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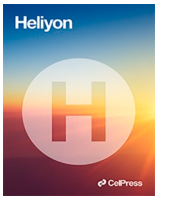

Research article

Exploring how enterprise social media usage affects employee creativity: Based on self-determination theory

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ABSTRACT

The present research sheds light on how ESM (Enterprise Social media) usage (social, work) affects employee creativity through primary psychological standards (perceived relatedness, autonomy, and competence). Drawing on self-determination theory (SDT), current research also examines the mediating mechanism of basic psychological needs. Applying structural equation modeling (SEM), 415 samples were analyzed on AMSO 24.0 version. The results illustrated that social, and work-related ESM usage has a significant impact on basic psychological needs. Further, results revealed that perceived relatedness and competence are significant predictors of employee creativity. However, perceived autonomy has an insignificant effect on individual creativity. The present research also analyzed the mediating mechanism of basic psychological needs. Findings confirmed that perceived relatedness and competence mediate the connection between social, work-oriented ESM usage and individual creativity; whereas perceived autonomy did not mediate the link between social, work-oriented ESM usage and employee creativity. This study also has several implications in theory and practice.

1. Introduction

Employee creativity is recognized as the emergence of original and creative ideas in organizations relating to goods, services, practices, or techniques [1,2]. Creativity also plays a curical role in the continued existence and performance of organizations [3]. Prior scholars have considered employee creativity as an outcome of individual characteristics, and environmental factors [4,5]. The majority of organizations concentrate greatly on worker creativity for competitive advantages and effectiveness [1,6]. Considering the significance of employee creativity for companies, scholars in relevant disciplines have examined how to promote such creativity. In the digital era of technology, the explosive development of technological innovation presents possibilities for organizations and their internal workers [7,8]. ESM presents workers with a web-based service that promotes interaction, exchange of documents, and cooperative editing [9,10]. The potential benefits of ESM deployment are extensively recognized including increased information sharing [11], frequent communication [12], promoted social networks [13], and cross-border cooperation, and increased employee creativity [4,14]. Numerous companies are currently using several ESM tools including “Microsoft Yammer”, “IBM Connections”, and “DingTalk” to optimize productivity in operations [15]. For example, the DingTalk is one of the most popular ESM platforms, with over 100 million users and 700 million business users (Krancher et al., 2018; Mo and Yu, 2017). The DingTalk includes several corporate functionalities such as “DING” attendance systems, file sharing, calendars, and cloud-based services. Plenty of organizations have

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utilised DingTalk to improve workers communication and cooperation, particularly on a worldwide scale. DingTalk allows employees to interact and cooperate without regard for time or place (Mo and Yu, 2017). Present scholarship on the connection between ESM and employee creativity mainly focuses on its influence via the lens of ESM usage, which is defined as the extent to which ESM is used for interpersonal interaction and information exchange [1,16]. This type of approach conceals disparities in how individuals use ESM and, consequently the variations in the impact of ESM use on creativity. It is feasible that ESM usage differently by employees in distinct organizations or in same organizations. As a result, distinct approaches to employing ESM in assessing employee creativity must be differentiated.

Furthermore, earlier researchers investigated the impact of ESM use on individual job performance using an array of theories. For example, Zhu, Sun [7] based on visibility theory examined the link between social network ties and workers' agility performance. Yin, Wang [6] discussed ESM usage and job autonomy in the context of information processing theory. Deng and Zhu [1] applied self-regularization theory and investigated the association between ESM usage and creativity. Nevertheless, SDT has received less scholarly attention. In line with SDT, human beings have three primary psychological necessities (autonomy, relatedness, and competence), which represent the need of individuals to make decisions on their psychological needs [17], communicate and support one another [15], and productively produce creative ideas. Prior research has shown that when an individual's three fundamental psychological needs are addressed, individual behavior intentions become active and result in a sequence of positive job outcomes [15, 18]. In addition, previous scholars also believed that intrinsic motivation, emotional, psychological support, and a positive social environment are critical for individuals' innovation and positive attitude [19–21]. Scholars have also recognized the critical role of psychological conditions including psychological safety, meaningfulness, and availability in strengthening employee outcomes [20, 22]; nevertheless, the role of the three fundamental psychological requirements of individual have not been taken into consideration. Specifically, role of the primary psychological necessities are critical since these psychological needs not only elevate worker creativity but also linked to individual's optimal performance. In this environment, use of digital technologies like ESM can be useful because ESM provides assistance and possibilities for workers to address their basic psychological requirements [20], leading to positive results. Despite this, prior studies have not investigated the connection between ESM usage and psychological demands. Considering ESM usage has become more prevalent for work across organizations and promotes the exchange of knowledge and human development, it is worthwhile to discover the significance of ESM usage in promoting worker creativity through employees' basic psychological needs.

Addressing the gaps in previous studies, the present study intends to examine the specific impact of social, work-related ESM usage on worker creativity through three psychological requirements (need for competence, autonomy, and relatedness). Furthermore, we explore the role of competence, relatedness, and autonomy as mediating factors in the relationship between social, and work-related ESM usage and employee creativity. In theory, the outcomes of this study could assist in clarifying the underlying process that connects social, work-oriented ESM usage and worker creativity through psychological demands. Specifically, by using SDT in the area of ESM and employee creativity, the present research efficiently broadens the causes and results of employee fundamental psychological needs satisfaction. Recognizing such a process is crucial for managers to fine-tune their ESM approach and elevate employee ESM adoption. The theoretical framework of the study is represented in Fig. 1.

2. Literature review and theoretical background

2.1. Self-determination theory (SDT)

SDT suggests how individuals make decisions irrespective of external factors and interruptions [17,18]. SDT emphasizes that

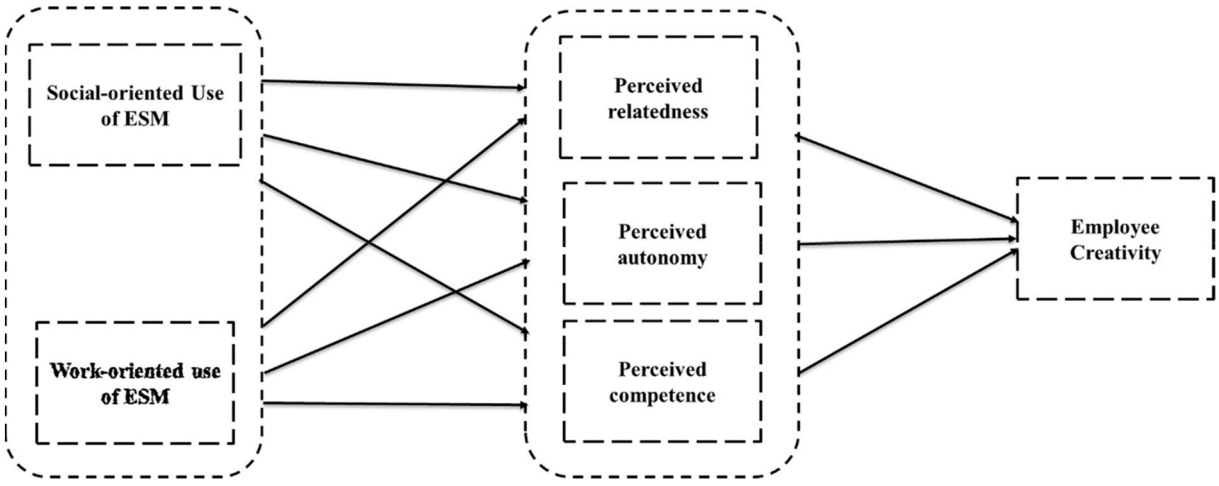

Fig. 1. Conceptual model.

human beings have intrinsic psychological requirements for relatedness, competence, and autonomy [15]. According to earlier research, when these essential needs are fulfilled, individuals are more likely to remain focused and conclude their activities in a higher-quality way [19,23]. According to SDT, the demand for competence illustrates that individuals possess a desire to respond efficiently to unexpected environments, consider themselves competent in achieving their goals, and avert adverse outcomes [24]. The urge for autonomy reflects a person's intrinsic inclinations to engage in activities with their internal motivations and behavioral alternatives [15]. The demand for relatedness is also an essential psychological need that demonstrates individual demand to interact, and kindness, an individual need to engage in interpersonal interaction and conversation with coworkers [25]. In accordance with SDT, these three psychological needs contribute to an array of positive results, including well-being [26], leadership behaviors [27], and continued psychological development [15], these results have been demonstrated in a wide range of academic areas. For example, Deci and Ryan [17] concluded that when workers had higher autonomy at work, individuals recognized the organization more and were more satisfied with their work. Ryan, Patrick [28] also reported that individuals whose autonomy, relatedness, and competence needs are satisfied to perform more efficiently and produce more creative ideas.

In recent years, individuals' psychological needs satisfaction has received more scholarly attention. Prior research has revealed that social media technology may considerably enhance the satisfaction of individual basic psychological requirements [20]. In broad terms, scholars have studied the causes and consequences of individuals' basic psychological needs satisfaction and have uncovered different outcomes. With the rapid deployment of ESM in organizations [29], organizations have encountered major changes and also changed the way employees work. Nevertheless, the prior literature has focused minimal attention on whether and how the individual's psychological needs satisfaction is affected by the adoption of ESM in the workplace. In addition, while earlier research has shown the significant outcomes of individual basic psychological needs, it is still not clear how these consequence effect employee creativity. Consequently, this study investigates the relationship between employees psychological needs satisfaction and employee creativity.

2.2. Enterprise social media usage (ESM usage)

ESM has become an effective tool for strengthening interactions, socialization [1], and collaboration within organizations [6]. An increasing number of organizations use ESM to promote employee cooperation and collaboration. Based on functionalities, ESM usage can be categorized as work-oriented and social-oriented [1]. Work-oriented ESM usage describes as the use of ESM for work-related activities including the exchange of information related to organizational policies, and also sharing reports of assigned tasks [30]. The term "social-oriented ESM usage" describes the use of ESM for social-related tasks including arranging a social event with colleagues [31], and making social connections within the workplace. Nevertheless, empirical evidence on the consequences of ESM usage yielded mixed findings. On the one hand, several research on ESM has demonstrated the positive effects of ESM on workers by facilitating interaction, collaboration, work engagement, and, most importantly, knowledge sharing [32]. For example, Cao, Guo [33] have revealed a significant connection between ESM use and work outcomes. ESM usage benefited the job autonomy through information eq. On the other hand, few scholars also warrant the adverse impact of ESM usage on individuals including strain, and information overload. For example, Chen, Wei [34] discovered an inverted U-shaped connection between work-related ESM usage and information overload, and a U-shaped connection between social-related ESM use and information overload, resulting in ESM-related strain.

Presently, several scholars have documented that ESM use affects individual work attitudes, psychological conditions, and cognitive processes. Cai, Huang [20] contend that ESM usage may strengthen worker agility through psychological meaningfulness, availability, and safety. Sun, Wu [5] proposed that individuals may experience emotional support with the use of ESM technology. van Zoonen, Sivunen [11] argued that ESM usage may cause employee exhaustion when excessive interruption is triggered. However, findings in this line of research are insufficient. These studies provide us with a theoretical foundation for understanding how ESM usage promotes employee creativity. Nevertheless, when and in which manner ESM usage affects employee creativity through psychological needs satisfaction has not been discovered and observed. The intention of the present research is to analyze the processes through which ESM usage promotes individual creativity through psychological needs satisfaction.

3. Hypothesis development

3.1. ESM usage, psychological needs satisfaction

Relatedness refers to an employee's natural psychological need to interact and be linked with others [18]. The higher the individual's feeling of belonging and closeness to others, the greater the feeling of relatedness. With social-oriented ESM usage, employees may easily acquire information from coworkers and also know their work behavior [35]. Specifically, with the proximity afforded by social-related ESM usage, individuals are more likely to seek support from coworkers when workmates encounter work-related challenges [3,36]. Social-oriented ESM usage also promotes the extent of interactions between workers and their peers [15], assisting in satisfying the relatedness need. The increased communication intensity assists employees in perceiving relatedness by improving intimacy with others. Based on this, this study proposes.

H1a. Social-oriented ESM usage is significantly related to perceived relatedness.

Social-oriented ESM usage facilitates individuals to establish personal relationships and provide assistance to each other within the organization [37], resulting a seamless knowledge and information exchange among colleagues. Social-oriented ESM usage permits

individuals to become connected with one another [35], minimizing the ambiguity of the workplace environment for workers. Specifically, social-oriented ESM usage stimulates social support among workers, making it less complicated for employees to discover coworkers in the organization who have the same attributes [38]. In such an environment, individuals receive higher and more relevant information and also become familiar with other employees who are essential for processing the task. In addition, Deng and Zhu [1] reported that social-oriented ESM usage may also assist individuals in obtaining information to enhance their job skills [39]. The development of such skills allows individuals to cope with challenges using their strategies, to perceive a high degree of autonomy. As a result, individuals may autonomously organize work schedules, customize their work procedures, and select how to deal with routine tasks flexibly based on their knowledge of tasks. In simpler terms, increased social-oriented ESM usage allows workers to obtain information, possibilities of connections, and work autonomously. Accordance with this discussion, we proposes.

H1b. Social-oriented ESM usage is significantly related to perceived autonomy.

Perceived competence entails the capacity to appropriately manage and change the environment, and discover possibilities to develop new skills, expertise, and capacities [18]. Social-related ESM use offers employees an opportunity to interact with coworkers across the organization [40]. ESM uage encourages employees to obtain appropriate knowledge and emotional support from coworkers to properly handle an array of challenging duties [1], thereby incorporating a sense of competence. Social-related ESM usage also permits employees to develop deep connections with coworkers and directly receive information, and knowledge [33]. Employee can enhance their expertise through learning to satisfy their competence needs [10]. Previous research concluded that individuals with higher expectations for competence are more likely to seek opportunities to present their skills and abilities. Social-related ESM usage encourages employees to present themselves to others due to strong social connections [32]. Furthermore, social-related ESM usage strengthens mutual friendship and provides an efficient channel of communication and cooperation, giving them more opportunities to encourage their coworkers and satisfy competence needs. Based on this discussion, this study proposes the following hypothesis.

H1c. Social-oriented ESM usage is significantly related to perceived competence.

Work-related ESM usage elevates the accuracy of information by motivating individuals to exchange information with specified readers more intentionally [1]. As the accuracy of information becomes better, employees can more effectively interact and collaborate with others [41], promoting familiarity between employees and fulfilling the individual need for relatedness. Work-related ESM usage makes all information and communication content available to employees [40]. Employees may improve their meta-knowledge by viewing others' information [9]. Visibility may also increase the possibility of more interaction with workmates, allowing broader and tighter connections thus fulfilling the need of relatedness [42]. Work-oriented ESM usage connects individuals with similar interests and backgrounds, allowing them to explore possible links, establish professional connections, and strengthen ties with coworkers [7]. Specifically, ESM usage may possess the capacity to personally engage individuals through cooperation, thereby making it less challenging for workers to establish a social interaction. Work-oriented ESM usage also motivates individuals to maintain professional, and close relationships with colleagues through exchanging personal information or reacting to others' posts [32], thereby satisfying the need for relatedness. Based on this discussion, we propose the following hypothesis.

H2a. Work-oriented ESM usage is significantly related to perceived relatedness.

In addition, we consider that work-oriented ESM usage may assist individuals in becoming more independent in completing any given job by giving them flexibility and effective networks to handle their tasks. Work-oriented ESM usage supports employees to maintain intimate connections with coworkers throughout the organization since an individual may easily connect with other coworkers without his consent [29,43]. Consequently, individuals recognize a greater level of autonomy when employees readily interconnect with other coworkers in the workplace [37]. Work-oriented ESM usage makes it possible for employees to readily obtain information and content from coworkers [1], which further satisfies employees' autonomy needs. Work-oriented ESM usage establishes a virtual environment where individuals may organize, articulate, and evaluate their responsibilities [30,44], increasing the autonomy of the work process. The development of task-specific information provides employees with a mechanism for addressing task challenges and observing the task procedure in their unique way [45]. As an individual's task grows more autonomous, individuals exert significant control over the planning and execution of their activities, giving them a sense of high autonomy. Hence, we propose.

H2b. Work-oriented ESM usage is significantly related to perceived autonomy.

Work-oriented ESM usage may facilitate the dissemination of credible information and technical expertise [46,47], higher the relevant information and skills that individuals learn from ESM usage, the greater their competence. Specifically, work-oriented ESM usage enables workers with several possibilities to cope with workplace challenges [6,15]. Accordingly, work-oriented ESM usage facilitates individuals to analyze the work-related activities of their coworkers [13], permitting them to learn personally by conversing directly with a colleague or obtain meta-knowledge indirectly by observing others communication. Previous scholars observed that work-related ESM usage encourages individuals to exchange information and acquire resources, ensuring them strengthen their expertise, skills, and knowledge [30,35], and perception of competence. In addition, by using work-oriented ESM, employees may strengthen their capabilities by generating work-related information and addressing queries of other workmates [1,15]. Workers may debate the procedure of work and illustrate their competence in arranging the task at hand. Thus, we propose.

H2c. Work-oriented ESM usage is significantly associated to perceived competence.

3.2. Psychological needs satisfaction, employee creativity

In the workplace, individual creativity is frequently shaped by interpersonal relationships and the exchange of information with coworkers. When individuals exchange their expertise with others at work, Workmates can consider problems from other angles, allowing their expertise to broaden. Presently, no comprehensive examination of the interaction between ESM usage, psychological needs, and creativity has been conducted, and our analysis based on SDT may offer significant knowledge regarding these connections. Perceived relatedness is described as the feeling of connection or interaction with other persons [18]. According to SDT, when workers' relatedness requirements are satisfied, employees are more likely to perceive interaction, trust, and esteem [19]. A lower degree of relatedness satisfaction is connected with a lack of participation in creative behaviors; by contrast, a higher degree of relatedness satisfaction may be significantly related to creative activities. According to SDT, relatedness plays a critical role in motivation [48], and employees are more likely to attain organizational goals when employees are interconnected with other members. The perception of relatedness also promotes significant feelings and unlocks the broaden-and-build model [15], allowing employees to expand their energy levels and readiness of learning [10], leading them to develop their knowledge and abilities related to emerging ideas. Hence, this study proposes.

H3a. Perceived relatedness is significantly related to employee creativity.

Perceived autonomy refers to an individual's perception of their ability to handle their duties [37,49], content, schedule, position, decision-making, freedom, and outcome of activities [50]. In accordance with this concept, numerous studies consider autonomy as a crucial component of an individual's intrinsic motivation that allows self-determination and satisfaction of psychological demands [18,51]. Previous studies have reported that autonomy is significantly related to job performance [37,52]. Specifically, higher autonomy allows individuals greater flexibility in determining how to handle tasks and establish their creative activities within the workplace. Autonomy may also encourage employee's cognitive flexibility and commitment to discovering new ideas and approaches [18,53]. A higher degree of autonomy may also motivate the employee to act, think, and solve problems independently [15]. According to Parker [54], autonomy not only promotes job responsibility but also encourages employees to acquire an immense quantity of information, knowledge, and promotes individuals to acquire new skills. This work-related related knowledge promotes the employees' creativity. Scholars also contend that freedom from external forces improves creativity since external control and stress mitigate the interest of employees in the work itself [18], which is essential to creative performance. Hence, based on previous studies, this study also proposes.

H3b. Perceived autonomy is significantly related to employee creativity.

Competence is related to being efficient and capable of achieving desired valued outcomes in a specific environment [19]. Perceived competence is described as a person's belief that he/she can complete a task efficiently [15]. Employees are likely to produce creative ideas and interact with their environment when individual feel self-efficient [1]. Scholars observed that individuals with greater levels of competency are more likely to cope with difficult and challenging problems arising in the workplace [7]. Furthermore, past research has shown that individuals with perceived competence are more efficient, creative, and passionate in discovering solutions to challenges [18,48]. Specifically, competence is regarded as an ability to generate novel ideas and hence assumed to be necessary for creativity. Theoretical literature suggests that individuals who possess greater competency are innovative and always present emerging and innovative ideas than employees with lower competence. Based on this discussion, we suggest.

H3c. Perceived competence is significantly related to employee creativity

3.3. Mediating role of psychological needs satisfaction

Previously we proposed that social-oriented, and work-oriented ESM usage has a significant effect on employees' creativity through psychological needs. Previous studies have demonstrated that ESM usage promotes information exchange among employees within organizations [29,47]. Knowledge exchange among individuals is considered a contextual characteristic to meet the autonomy and competency needs of individuals [3]. This frequent exchange of knowledge transfer promotes employees' understanding of how organizations work and facilitates individuals with the required resources to produce creative ideas. In addition, social and work-oriented ESM usage facilitates individuals to develop mutual relationships [33]. Through close connection, individuals may experience not simply relatedness, but also competence needs, since close connection encourages individuals to take risks and promotes a learning culture at the workplace. When workers' fundamental psychological needs are fulfilled by the use of social and work-related ESM, their creativity may increase. Specifically, psychological needs have a significant effect on motivation, which causes them to be more active at work, and work with more dedication, thereby improving creativity. Hence, we suggest.

H4a. Perceived relatedness mediates the connection between (i) social-oriented ESM usage; (ii) work-oriented ESM usage and employee creativity.

H4b. Perceived competence mediates the connection between (i) social-oriented ESM usage; (ii) work-oriented ESM usage and employee creativity.

H4c. Perceived autonomy mediates the connection between (i) social-oriented ESM usage; (ii) work-oriented ESM usage and employee creativity.

4. Research methods

4.1. Sample and procedure

In order to attain the objective of the study a questionnaire survey was employed by following the approach of previous studies. This empirical study was conducted in response to the increasing adoption of ESM technology by Chinese firms [55]. As indicated by prior studies Chinese firms widely deployed WeChat, WeCom, and Dingtalk for their employee's communication, and information sharing [3,6]. These ESM platforms entail messaging services, group discussion, moments, searching, assessment, and other features that enable individuals to exchange information, collaborate, and share work-related information [56]. Furthermore, for data collection, the author approached the Alumni Office of the Master of Engineering Management (MEM) at the authors' institute. With the assistance of MEM's Alumni Office, the author acquired contact information for MEM students, both undergraduates and on-campus students, all of whom have a minimum of one or more years of employment experience. These alumni have been selected as data collection sources since their primary field is management of projects and the majority of them are employed in project management-related companies including real estate, health centers, IT, banking, and manufacturing. Before conducting the survey, initially, we discussed the objective of the study with respondents and ensured the anonymity of their responses. We also stressed that this survey is not mandatory and confidential in order to promote candid responses. Furthermore, we incorporated some assessment questions in the survey to ensure the sample's validity. These assessment questions included whether the participants were employees of the organization who used ESM in their everyday duties. We also asked the participants to comment on the ESM usage employed at work to confirm the actual usge of ESM.

We obtained data by employing a two-wave time-lagged methodology with a difference of two weeks to mitigate the potential issue of common method variance [57] and to determine causal connections among constructs. In first stage, we obtained data for social, and work-related use of ESM, and Psychological need satisfaction. In the second stage, we gathered data for employee creativity. In stage 2 we only contacted those individuals who had participated in the first stage of the survey. Furthermore, to control for variations we asked users to share simply their involvement with organizationally provided ESM systems, rather than their personal use of ESM. Before conducting the original survey, the author also conducted a pilot test with 61 responses. The outcome of the pilot testing yielded appropriate outcomes, such that convergent validity and reliability were found appropriate.

The first stage of data collection occurred from November 2022 to January 2023. During this period, we delivered 585 surveys to relevant workers, and 510 responses were returned, yielding (88.03%) response rate. After eight weeks, we collected data for the second phase of the survey, we only approached the 510 participants who had responded in the prior round of survey. In the second round, only 445 employees out of 510 responded to the survey, yielding a (87.25%) response rate. A specific amount of (30) questionnaires were deleted due to incomplete or duplicate responses, inability to reply to our evaluation queries or completion in less than 3 min. Hence, finally, 415 responses were considered for final data analysis. In addition, by applying the process of prior studies, we also measured a non-response bias test on the initial (25%) and final (25%) values of all survey responses containing demographic information [18,58]. The outcomes of the analysis revealed that non-response bias is not a major problem in the current study. Table 1 summarizes statistical characteristics of each respondent.

4.2. Research instruments

All the proposed constructs of the research model originated from previous studies since these assessment instruments are also consistently employed by scholars in the Chinese context. Consistent with the common approach used by several scholars, all the instruments of the research model were anchored on Likert-type scales (1 = Strongly Agree, 2 = Strongly Disagree). Before developing the questionnaire, the author collaborated with managers, PhD students, and management professors for a critical assessment and recommendations, some minor modifications were recommended. Further, the author also obtained assistance from an English

Table 1
Demographics.

Variables	N	Percentage	Variables	N	Percentage
Gender			Education		
Male	241	56.70	Under-graduate	175	41.20
Female	184	43.30	Graduate	136	32.00
Age			Masters or Above	114	26.80
Between 21 and 30	112	26.40	**Experience**		
Between 31 and 40	98	23.10	Less than- 1 h	86	20.20
Between 41 and 50	112	26.40	2–3 h	92	21.60
>50 year old	103	24.20	4–5 h	136	32.00
Position			More than 5 h	111	26.10
General employees	131	30.80			
General Managers	72	16.90			
Assistant Managers	94	22.10			
Departmenal Managers	74	17.40			
Regional Managers	33	78.80			
Directors	21	4.90			

Table 2
Results of measurement analyses.

Constructs	Items	Cronbach α	Composite Reliability	AVE
Work-oriented use of ESM	5	0.845	0.89	0.62
Social-oriented use of ESM	5	0.879	0.91	0.67
Employee Creativity	7	0.861	0.89	0.53
Perceived autonomy	5	0.800	0.86	0.55
Perceived relatedness	4	0.807	0.86	0.61
Perceived competence	3	0.816	0.88	0.71

Note: AVE = Average Variance Extracted.

language Professor for proofreading and grammatical mistakes. Moreover, all the respondents of this study are Chinese employees, following the method suggested by Van de Vijver, Leung [59]. Accordingly, to eliminate semantic variations, the primary English questionnaire was converted into Chinese and back-translated into English, which was managed with the collaboration of two masters and two subject specialists. By analyzing both the versions of survey items English and Chinese, no significant semantic differences were discovered. Finally, we consulted with two ESM technology experts to extensively analyze the survey questions. Their comments were completely considered to improve and optimize the questionnaire. The survey questions are described in detail here.

4.2.1. .ESM usage

ESM usage is categorized as work-oriented ESM usage and social-oriented ESM usage, the scale includes five items each and is adopted from Deng and Zhu [1]. The sample item of social-oriented ESM usage is "In my organization, I use ESM to get acquainted with coworkers who share my interests", and work-oriented ESM usage is "In my organization, I use ESM to disseminate content at work".

4.2.2. Psychological needs satisfaction

The scale of psychological needs satisfaction included three constructs namely perceived autonomy (5 items), perceived competence (3 items), and perceived relatedness (4 items). The psychological needs satisfaction is measured using the scale of Sun, Mengyi [15]. The sample of perceived relatedness is "The members of this organization care about me", perceived autonomy "I am free to express my ideas and opinions at work", and perceived competence "Most days I feel a sense of accomplishment at work".

4.2.3. Employee creativity

Employee creativity is used as a dependent construct in the research model. Seven items are adopted from Farmer, Tierney [14]. An example question of this construct is "Identified opportunities for new products/processes".

4.2.4. Control variables

We measured demographic factors for workers (gender, age, education level, position, and experience) as control factors that may affect their creativity.

5. Results and analysis

5.1. Validity and reliability

Before assessing the hypothesis, this study computed the reliability and validity of the suggested research data. Based on Hair, Ringle [60], data may assessed by validity and reliability. Accordingly, Cronbach's alpha (CA), composite reliability (CR), and average variance extracted (AVE) analysis can be used to evaluate convergent validity and discriminant validity [61]. Previous researchers have recommended that values of CA, CR $>$ 0.70 [62], and AVE $>$0.50 are acceptable. Results of Table 2 illustrated that values of CA (0.800–0.879), CR (0.86–0.89), and AVE (0.53–0.71) are in the suggested range [60,63]. Furthermore, convergent validity of research model was assessed by observing the factor-loading of all the constructs in Table 4. Results of Table 4 illustrated that all the constructs of all the items have loading $>$0.60 [63]. As a result, the proposed research model possesses an acceptable level of reliability and validity.

We applied distinct approaches to observe the discriminant validity of the suggested model. First, the correlation matrix illustrated that all constructs have values lower than the recommended value of 0.700 [64]. Second, we used the method proposed by Fornell and Larcker [63] and assessed the discriminant validity of the proposed model. The results of Table 3 illustrated that all the values of square root of AVE were higher than the inter-construct correlation values. In addition, Table 4 presents the cross-loadings of all constructs, indicating that all constructs have higher values in their assigned columns and fewer values in other columns. Accordingly, all the observations in Tables 3 and 4 show that the research model has a sufficient level of discriminant validity.

5.2. Common method variance (CMV)

Previous research has proposed certain methodological and statistical approaches to handle the possibility of CMV occurrence in survey data [57]. We initially assessed the probability of bias at the respondent level. Accordingly, we collected data in two distinct

Table 3
Correlation matrix and Mean, Standard Division.

Construct	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1 Work-oriented use of ESM	3.641	0.773	**0.787**										
2 Social-oriented use of ESM	3.878	0.772	0.193**	**0.818**									
3 Employee Creativity	3.986	0.623	0.282**	0.358**	0**0.728**								
4 Perceived autonomy	3.644	0.761	0.365**	0.144**	0.261**	**0.741**							
5 Perceived relatedness	3.588	0.756	0.158**	0.221**	0.388**	0.117**	**0.781**						
6 Perceived competence	3.020	0.994	0.168**	0.247**	0.155**	0.162**	0.304**	**0.842**					
7 Experience	**NA**	**NA**	0.047	−0.041	0.040	−0.100*	0.019	−0.097	**NA**				
8 Position	**NA**	**NA**	0.008	0.010	0.006	0.073	−0.126**	−0.093	−0.037	**NA**			
9 -Education	**NA**	**NA**	−0.162**	−0.038	−0.004	−0.095	0.161**	−0.112*	0.108*	−0.019	**NA**		
10 -Age	**NA**	**NA**	0.066	0.045	0.030	0.080	−0.038	0.016	−0.046	−0.060	−0.324**	**NA**	
11 -Gender	**NA**	**NA**	0.044	−0.092	−0.031	0.008	−0.120*	−0.219**	0.045	−0.201**	0.190**	−0.022	**NA**

Note: *p < 0.05, **p < 0.01.

Table 4
Cross-loading.

Constructs	Items	(EC)	SESM	WESM	PA	PR	PC
Employee Creativity (EC)	EC01	**0.808**	−0.013	0.018	−0.110	−0.013	0.001
	EC02	**0.789**	−0.007	−0.061	−0.009	0.027	−0.047
	EC03	**0.764**	−0.009	−0.024	0.153	−0.036	−0.012
	EC04	**0.729**	0.010	0.065	−0.031	0.017	0.030
	EC05	**0.711**	0.047	0.040	0.173	−0.113	0.017
	EC06	**0.706**	−0.031	−0.052	−0.016	0.165	−0.114
	EC07	**0.601**	0.042	0.029	−0.115	0.054	0.112
Social-oriented use of ESM (SESM	SESM01	−0.079	**0.890**	0.003	0.031	0.033	0.014
	SESM02	0.012	**0.833**	0.021	0.022	0.021	0.020
	SESM03	0.032	**0.826**	0.020	0.006	0.005	−0.004
	SESM04	0.062	**0.803**	−0.036	−0.045	−0.064	−0.044
	SESM05	−0.002	**0.739**	−0.028	0.000	−0.022	0.030
Work-oriented use of ESM (WESM)	WESM01	0.063	−0.051	**0.836**	−0.017	−0.152	0.122
	WESM02	0.023	−0.111	**0.799**	−0.040	−0.022	0.020
	WESM03	0.029	0.093	**0.771**	−0.137	−0.017	0.004
	WESM04	−0.007	−0.031	**0.771**	0.151	0.040	−0.022
	WESM05	−0.124	0.094	**0.742**	0.071	0.169	−0.137
Perceived autonomy (PA)	PA01	0.052	−0.034	−0.058	**0.782**	−0.050	−0.046
	PA02	−0.039	0.029	0.066	**0.766**	0.014	−0.082
	PA03	−0.087	−0.025	0.041	**0.765**	0.088	0.004
	PA04	0.028	0.046	−0.058	**0.743**	−0.036	0.025
	PA05	0.041	−0.003	−0.004	**0.658**	−0.017	0.148
Perceived relatedness (PR)	PR01	−0.030	−0.056	−0.128	0.110	**0.817**	0.088
	PR02	0.012	0.029	−0.038	−0.103	**0.812**	0.014
	PR03	0.077	−0.046	0.118	0.009	**0.761**	−0.019
	PR04	0.046	0.043	0.056	−0.016	**0.725**	−0.014
Perceived competence (PC)	PC01	−0.032	−0.052	−0.009	0.020	−0.021	**0.867**
	PC02	0.014	0.022	0.041	−0.003	0.012	**0.860**
	PC03	−0.009	0.054	−0.026	0.004	0.088	**0.792**

rounds while keeping the participant's information confidential [65]. Survey participants were also informed that the survey question had no specific wrong or right answer. Further, we also used some statistical analysis to control the possible issue of bias. For the purposes of statistical analysis, we initially analyzed the collinearity test, which stipulated that the VIF values must be less than 3.3 [66]. Results revealed that all the VIF values are less than the recommended value of 3.3. Thus, bias may not undermine the validity of the suggested model. Second, we analyzed the possible issue of bias using Herman single factor analysis on all the constructs of all the variables. The statistical analysis of the Herman test demonstrated that no single element appeared; the highest covariance caused by one factor was 23.63%, which was less than the standard value of 50% [57]. Finally, we employ Liang, Saraf [67] strategy and address the possible issue of bias in the data set. Accordingly, the author measured the squared value of all items and the substantive loading of each item. According to the findings, the average squared substantive variance of the items is 0.58, while the average squared method-based variance is 0.14. In conclusion, we summarized that bias was not likely a serious problem in our data.

5.3. Model fit values

The results of model values of the measurement model and structural model are presented in Table 5. Overall fit values of measurement model are ($\chi 2/df = 2.345$; CFI = 0.912; TLI = 0.899; IFI = 0.913; NFI = 0.858 and RMSEA = 0.056), and structural model are ($\chi 2/df = 2.499$; CFI = 0.900; TLI = 0.888; IFI = 0.901; NFI = 0.846 and RMSEA = 0.059) in a specified range [61]. Considering these findings of model fit are reasonable, we further examined our hypothesis using structural equation modeling (SEM) on AMOS software.

5.4. Structural model

The findings of SEM are shown in Fig. 2. The results revealed that social-oriented use of ESM is positively related to perceived relatedness ($\beta = 0.194$, $p < 0.001$), perceived autonomy ($\beta = 0.082$, $p < 0.05$), and perceived competence ($\beta = 0.252$, $p < 0.001$), thereby H1a, H1b, and H1c is accepted. Similarly, work-oriented use of ESM is also significantly related to perceived relatedness ($\beta =$

Table 5
Comparison measure model and structural model.

	Absolute fit measures			Incremental fit measures		Parsimonious fit measures		
Model	X^2/DF	SRMR	RMSEA	NFI	PNFI	CFI	IFI	TLI
MM	2.345	0.056	0.056	0.858	0.888	0.912	0.913	0.899
SEM	2.499	0.079	0.059	0.846	0.879	0.900	0.901	0.888

Note: MM = Measuremnt Model, SEM = Structural Model.

0.190, $p < 0.05$), perceived autonomy ($\beta = 0.599$, $p < 0.001$), and perceived competence ($\beta = 0.260$, $p < 0.001$), thereby H2a, H2b, and H2c is supported. Finally, employee creativity is significantly impacted by perceived relatedness ($\beta = 0.399$, $p < 0.001$), perceived competence ($\beta = 0.238$, $p < 0.001$), H3a, and H3b is also supported by this study. Surprisingly perceived autonomy ($\beta = 0.007$, $p > 0.05$) has an insignificant effect on individual creativity, H3c is not supported by this study. In conclusion. H1a, H1b, H1c, H2a, H2b, H2c, H3a, H3b is supported and H3c is rejected by this data. A summary of all the hypotheses is presented in Table 6.

5.5. Mediation analysis

In addition, we also analyzed the mediating role of perceived relatedness, perceived autonomy, and perceived competence using bootstrapping with 5000 samples [68]. The analysis results presented in Table 7 indicate that perceived relatedness [LLC = 0.048; ULC = 0.116] and perceived competence [LLC = 0.009; ULC = 0.047] mediated the relationship of the social-oriented ESM usage and employee creativity, zero is not included, thereby H4a is validated by this study. Similarly, Table 7 illustrated that perceived relatedness [LLC = 0.018; ULC = 0.090] and perceived competence [LLC = 0.020; ULC = 0.081] mediated the relationship between the work-oriented ESM usage and employee creativity, zero is not included, thereby H4b is validated by this study In contrast, Table 7 outcome relieved that perceived autonomy did not mediate the connection between social-oriented ESM usage [LLC = −0.015; ULC = 0.010], work-oriented ESM usage [LLC = −0.015; ULC = 0.012] and employee creativity, zero is included, hence H4c is rejected by this study.

6. Discussion, implications, limitations

6.1. Discussion

We assessed how social and work-related ESM usage promotes employee creativity by fulfilling the three main psychological needs of workers, and nearly all of hypotheses are validated by current study. The present research validates h1a, h1b, h1c, h2a, h2b, and h2c by confirming that social-oriented, and work-oriented ESM usage is significantly related to basic three psychological needs, namely perceived relatedness, autonomy, and competence. These outcomes are also consistent with previous results and according to our predictions [15,19,53]. For example, Yoon and Rolland [19] evaluated the consequences of perceived autonomy, competence, and relatedness on the exchange of knowledge in the environment of web-based communities and concluded that only competence and relatedness had a significant impact on knowledge sharing. Sun, Mengyi [15] based on SDT demonstrated that visibility and association affordance have a substantial influence on three psychological needs. Similarly, Tsai and Pai [53] reported that social identity is significantly related to perceived relatedness and perceived competence while having no impact on perceived autonomy. In addition, results also illustrated that perceived relatedness and competence have a significant impact on worker creativity, h3a, and h3b are accepted. In contrast, results also indicated that perceived autonomy has an insignificant effect on employee creativity. Prior research also demonstrated that employees' basic psychological needs may better their work competence and performance [48]. Sun, Mengyi [15] also discovered that individual basic psychological needs have a positive effect on employee's agility performance.

Lastly, we analyzed the mediation processes of psychological needs satisfaction in the correlations between social and work-related ESM usage and worker creativity. Our predictions were mostly achieved (h4a, h4b), are supported, however, perceived autonomy had no significant mediation effect on the connections between social and work-related ESM usage and worker creativity, and h4c is rejected by this study. These results further suggest that the use of social, work-oriented ESM improves employee creativity by strengthening perceived relatedness and perceived competence instead of perceived autonomy. A possible clarification for this rejected

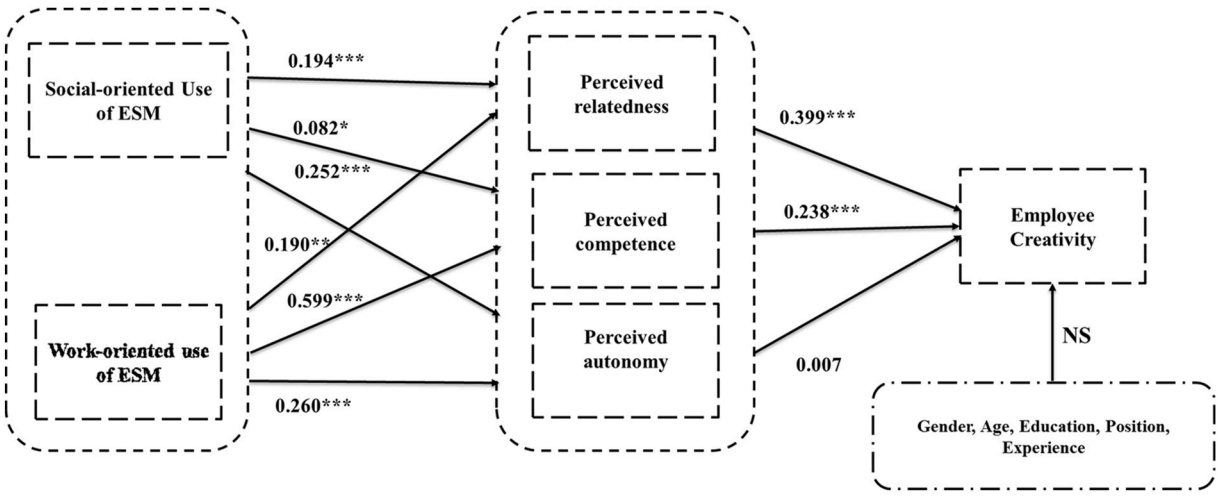

Fig. 2. Structural model *P < 0.05, ***P < 0.001, NS = non-significant.

Table 6
Summary of hypothesis.

Relationship	Result
H1:Social-Oriented use of ESM to Perceived relatedness	Supported
H2: Social-Oriented use of ESM to Perceived autonomy	–
H3: Social-Oriented use ESM to Perceived competence	–
H4: Work-Oriented use of ESM to Perceived relatedness	–
H5: Work-Oriented use of ESM to Perceived autonomy	–
H6: Work-Oriented use of ESM to Perceived competence	–
H7: Perceived relatedness to Employee creativity	–
H8:Perceived autonomy to Employee creativity	–
H9: Perceived competence to Employee creativity	Not-Supported

Table 7
Results of mediation effect analysis.

Indirect effect (IV-*M*-DV)					
IV	M	DV	Coffecient	95% BCCI	Mediating effect
Social-Oriented use of ESM	Perceived relatedness	Employee creativity	0.077	[0.048–0.116]	Significant
Social-Oriented use of ESM	Perceived autonomy	Employee creativity	0.237	[0.009–0.047]	Significant
Social-Oriented use of ESM	Perceived competence	Employee creativity	−0.001	[-0.015-0.010]	In-Significant
Work-Oriented use of ESM	Perceived relatedness	Employee creativity	0.051	[0.018–0.090]	Significant
Work-Oriented use of ESM	Perceived autonomy	Employee creativity	0.047	[0.020–0.081]	Significant
Work-Oriented use of ESM	Perceived competence	Employee creativity	−0.008	[-0.015-0.012]	In-Significant

Note(s): IV: Independent variable; M: mediator; DV: Dependent variable.

assumption might be the characteristics of autonomy. Accordingly, scholars of information systems also emphasized that the use of ESM may result in information overload [40,69], preventing employees from readily obtaining the information required, which might be damaging the employees' perceived autonomy. Individual creativity isn't possible in this situation because workers have uncertainty that workers would be unable to acquire the essential information from the ESM network to meet their demands.

6.2. Theoretical implications

First, recent studies have made substantial contributions to the theoretical and empirical understanding of ESM usage [1,29]. For example, the extent research investigated the consequences of ESM usage from distinct perspectives including information sharing [32], learning [11], work performance [33], and communication quality [6]. A single and limited framework is incapable of entirely and effectively capturing the wide-range features of ESM usage and fails to identify important differences among social media usage behaviors. The results we present provide considerable empirical evidence for the two types of ESM usage, namely work- and social-oriented ESM usage. Future studies may examine how ESM usage evolves over time using a different techniques. Another intriguing expansion to the present research is the adverse effects of social-related ESM usage [6], and the optical amounts of social-oriented ESM utilization, which may yield some more novel outcomes.

Second, the result of the present provides a valuable theoretical framework for investigating how social, and work-oriented ESM usage affects individual creativity through psychological needs. Essentially, past studies investigated the consequence of ESM usage on employee performance, and agility, through knowledge sharing, social network ties, and workplace conflict. The primary psychological necessities of an individual may promote employee creativity have received less scholarly attention. Although previous research has shown the significance of psychological factors in the connection between ESM usage and worker outcomes [70]. It is still essential to investigate the potential significance of fundamental psychological needs satisfaction in connection with individual outcomes. The results of the present study revealed that relatedness and competence needs are essential for individual psychological needs since these play a significant role in human effectiveness. By investigating the connection between social, work-oriented ESM usage, fundamental psychological requirements, and employee creativity, the present study not only incorporates existing studies of employee creativity but also offers novel approaches and theoretical foundations to strengthen employee creativity.

Third, the present investigation analyses the causes and effects of individuals' primary psychological necessities in the digital era, especially in ESM environments, by considering the mediating mechanisms of worker basic psychological needs satisfaction and the connection between social and work-related ESM usage and employee creativity. Despite the previous research has demonstrated that fundamental psychological needs satisfaction leads to an array of positive results for employees, including increased well-being, performance, information sharing, and agility performance [15], it is unknown if it contributes to an enhancement of employee creativity. Furthermore, while previous research has identified numerous aspects to fulfill employees' primary psychological needs, it is uncertain whether ESM deployment will satisfy employees' primary psychological needs in the work environment and promote employee creativity. Our study efficiently enhances the background and results of employees' fundamental psychological needs fulfillment by evaluating the impacts of social and work-related ESM usage on employee creativity via psychological needs satisfaction.

6.3. Managerial implications

The results of the present study offer several recommendations for managers to appropriately implement ESM to promote employee creativity. Firstly, employee creativity is becoming more widely accepted as an effective instrument for achieving organizational competitiveness. Especially in the modern technological environment, worker creative performance is a critically important asset for organizations. Considering the growing demand for employing ESM tools to maximize individuals' work accessibility, the results may encourage supervisors to give specific consideration to the significance of both types of ESM usage, namely, work-oriented and social-oriented, in employees' basic psychological needs, thereby promoting individual creativity. These two types of ESM usage may assist workers to communicate task-related information and maintain intimate connections with their coworkers.

Second, Findings illustrated the positive impact of social, and work-oriented ESM usage on the individuals' perceived relatedness, autonomy, and competence needs. Consequently, to meet basic psychological demands, managers should convince workers to use ESM for social and work-oriented to develop close interpersonal connections with coworkers. Accordingly, managers could motivate workers to employ social-oriented ESM to remain in contact with coworkers. In a similar vein, managers may motivate workers to use work-oriented ESM to satisfy their competence needs. Accordingly, supervisors may urge individuals to use work-oriented ESM to monitor the queries of coworkers and offer assistance, or to use work-oriented ESM to learn from others in the organization. Managers may suggest workers utilize work-oriented ESM to monitor the progress of their assignments and elevate control over tasks in order to fulfil their autonomy requirements. This type of ESM usage may assist individuals to acquire assets by addressing their psychological demands, hence increasing their creativity.

Third, the present findings may assist managers in stimulating employee creativity. According to findings perceived relatedness and perceived competence had strong positive connections with worker creativity. As a consequence, to promote employee creativity, managers should strive to meet employees' relatedness and competence demands. Accordingly, managers may properly disseminate responsibility to employees and provide them with the ability to self-determine, which may assist employees in developing new ideas. Managers may also allocate work, based on employees' competencies as far as feasible. It can be effective to meet competence demands by fostering a competitive and cooperative team environment since this allows individuals to exhibit their expertise and skills in such an environment.

6.4. Limitations and future directions

Although the results of the present study yield important observations concerning ESM usage and worker creativity, its limitations must be considered when determining the possibilities for future studies. First, the present study investigated the significant consequence of social and work-oriented ESM usage on employee creativity through psychological needs satisfaction. Future scholars may consider the adverse impact of ESM technology and examine ESM connection with basic psychological needs satisfaction. Prior scholars also warrant the negative effects of ESM usage in workplace and stressed more research [2]. In addition, scholars can apply basic psychological needs to other employee's outcomes including work performance, work engagement, and knowledge sharing.

Second, this study did not investigate the boundary condition, future scholars may examine the role of perceived autonomy as a moderator since mediating construct autonomy revealed the inconsistent connection between social, work-oriented ESM usage on employees' creativity [18]. Further, scholars may use other workplace factors as a moderator construct and investigate the findings.

Third, this study did not assess the frequency of ESM usage, which may affect the validity of our results. Although we eliminated unusual responses, future scholars should appropriately handle the degree of ESM usage during the data analysis process. Finally, considering resource limitations, this study used a cross-sectional questionnaire approach in China. Future scholars may use a longitudinal strategy in a broader range of different countries using a same conceptual model and investigate the same relationship.

7. Conclusion

The overall objective of the present research is to investigate the influence of ESM usage (social, work) on employee creativity through basic psychological needs of employees. Using SDT theory, this study also examined the mediating role of basic psychological needs on the connection between ESM usage (social, work) and employee creativity. The findings illustrated that ESM usage (social, work) is significantly related to basic psychological needs (relatedness, competence, autonomy). In addition, results also indicated that relatedness, and competence mediates the connection between ESM usage and employee creativity. Perceived relatedness, and competence also indicated significant relation with employee creativity. However, autonomy has insignificant relationship with employee creativity.

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Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles and guidance from ethical committee. All study protocols were approved by ethics committee of Sir Syed University of Engineering and Technology Karachi. The following is ethical number of study. SSUET-1198. Further, a informed consent was obtained from the individuals who have participated in this study.

CRediT authorship contribution statement

Abdul Hameed Pitafi: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Wanxiang Xie:** Writing – review & editing, Visualization, Validation, Supervision.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Abdul Hameed Pitafi reports was provided by Sir Syed University of Engineering & Technology. Abdul Hameed Pitafi reports a relationship with Sir Syed University of Engineering & Technology that includes: employment. Abdul Hameed Pitafi has patent licensed to Sir Syed University. No any new information If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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