

## SPECIAL ISSUE ARTICLE

# Knowledge management process, infrastructure, and system quality as resilient strategies to respond to COVID-19 pandemic challenges: Evidence from higher educational institutions in India

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## Abstract

The COVID-19 global pandemic has adversely affected educational institutions worldwide, resulting in frequent mandatory lockdowns and social distancing rules. After waiting for a brief period, most organizations, including educational institutions, moved their operations from traditional in-class to virtual, web-based teaching-learning. As a result of unprecedented change, faculty, students, and administrators faced several challenges. However, how the educational institutions were coping with this challenging situation remained an important question. To address this, we present Knowledge Management Process (KMP), Knowledge Management System Infrastructure (KMSINF), and Knowledge Management System Quality (KMSQU) as resilient strategies to convert the challenges into opportunities. Using the KM processes and practices, a complex model is constructed to positively influence employee commitment, performance, and job satisfaction. A survey instrument was used to collect data from 747 faculty members from 14 higher educational institutions in the southern part of India. After testing the measurement properties using the Lisrel package of structural equation modeling, the complex model was tested using Hayes PROCESS macros. The results indicate (i) KMP is positively related to performance and employee commitment, (ii) employee commitment mediates the relationship between KMP and performance, (iii) KMSINF moderates the relationship between KMP and employee commitment, (iv) KMSQU moderates the moderated relationship between KMP and KMSINF in influencing the employee commitment, and (v) performance is positively related to job satisfaction. The results suggest that KM processes, system infrastructure, and system quality are effective, resilient strategies to bring educational institutions to normal functioning during the present global pandemic. The implications for KM, employee commitment, and job satisfaction are discussed.

## 1 | INTRODUCTION

One of the greatest “black swan” events of the present century was coronavirus disease (COVID-19) in December 2019, which turned into

a global pandemic by March 2020 (Sohrabi et al., 2020). As a result of the pandemic, the entire world's social, economic, and business life has come to a standstill. Several countries imposed “lockdowns” to prevent people from getting exposed to the virus (Lonska

et al., 2021). As a result, social distancing and virtual communication have become the order of the day. After a brief lull, leaders of all the nations diverted their resources to fight the invisible enemy. The reduction of economic activity severely affected all the manufacturing and service sectors (retail, banks, educational institutions, real estate, IT, recreation, media, and healthcare) except only “front-line” workers who were fully engaged. The social distancing norms increased the use of the internet and internet-based services for communications and work-from-homes (D'Souza et al., 2022).

The global pandemic has brought paradigmatic changes in the functioning of several organizations, including higher educational institutions worldwide (Ahmed et al., 2020; Apte et al., 2022; Lonska et al., 2021). The employees, faculty (also called knowledge workers), students, and general public had to deal with health challenges imposed by the pandemic and, at the same time, continue to perform their regular activities (Henriksen et al., 2020; Khan, 2021). Hereinafter faculty refers to “*knowledge workers*” who create, acquire, share, and disseminate knowledge among students. Higher educational institutions had to find ways to survive by formulating and implementing resilient strategies for higher educational institutions (Rana et al., 2020; Zieba & Bongiovanni, 2022). One of the biggest challenges educational institutions face during the crisis is to switch from in-class to web-based online education. In developing countries like India, such an immediate change was challenging because of the lack of adequate infrastructure to implement online instructions (Almaiah et al., 2020; Irshad et al., 2021; Usman et al., 2021).

The present study investigates how the higher educational institutions implemented resilient strategies to address the challenges created by the global pandemic and restore normal functioning. As “knowledge” is a strategic asset, “knowledge workers” (Cegarra et al., 2010) and “chief knowledge officers” play an important role in organizations by creating and disseminating knowledge across organizational participants (Cegarra-Navarro et al., 2020). Further, learning in educational institutions is a “knowledge intensive process at both individual and organizational level and integrates knowledge acquiring, knowledge storage, and knowledge creation through conscious effort” (Bratianu et al., 2011: p. 10). Realizing this, the benefits of knowledge management (KM) have been well-documented in the literature; and this study considers the Knowledge Management Process (KMP), Knowledge Management System Infrastructure (KMSINF), and Knowledge Management System Quality (KMSQU) can be used as resilient strategies to face a crisis like the global pandemic. Roughly a decade back, researchers found that KMP was rhetorically employed as an effective strategy in crisis management (Davenport & Prusak, 1998; Jennex & Raman, 2009). Taking a cue from the earlier studies on crisis management, this study argues that creating a culture of knowledge sharing among the employees and developing knowledge infrastructure by encouraging a collaborative climate would negate the ill effects of a global pandemic. One possible consequence is restoring employee commitment, performance, and job satisfaction. In addition, some of the earlier studies documented that KMP helps mitigate emotional exhaustion and stress among employees (Parayitam et al., 2021; Shea et al., 2021).

Since faculty members are considered as knowledge workers and chief knowledge officers, their role in enhancing commitment, performance and satisfaction cannot be underemphasized. In organizations, “knowledge workers are those who not only share information but also make an effective use of knowledge built on this information” (Reinhardt et al., 2011). Applying this definition, faculty members in educational institutions can be considered knowledge workers who help students transform information into relevant knowledge (Bratianu, 2014; Cegarra-Navarro et al., 2020). In organizational settings, the chief knowledge officers strategize to promote KM practices and motivate the employees for superior performance. For example, in a study conducted on the Spanish construction industry, researchers found that openness to new ideas, learning from the environment's demand, and using knowledge in time is essential for corporate success (Cegarra et al., 2010).

Against the backdrop of knowledge workers and chief knowledge officers, it is important to see how the faculty members implement resilient strategies in the present-day COVID-19 crisis. As the global pandemic in developing countries such as India, inadequate infrastructure and unpreparedness to face the crisis may adversely affect productivity and employee commitment and performance, and KMP may be pretty helpful in mitigating such adverse effects (Parayitam et al., 2022). This paper addresses how KMP, KMPINF, and KMPSQ help enhance employee commitment, performance, and job satisfaction. To the best of our knowledge, the studies focusing on the utilization of KM during the global pandemic situation are sparse; we try to bridge the gap by answering the following research questions (RQs):

**RQ1:** How does KMP act as a resilient strategy to enhance performance and employee commitment during the global pandemic?

**RQ2:** How does KMPINF moderate the relationship between KMP and employee commitment?

**RQ3:** How does KMPSQ moderate the moderated relationship between KMP and KMPINF in influencing employee commitment?

The present study makes five significant contributions to KM and employee commitment literature. First, the five components of KMP (knowledge creation, storing, sharing, accessibility, and application) play a vital role in enhancing employee commitment (affective, normative, and continuance) in crises like the global pandemic. Second, the KMSINF strengthens the positive effect of KMP on employee commitment. Third, this study found evidence that KMSQU provides additional support to the positive association of KMP with employee commitment. Fourth, the five components of KMP have an indirect effect on performance through employee commitment. Fifth, the study adds to the growing literature on the positive association between performance and job satisfaction. To sum, the double-layered moderated-mediation model focuses on the role of KMP, KMSINF, and KMSQU, which is the first of its kind to study educational institutions in India, to the best of our knowledge, makes a novel contribution to this study to both works of literature on KM and employee commitment.

The rest of the paper is organized as follows. In the following sub-section, we define the variables in the present study. In Section 2, we provide theoretical background and hypotheses development. Section 3 includes methodology, and Section 4 deals with analysis. Finally, the discussion, theoretical and practical implications, limitations, future research, and conclusion will be presented in Section 5.

## 1.1 | Variables in the present study

The variables in this study are: KMP, KMSINF, KMSQU, employee commitment, performance, and job satisfaction.

The KMP consists of five components: knowledge creation, knowledge storing, knowledge sharing, knowledge accessibility, and knowledge application.

### 1.1.1 | Knowledge creation

Knowledge is created when individuals collect, synthesize, and process the knowledge and develop new ideas and insights (Nonaka, 1994; Vorbeck & Finke, 2001). Using an individual's knowledge becomes the basis for knowledge sharing in organizations.

### 1.1.2 | Knowledge storing

In organizations, knowledge is stored in various forms: written documents, files, electronic databases, organizational procedures, and routines. When new knowledge is created, it must be stored to use in the future whenever required (Vorbeck & Finke, 2001).

### 1.1.3 | Knowledge sharing

One essential component of KMP is knowledge sharing. When knowledge is shared, it gradually progresses to higher levels as the sharing of knowledge moves vertically (Intezari et al., 2017; Nonaka, 1994).

### 1.1.4 | Knowledge accessibility

Accessibility is concerned with the availability of stored knowledge. If organizational participants cannot access the knowledge, the purpose for which the knowledge is stored gets defeated. Therefore, it is imperative to see that the intended users should have access to the knowledge stored (Tiwana, 2000).

### 1.1.5 | Knowledge application

The degree to which individuals apply the knowledge to complete a given task is significant. If the individuals cannot make use of knowledge,

their performance suffers. For example, if an employee is unable to take benefit of software to prepare payroll accounting, the purpose of installing the software becomes redundant. Therefore, the employees need to acquire skills to apply the available knowledge in organizations.

### 1.1.6 | Knowledge Management System Infrastructure

The concept borrowed from the information technology (IT) system, the KMSINF refers to the support provided in terms of networks, computers, web-based technologies, digital media, system software, databases, software tools, and applications (Jarvenpaa & Staples, 2001; Tan & Noor, 2013). Therefore, lack of infrastructure becomes a severe handicap and would not enable the organizational participants to share knowledge.

### 1.1.7 | Knowledge Management System Quality

The quality of information stored, transferred, and shared depends on the system quality (Lin, 2011). The reliability and accuracy of information are necessary for making decisions, and hence KMSQU plays a vital role in enhancing performance (Nelson et al., 2005). In the context of organizations, the functioning of research and development (R&D) departments largely depends on the system quality. In higher educational institutions, high KMSQU is required so that faculty engage in research activities and engage in innovative pedagogy.

### 1.1.8 | Knowledge Management Process

Employee commitment: Employee commitment in the organization has been widely studied in organizational behavior and industrial psychology (Allen & Meyer, 1990; Wang et al., 2020; Xu et al., 2020). As a global concept, employee commitment is defined as a "psychological state that binds the individual to the organization" (Allen & Meyer, 1990, p. 14). Employee commitment is a multi-dimensional construct and is explained in the three-component model (Allen & Meyer, 1990). These components are affective commitment, continuance commitment, and normative commitment.

*Affective commitment* refers to the emotional attachment of an individual toward an organization. According to Allen and Meyer (1990), affective commitment refers to "an affective, emotional attachment to the organization. The strongly committed individual identifies with, is involved in, and enjoys membership in, the organization" (p. 2). Thus, affective commitment reveals an individual's desire to stay in the organization.

*Normative commitment* refers to an individual's moral obligation to stay in an organization. In a sense, normative commitment represents an individual's loyalty to an organization. It also refers to an individual's necessity to remain in the organization.

*Continuance commitment* refers to the costs of leaving the organization and profits related to continued employment (Kanter, 1968;

Meyer et al., 2002). The costs may include the psychological attachment to the present organization foregone if an employee leaves the organization. Thus, continuance commitment reflects an individual's need to remain in the organization.

### 1.1.9 | Performance

The performance of employees is a significant determinant of organizational success. Job performance is a multi-dimensional construct that consists of an employee's set of behaviors that contributes to organizational goals (Campbell & Wiernik, 2015). In this study, we consider task performance and contextual performance (Ramos-Villagrasa et al., 2019).

*Task performance* refers to the “behaviors that contribute to producing a good or providing a service” (Rotundo & Sackett, 2002: p. 67). The task performance includes jobs to be performed, usually in the job description.

*Contextual performance* refers to “behavior that contributes to the organization's goals by contributing to its social and psychological environment” (Rotundo & Sackett, 2002: 67–68). The tasks include those that go beyond specified duties and contribute to the organization. These are also called extra-role behaviors or organizational citizenship behaviors.

### 1.1.10 | Job satisfaction

One widely studied construct in organizational behavior and industrial psychology is job satisfaction (Judge et al., 2001). Job satisfaction refers to a person's positive or negative attitude regarding the work environment and employment (Issam, 2008; Judge et al., 2001). Job satisfaction stems from the type of job an employee is occupied with and the responsibilities related to the job. Job satisfaction is defined as “an agreeable or positive emotional state derived from an evaluation made by a person about his work or his work experience” (Locke, 1976, p. 1300). In this study, we examine how the resilient strategies implemented in organizations positively influence employees' job satisfaction.

## 1.2 | Rationale for the present study: Indian context

Most of the previous studies focused on the importance of KMP on employee commitment, performance, and job satisfaction in the Western context (Argote & Fahrenkopf, 2016; Inkinen, 2016; Judge et al., 2002). Most importantly, the effect of the global pandemic on educational institutions was studied in the context of developed countries in the West, Europe, and Australia (Besser et al., 2020; Caron et al., 2022; Zieba & Bongiovanni, 2022). The studies in the Indian context, especially concerning the challenges faced by educational institutions and the resilient strategies, though some studies were related to employees in the IT industry (Apte et al., 2022). Since the working conditions and culture are different in India, it would be interesting to

examine how KMP, system quality, and infrastructure play a significant role in bringing the higher education system to normalcy after periodical lockdowns and mandatory social distancing norms forcing the faculty and administrators to move to web-based teaching.

## 2 | THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

The theoretical framework for this study comes from KMP, Knowledge Management Practices (Alavi & Leidner, 2001; Lee & Choi, 2003; Nonaka, 1994), and Intellectual Capital Theory (ICT) (Bratianu et al., 2011; Edvinsson & Malone, 1997; Stewart, 1999). The study posits that the KM process, systems, and infrastructure could be used effectively to face the present-day COVID-19 crisis in higher educational institutions. First, changing the work culture from an in-class to an online instructional model requires knowledge sharing and knowledge transfer among the faculty and students. The administrators, faculty, and students were not exposed to web-based teaching in a typical Indian environment characterized by a lack of adequate technology infrastructure and financial resources to implement the web-based instruction overnight. This requires radical adjustment to the changing climate, and knowledge sharing would be pretty helpful to smoothen the process. Second, educational institutions operating under severe budget constraints may find the implementation of high-quality KM systems and operationalization of KMS infrastructure to restore trust among the students in the capability of educational institutions to deliver quality instructions parallel to in-class teaching. Third, as employees are not adequately trained to conduct classes online, the extra-role behaviors exhibited by some employees in sharing the knowledge would enable smooth functioning.

In addition to the KM Practices and KM Processes, the present study considers ICT as a helpful framework that explains the importance of “knowledge assets” as a component of “intellectual capital,” especially in connection with the universities (Bratianu, 2013). The basic tenet of ICT is that “Learning is a knowledge-intensive process at both individual and organizational levels and integrates knowledge acquiring, storage, and creation through conscious effort” (Bratianu et al., 2011: p.10). Knowledge assets are also called “organizational intellectual capital,” and the creation, acquisition, sharing, dissemination, and transfer of knowledge generates value in organizations (Bratianu, 2013; Edvinsson & Malone, 1997; Stewart, 1999). Because of its ability to explain the relationship between KMP, performance, and satisfaction, ICT is considered an essential theoretical framework in this study.

### 2.1 | Hypotheses development

#### 2.1.1 | KMP—Performance relationship

KM process consisting of knowledge creation, storing, sharing, accessibility, and application was positively connected to creativity, innovation, and performance (Andreeva & Kianto, 2011; Lee & Choi, 2003;

Marqués & Simón, 2006; Zack et al., 2009). KMP enables the individuals to share the knowledge created, stored, and accessible when needed, thus improving performance (Inkinen, 2016). Knowledge is considered a “strategic asset,” and the five dimensions of KMP (Alavi & Leidner, 2001) help improve employee performance. By synthesizing and assimilating the existing knowledge, knowledge creation helps develop new ideas and insights (Nonaka, 1994). When that knowledge is stored to make it available for future use (Gray & Fu, 2004) and shared between the employees (Intezari et al., 2017), the benefits of such knowledge can be realized in terms of improved performance. The application of knowledge created, stored, and shared would help the employees increase their performance (Parayitam et al., 2021). Thus, several researchers in the past documented a positive association between KMP and performance both conceptually and empirically (Bhatti et al., 2011). In the present-day context of the global pandemic COVID-19, KMP is expected to enhance employee performance as knowledge sharing helps them meet organizational goals. Based on the available empirical evidence and *logos*, we offer the following hypothesis:

**Hypothesis 1:** *KMP is positively and significantly related to performance.*

### 2.1.2 | KMP—Employee commitment relationship

Through social interaction and effective communication, knowledge sharing in organizations would be enhanced, and extant research reported that knowledge sharing would positively impact employee commitment (Alvesson, 2000; Cabrera & Cabrera, 2005; Song et al., 2006). A recent study conducted on 611 employees in Vietnam found that knowledge acquisition, conversion, and application are positively related to employee commitment (Khoá & Hoa, 2021). Researchers in the past have pointed out that organizations creating a supportive environment for knowledge sharing, transfer, and availability would encourage teamwork among employees and enhance organizational commitment (Benson & Brown, 2007; Gold et al., 2001). Researchers argue that KMP enables organizations to engage in interaction and participation by members and motivates them to learn and acquire knowledge to perform effectively and remain committed to the organization (Yuniawan & Udin, 2020). Some researchers found that KMP increases commitment through enhanced job satisfaction (Najeeb et al., 2018). A positive association between KMP and employee commitment was found (Al-Shanti, 2020). Thus, based on the available empirical evidence and *logos*, we offer the following hypothesis:

**Hypothesis 2:** *KMP is positively and significantly related to employee commitment.*

### 2.1.3 | Employee commitment—Performance relationship

Extant research reported a strong positive relationship between each of the dimensions of employee commitment (affective, normative, and

continuance) (Meyer & Allen, 1991) to employee performance (Chen et al., 2006; Gunlu et al., 2010; Qureshi et al., 2019). The positive relationships between each of the components were significantly related to employee productivity and performance (Dixit & Bhati, 2012; Qaisar et al., 2012; Sinclair et al., 2005; Suliman & Iles, 2000). While most of the studies reported a positive association between the three components and performance, in one study conducted among 329 employees in Turkey, only affective commitment significantly impacted performance (Metin & Asli, 2018). Some of the recent studies provide strong evidence supporting the positive association between three components of employee commitment and performance (Wang et al., 2020; Xu et al., 2020). Based on the above, we offer the following hypothesis:

**Hypothesis 3:** *Employee commitment is positively and significantly related to performance.*

### 2.1.4 | Employee commitment as a mediator

Since knowledge is considered a strategic asset, as we explained before, organizations implement KM processes effectively to enhance worker performance. While the direct effect of KMP on performance is self-explanatory, some researchers argue that the KMP will have an indirect effect on performance through commitment. For instance, in a study conducted among 302 employees in a Taiwanese public utility company, Chiu and Chen (2016) found that employee commitment mediated the relationship between KM capabilities and organizational effectiveness. Another study conducted in Pakistan found that employee commitment acted as a mediator between KM practices and worker performance (Razzaq et al., 2019). Thus, while extant research provided strong empirical support for the direct effect of three dimensions of commitment on performance and job satisfaction (Diamantidis & Chatzoglou, 2019; Nazir & Islam, 2017; Ribeiro et al., 2018), the role of organizational commitment as a mediator between KMP and performance has been understudied. Based on scant empirical evidence but with strong *logos*, we offer the following mediating hypothesis:

**Hypothesis 4:** *Employee commitment mediates the relationship between KMP and performance.*

### 2.1.5 | Performance and job satisfaction relationship

One of the widely studied areas in organizational behavior and applied psychology is the relationship between performance and job satisfaction. An individual's love or enjoyment of their work largely depends on situational and spiritual factors (Keller & Semmer, 2013; Tekingündüz et al., 2015). Job satisfaction depends on several dimensions: wages, work benefits, promotional opportunities, working conditions, the behavior of supervisors, and overall organizational experience (Misener et al., 1996). Job satisfaction has two components: intrinsic (or internal satisfaction)

and extrinsic (external satisfaction). Satisfaction from the result of work in the form of wages and economic rewards results in external satisfaction, whereas the sense of achievement results in intrinsic satisfaction.

Job performance is related to the success of performing the tasks as defined in the job description. Employees are evaluated on how successful they are performing their jobs and rewarded accordingly. Thus, superior performance results in greater rewards, which leads to job satisfaction. However, the relationship between performance and job satisfaction is not straightforward. Researchers in organizational behavior and industrial psychology differ as to which one precedes: whether performance or satisfaction. Judge et al. (2001) examined seven models of the performance-satisfaction relationship and found that some scholars argue that job satisfaction results in performance (e.g., Keaveney & Nelson, 1993; Shore & Martin, 1989), whereas others contend that performance causes job satisfaction (Naylor et al., 1980; Olson & Zanna, 1993). The behavioral scholars from expectancy theory suggest that “good performance leads to rewards which, in turn, lead to job satisfaction” (Lawler & Porter, 1967: p. 23). Extant research earlier conducted has reported a strong and positive relationship between performance and job satisfaction (Brown et al., 1993; Darden et al., 1989; MacKenzie et al., 1998). Some recent studies found a positive association between performance and job satisfaction (Ertekin & Avunduk, 2021; Platis et al., 2015). Based on abundant available empirical evidence, we offer the following hypothesis:

**Hypothesis 5:** *Performance is positively and significantly related to job satisfaction.*

### 2.1.6 | KMSINF as a first moderator

The five components of KMP involve exchanging information about the knowledge, and the ease with which organizational members can store, update, retrieve, and access information depends on the KM system infrastructure (KMSINF) (Hansen et al., 1999). An effective KMSINF enables the employees to interact and collaborate and share their knowledge to achieve the organization's desired goals (Andersen, 1998; Yaacob & Hassan, 2005). An efficient KMSINF in organizations supports communication both horizontally and vertically and thus helps transfer the knowledge and information economically and geographically (Connelly & Kelloway, 2003). A typical KMSINF includes networks, computers, storage, digital media, electronic databases, system software, and applications, which facilitates technical and social connectivity between the members of an organization (Jarvenpaa & Staples, 2001). In the context of universities, such KMSINF is extremely important to share knowledge that fosters research, teaching, and service rendered by the faculty. In this study, we argue that KMSINF increases the strength of the positive relationship between KMP and employee commitment. When employees can communicate effectively, access the knowledge, and share it whenever needed, they become motivated to perform and exhibit commitment. While some scholars have documented the benefits of KMSINF in effective interpersonal communication and enhancing performance,

it would be interesting to explore the moderating effect of KMSINF on employee commitment. Especially during the present global pandemic, KMSINF would enable the faculty in academic institutions to share the stored information that would help successfully perform the teaching, research, and service. Based on the above, we offer the following moderating hypothesis:

**Hypothesis 2a:** *KMSINF moderates the relationship between KMP and employee commitment.*

### 2.1.7 | KMSQU as a second moderator

While the system infrastructure provides a platform for the organizational participants to exchange information through communication, the efficiency and effectiveness depend on the KM system quality. In IT, system quality refers to the accuracy, reliability, and relevance of information available to the employees (Lin, 2011). KMSQU is related to the quality of knowledge created, stored, transferred, and accessible to employees (Nelson et al., 2005). KMSQU is very important for organizations to function effectively and enjoy sustained competitive advantage, as an ineffective system allows only to show suboptimal performance. In higher educational institutions, KMSQU enables the faculty to have access to stored knowledge and helps in knowledge sharing and transfer (Kulkarni et al., 2006). The evidence of positive outcomes of KMSQU on faculty excellence in research-oriented universities suggests that KMP is leveraged to provide accurate and easily accessible knowledge to enhance performance and growth (Alavi & Tiwana, 2002; DeLone & McLean, 2003). If KMSQU is low, organizational knowledge sharing will be limited, and employees may tend to engage in knowledge hoarding and withheld information, thus adversely affecting the performance of others (Lim et al., 2013).

While the previous studies established positive consequences of KMSINF and KMSQU, the moderating effects of the system infrastructure and system quality have not been explored. Therefore, it would be interesting to explore the moderating effect of KMSQU (second moderator) on the relationship between KMP and KMSINF (the first moderator) to influence employee commitment. In this study, we offer the following exploratory double-layered moderation hypothesis (moderated moderated-mediation):

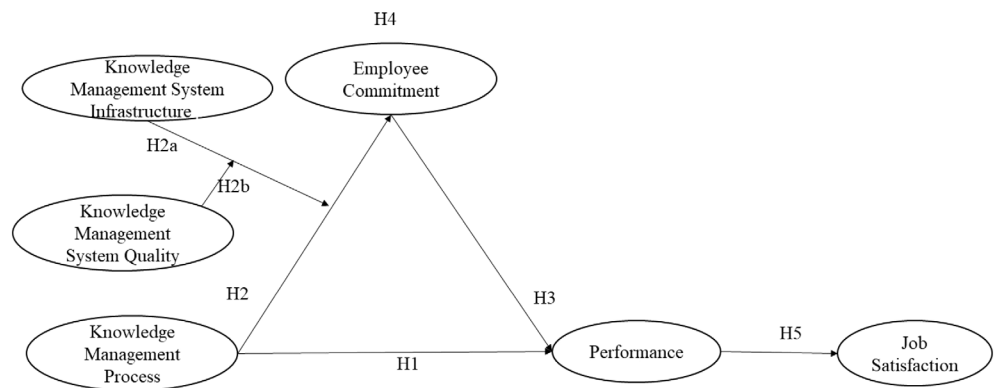
**Hypothesis 2b:** *KMSQU moderates the moderated effect of KMSINF and KMP on employee commitment.*

The conceptual model is presented in Figure 1.

## 3 | METHOD

### 3.1 | Sample and respondents

Since the study context is educational institutions, a structured survey instrument was used to collect data for the faculty and administrators

**FIGURE 1** Conceptual model

from top-ranking colleges affiliated with reputed universities in the southern part of India. We followed a stratified method of sampling. The sampling procedure, therefore, was sequential. First, we selected 14 educational institutions based on the National Institutional Ranking Framework of the Ministry of Education, Government of India (NIRF, 2022). These institutions are located in four cities: Chennai, Tiruchirappalli, Coimbatore, and Virudhunagar. Second, we contacted the heads of the institutions and gathered the information, including e-mails about the faculty members. All the educational institutions were operating remotely because of social distancing problems during the COVID-19 global pandemic. Therefore, we sent the survey instrument through Google Docs. We collected surveys from 747 faculty members. We started data collection in November 2021 and completed it in March 2022. Since Google Docs does not allow the respondents to proceed to the next question unless the answers were given, all the surveys were complete. We checked non-response bias by comparing the first 100 respondents with the last 100 respondents and found no significant differences between these two groups.

The demographic profile of the respondents is presented in Table 1.

### 3.2 | Measures

The constructs were measured on a Likert-type five-point scale (“1” = strongly disagree; “5” = strongly agree). The five components of KMP: knowledge creation (four items), knowledge storing (five items), knowledge sharing (three items), knowledge accessibility (four items), and knowledge application (four items), were measured using the instrument adapted from Muhammed (2006). Affective commitment (five items), normative commitment (five items), and continuance commitment (six items) were measured using the scale adapted from Allen and Meyer (1990). KMSINF (five items) and KMSQU (five items) were measured using the scale adapted from Tan and Noor (2013). Job satisfaction was measured using the six items adapted from Brayfield and Rothe (1951). Finally, the task performance (five items) and contextual performance (eight items) were measured using the scale adapted from (Ramos-Villagrasa et al., 2019).

**TABLE 1** Demographic profile

	Number	Percentage
Gender		
Male	316	42.3
Female	431	57.7
Age (in years)		
Less than 30	140	18.7
30–40	357	47.8
40–50	187	25.0
Above 50	63	8.4
Experience (in years)		
Less than 7	278	37.2
8–14	257	34.4
15–21	123	16.5
22–28	68	9.1
Above 29	21	2.8
Annual income		
Less than Rs. 300,000 (\$4000)	376	50.3
Rs. 300,000–Rs. 600,000 (\$4000–\$8000)	200	26.8
Rs. 600,000–Rs. 900,000 (\$8000–\$12,000)	51	6.8
Rs. 900,000–Rs. 1200,000 (\$12,000–\$16,000)	50	6.7
Above Rs. 1200,000 (\$16,000)	70	9.4

The Appendix consists of Table A1 (showing indicators of all the constructs), Table A2 (showing the second-order latent variables), and Table A3 (showing the comparison of various measurement models).

### 3.3 | Measurement model

It is essential to check the measurement model before testing hypotheses (Anderson & Gerbing, 1988). Accordingly, we performed

confirmatory factor analysis, assessed the constructs' properties in the measurement model, and presented the results of first-order latent variables in Table A1 and second-order latent variables in Table A2 (see Appendix).

The factor loadings of all the 13 constructs were over 0.7; the Cronbach's alpha for all the variables was above 0.7, and the average variance extracted estimate (AVE) for all the variables was over the minimum acceptable level of 0.5, thus establishing reliability (Fornell & Larcker, 1981; Hair et al., 2019). We also compared various models

using the LISREL package of structural equation modeling, and the results were mentioned in Table A3 (see Appendix).

As shown in Table A3, the baseline 13-factor model fit the data well [ $\chi^2 = 5386.21$ ;  $df = 2066$ ;  $\chi^2/df = 2.60$ ; RMSEA = 0.046; CFI = 0.94; RMR = 0.046 Standardized RMR = 0.040; TLI = 0.93; GFI = 0.81]. The comparison of the baseline model with 12 alternative models reveals that the comparative fit index (CFI) for the 13-factor model was 0.94; the root-mean-squared error of approximation (RMSEA) was 0.046 (which is less than the cut off value of 0.08).

**TABLE 2** Descriptive statistics: Means, standard deviations, and zero-order correlations

Variables	Mean	Standard deviation	1	2	3	4	5	6
1. Knowledge Management Process (KMP)	4.03	0.76	<b>0.83</b>					
2. Knowledge Management System Quality (KMSQ)	3.74	0.98	0.64***	<b>0.87</b>				
3. Knowledge Management System Infrastructure (KMSINF)	4.05	0.87	0.71***	0.52***	<b>0.91</b>			
4. Employee commitment	3.77	0.81	0.61***	0.64***	0.48***	<b>0.84</b>		
5. Performance	4.09	0.81	0.73***	0.54***	0.63***	0.64***	<b>0.86</b>	
6. Job satisfaction	3.92	0.88	0.63***	0.58***	0.52***	0.73***	0.71***	<b>0.77</b>

Note: The values in diagonals are the square root of average variance extracted estimate (AVE). Bold values show that the regression coefficients are significant.

\*\*\* $p < 0.001$ .

**TABLE 3** Testing H1, H2, H3, and H4 (mediation hypothesis)

	DV = performance Step 1				DV = employee commitment H2 Step 2				DV = performance Step 3			
	Coeff	se	t	p	Coeff	se	t	p	Coeff	se	t	p
Constant	0.9374	0.0953	9.8340	0.0000	1.2305	0.1172	10.5023	0.0000	0.6376	0.0975	6.5387	0.0000
KMP H1	<b>0.7865</b>	<b>0.0233</b>	<b>33.7432</b>	<b>0.0000</b>	<b>0.6324</b>	<b>0.0286</b>	<b>22.0765</b>	<b>0.0000</b>	0.6324	0.0286	22.0955	0.0000
Employee commitment H3									<b>0.2436</b>	<b>0.0285</b>	<b>8.5609</b>	<b>0.0000</b>
R <sup>2</sup>	0.604				0.395				0.640			
F	1138.60				487.37				661.18			
df1	1				1				2			
df2	745				745				744			
p	0.0000				0.0000				0.0000			
Total effect					Total effect	se	t	p	LLCI	ULCI		
					0.7865	0.0233	33.7432	0.0000	0.7407	0.8322		
Direct effect					Direct effect	se	t	p	LLCI	ULCI		
KMP → Performance					0.6324	0.0286	22.0955	0.0000	0.5762	0.6886		
Bootstrapping indirect effect: H4					Indirect effect	BOOT se	BOOT LLCI	BOOT ULCI				
KMP → Employee commitment → Performance					<b>0.1541 (0.6324 × 0.2436 = 0.1541)</b>	<b>0.0279</b>	<b>0.0986</b>	<b>0.2090</b>				

Note:  $N = 747$ . Boot LLCI refers to the lower bound bootstrapping confidence intervals. Boot ULCL refers to the upper bound bootstrapping confidence intervals. Bold values show that the regression coefficients are significant.

Abbreviations: KMP, Knowledge Management Process; KMSINF, Knowledge Management System Infrastructure; KMSQU, Knowledge Management System Quality.



TABLE 4 Testing of Hypothesis 2a (three-way interaction) (results of moderated mediator-moderated-mediation model)

DV = performance; mediator = employee commitment; moderators: KMSINF (first moderator) and KMSQU (second moderator); IV = KMP												
DV = employee commitment						DV = performance						
	Coeff	se	t	p	LLCI	ULCI	Coeff	se	t	p	LLCI	ULCI
Constant	-0.4557	0.6088	-0.7485	0.4544	-1.6509	0.7395	0.5962	0.1082	5.5103	0.0000	0.3838	0.8086
KMP	0.9124	0.1837	4.9656	0.0000	0.5517	1.2731	0.5802	0.0314	18.4887	0.0000	0.5186	0.6418
KMSINF	0.8225	0.2667	3.0846	0.0021	0.2990	1.3460						
KMSQU	0.4621	0.3377	1.3684	0.1716	-0.2008	1.1250						
KMP × KMSINF H2a	<b>0.2355</b>	<b>0.0646</b>	<b>3.6465</b>	<b>0.0003</b>	<b>0.1087</b>	<b>0.3623</b>						
KMP × KMSQU	-0.0854	0.0800	-1.0675	0.2861	-0.2424	0.0716						
KMSINF × KMSQU	-0.1387	0.0936	-1.4808	0.1391	-0.3225	0.0452						
KMP × KMSINF × KMSQU H2b	<b>0.0439</b>	<b>0.0209</b>	<b>2.1012</b>	<b>0.0360</b>	<b>0.0029</b>	<b>0.0849</b>						
Employee commitment							0.3067	0.0296	10.3475	0.0000	0.2485	0.3649
R <sup>2</sup>	0.464						0.591					
F	91.21						538.45					
df1	7						2					
df2	739						744					
p Value	.0000						.0000					
Index of moderated mediator-moderation												
Index	BOOT SE			BOOT LLCI			BOOT LLCI			BOOT ULCI		
0.0135	0.0064			0.0012			0.0012			0.0264		
Indices of conditional moderated mediation by KMSINF												
KMSQU	Index			BOOT SE			BOOT LLCI			BOOT ULCI		
3.0000 (low)	-0.0318			0.0173			-0.0631			0.0063		
4.0000 (medium)	-0.0184			0.0187			-0.0513			0.0235		
5.0000 (high)	-0.0049			0.0219			-0.0436			0.0440		
Conditional effects of the focal predictor (employee commitment) at values of moderators (KMSINF × KMSQU)												
KMSINF	KMSQU	Effect	se	t	p	LLCI	ULCI					
Low	Low	0.2930	0.0557	5.2593	0.0000	0.1836	0.4024					
Low	Medium	0.3613	0.0592	6.1039	0.0000	0.2451	0.4775					
Low	High	0.4296	0.0851	5.0477	0.0000	0.2625	0.5967					
Medium	Low	0.2152	0.0642	3.3503	0.0008	0.0891	0.3413					
Medium	Medium	0.3164	0.0529	5.9868	0.0000	0.2127	0.4202					
Medium	High	0.4176	0.0746	5.6019	0.0000	0.2713	0.564					

(Continues)

TABLE 4 (Continued)

Conditional effects of the focal predictor (employee commitment) at values of moderators (KMSINF × KMSQU)							
KMSINF	KMSQU	Effect	se	t	p	LLCI	ULCI
High	Low	0.1633	0.0775	2.1075	0.0354	0.0112	0.3154
High	Medium	0.2865	0.0643	4.4524	0.0000	0.1602	0.4128
High	High	0.4097	0.0862	4.7548	0.0000	0.2405	0.5788

Note: Bold values show that the regression coefficients are significant.

These goodness of statistics indicate good fit of the model to the data (Browne & Cudeck, 1993). To sum, these statistics provide evidence of distinctiveness of all 13 constructs.

Since we aggregated the five dimensions of KMP, two dimensions of performance, and three dimensions of employee commitment, we performed second-order latent variables. We presented the factor loadings and AVE in Table A2.

The goodness of fit statistics for the second-order latent variables provide good fit of the data to the model [ $\chi^2 = 3626.57$ ;  $df = 1211$ ; RMSEA = 0.052; CFI = 0.94; NNFI = 0.93; RMR = 0.054; Standardized RMR = 0.048; GFI = 0.822].

### 3.4 | Reliability and validity

Table 2 captures the descriptive statistics: means, standard deviations, and zero-order correlations.

A preliminary analysis of correlations reveals that highest correlation was 0.73 and the lowest correlation was 0.52. Since the correlations were not over 0.75, multicollinearity is not a problem with the data (Tsui et al., 1995). Further, the square root of AVE for all the six variables were greater than the correlations between the variables. For example, the correlation between KMSQ and employee commitment was 0.64 which is less than the square root of AVE (0.87) of KMSQ and (0.84) of employee commitment. As an additional check on multicollinearity, we observed the variance inflation factor (VIF) and found that the VIF values were less than 5, thus suggesting that multicollinearity is not a problem with the data (Hair et al., 2019).

### 3.5 | Common method bias

As common method bias is a potential problem in survey research, it is customary to check for the common method bias. The results showed that a single factor accounted for less than 30% of variance, which is less than the cut-off value of 0.50, suggesting that common method bias is not a problem in this study (Podsakoff et al., 2003). Further, the comparison of the baseline 13 factor model with the single factor model (shown in Table A3) vouches for poor estimate of single factor and good estimate of 13 factors indicate that common method bias is not a problem in this research.

## 4 | HYPOTHESES TESTING

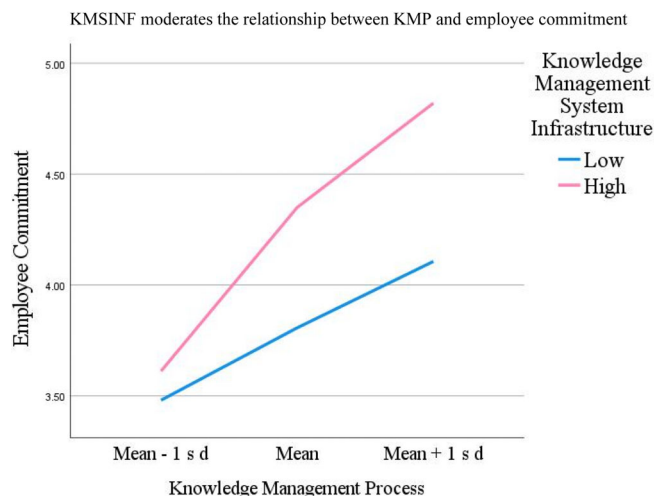
To test Hypotheses 1 through 4, the Hayes (2018) PROCESS macros (model number 4) was used. The results were presented in Table 3.

Hypothesis 1 posits that KMP is positively associated with performance. Step 1 in Table 3 shows that the regression coefficient of KMP on performance was positive and significant ( $\beta = 0.786$ ;  $t = 33.74$ ;  $p < 0.001$ ), thus supporting H1. The regression coefficient of KMP on employee commitment (shown in Step 2 of Table 3) was positive and significant ( $\beta = 0.632$ ;  $t = 22.07$ ;  $p < 0.001$ ), thus supporting

H2. The regression coefficient of employee commitment on performance (shown in Step 3) was positive and significant ( $\beta = 0.243$ ;  $t = 8.756$ ;  $p < .001$ ), thus supporting H3. Checking the mediation hypothesis requires examination of the indirect effect of KMP on performance mediated through employee commitment. The indirect effect of KMP on performance was positive and significant ( $\beta = 0.1541$ ; 95% bias-corrected confidence interval (BCCI) [0.0986; 0.2090]), and

since “zero” was not contained in the BCCI intervals, the mediation hypothesis is supported.

The indirect effect was 0.1541 ( $0.6324 \times 0.2436$ ), and the total effect was direct effect (0.6324) plus the indirect effect (0.1541) [ $0.6324 + 0.1541 = 0.7865$ ]. Thus, the bootstrapping samples of 20,000 thus support the mediation hypothesis (H4) that employee commitment mediates the relationship between KMP and performance.



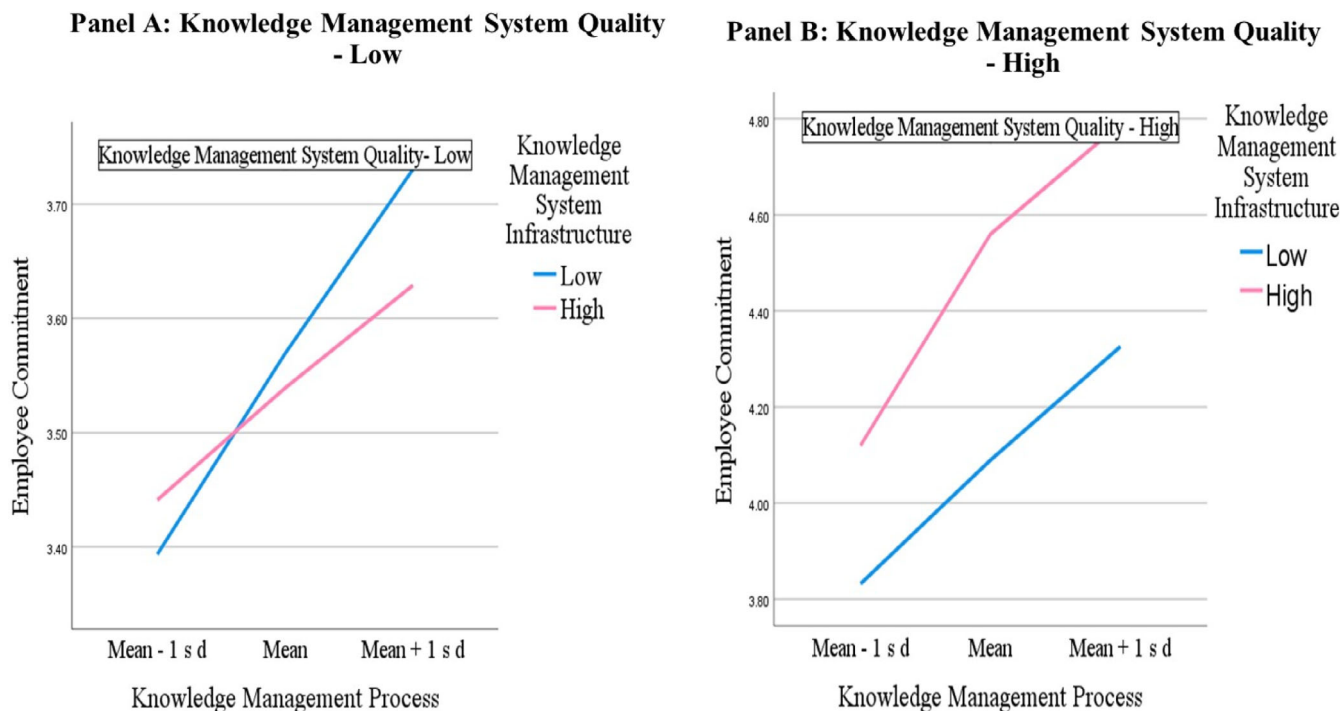
**FIGURE 2** Knowledge Management System Infrastructure moderates the relationship between Knowledge Management Process and employee commitment. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

#### 4.1 | KMSINF as a moderator (H2a)

To test moderation hypothesis (H2a) and moderated-mediation hypothesis (H2b) we used model number 11 of Hayes (2018) PROCESS macros. The results were presented in Table 4.

Following the Model number 11, we entered KMP as an independent variable, performance as a dependent variable, employee commitment as a mediator, KMSINF as a first moderator, and KMSQU as a second moderator, to show the effect of two-way and three-way interactions on employee commitment. The regression coefficient of the two-way interaction term was significant ( $\beta_{KMP \times KMSINF} = 0.235$ ;  $t = 3.646$ ;  $p < 0.01$ ), and bootstrapping samples of 20,000 yielded the BCCI [0.1087; 0.3623], and zero was not contained in the confidence intervals, thus supporting the hypothesis that KMSINF moderates the relationship between KMP and employee commitment. The visual inspection of the interaction plot is presented in Figure 2.

As shown in Figure 2, lower levels of KMP are associated with lower level of employee commitment when KMSINF levels are low when compared to higher levels of KMSINF. Further, as KMP is



**FIGURE 3** Panel A: The relationship between Knowledge Management Process and Knowledge Management System Infrastructure at low levels of Knowledge Management System Quality. Panel B: The relationship between Knowledge Management Process and Knowledge Management System Infrastructure at high levels of Knowledge Management System Quality [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

increasing from low to high levels, there is steep increase in the employee commitment at higher levels of KMSINF than at lower levels of KMSINF. These results corroborate the moderation Hypothesis 2a.

The regression coefficient of the three-way interaction, as hypothesized in 2b, was significant ( $\beta_{\text{KMP} \times \text{KMSINF} \times \text{KMSQU}} = 0.044$ ;  $t = 2.101$ ;  $p < 0.05$ ), and bootstrapping samples of 20,000 yielded the BCCI [0.0029; 0.0849], and zero was not contained in the confidence intervals, thus supporting the moderated moderated-mediation hypothesis that KMSQU moderated the moderated relationship between KMP and KMSINF influencing the employee commitment. The index of moderated moderated-mediation was 0.0135 (Boot SE = 0.0064; Boot LLCI = 0.0012; Boot ULCI = 0.0264), and the conditional effects of the focal predictor (employee commitment) at different values of the moderators presented in the bottom of the Table 4 render support to H2b. The visual inspection of the interaction plot is presented in Figure 3.

Figure 3 shows the moderation effect of KMSQU at low and high values. The Panel A shows the moderating effect of KMSINF and KMP on employee commitment at lower levels of KMSQU. As can be seen in Panel A, lower levels of KMP are associated with lower levels of employee commitment when KMSINF is low than when KMSINF is high. When we observe Panel B, which shows the interaction effect of KMP and KMSINF at higher levels of KMSQU, there is significant difference between the lines, exhibiting a stronger positive

relationship between KMP and higher values of KMSINF than at lower values of KMSINF. These results corroborate the moderation Hypothesis 2b.

## 4.2 | Testing the H5

Hypothesis 5 posit that performance leads to job satisfaction. Since the model shows that performance is a mediator between KMP and job satisfaction, to test H5, we used model number 4 of Hayes (2018) and presented the results in Table 5.

In Step 3 of Table 5, we can see that the regression coefficient of performance on job satisfaction was positive and significant ( $\beta = 0.520$ ;  $t = 12.24$ ;  $p < .001$ ), thus supporting H5. Though we did not hypothesize that performance mediates the relationship between KMP and job satisfaction, the indirect effect of KMP  $\rightarrow$  performance  $\rightarrow$  job satisfaction was 0.4094 and significant (Boot SE = 0.0461; Boot LLCI = 0.3133; Boot ULCI = 0.4940).

## 5 | DISCUSSION

This study is aimed at unraveling the resilient strategies employed by educational institutions during the present global pandemic. Riding on

**TABLE 5** Testing H5

	DV = job satisfaction Step 1				DV = performance Step 2				DV = job satisfaction Step 3			
	Coeff	se	t	p	Coeff	se	t	p	Coeff	se	t	p
Constant	1.0020	0.1212	8.2676	0.0000	0.9374	0.0953	9.8340	0.0000	0.5140	0.1176	4.3704	0.0000
KMP	0.7281	0.0296	24.5697	0.0000	0.7865	0.0233	33.7432	0.0000	0.3187	0.0430	7.4077	0.0000
Performance <b>H5</b>									<b>0.5206</b>	<b>0.0425</b>	<b>12.2416</b>	<b>0.0000</b>
R <sup>2</sup>	0.447				0.604				0.540			
F	603.66				1138.60				437.07			
df1	1				1				2			
df2	745				745				744			
p	.0000				.0000				.0000			
Total effect					Total effect	se	t	p	LLCI	ULCI		
					0.7281	0.0296	24.5697	0.0000	0.6699	0.7862		
Direct effect					Direct effect	se	t	p	LLCI	ULCI		
KMP $\rightarrow$ Performance					0.3187	0.0430	7.4077	0.0000	0.2342	0.4031		
Bootstrapping indirect effect:					Indirect effect	BOOT se	BOOT LLCI	BOOT ULCI				
KMP $\rightarrow$ Performance $\rightarrow$ Job satisfaction	0.4094 (0.7865 $\times$ 0.5206 = 0.4094)				0.0461	0.3133	0.4940					

Note:  $N = 747$ . Boot LLCI refers to the lower bound bootstrapping confidence intervals. Boot ULCL refers to the upper bound bootstrapping confidence intervals. Bold values show that the regression coefficients are significant.

Abbreviations: KMP, Knowledge Management Process; KMSINF, Knowledge Management System Infrastructure; KMSQU, Knowledge Management System Quality.

the KM processes, infrastructure, and systems, a conceptual model is developed and tested to show how the employee commitment, performance and satisfaction are enhanced in higher educational institutions. We have highlighted the importance of KMP, system quality, infrastructure as important variables that help alleviate the ill-effects of global pandemic on the faculty when they moved to web-based instructions.

First, the results of this study indicate KMP is positively and significantly associated with performance of employees (Hypothesis 1), the finding consistent with the other studies in the literature (Marqués & Simón, 2006; Parayitam et al., 2021; Zack et al., 2009). Second, the findings indicate the positive association of KMP with employee commitment (Hypothesis 2), and these results suggest that the five dimensions of KMP have positive effect on three dimensions of commitment. These results are consistent with the findings from the past studies (Gold et al., 2001; Khoa & Hoa, 2021; Yuniawan & Udin, 2020).

Third, the results provide strong evidence in support of positive impact of employee commitment on performance (Hypothesis 3), which is consistent with the past studies in the literature on employee commitment (Chen et al., 2006; Qureshi et al., 2019; Wang et al., 2020). Fourth, this study reports that the KMP, in addition to direct effect, has indirect effect through employee commitment (Hypothesis 3). Though positive relationship between employee commitment and performance has been documented by previous researchers, this study goes one step further to support mediation hypothesis.

Fourth, this study provided strong evidence that KMSINF moderated the relationship between KMP and employee commitment (Hypothesis 2a). Though there were no previous studies to vouch for this relationship, the direct effects of system infrastructure help explain this moderation effect. Fifth, in addition to KMSINF, the study reported double moderation effect of KMSQU on employee commitment (Hypothesis 2b). This three-way interaction was not studied by previous researchers and hence to vouch for this result we rely on the direct relationships. Finally, the positive association between performance and job satisfaction (Hypothesis 5) found support in this study. This is in line with the vast literature on performance-satisfaction relationship. However, since this study was conducted during the global pandemic, the results reveal that KMP, infrastructure, system quality act to facilitate the employee commitment, performance, and satisfaction.

## 5.1 | Theoretical implications and contributions

The findings from this study have significant implications for KM theory and practice. First, beyond the empirical results, the first significant contribution of this research is our approach to understanding the consequences of global pandemic on commitment, performance, and satisfaction in educational institutions. The fundamental mechanism before scholars in organizational behavior and industrial psychology is to identify the resilient strategies to avert the negative consequences of pandemic. This research found that knowledge

sharing, accessibility, and application pave way for increasing the task and contextual performance, by enhancing the employee commitment. Following recommendations of early scholars that in crisis situations KMP need to be used as a resilient strategy in today's global pandemic scenarios. Second, this study underscores the importance of implementing KMSINF to enable the faculty to share the knowledge among themselves. As most of the faculty in Indian subcontinent are not exposed to web-based teaching, only some members who are tech-savvy may have full knowledge of hybrid method of teaching. Moreover, the younger faculty are fast learners and would be able to help others, which comes under the contextual performance. Third important contribution of this study is the recognition of the importance of KMSQU so that the information shared and transferred is of high quality. Sometimes, the universities may have embedded infrastructure but lack the quality of the system, which hampers the performance. Anecdotal evidences and available scant research reveal that low network connections, inability to deliver instructions through online have resulted in student dissatisfaction (Gopal et al., 2021). This study documented that by maintaining system quality, the positive association between KMP and employee commitment gets strengthened, which ultimately leads to superior performance and job satisfaction.

The third key contribution of this research is the support for the multi-layered moderated mediation, which is a novel concept, which has not been explored by previous researchers. The sudden shift to online teaching without giving enough time has resulted in growing tension in all the sectors, including the educational sector, and before it adversely affects employee commitment, educational institutions found it useful to incorporate KMP as a resilient strategy. The support from top management of these institutions, responding to the growing demands and challenges created by pandemic, has resulted in utilization of knowledge sharing and transfer for successful completion of semesters after prolonged lockdowns for the last 2 years. Faculty who are not used to Google meet and Zoom find it challenging to adjust to the pedagogic tools. The only plausible solution is to ease from the technostress is to create a climate of knowledge transfer among the faculty members. In some respects, the organizational citizenship behavior, which is reflected in the contextual performance, has helped the faculty to overcome the stress and see that the commitment is not adversely affected. Overall, this study found that to maintain equilibrium, employees need to leverage their skills and competencies and energize colleagues for the benefit of organization.

## 5.2 | Limitations and future research

The results from the present study should be interpreted in light of some limitations. First, common method bias, which is inherent any survey research could be a potential problem. However, we dealt with this problem by following the recommendations of Podsakoff et al. (2003), and explained about it in the analysis section. Second, since the survey involved collection of data from the respondents, there is a chance that the data may be infected by social desirability bias.

However, as advocated by some researchers, we followed the social desirability bias by assuring the respondents about the anonymity of the data (Holden & Passey, 2009). Third limitation is that we focused only on the faculty in higher educational institutions. The students' perception about the effectiveness of instructional change has not been studied. Fourth, the sample is from southern part of India, which may not rise the problem of generalizability because all the higher educational institutions are governed by University Grants Commission, the premier apex body at the national level. However, the nature and experience of the effect of global pandemic on educational institutions in developed countries is radically different, apart from the cultural differences. Therefore, the results may not be generalizable across developed countries.

This research provides several avenues for future research. First, the conceptual model developed and tested in this research can be applied to different sectors, including IT, healthcare, automobile, and manufacturing industries. Since the KMP, infrastructure, system quality plays a vital role, irrespective of the sectors, it is more likely that the results would be applicable in other sectors. Second, the future researchers can focus on a cross-country studies to see if any cultural differences factor into the relationships. Third, additional variables such as social support, support from administrative staff, trust among the faculty members, leadership styles—transactional and transformational, can be included to see counter the adverse effects of crisis situations that may have on employee commitment, performance, and job satisfaction.

## 6 | CONCLUSION

Based on the KM Process, Practices, and intellectual capital theories, the present study demonstrated that organizations could bounce back from adverse situations imposed by crises such as the COVID-19 pandemic by employing resilient strategies. In this study, we considered educational institutions as the focus. We highlighted the importance of KMP, KMSINF, and KMSQU as the crucial variables, but the results apply to any organization. Since the role of knowledge workers and chief knowledge officers is recognized in organizational settings to enhance productivity, performance, commitment, and satisfaction, it is crucial to understand the significance of implementing the appropriate resilient strategies to manage crises situations such as the global pandemic. By developing a multi-layered complex model, we have specified boundary conditions where the combined effects of KMP, infrastructure, and system quality for enhancing employee commitment, performance, and satisfaction. In addition to the variables studied in this exploratory model, we conclude that leadership styles, emotional intelligence, and interpersonal trust in moving the research forward and finding other ways of enhancing performance and satisfaction. While the global pandemic has created challenges, it also created an opportunity of finding alternative ways of functioning without hampering the performance. As the worldwide pandemic continues and the work-from-home has become a norm rather than an exception, web-based teaching has provided an opportunity for educational

institutions in developing countries. Eventually, organizations get prepared for such crises with adequate infrastructure and system quality in force.

## DATA AVAILABILITY STATEMENT

Data would be available upon request.

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## APPENDIX A

TABLE A1 Results of confirmatory factor analysis and measurement properties (first order latent variables)

Variables and the sources of measures	Alpha	Standardized loadings ( $\lambda_{yl}$ )	Reliability ( $\lambda^2_{yl}$ )	Variance ( $\text{Var}(\epsilon_i)$ )	Variance-extracted estimate $\Sigma(\lambda^2_{yl})/[\lambda^2_{yl} + \text{Var}(\epsilon_i)]$
Knowledge creation (Muhammed, 2006).	0.86				0.78
I have created new knowledge by interacting with others.		0.85	0.71	0.29	
I have created new knowledge by expressing what I knew.		0.89	0.80	0.20	
I have created new knowledge by applying my knowledge.		0.89	0.80	0.20	
I have created new knowledge by combining information that I collected		0.89	0.79	0.21	
Knowledge storing (Muhammed, 2006).	0.89				0.78
I have stored new knowledge that I created.		0.88	0.77	0.23	
I have stored new information whenever I received it.		0.89	0.80	0.20	
I have stored new information whenever I used it.		0.90	0.80	0.20	
I have retained information in computers/files/or my memory		0.88	0.77	0.23	
I have retained my new ideas in computers/files/or my memory		0.88	0.77	0.23	
Knowledge sharing (Muhammed, 2006).	0.85				0.83
I have shared my best practices.		0.90	0.82	0.18	
I have shared the information that I used.		0.92	0.85	0.15	
I have shared the information that I have gained from elsewhere.		0.91	0.82	0.18	
Knowledge accessibility (Muhammed, 2006).	0.88				0.74
I have accessed needed information with ease.		0.84	0.70	0.30	
I have retrieved information that I have stored.		0.88	0.77	0.23	
I was able to recall the required information with ease.		0.89	0.79	0.21	
I could remember things easily.		0.84	0.70	0.30	
Knowledge application (Muhammed, 2006).	0.90				0.81
I have implemented my ideas in my job.		0.89	0.79	0.21	
I have applied my knowledge in my job.		0.91	0.83	0.17	
I have applied new information I received in my work.		0.91	0.83	0.17	
I have implemented the best practices that I developed.		0.90	0.80	0.20	
Knowledge Management System Quality (KMSQU) (Tan & Noor, 2013)	0.89				0.77
The knowledge provided by the knowledge management system at my institution is relevant to my research work		0.89	0.80	0.20	
The knowledge provided by the knowledge management system at my institution is accurate.		0.91	0.83	0.17	
The knowledge provided by the knowledge management system at my institution is always up-to-date.		0.90	0.81	0.19	

TABLE A1 (Continued)

Variables and the sources of measures	Alpha	Standardized loadings ( $\lambda_{yi}$ )	Reliability ( $\lambda_{yi}^2$ )	Variance ( $\text{Var}(\epsilon_i)$ )	Variance-extracted estimate $\Sigma (\lambda_{yi}^2) / (\lambda_{yi}^2 + \text{Var}(\epsilon_i))$
The operation of the knowledge management system at my institution is dependable		0.80	0.64	0.36	
The knowledge management system at my institution makes knowledge easy to access		0.89	0.79	0.21	
Knowledge Management System Infrastructure (Tan & Noor, 2013)	0.92				0.83
My institution uses a knowledge management system that allows academic faculty to collaborate with each other		0.90	0.81	0.19	
My institution uses a knowledge management system that allows academic faculty to communicate with each other		0.92	0.84	0.16	
My institution uses a knowledge management system that allows academic faculty to search for necessary knowledge		0.93	0.86	0.14	
My institution uses a knowledge management system that allows academic faculty to access necessary knowledge		0.93	0.86	0.14	
My institution uses a knowledge management system that allows academic faculty to store specific types of knowledge that include explicit knowledge (e.g., documents) and tacit knowledge (e.g., personal/experience-based knowledge)		0.88	0.77	0.23	
Affective Commitment (Allen & Meyer, 1990)	0.87				0.74
I would be very happy to spend the rest of my career in this institution.		0.82	0.67	0.33	
I feel as if this institution's problems are my own.		0.80	0.64	0.36	
I feel like "part of my family" at this institution.		0.88	0.77	0.23	
I feel "emotionally attached" to this institution.		0.88	0.77	0.23	
This institution has a great deal of personal meaning for me.		0.89	0.78	0.22	
Continuance Commitment (Allen & Meyer, 1990)	0.84				0.60
It would be very hard for me to leave my job at this institution right now even if I wanted to		0.72	0.51	0.49	
Too much of my life would be disrupted if I leave my institution		0.80	0.64	0.36	
Right now, staying with my job at this institution is a matter of necessity as much as desire.		0.80	0.64	0.36	
I believe I have too few options to consider leaving this institution.		0.79	0.62	0.38	
One of the few negative consequences of leaving my job at this institution would be the scarcity of available alternatives elsewhere.		0.73	0.54	0.46	
One of the major reasons I continue to work for this institution is that leaving would require considerable personal sacrifice.		0.80	0.64	0.36	
Normative Commitment (Allen & Meyer, 1990)	0.85				0.63

(Continues)

TABLE A1 (Continued)

Variables and the sources of measures	Alpha	Standardized loadings ( $\lambda_{yi}$ )	Reliability ( $\lambda^2_{yi}$ )	Variance ( $\text{Var}(\epsilon_i)$ )	Variance-extracted estimate $\Sigma(\lambda^2_{yi})/[\lambda^2_{yi} + \text{Var}(\epsilon_i)]$
I feel no obligation to remain with my institution.		0.71	0.50	0.50	
Even if it were to my advantage, I do not feel it would be right to leave.		0.73	0.53	0.47	
I would feel guilty if I left this institution now.		0.78	0.61	0.39	
This institution deserves my loyalty.		0.86	0.74	0.26	
I would not leave my institution right now because of my sense of obligation to it.		0.84	0.71	0.29	
I owe a great deal to this institution.		0.84	0.71	0.29	
<b>Task Performance (Ramos-Villagrasa et al., 2019)</b>	<b>0.90</b>				<b>0.79</b>
I managed to plan my work so that I finished it on time		0.87	0.76	0.24	
I kept in mind the work result I needed to achieve		0.88	0.78	0.22	
I was able to set priorities		0.90	0.80	0.20	
I was able to carry out my work efficiently		0.91	0.83	0.17	
I managed my time well		0.89	0.79	0.21	
<b>Contextual Performance (Ramos-Villagrasa et al., 2019)</b>	<b>0.91</b>				<b>0.77</b>
On my initiative, I started new tasks when my old tasks were completed		0.84	0.71	0.29	
I took on challenging tasks when they were available		0.87	0.76	0.24	
I worked on keeping my job-related knowledge up-to-date		0.88	0.77	0.23	
I worked on keeping my work skills up-to-date		0.90	0.80	0.20	
I came up with creative solutions for new problems		0.88	0.77	0.23	
I took on extra responsibilities		0.89	0.79	0.21	
I continually sought new challenges in my work		0.88	0.78	0.22	
I actively participated in meetings and/or consultations		0.87	0.75	0.25	
<b>Job satisfaction (Brayfield &amp; Rothe, 1951)</b>	<b>0.84</b>				<b>0.59</b>
I find real enjoyment in my job		0.85	0.73	0.27	
I like my job better than the average worker does		0.88	0.77	0.23	
I am seldom bored with my job		0.45	0.20	0.80	
I would not consider taking another job		0.68	0.47	0.53	
Most days I am enthusiastic about my job		0.86	0.74	0.26	
I feel fairly well satisfied with my job		0.81	0.66	0.34	

TABLE A2 Results of confirmatory factor analysis and measurement properties (second order latent variables)

Variable	Alpha	Standardized loadings ( $\lambda_{yi}$ )	Reliability ( $\lambda^2_{yi}$ )	Variance ( $\text{Var}(\epsilon_i)$ )	Variance-extracted estimate $\Sigma(\lambda^2_{yi})/[\lambda^2_{yi} + (\text{Var}(\epsilon_i))]$
Knowledge Management Process (KMP)	0.88				0.70
Knowledge creation		0.87	0.76	0.24	
Knowledge storing		0.86	0.74	0.26	
Knowledge sharing		0.87	0.76	0.24	
Knowledge accessibility		0.76	0.58	0.42	
Knowledge application		0.81	0.66	0.34	
Employee Commitment	0.87				0.71
Affective commitment		0.86	0.74	0.26	
Continuance commitment		0.74	0.55	0.45	
Normative commitment		0.91	0.83	0.17	
Performance	0.81				0.75
Task performance		0.86	0.74	0.26	
Contextual performance		0.87	0.76	0.24	

TABLE A3 Comparison of measurement models

Model	Factors	$\chi^2$	df	$\Delta\chi^2$	RMSEA	RMR	Standardized RMR	CFI	TLI = NNFI	GFI
Null		55869.75	2211							
Baseline model	Thirteen factors: KMSINF, KSMQ, KCR, KST, KSH, KAC, KAP, AFC, COC, NOC, SAT, TPE, CPE	5386.21	2066		0.046	0.0467	0.0394	0.94	0.93	0.81
Model 1	Twelve factor model: KMSINF + KMSQU, KCR, KST, KSH, KAC, KAP, AFC, OC, NOC, SAT, TPE, CPE	6257.87	2078	871.66*	0.052	0.0480	0.0410	0.92	0.91	0.72
Model 2	Eleven factor model: KMSINF + KMSQU + KCR, KST, KSH, KAC, KAP, AFC, COC, NOC, SAT, TPE, CPE	8274.55	2089	2888.34*	0.063	0.073	0.070	0.88	0.87	0.69
Model 3	Ten factor model: KMSINF + KMSQU + KCR + KST, KSH, KAC, KAP, AFC, COC, NOC, SAT, TPE, CPE	10427.61	2099	5041.4*	0.072	0.070	0.065	0.84	0.83	0.56
Model 4	Nine factor model: KMSINF + KMSQU + KCR + KST + KSH, KAC, KAP, AFC, COC, NOC, SAT, TPE, CPE	11455.87	2108	6069.66*	0.077	0.068	0.060	0.82	0.81	0.54
Model 5	Eight factor model: KMMINF + KMSQU + KCR + KST + KSH + KAC, KAP, AFC, COC, NOC, SAT, TPE, CPE	12114.29	2116	6728.08*	0.079	0.071	0.61	0.81	0.80	0.53
Model 6	Seven factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP, AFC, COC, NOC, SAT, TPE, CPE	13269.97	2123	7883.76*	0.083	0.074	0.064	0.79	0.78	0.52
Model 7	Six factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC, COC, NOC, SAT, TPE, CPE	15755.55	2129	10369.34*	0.092	0.087	0.076	0.75	0.74	0.46
Model 8	Five factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC + COC, NOC, SAT, TPE, CPE	17581.49	2134	12195.28*	0.098	0.097	0.082	0.71	0.70	.43
Model 9	Four factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC + COC + NOC, SAT, TPE, CPE	18949.68	2138	13563.47*	0.103	0.098	0.084	0.69	0.68	.39
Model 10	Three factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC + COC + NOC + SAT, TPE, CPE	19926.77	2141	14540.56*	0.105	0.099	0.085	0.67	0.66	0.37
Model 11	Two factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC + COC + NOC + SAT + TPE, CPE	21940.37	2143	16554.16*	0.111	0.103	0.089	0.63	0.62	0.35
Model 12	One factor model: KMSINF + KMSQU + KCR + KST + KSH + KAC + KAP + AFC + COC + NOC + SAT + TPE + CPE	24228.83	2144	18842.62*	0.117	0.107	0.092	0.59	0.58	0.32

Abbreviations: AFC, affective commitment; COC, continuance commitment; CPE, contextual performance; KAC, knowledge accessibility; KAP, knowledge application; KCR, knowledge creation; KMSINF, Knowledge Management System Infrastructure; KMSQU, Knowledge Management System Quality; KSH, knowledge sharing; KST, knowledge storing; NOC, normative commitment; SAT, job satisfaction; TPE, task performance.

\* $p < 0.01$ .