSION

In the past few years, IT and software organizations have paid attention to acquiring talented and skilled employees. It has been observed from the recent literature that high employee turnover intention is one of the critical issues. Due to the high turnover intention of employees, it is difficult for organizations to retain them. Therefore, the SLR was conducted to identify the critical factors influencing IT professionals' turnover intention. From the findings of SLR, the identified affecting factors are recruitment & selection process, team & management support, performance & career management, salary & compensation, employee commitment, job security, recognition, organizational, and personal demographics. Furthermore, the conceptual framework was proposed along with research hypotheses to evaluate the affecting factors empirically. A survey has been circulated to 490 participants working in the IT or software industries.

The findings of this study demonstrate the negative impact of employee turnover intention on influencing factors in Pakistan's IT and software industries. The retaining of key employees starts with the recruitment and selection process. Well-organized team & management support encourage talented employees to stay connected with their organization. Salary and compensation play a significant role in attaining valuable employees because a compensation plan is the main attraction for employment. Organizations have to pay attention to employee commitment, job security, and recognition factors to reduce turnover intention. Personal demographic factors were evaluated using job satisfaction as a mediator with turnover intention. However, the non-significant results of age and gender were obtained, which depict the weak effect on employee turnover intention.

This study's practical and societal implication consolidates the argument for retaining talented employees in Pakistan's IT and software industries and emphasizes their advantages in increasing employee commitment, satisfaction, recognition, and retention intention. The findings of this study are also helpful for the top management of IT

organizations to retain their skilled and talented employees. As a result, the annual revenue loss will be reduced in terms of recruitment and training cost and increased productivity. Furthermore, this study presents evidence for the negative relationship between identified influencing factors and IT professionals' turnover intention. By using the findings of this study, organizations must develop new policies and strategies to decrease the high intention of employees to leave. The efficient training programs and supportive team management increase the satisfaction level of employees to stay long tenure. The top management should gain insight into improving the work environment and team culture. In addition, employee recognition must be considered while developing new strategies because it builds the trust level in organizations and feels secure about their job security. The well-organized compensation plans also attract talented and skilled employees, which is beneficial for organizations.

The theoretical implication of this study contributes to overcoming employee turnover intention in Pakistan's IT and software industry. It improves and enhances the existing literature by investigating and identifying influencing factors that significantly impact turnover intention. The triangulation of this study helps to determine the most critical factors that have a negative impact on turnover intention. This study also provides the foundation for future scholars in the context of retention intention for skilled employees and management practices for high employee turnover.

A. LIMITATION AND FUTURE WORK

Generally, all the research studies have some limitations or drawbacks. So, this study also has a few limitations. First, in this study, the most significant factors of the turnover intention of IT professionals were identified from SLR and considered for further analysis. However, in the future, researchers may analyze a few other factors such as work environment, work-life balance, work-family conflict, and employee engagement, which may play a significant role in employee turnover intention. In addition, researchers may identify more factors from the industry through interviews. The researchers may evaluate the significance of age and gender factors by considering equal numbers of sample data. As the sample data of age and gender factors are categorical; therefore, chi-square and t-test can be used for evaluation. To overcome this limitation, the authors of this study performed triangulation of SLR and empirical analysis findings. Secondly, the data was collected only from Pakistan's small and medium-sized IT and software industries. Therefore, the study results cannot be generalized. Applying the same study to other countries and sectors is suggested to overcome this limitation. During the study, it was observed that psychological factors and personality traits that cause mental health issues might lead to high turnover. Therefore, researchers can explore this area for further research in the future.

REFERENCES

[1] R. Arora, "Leadership and its impact on women employee turnover in IT industry," *Gurukul Bus. Rev. (GBR)*, vol. 15, p. 15, Apr. 2019.

[2] D. K. Sathyanarayan and D. B. L. Lavanya, "Effect of organizational commitment, motivation, attitude towards work on job satisfaction, job performance and turnover Intention-VUCA perspective," *J. Manage.*, vol. 5, no. 4, pp. 445–457, 2018.

[3] G. G. Sharma and K.-J. Stol, "Exploring onboarding success, organizational fit, and turnover intention of software professionals," *J. Syst. Softw.*, vol. 159, Jan. 2020, Art. no. 110442.

[4] B. Koo, J. Yu, B.-L. Chua, S. Lee, and H. Han, "Relationships among emotional and material rewards, job satisfaction, burnout, affective commitment, job performance, and turnover intention in the hotel industry," *J. Quality Assurance Hospitality Tourism*, vol. 21, no. 4, pp. 371–401, Jul. 2020.

[5] E. Lee and J. Kim, "Nursing stress factors affecting turnover intention among hospital nurses," *Int. J. Nursing Pract.*, vol. 26, no. 6, Dec. 2020, Art. no. e12819.

[6] V. Yukongdi and P. Shrestha, "The influence of affective commitment, job satisfaction and job stress on turnover intention: A study of Nepalese bank employees," *Rev. Integrative Bus. Econ. Res.*, vol. 9, pp. 88–98, 2020.

[7] M. Chung and A. Jeon, "Social exchange approach, job satisfaction, and turnover intention in the airline industry," *Service Bus.*, vol. 14, no. 2, pp. 241–261, Jun. 2020.

[8] S. Sandhya and M. Sulphey, "An assessment of contribution of employee engagement, psychological contract and psychological empowerment towards turnover intentions of IT employees," *Int. J. Environ., Workplace Employment*, vol. 5, no. 1, pp. 22–31, 2019.

[9] L. John Miller. (2018). *Why do Software Engineers Change Jobs so Frequently*. Accessed: Sep. 6, 2021. [Online]. Available: https://www.forbes.com/sites/quora/2018/02/06/why-do-software-engineers-change-jobs-so-frequently/?sh=2e6a34b648a7

[10] H. Farooq *et al. Pakistan's IT Industry Overview*. Accessed: Sep. 13, 2021. [Online]. Available: http://www.moit.gov.pk/SiteImage/Misc/files/Pakistan

[11] E. Noronha and P. D'Cruz, "The Indian IT industry: A global production network perspective," Indian Inst. Manage., Ahmedabad, Gujarat, Working Paper 134, 2020.

[12] NASSCOM Strategic Review. (2019). *IT-BPM Sector in India Decoding Digital: Strategic Review*. Accessed: Sep. 6, 2021. [Online]. Available: https://nasscom.in/sites/default/files/uploads/temp/NASSCOM_Strategic_Review_2019_Decoding_Digital_Secured_15032019.pdf

[13] National Accounts Committee (NAC). (2022). *Press Release Pakistan Bureau of Statistics*. Accessed: Jun. 3, 2022. [Online]. Available: https://www.pbs.gov.pk/sites/default/files/press_releases/2022/Press_Release_National_Accounts_Committee_Meeting_18-05-2022.pdf

[14] A. Louie. *B2B News: 112 Employee Turnover Statistics: 2021 Causes, Cost & Prevention Data*. Accessed: Sep. 13, 2021. [Online]. Available: https://financesonline.com/employee-turnover-statistics/

[15] M. G. Bhaguna and S. R. Sharma, "Retention as an issue in Indian software industry," *Int. J. Res. Econ. Social Sci. (IJRESS)*, vol. 7, no. 10, pp. 2249–7382, 2017.

[16] B. Sumanarathna and S. Samarakoon, "The effect of work-life balance policies on the retention intention of executive women employee in information technology (IT) industry in Sri Lanka," *J. Hum. Resource Manage.*, vol. 14, no. 1, pp. 1–16, 2019.

[17] B. M Scholtz, J.-P. Van Belle, K. Njenga, A. Serenko, and P. Palvia, "The role of job satisfaction in turnover and turn-away intention of IT staff in South Africa," *Interdiscipl. J. Inf., Knowl., Manage.*, vol. 14, pp. 077–097, 2019, doi: 10.28945/4267.

[18] M. Al-Dalahmeh and M. Héder-Rima, "The effect of talent management practices on employee turnover intention in the information and communication technologies (ICTs) sector: Case of Jordan," *Problems Perspect. Manage.*, vol. 18, no. 4, p. 59, 2021.

[19] B. Prommegger and H. Krcmar, "Through good times and bad: The influence of workplace social support on IT Professionals' turnover intention during the COVID-19 crisis," in *Proc. Comput. People Res. Conf.*, Jun. 2021, pp. 13–21.

[20] A. Koszela, "Group factors of voluntary employee turnover in organizations from IT sector," in *Proc. Inter. Sci. Conf. Hradec Econ. Days*, Jan. 2021, pp. 426–437, doi: 10.36689/uhk/hed/2021-01-043.

[21] A. H. Özkan, "A meta-analysis of the variables related to turnover intention among IT personnel," *Kybernetes*, vol. 51, no. 4, pp. 1584–1600, Mar. 2022, doi: 10.1108/K-02-2021-0098.

[22] L. A. Berger and D. R. Berger, *The Talent Management Handbook*, 3rd ed. New York, NY, USA: McGraw-Hill, 2003.

[23] V. Belle, J. P. Van-Belle, B. Scholtz, K. Njenga, A. Serenko, and P. Palvia, "Should I stay or should I go?–Antecedents of turnover intentions of IT staff in South Africa," in *Proc. Global Inf. Technol. Manage. Assoc. Conf. (GITMA)*, Mexico City, Mexico, 2018, pp. 1–6.

[24] S. Kumar, "The impact of talent management practices on employee turnover and retention intentions," *Global Bus. Organizational Excellence*, vol. 41, no. 2, pp. 21–34, Jan. 2022.

[25] M. B. Mufitha, S. T. Lee, and C. C. Yong, "Is professional commitment the reason for turnover intentions of IT professionals?" *Adv. Bus. Res. Int. J.*, vol. 5, no. 1, pp. 124–143, 2019.

[26] J.-Y. Moon, "Study on the effects of the Korean IT consultants training on the job satisfaction and the employee turnover," *Indian J. Sci. Technol.*, vol. 9, no. 35, pp. 1–9, Sep. 2016.

[27] S. R. Murali and M. Aggarwal, "A study on HR practices and its impact on job satisfaction, organizational commitment and employee turnover in ICT industry in the UAE," *Int. J. Manage. (IJM)*, vol. 11, no. 7, pp. 1061–1073, 2020.

[28] V. Gupta, "Designing and implementing a program to reduce IT professionals' turnover," *Int. J. Innov. Sci. Res. Technol.*, vol. 5, no. 2, pp. 594–610, 2020.

[29] J. Ambrosius, "Strategic talent management in emerging markets and its impact on employee retention: Evidence from Brazilian MNCs," *Thunderbird Int. Bus. Rev.*, vol. 60, no. 1, pp. 53–68, Jan. 2018.

[30] I. Osman, F. Noordin, N. Daud, and M. Z. Othman, "The dynamic role of social exchange and personality in predicting turnover intentions among professional workers," *Proc. Econ. Finance*, vol. 35, pp. 541–552, Jan. 2016.

[31] C. Subramaniam, L. S. Choo, and J. Johari, "What makes employees want to stay? A study in the Malaysian manufacturing sector," *Global Bus. Organizational Excellence*, vol. 38, no. 5, pp. 33–43, Jul. 2019.

[32] P. Sudhakaran and G. Senthilkumar, "An empirical study to analyze the stay aspects versus the voluntary turnover intentions of software professionals in India," *Int. J. Adv. Sci. Res. Manage.*, vol. 2, no. 5, pp. 1–6, 2017.

[33] I.-S. Chen and M. R. Fellenz, "Personal resources and personal demands for work engagement: Evidence from employees in the service industry," *Int. J. Hospitality Manage.*, vol. 90, Sep. 2020, Art. no. 102600.

[34] A. Yousaf, K. Sanders, and Q. Abbas, "Organizational/occupational commitment and organizational/occupational turnover intentions: A happy marriage?" *Personnel Rev.*, vol. 44, no. 4, pp. 470–491, 2015.

[35] D. Brougham and J. Haar, "Technological disruption and employment: The influence on job insecurity and turnover intentions: A multi-country study," *Technol. Forecasting Social Change*, vol. 161, Dec. 2020, Art. no. 120276.

[36] J. Wynen and S. Op de Beeck, "The impact of the financial and economic crisis on turnover intention in the U.S. Federal Government," *Public Personnel Manage.*, vol. 43, no. 4, pp. 565–585, 2014.

[37] S. D. Hussain, A. Khaliq, Q. A. Nisar, A. Z. Kamboh, and S. Ali, "The impact of employees' recognition, rewards and job stress on job performance: Mediating role of perceived organization support," *SEISENSE J. Manage.*, vol. 2, no. 2, pp. 69–82, 2019.

[38] S. Sethunga and I. Perera, "Impact of performance rewards on employee turnover in Sri Lankan IT industry," in *Proc. Moratuwa Eng. Res. Conf. (MERCon)*, May 2018, pp. 114–119.

[39] M. A. Soomro, "Demographics and turnover intentions: Can there be any link?" *Ann. Contemp. Develop. Manage. HR*, vol. 2, no. 3, pp. 9–14, Aug. 2020.

[40] J.-O. Kwon and J.-M. Kang, "The effect of person-evironment fit (person-job fit, person-organization fit, person-supervisor fit) and job embeddedness on turnover intention in clinical nurses,'" *J. Korea Converg. Soc.*, vol. 10, no. 3, pp. 307–317, 2019.

[41] S. Ryan and G. Harden, "Job embeddedness of information technology professionals: The effects of gender," *J. Comput. Inf. Syst.*, vol. 54, no. 4, pp. 52–59, Jun. 2014.

[42] B. D. Emiroğlu, O. Akova, and H. Tanriverdi, "The relationship between turnover intention and demographic factors in hotel businesses: A study at five star hotels in Istanbul," *Proc.-Social Behav. Sci.*, vol. 207, pp. 385–397, Oct. 2015.

[43] A. Boland, G. Cherry, and R. Dickson, *Doing a Systematic Review: A Student's Guide*. New York, NY, USA: SAGE Publications, 2017.

[44] B. Kitchenham, R. Pretorius, and D. Budgen, "Systematic literature reviews in software engineering–A tertiary study," *Inf. Softw. Technol.*, vol. 52, no. 8, pp. 792–805, 2010.

[45] R. Moquin, C. K. Riemenschneider, and R. L. Wakefield, "Psychological contract and turnover intention in the information technology profession," *Inf. Syst. Manage.*, vol. 36, no. 2, pp. 111–125, Apr. 2019.

[46] J. Haridas, R. S. Ture, and A. K. Nayanpally, "Organizational career management and turnover intentions: Mediating role of trust in management," *Eur. J. Training Develop.*, vol. 46, nos. 1–2, pp. 257–275, Jan. 2022, doi: 10.1108/EJTD-09-2020-0136.

[47] Z. Zhang, T. Liu, and Y. Chen, "The impact of work-family interface on turnover intention of IT R&D personnel: A mediator role of psychological contract," in *Proc. IEEE Int. Conf. Ind. Eng. Eng. Manage. (IEEM)*, Dec. 2016, pp. 1737–1741.

[48] K. A. Hoffmaster, J. O. Angeles, I. R. Guzman, and K. W. Cromer, "Job-leisure and work-family conflict: Do they really matter in IT professional turnover?" in *Proc. Comput. People Res. Conf.*, 2020, pp. 107–113.

[49] N. S. Jaharuddin and L. N. Zainol, "The impact of work-life balance on job engagement and turnover intention," *South East Asian J. Manage.*, vol. 13, no. 1, p. 7, Apr. 2019.

[50] R. M. Oosthuizen, M. Coetzee, and Z. Munro, "Work-life balance, job satisfaction and turnover intention amongst information technology employees," *Southern Afr. Bus. Rev.*, vol. 20, no. 1, pp. 446–467, Mar. 2019.

[51] C. A. Gumussoy, "The effect of five-factor model of personality traits on turnover intention among information technology IT professionals," *AJIT-e: Bilişim Teknolojileri Online Dergisi*, vol. 7, no. 22, pp. 7–28, 2016.

[52] X. Zhang, L. Ma, B. Xu, and F. Xu, "How social media usage affects employees' job satisfaction and turnover intention: An empirical study in China," *Inf. Manage.*, vol. 56, no. 6, 2019, Art. no. 103136.

[53] G. Abid, I. Zahra, and A. Ahmed, "Promoting thriving at work and waning turnover intention: A relational perspective," *Future Bus. J.*, vol. 2, no. 2, pp. 127–137, Dec. 2016.

[54] R. E. S. Santos, F. Q. B. da Silva, C. V. C. de Magalhães, and C. V. F. Monteiro, "Building a theory of job rotation in software engineering from an instrumental case study," in *Proc. 38th Int. Conf. Softw. Eng.*, May 2016, pp. 971–981.

[55] W. Liyun and L. Guangyi, "Research on the relationship between IT employee's work pressure, control points and turnover intention," *Can. Social Sci.*, vol. 12, no. 6, pp. 1–6, 2016.

[56] P. Garg and N. Yajurvedi, "Impact of work-life balance practices on employees retention and organizational performance–A study on IT industry," *Indian J. Appl. Res.*, vol. 6, no. 8, pp. 105–108, 2016.

[57] V. Sharma, "Exploring employee retention in IT industry in India: Study based on multi response analysis," *Int. J. Core Eng. Manage.*, vol. 2, no. 12, pp. 86–89, Mar. 2016.

[58] C. Koh and D. Joseph, "Experienced meaningfulness and calling: Effects on IT professionals' retention intention," in *Proc. ACM SIGMIS Conf. Comput. People Res.*, 2016, pp. 97–103.

[59] C. Pflügler, M. Wiesche, and H. Krcmar, "The dual-sided effect of project failure on IT professionals," in *Proc. ACM SIGMIS Conf. Comput. People Res.*, Jun. 2016, pp. 33–37.

[60] J. E. Moore, A. J. Hester, and S. E. Yager, "Paving the higher road: The role of voice in the retention of IT workers," *ACM SIGMIS Database: DATABASE Adv. Inf. Syst.*, vol. 47, no. 1, pp. 8–28, 2016.

[61] R. E. Santos, F. Q. da Silva, and C. V. de Magalhães, "Benefits and limitations of job rotation in software organizations: A systematic literature review," in *Proc. 20th Int. Conf. Eval. Assessment Softw. Eng.*, 2016, pp. 1–12.

[62] M. P. Zylka, "Putting the consequences of IT turnover on the map: A review and call for research," in *Proc. ACM SIGMIS Conf. Comput. People Res.*, 2016, pp. 87–95.

[63] R. Naidoo, "A communicative-tension model of change-induced collective voluntary turnover in IT," *J. Strategic Inf. Syst.*, vol. 25, no. 4, pp. 277–298, Dec. 2016.

[64] P. Haridas, "A study on employee attrition: With special reference to Kerala IT industry," *Int. J. Res. Bus. Manage.*, vol. 4, no. 6, pp. 75–82, 2016.

[65] M. P. Zylka and K. Fischbach, "Turning the spotlight on the consequences of individual IT turnover: A literature review and research agenda," *ACM SIGMIS Database: DATABASE Adv. Inf. Syst.*, vol. 48, no. 2, pp. 52–78, 2017.

[66] J. M. Bass, B. Sarah, M. A. Razzak, and J. Noll, "Employee retention and turnover in global software development: Comparing in-house offshoring and offshore outsourcing," in *Proc. IEEE/ACM 13th Int. Conf. Global Softw. Eng. (ICGSE)*, May/Jun. 2018, pp. 77–86.

[67] M. Hilton and A. Begel, "A study of the organizational dynamics of software teams," in *Proc. 40th Int. Conf. Softw. Eng., Softw. Eng. Pract.*, May 2018, pp. 191–200.

[68] M. J. Thomas, "Impact of work life balance on employee turnover among IT professionals," *ADALYA J.*, vol. 8, no. 10, pp. 1–11, 2019.

[69] B. Prommegger, M. Wiesche, and H. Krcmar, "What makes IT professionals special? A literature review on context-specific theorizing in IT workforce research," in *Proc. Comput. People Res. Conf.*, pp. 81–90, 2020.

[70] B. Prommegger, M. Wendrich, M. Wiesche, and H. Krcmar, "Short-term affair or long-term commitment? An investigation of employees without IT background in IT jobs," in *Proc. Comput. People Res. Conf.*, 2020, pp. 91–98.

[71] S. Sandhya and M. M. Sulphey, "Influence of empowerment, psychological contract and employee engagement on voluntary turnover intentions," *Int. J. Productiv. Perform. Manage.*, vol. 70, no. 2, pp. 325–349, Apr. 2020, doi: 10.1108/IJPPM-04-2019-0189.

[72] J. Billiet, "What does measurement mean in a survey context?" in *The Sage Handbook of Survey Methodology*. New York, NY, USA: SAGE Publications, 2016, ch. 14.

[73] J. F. Hair, L. M. Matthews, R. L. Matthews, and M. Sarstedt, "PLS-SEM or CB-SEM: Updated guidelines on which method to use," *Int. J. Multivariate Data Anal.*, vol. 1, no. 2, pp. 107–123, 2017.

[74] *Women in Tech Statistics: The Hard Truths of an Uphill Battle*. Accessed: Dec. 19, 2021. [Online]. Available: https://www.cio.com/article/201905/women-in-tech-statistics-the-hard-truths-of-an-uphill-battle.html

[75] T.-H. Kim and H. White, "On more robust estimation of skewness and kurtosis," *Finance Res. Lett.*, vol. 1, no. 1, pp. 56–73, Mar. 2004.

[76] S. Solutions, "Pearson's correlation coefficient," *Retrieved February*, vol. 11, p. 20188, Mar. 2018.

[77] N. Kock, "Full latent growth and its use in PLS-SEM: Testing moderating relationships," *Data Anal. Perspect. J.*, vol. 1, no. 1, pp. 1–5, 2020.

[78] J. Pallant, *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*. Evanston, IL, USA: Routledge, 2020.

[79] R. Freeze and R. L. Raschke, "An assessment of formative and reflective constructs in IS research," in *Proc. Eur. Conf. Info. Sys. (ECIS)*, Jan. 2007, pp. 1481–1492.

[80] N. Kock and M. Mayfield, "PLS-based SEM algorithms: The good neighbor assumption, collinearity, and nonlinearity," *Inf. Manage. Bus. Rev.*, vol. 7, no. 2, pp. 113–130, 2015.

[81] M. A. Rahman, T. Abir, D. Yazdani, A. B. A. Hamid, and A. Al Mamun, "Brand image, eWOM, trust and online purchase intention of digital products among Malaysian consumers," *J. Xi'an Univ. Archit. Technol.*, vol. 12, pp. 4935–4946, May 2020.

[82] N. Kock and P. Hadaya, "Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods," *Inf. Syst. J.*, vol. 28, no. 1, pp. 227–261, Jan. 2018.

[83] S. Abu-Bader and T. V. Jones, "Statistical mediation analysis using the Sobel test and Hayes SPSS process macro," *Int. J. Quant. Qualitative Res. Methods*, vol. 9, no. 1, pp. 42–61, Mar. 2021.

[84] U. I. Janjua, T. M. Madni, M. F. Cheema, and A. R. Shahid, "An empirical study to investigate the impact of communication issues in GSD in Pakistan's IT industry," *IEEE Access*, vol. 7, pp. 171648–171672, 2019.

TAHIR MUSTAFA MADNI received the M.S. degree in interactive system engineering from the KTH Royal Institute of Technology, Stockholm, Sweden, and the Ph.D. degree from the Universiti Teknologi PETRONAS, Malaysia. He is currently working as an Assistant Professor with the Department of Computer Science, COMSATS University Islamabad (CUI), Pakistan. The title of research was "Design and evaluation of content-orientation techniques for medical applications using multi-touch tabletop displays." His research has focused on the areas of interactive systems, medical image analysis, ubiquitous computing, and multimodal interfaces.

ABDUL WAHEED received the master's degree in computer science and the Ph.D. degree in computer science from the Department of Information Technology, Hazara University, Mansehra, in 2014 and 2021, respectively. He has completed his Ph.D. research from NetLab-INMC under the School of Electrical and Computer Engineering (ECE), Seoul National University (SNU), South Korea, in 2019, under the HEC Research Program. He is a member of the Crypto-Net Research Group, Hazara University. He also serves as an Assistant Professor with Department of Computer Sciences, and the Dean of the Faculty of Engineering and Information Technology (FEIT), Northern University, Nowshera, Pakistan. He has numerous publications in journals and international conferences. His research interests include information security, secure and smart cryptography, heterogeneous communications within IoT, mobile Adhoc networks (MANETs), wireless sensor networks (WSNs) security, and fuzzy logic-based decision-making theory.

HASSAN FAROOQ received the bachelor's degree in computer science from the NFC Institute of Engineering and Fertilizer Research, Faisalabad, Pakistan. He is currently pursuing the master's degree in computer science with COMSATS University Islamabad, Pakistan. His research interests include employee turnover intention in Pakistan's software and IT industry, project management, and software engineering.

UZAIR IQBAL JANJUA received the Ph.D. degree in information technology from the Universiti Teknologi PETRONAS, Malaysia. He is currently working as an Assistant Professor of computer science with COMSATS University Islamabad, Islamabad, Pakistan. He has more than 12 years of total experience in software industry and academia. He is also a PI and CoPI of a few funded projects. His research has appeared in several reputable international venues. He is also serving as the referee for numerous prestigious journals. His research interests include but are not limited to software engineering, project management, grounded theory, research methodology, and AI and VR.

MAHDI ZAREEI (Senior Member, IEEE) received the M.Sc. degree in a computer network from the University of Science, Malaysia, in 2011, and the Ph.D. degree from the Communication Systems and Networks Research Group, Malaysia-Japan International Institute of Technology, University of Technology, Malaysia, in 2016. In 2017, he joined the School of Engineering and Sciences, Tecnológico de Monterrey, as a Postdoctoral Fellow, where he has been working as a Research Professor, since 2019. His research mainly focuses on wireless sensor and ad hoc networks, energy harvesting sensors, information security, and machine learning. He is a member of the Mexican National Researchers System (level I). He is also serving as an Associate Editor for the IEEE Access and *Ad Hoc & Sensor Wireless Networks* journals.

FAISAL ALANAZI received the B.Sc. degree in electrical engineering (electronics and communication) from KSU and the M.Sc. and Ph.D. degrees in electrical and computer engineering from The Ohio State University, in 2013 and 2018, respectively. He is currently working as an Assistant Professor with PSAU. His research interests include cryptography, vehicular ad-hoc networks, and delay tolerant networks. He is a member of the IEEE Communication Society.

● ● ●