

An Investigation on Task Characteristics and Knowledge Creation Process in the context of Malaysian Administrative and Diplomatic Officers

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Abstract

The study investigates the relationships between job design's task characteristics and knowledge creation process (SECI). The implication of job design in improving work productivity and performance has been extensively reported in various studies. However, only slight attention was given concerning the relationship between job design characteristics and knowledge creation process. Using the survey research methodology involving the Administrative and Diplomatic Officers working in several Malaysian federal ministries, the study found that the six independent variables of task characteristics have significant relationships with SECI. The findings suggest the importance of well-designed task characteristics in supporting the creation of knowledge within the federal ministries. The present study should capture the interest of both researchers and practitioners as it has developed an empirical-based framework linking task characteristics and SECI.

Keywords: Job design; task characteristics; knowledge creation process; SECI; Malaysian federal ministries

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1.0 INTRODUCTION

Job design is aimed to modify the working methods by taking account the human factors. Job must be redesigned to acquire the best fit between the needs of an organization and the employees. The importance of job design in boosting individual's productivity and performance has been discussed extensively in various studies (Griffin and McMahan, 1994; Morgeson & Humphrey 2006; Hameed and Amjad, 2009; Ali & Aroosiyah, 2010; Fernando & Ranasinghe, 2010; Dere, 2011). A well designed job could lead to a positive impact on job satisfaction and performance's quality.

Job design has its roots in two main streams, namely the behavioral science and in the practical techniques of management services (Kirkman, 1981). The behavioural science aspect of job design concerns on the nature of a task and its subsequent effect on the individual and it also relates to the variables that affect work behavior. Meanwhile the management service aspect concerns on the organizations' innovative functions in term of productive methods and workflows. Prominent job design theory, such as Job Characteristics Model by Hackman & Oldham (1976) has stimulated substantial interest on research in the field of job design. Inspired by Hackman & Oldham (1976), Morgeson & Humphrey (2006) have developed Work Design Questionnaire (WDQ) to assess job design and the nature of work. WDQ is designed as a common organizational diagnostic tool for work characteristics. The measure consists of three major characteristics of job design, namely the motivational characteristics (further divided into task characteristics and knowledge characteristics), social characteristics and work context characteristics.

While studies adopting the Morgeson & Humphrey's (2006) job design diagnostic tool has been quite extensively reported in the literatures, little attention was given on its relationship to Nonaka & Takeuchi's (1995) knowledge creation process. Particularly, no study has yet been conducted in the context of administrative and diplomatic officers working in the Malaysian federal ministries. Driven by this gap, this paper reports the findings of a study aimed at investigating the relationship between job design; emphasizing on the task characteristics and knowledge creation process of administrative and diplomatic officers working in the Malaysian federal ministries.

2.0 LITERATURE REVIEW

Knowledge Creation Process (SECI)

Nonaka & Takeuchi (1995) have classified knowledge into explicit and tacit. Notably, tacit and explicit knowledge are also the two major types of knowledge identified by knowledge theories (Polanyi, 1966). Tacit knowledge is the kind of knowledge that is related to personal perspectives, intuition, emotions, beliefs, know-how, experiences and values. It is intangible and difficult to articulate to another person by

means of writing or verbalizing it (Nonaka & Takeuchi, 1995). In contrast, explicit knowledge are more easily articulated, codified or stored in certain mediums. It also can be readily shared with others.

Knowledge creation is the outcome of continuous interaction between tacit and explicit knowledge. Nonaka & Takeuchi (1995) propose the SECI model to signify the processes in creating knowledge (see Figure 1). The SECI model consisting; socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit) is a cyclical model that supports continuous interactions and conversions of tacit and explicit knowledge for creating knowledge in an organization (Nonaka & Takeuchi, 1995; Tsai & Yong, 2007 and Easa, 2011). The elaborations of these SECI model are as follows:

- Socialization is the conversion of tacit knowledge into new tacit knowledge through shared experience where it may take place through social and cultural processes linked to the organizational activities (Martin, Lopez & Novas, 2008). Typically occurs in a traditional apprenticeship, knowledge could be passed through shared experiences, such as observation, imitation, guidance and practice;
- Externalization is the conversion of tacit knowledge into explicit knowledge which occurs when the organization articulate its internal rules of operation formally or openly sets its organizational goals which is then are captured by writing or computerized (Easa, 2011). As the knowledge become crystallized, it is allowed to be shared by others and becomes the basis of new knowledge. The tools of this conversion use different metaphors, analogues, concepts, hypotheses and models;
- Combination is the conversion of explicit knowledge into more complex and systematic sets of explicit knowledge by integrating, categorizing, reclassifying and synthesizing existing explicit knowledge before disseminating it among the members of the organization (Tsai & Yong, 2007). The knowledge is gathered from inside or outside an organization, which will then be combined, edited or processed to form the new explicit knowledge. This new explicit knowledge can be readily disseminated through, such as publications, presentations or meetings;
- Internalization refers to the creation of new tacit knowledge from explicit knowledge where it may occur, for example through the involvement of members of the organization in training programs or through reading the organization's documents or manuals. As explicit sources are used and learned, the knowledge is internalized, thus modifying the user's existing tacit knowledge.

Several studies have demonstrated the successful applications of the SECI model within a different set of disciplines and nations. These includes in the pharmaceutical sector (Refaey, 2002), IT sector (Rodrigues, Gayathri & Rao, 2006), high tech and manufacturing (Tsai & Li, 2007; Li & Tsai, 2009), Tanzania's construction organisations (Eliufoo, 2008), Cuban's higher education and training system (Cabrera, 2008) and Egyptian banking sectors (Easa, 2011; 2012a). The listed studies reported that the utilization of the SECI model has improved the performance of the respective organizations.

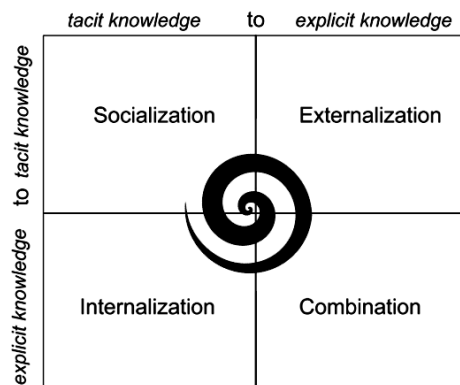


Figure 1 SECI model (Nonaka & Takeuchi, 1995)

Furthermore, various factors that can influence knowledge creation has also been mentioned in several literatures. Some studies regard knowledge sharing as a factor that positively influences knowledge creation (Hendriks (1999); Hsu (2006); Yi & Jayasingam (2012). Alternatively, Abbas et al. (2013) have identified that organizational culture, trust, employee's attitude, motivation, and socialization are the factors which are responsible for the process of sharing and creation of knowledge in the banking sectors of Pakistan.

The literature suggests that, job design's task characteristics are important enablers for the accomplishment of knowledge creation. For instance, Nonaka (1994), Stenmark (2002) and Khanyile (2009) have pointed out autonomy as a factor in facilitating knowledge creation. The freedom associated with higher job autonomy, including autonomy in work scheduling, decision-making and work methods may lead to employee engagement in a regular knowledge exchange among other employees, which increases the possibility of creating new knowledge.

Task Characteristics

Task characteristics is one of the components of job design framework. Developed by Morgeson & Humphrey (2006), job design framework is considered as the most comprehensive framework as it has been referred and applied by numerous researchers in studying job design of various professions (e.g. Humphrey, Hollenbeck, Meyer & Ilgen 2007 and Dere, 2011). The framework describes job design as consisting of motivational characteristics; which further divided into task characteristics and knowledge characteristics, social characteristics and work context characteristics (Morgeson & Humphrey, 2006).

Task characteristics focus on the scope and the nature of a job, including the manner in accomplishing the tasks associated with the job. Research on the task characteristics is primarily based on Hackman and Oldham's (1975, 1976) model and measurement tool, namely the Job Diagnostic Survey (JDS). The dimensions of task characteristics are autonomy, task variety, task significance, task identity and feedback from a job was identified as the major scales of JDS. While initially regarded as sufficient in describing the job design, the scale is argued to be only a portion of current understanding of work design (Morgeson & Campion, 2003; Morgeson & Humphrey, 2006; Humphrey, Nahrgang & Morgeson, 2007). The elaborations of task characteristics are as follows:

- Work scheduling autonomy is defined as the degree to which workers have the freedom to control the scheduling, sequencing and the timing of their own work (Breugh, 1985). Work scheduling autonomy most likely will develop employee motivation towards accomplishing assigned tasks. Thus, without the pressures from "deadlines", employee could focus more on the accuracy of the assigned tasks by being well-versed on the subject matters.
- Decision making autonomy or employee empowerment is the level of liberty on the decision-making regarding their specific organizational tasks (Grimsley, 2010). It encourages the employees to take responsibilities of having a unique approach to the issues or problems faced by organizations. Nonaka & Takeuchi (1995) state that empowerment promotes the creation of knowledge. It allows the employees the freedom to seek new methods and knowledge when challenges arise or while improving the policies, procedures or organization's products.
- Work methods autonomy are the extent of an individual's judgment and independence regarding the procedures or methods they utilize in going about their tasks (Breugh, 1985). The freedom given to lower level employees tends to motivate them to invest more energy and be accountable for their decisions. The interchangeable of ideas between different levels of employees will also prompt new innovative solutions.
- Task variety is associated with the range of tasks that need to be performed by the employees on their job (Morgeson & Humphrey, 2006). Ali & Aroosiya (2010) mention that a task variable expands a job to more interesting varied tasks. The varied tasks will encourage the conversion of knowledge among individuals, employees and group levels, especially during the sharing and transferring of work related knowledge. Task variety with differing skill level could also boost the value of an employee; considering the knowledge gained while conducting varied tasks.
- Task significance reflects the impact of one's job on the lives or works of others, whether inside or outside the organizational environment (Hackman & Oldham, 1975, 1980; Morgeson & Humphrey 2006). As employees realized that their jobs are strongly related to other people; via the perceptions of the jobs' social impact and worthiness, it could increase the employee's dedication and longevity with the organization. Experienced employees are indispensable to organization; making them as pillars that supports continuous interactions in creating knowledge within the organization.
- Task identity is where the employee performs identifiable tasks and involve in each step of the task completion from the beginning to end (Hackman & Oldham, 1976, 1980). Task identity could elevate a sense of pride in the employees toward their job (Hackman & Oldham, 1976). Employee involvement throughout a task could cultivate innovation. While the employee faced challenges or when strategizing improvements in the organizations' policies, procedures or products, it will promote critical and inventive thinking.
- Feedback from the job description that the job will provide sufficient information on the ones' job performance level (Humphrey, Nahrgang & Morgeson, 2007). Morgeson & Humphrey (2008) explain that the employee will receive timely feedback directly from the job they are performing. This feedback will allow the employee to assess their aims in relation to their job performance and most importantly, their proficiency and level of knowledge regarding the job.

There has been an emerging research interest in the subject of task characteristics. Several literatures have identified significant relations between the dimensions of task characteristics with several specific attributes. These includes the associations with job satisfactions and motivation (Parker, Wall & Cordery, 2001; Humphrey, Nahrgang & Morgeson, 2007; Indartono, 2009; Kumar, Abbas, Ghumro & Zeeshan, 2011; Bhatti, Syed & Shaikh, 2012), innovation (Holman et al., 2011; Spiegelare, Gyes & Hootegem, 2012; Wenjing, Wei & Shuliang, 2013), learning organization (Zare, Jajarmizadeh & Abbasi, 2010), knowledge sharing (Verma, 2013) and also knowledge productivity (Masrek, Yusof, Noordin, Johare, 2013).

Administrative and Diplomatic Officers (PTD)

Administrative and Diplomatic Officers or better known as Pegawai Tadbir dan Diplomatik (PTD), is one of the earliest schemes born as a continuation of the country's administrative machinery since before independence. PTDs are engaged in diverse level of employments in the Administrative and Diplomatic Service. This service has eight fields of specialization including (i) Administration and Development of Federal / Land / District / Local Government (ii) Economic Resource Management (iii) Financial Resource Management (iv) Human Resource and Organization Management, (v) Information Technology and Communication Management (vi) International Relations and Foreign Affairs (vii) Planning and Administration of Social / Infrastructure and (viii) Security and National Defense (Salehuddin, 2011).

The PTDs job is mainly focused on structuring, implementing and managing the country's public policies, including strengthening the administrative functions, social infrastructures and also the performance of economic growths (Pegawai Tadbir dan Diplomatik, 1999). Due to the rapid transformation and the increasing liability of the knowledge workers, the PTDs are required to have the knowledge, proficiency and skill sets that are appropriate to meet the current and upcoming challenges faced by the country. Thus, as the main policy makers of the government, the PTD need to act as the prime mover in promoting the widespread use of knowledge.

Given the significant roles played by the PTD, studies investigating their job design; particularly their task characteristics has been very limited. Job design plays an essential part in supporting the employees' work performance in achieving organizational relevant outcomes as it may directly or indirectly influence the manner they perform their responsibilities and tasks (Ali & Aroosiya, 2010). Hence, the PTDs' work diversity need to be parallel towards the government transformation agenda in achieving the status of a developed and high income nation by the year 2020. In the same light, to date, the applicability of the SECI model to signify the knowledge creation

process in the context of the PTD is still unknown. Therefore, there is a need to investigate on the four modes of the knowledge creation process, namely socialization, externalization, combination and internalization in the context of the PTD.

■3.0 RESEARCH FRAMEWORK

Figure 2 shows the theoretical framework used in this study. The framework was conceptualized based on Nonaka & Takeuchi (1995) and Morgeson & Humphrey (2006) studies. The independent variables are the dimensions of task characteristics, namely; work scheduling autonomy, decision making autonomy, work methods autonomy, task variety, task significance, task identity and feedback from a job. The dependent variable is the knowledge creation process or SECI; consisting socialization, externalization, combination and internalization.

As discussed in the literature studies in section 2, we recognized that many researchers have found a significant relationship between job design's task characteristics and job satisfaction. Several researchers have also revealed the relationship between some of the dimensions of task characteristics and innovation. Therefore, this study argued that the dimensions of task characteristics also could have relations with knowledge creation process (SECI). Becerra-Fernandez & Sabherwal (2001) also stated that the four modes of SECI is dependent on the presence of certain task characteristics. Based on this argument, the following hypotheses are established:

- H1: Work scheduling autonomy has a significant relationship with SECI.
- H2: Decision making autonomy has a significant relationship with SECI.
- H3: Work methods autonomy has a significant relationship with SECI.
- H4: Task variety has a significant relationship with SECI.
- H5: Task significance has a significant relationship with SECI
- H6: Task identity and feedback from job has a significant relationship with SECI

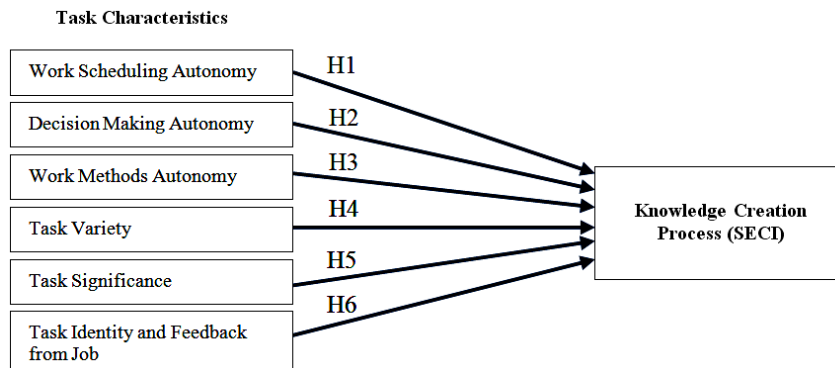


Figure 2 Research framework

■4.0 RESEARCH METHODOLOGY

This study employed the descriptive survey method where questionnaire was used as the instrument in collecting the research data. The questionnaire was developed based on the validated measures that have been empirically used in previous studies by Morgeson & Humphrey (2006) and Easa (2012). The questionnaire items were measured using a Likert scale anchored at 1 for "Strongly Disagree" to 7 for "Strongly Agree". High-level scale indicates a higher level of involvements towards the items being evaluated. The questionnaire had undergone several pre-testing sessions with several field experts and prospective respondents to ensure its quality and accuracy. Furthermore, it was also pilot tested with 36 officers. The results of the pilot test are as shown in Table 1; indicate the Cronbach Alpha for the majority of the variables were well above 0.7, suggesting that the questionnaire was perceivably reliable.

The population of the study was among PTDs working in federal ministries located in Putrajaya, Malaysia. A total of 548 questionnaires was distributed to targeted respondents based on stratified random sampling. The questionnaires were distributed accordingly to PTDs with different grade level. Several representatives were appointed to distribute and collect the questionnaires in each ministry. A total of 421 questionnaires was returned, giving a response rate of 76.8 %. However, only 305 questionnaires are complete; yielding to a total usable rate of 72.45%. The total number is perceived appropriate and in accordance with Sekaran (2003) suggested that the response rate need to be at least 15% of the total population. The usable questionnaires were analyzed statistically using IBM SPSS including the frequency analysis; descriptive analysis focusing on the mean and standard deviation; factor analysis (EFA) to assess the common method bias, correlation analysis to investigate the relationship between the variables and multiple regressions to test the research hypotheses.

Table 1 Sources of measurements of variables and results of pilot test

Variable	No of items	Sources of measurement	Cronbach Alpha of pilot test
Work Scheduling Autonomy	4		0.673
Decision Making Autonomy	4	Sims, Szilagyi & Keller (1976),	0.821
Work Methods Autonomy	4	Hackman & Oldham (1980),	0.847
Task Variety	4	Idaszak & Drasgow (1987),	0.685
Task Significance	4	Campion & McClelland (1991),	0.843
Task Identity	4	Rice & Rice (2005),	0.872
Feedback from Job	4	Morgeson & Humphrey (2006)	0.834
Socialization	5	Tsai & Li (2007),	0.649
Externalization	5	Martin, Lopez & Novas (2008),	0.854
Combination	5	Schulze & Hoegl (2008),	0.864
Internalization	5	Easa (2012)	0.931

5.0 FINDINGS

Table 2 presents the demographic profile of the respondents. Out of 305 respondents, 51.1% were female and the remaining 48.9% were male. With regard to the respondents' age, the highest percentage was aged between 30 and 34 while the lowest percentage was less than 25 years.

Table 2 Demographic profile

Characteristics	Items	Frequency	Percentage
Gender	Male	149	48.9
	Female	156	51.1
Age	Less than 25 years	3	1.0
	25-29 years	97	31.8
	30-34 years	109	35.7
	35-39 years	56	18.4
	40-44 years	20	6.6
	45-49 years	10	3.3
	50 years and above	10	3.3

Harman's single factor test was conducted to test the presence of common method effect. Method variance can either inflate or deflate the relationships between constructs and may further bias the estimates of the accurate relationship among the observed constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Meade, Watson, & Kroustalis, 2007). All items from the constructs of the study were analyzed and loaded to a single factor. The results revealed that the single factor explained 45.3%, less than the benchmark value of 50% of the total variance, suggesting that a common method variance is unlikely to confound the interpretations of results. A reliability analysis was also conducted and the results showed that the Cronbach Alpha values are well above the cutoff value of 0.7. The Cronbach Alpha values are between 0.849 and 0.932 suggesting that the developed instrument for this study is highly reliable.

The mean scores of the entire variable stated well above the midpoint value, which is 4.00, suggesting that the respondents inclined to practice with the listed task characteristic dimensions, i.e. work scheduling autonomy, decision making autonomy, work methods autonomy, task variety, task significance, task identity and feedback from job (see Table 3). Meanwhile, the results of the correlation analysis suggest that all the independent variables have a moderate relationship with knowledge creation process (SECI); signifies that each independent variable has some influence with SECI. The strongest relationship is for the variable decision making autonomy ($r = 0.400$, $p < 0.01$), followed by work methods autonomy ($r = 0.359$, $p < 0.01$). Based on this result, all the established hypotheses; H1, H2, H3, H4, H5 and H6 are fully supported.

Table 3 Mean, standard deviation and correlation analysis

	Cronbach Alpha	Mean	Std. Deviation	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] Identity and Feedback	0.908	5.429	0.869	1.000						
[2] Decision Making	0.916	4.742	1.194	0.583**	1.000					
[3] Work Scheduling	0.890	5.495	1.028	0.582**	0.679**	1.000				
[4] Task Significance	0.849	5.549	0.985	0.487**	0.308**	0.326**	1.000			
[5] Task Variety	0.889	5.735	1.131	0.392**	0.360**	0.340**	0.370**	1.000		
[6] Work Methods	0.884	5.218	1.041	0.629**	0.721**	0.609**	0.380**	0.445**	1.000	
[7] SECI	0.932	4.635	1.020	0.339**	0.400**	0.271**	0.335**	0.269**	0.359**	1.000

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Regression analysis was executed to identify the significant predictor for SECI (see Table 4). The F statistics produced ($F = 37.912$, $p < 0.01$) confirms the fitness of the regression model. The coefficient of determination, R^2 was 0.214, which suggests that the six factors can significantly account for 21.4% contribution towards SECI. However, only two factors were found to be the significant predictors for SECI which are decision making autonomy and task significance. The coefficient value for decision making autonomy states 0.274; thus every unit increase in the decision making autonomy score will subsequently increases the SECI score by 0.274 point.

Table 4 Results of regression analysis.

R	0.463				
R^2	0.214				
F	37.912				
P value of F	0.000				
Variables in the equation					
	<i>b</i>	SE <i>b</i>	Beta (β)	t	<i>p</i> value
Constant	1.942	0.332		5.856	0.000
Identity and Feedback	0.074	0.555	0.062	1.042	0.298
Decision Making	0.274	0.048	0.321	5.747	0.000
Work Scheduling	-0.056	0.523	-0.045	-0.758	0.449
Task Significance	0.254	0.057	0.248	4.440	0.000
Task Variety	0.039	0.770	0.038	0.637	0.525
Work Methods	0.060	0.456	0.045	0.756	0.450

6.0 DISCUSSION

The present study provides both theoretical and practical contributions to understand the relationship of job design's task characteristics and knowledge creation process (SECI). All six dimensions of task characteristics are found to have significant relationships with SECI, suggesting the relevance of well-designed task characteristics in supporting the creation of knowledge.

Further analysis showed that only two out of six dimensions of task characteristics; namely decision making autonomy and task significance are the significant predictors of SECI. The results imply that, in the absence of these characteristics, respondents' capability towards knowledge creation process could be impacted. Decision making autonomy is found to be the strongest significant predictors for SECI. As mentioned by Nonaka & Takeuchi (1995), decision making autonomy could direct towards a better productivity as employees are likely to be engaged in more complex situations that requires more creative solutions. Hence, it is practical for the employee, in this case the PTD to be engaged and familiarized with knowledge creation activities such as learning by doing, teamwork and brainstorming as it could have them to be more autonomous while steering their responsibilities.

Meanwhile, based on the result, the absence of the remaining task characteristics dimensions namely work scheduling autonomy, work methods autonomy, task variety and task identity and feedback from job; suggest that these dimensions are disregard in the process of creating knowledge. Given this alarming result, organizations should take into consideration in assessing their job design; particularly on the impact of job design's task characteristics towards the creation of organizational knowledge.

Accordingly, the federal ministries will need to understand the importance of well designed jobs which could lead to a positive impact on the PTDs' performance's quality and knowledge innovations. The concept of job design could be tailored to a specific job role of an employee. Thus, a well-designed job role could increase the effectiveness of its task characteristics in prompting the creation and the usability of knowledge. Consequently, the ministries need to facilitate the PTDs in engaging and familiarise with the knowledge creation process; understanding the importance of their task diversity which need to be parallel towards continuous progression in creating knowledge.

7.0 CONCLUSION

The aim of this study has been to explore the relationship between job design's task characteristics and knowledge creation process (SECI). For this purpose, an empirical based framework drawn upon Nonaka & Takeuchi's (1995) SECI model and Morgeson & Humphrey's (2006) study has been developed. Task characteristics consist of six dimensions, which are work scheduling autonomy, decision making autonomy, work methods autonomy, task variety, task significance and task identity and feedback from a job. Knowledge creation process (SECI) consists of four dimensions, which are socialization, externalization, combination and internalization. The results of the analyses suggest that all six dimensions of task characteristics were found to have a significant relationship with SECI. Further analysis shows that decision making autonomy and task significance are the truly significant predictors. While this study has achieved its objectives, it is still subject to several limitations. Firstly, in this study, non-response bias was not assessed. Secondly, this study collected data based on perceptual measures. Future studies should address this issue and also consider extending the framework by integrating other independent variables.

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