INNOVATIVE BEHAVIOR OF EMPLOYEES IN SRI LANKAN SOFTWARE COMPANIES

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Abstract- Along with the advancement of the technology, software companies have to face a huge competition in the global and local market. To face this competition innovations can be used as a strategic weapon. As employees are the main driving forces of innovation, their behavior can be a crucial factor in boosting innovation. Innovative behavior is referred as the introduction and application of new ideas, products, processes, and procedures to a person's work role or an organization. This behavior directly affects innovation performance of an organization. The main aim of this study is to identify the factors that affect employee innovative behavior and their effect in Sri Lankan software companies using a quantitative methodology. Apart from that this study provides a conclusive summary of the current status of the innovative behavior of employees. Factors that have been proved by previously done research were used. So nine factors were considered to cover a broad area of innovative behavior. A model was constructed by considering the above factors to get a clear idea about the study. Findings of the study emphasizes that both individual and organizational factors effect on innovative behavior. Results have proven that psychological capital, organizational support, rewards, resource availability, leadership and social capital have a significant impact on employee innovative behavior while organizational structure, organizational commitment and work characteristics haven't any impact. Proposed model was reconstructed according to the results and areas that should be improved were identified.

Keywords- Innovation, Innovation performance, Quantitative methodology

I. INTRODUCTION

Employees are the main driving force of the innovation in the industry (Li & Zheng, 2014). So the employee innovative behavior is very crucial, which can defined as an act of generating, promoting and application of innovative thinking in the organization for the purpose of personal and organizational performance (Li & Zheng, 2014; Chatchawan1 et al. 2017). Innovative behavior enables to use innovative ways of thinking, quickly and accurately respond to customer demand changes. Influence on employee innovative behavior can be divided mainly into two categories as internal and external factors (Lukes & Stepahan, 2017; Li & Zheng, 2014; Smith et al. 2012). Internal factors refer to innovative personal traits and ability to participate in innovation, and external factors including the team environment (technology, culture, resources and etc.) and the support of leaders (Smith et al. 2012; Chatchawan1 et al. 2017; Monteiro et al. 2016).

As software companies in Sri Lanka are constantly evolving, it is important to know how a companies' ability to innovate can be improved. All innovative activities can be traced back to the behavior of employees. This absolutely makes the employee the center point of attention. It is difficult for innovation to be forged by an individual alone. As a result, a great deal of attention should be paid to the factors affecting innovative work behavior. (Chatchawan et al. 2017). In order to understand the state of innovative behavior of employees, it is important to go through difficulties and obstacles

which employees meet when they engage in innovative activities. For that we should consider the barriers in both internal and external factors regarding employees. The relationship between factors and barriers is that if a factor affect the subject negatively, it becomes a barrier. Therefore, the organizations have to take measures to stimulate the innovation willingness of employees and promote their innovative behavior. (Kabasheva et al. 2015).

Most of the research have been done on investigating the effect on individual or organizational factors that affect innovative behavior of employees in organizations. Only few research were there addressing both individual and organizational factors in the same research. And another problem was that, 75% of the research were qualitative and conclusive studies and they have not been focused on finding the current state of the employee innovative behavior. In the Sri Lankan context, no any research was published addressing the employee innovative behavior in software companies. Some of research were found regarding innovations in organizations. Therefore there is need of comprehensive study regarding this research topic. This study is aimed to investigate the effect of the factors that affect employee innovative behavior by identifying the current status of employee innovative behavior and to provide a conclusive summary regarding those factors, in Sri Lankan software companies. Furthermore this study helps to identify measures to stimulate the innovation willingness of employees and promote their innovative behavior.

The study consist of research problem, review of the relevant literature, methodology, data analysis, results and discussion sections. Final section provides the conclusion of the whole study including the future research possibilities.

II. METHODOLOGY

A. Research Methodology

In order to identify and examine the effect of organizational and individual factors on employee's innovative behavior of Sri Lankan software companies, a conclusive research design based on the quantitative approach was used. The aim of this study is to identify the current status of innovative behavior of employees in Sri Lankan software companies. To do this, information should be gathered from different groups of employees who are engaging in activities related to software development in companies. Information should be collected from the management level, both senior and junior software developers to understand their motivation, obstacles, dissatisfactions, expectations, opinions and experiences regarding their work role and behavior inside the company.
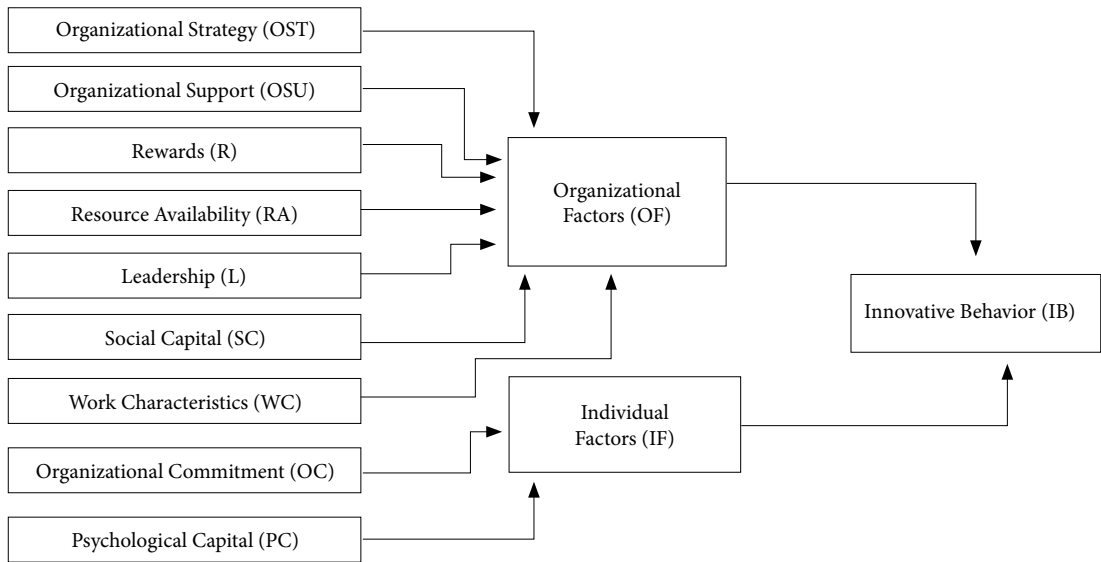
The quantitative survey method was chosen since it allows the collection of a large amount of data from a large population with a cost-effective manner (Rizkallah, et al. 2015). In order to do that, a questionnaire was used with proper scale and scope. Then the responses were statistically analyzed using SPSS version 20.

Before making the questionnaire, nine hypothesis have been formulated to cover the scope of the study and to measure the innovative behavior of employees in software companies. They were formulated by considering previously done researches as: **H1** - Organizational commitment influences on employee innovative behavior, **H2** - Psychological capital influences on employee innovative behavior, H3 - Organizational strategy influences on employee innovative behavior, **H4** - Organizational support influences on employee innovative behavior, **H5** – Personal rewards influence on employee innovative behavior, **H6** – Resource availability influences on employee innovative behavior, **H7** – Leadership influences on employee innovative behavior, **H8** – Social capital influences on employee innovative behavior, **H9** – Work characteristics influence on employee innovative behavior.

B. Questionnaire Design

Questionnaire was designed under two main factors and nine sub factors based on the hypothesis. Figure 1 shows the research model developed in order to get clear idea about the relationship between those factors (Dorner, 2012; Chatchawan et al. 2017; Monteiro et al. 2016). Here innovative behavior (IB) acts as the dependent variable and all others are independent variables (Shahzad et al. 2007; Hamdy, 2015). In the questionnaire, first respondent has to fill their name, age, designation and experience in their position. Then the rest of questions were provided with several options. Five-point Likert-type scale was used to capture responses from the employees which allowed them to make their level of agreement such as strongly agree, agree, no idea, disagree,

Figure 1. Research Model

III. RESULTS

A. Demographic Analysis

The dataset was analyzed by SPSS version 20 using various statistical tools. Demographic analysis was done while considering the frequencies of demographic variables. A dataset consisted of 100 valid responses was used to carry out the analysis part. Out of 100 responses, 62% and 38% represented male and female respondents respectively. Most of the respondents were young individuals between 25-35 years of age which was 70% of total responses. Rest of 30% was below 35 years of age. When considering the current position of employees, majority were software engineers which was 61% of the total responses, 16% were quality assurance engineers, 7% were business analyst and 6 % were software designers. All other positions were covered by the rest of responses including the high level management positions. Almost 50% of the respondents have got 6 months or less experience, 20 % have got 1-2 years of experience and rest 30% have got above 2 years of experience in their positions.

B. Measurement model assessment

Before doing descriptive, correlation and regression analysis, it is important to assess the measurement model.

and strongly disagree. Respectively scores of 5, 4, 3, 2, and 1 were assigned for the above mentioned categories. Therefore considering Likert-type scale, all items can be divided in to three main categories as values over 3, and values below 3 and values equal to exactly 3. (Shahzad et al. 2017) They can represent positive negative and neither positive or negative respectively. Value 3 is the mean value and it would be the decision criteria for this survey.

The preliminary designed questionnaire was given to some of experts in software engineering filed to ensure the content validity. All the questions were examined and checked that the survey items achieve research objectives. And after the confirmation of the questionnaire pilot test was done by giving the questionnaire to 25 individuals in the field. They were invited to complete the survey, to comment on whether the questionnaire is legible, understandable and any other comments to improve the design and content of the questionnaire. After that some modifications were done according to the comments, more designations were added when selecting position and also option to select gender was added. Then the reliability of the questionnaire was checked using Cronbach's alpha technique (Shahzad et al. 2017). Then four questions were changed again and rechecked the reliability. After the final confirmation, the questionnaire was developed in google forms and link was provided to employees in software companies through internet. (Vasanthapriyan et al. 2017).

For that reliability and validity of the questionnaire was checked. Validity of the questionnaire was tested using Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett's test of sphericity (BTS). BTS is a statistical test used to test overall significance of correlation. Criteria: 0.90s-marvellous, 0.80s-meritorious, 0.70s-middling, 0.60-medicore, 0.5s-miserable and below 0.5 is unacceptable. Table 2 shows that KMO value is above 0.79 which is an acceptable value and BTS is also a strong value. Reliability was checked using Cronbach's alpha technique (Shahzad et al. 2007; Vasanthapriyan et al. 2017; Hamdy, 2015). The value 0.50 was used as the threshold value to indicate adequate reliability for this study (Vasanthapriyan et al. 2017). The values of Cronbach's alpha were; OC= 0.71, PC= 0.27, OST= 0.87, OSU= 0.74, R= 0.52, RA= 0.60, L= 0.50, SC= 0.59, WC= 0.74 and IB= 0.54 as in the Table 2. As all the values were above 0.5, it was confirmed that reliability of the questionnaire was in a good state.

Table 2. Descriptive Statistics and Reliability

Factors	No of Items	Mean	Std. Deviation	Cronbach's Alpha
OC	4	3.73	0.61	0.71
PC	6	3.96	0.48	0.62
OST	6	3.88	0.63	0.87
OSU	4	3.71	0.74	0.74
R	2	3.66	0.85	0.52
RA	4	3.76	0.63	0.60
L	4	3.80	0.62	0.50
SC	6	3.75	0.55	0.59
WC	4	4.06	0.64	0.74
IB	2	3.68	0.72	0.54

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.798
of Sphericity Bartlett's Test	Approx. Chi-Square	3310.348
	df	780
	Sig.	.000

C. Descriptive Analysis

According to the Table 2, work characteristics and psychological capital has the highest mean values and rewards and innovative behavior has lowest mean values. Table 2 shows mean, standard deviation and Cronbach's alpha for each variable.

D. Correlation Analysis

To analyze the relationship between organizational factors, individual factors and Innovative Behavior (IB) Pearson Correlation matrix was used as shown in Table 3. Many indicators were used to determine influence of factors over innovative behavior of employees. From the data it was found that all the variables have got positive correlation between each other with $\rho < 0.05$ significant

value. The correlation of organizational support (OST) and innovative behavior (IB) was found as the highest correlation (r = 0.88, $\rho < 0.01$). Significant positive correlation was found between leadership (L) and innovative behavior (IB) (r = 0.79, $\rho < 0.01$). Next highest was between innovative behavior (IB) and psychological capital (PC) (r = 0.66, $\rho < 0.01$). Least correlation coefficient was found between organizational support (OST) and rewards (R) (r = 0.27, $\rho < 0.01$).

C. Regression Analysis

The Linear regression model has been developed in order to test hypothesis. (Shahzad et al. 2007; Edison et al., 2013). Multiple correlation coefficient R = 0.94 indicates

that there is a strong correlation between the innovative behavior (IB) with other variables. The most significant independent variables were in order: organizational support (OSU) ($\rho = 0.000$), leadership (L) ($\rho = 0.003$), psychological capital (PC) ($\rho = 0.007$), resource availability (RA) ($\rho = 0.033$), social capital (SC) ($\rho = 0.039$) and rewards (R) ($\rho = 0.040$). Other three variables, organizational commitment (OC), organizational strategy (OS), work characteristics (WC) were not significant in the regression model as their ρ values were over '0.05'. Therefore according to the data H1, H3 and H9 were

Table 3. Correlations

	OC	PC	OST	OSU	R	RA	L	SC	WC	IB
OC	1									
PC	0.57**	1								
OST	0.41**	0.48**	1							
OSU	0.33**	0.53**	0.27**	1						
R	0.44**	0.53**	0.66**	0.32**	1					
RA	0.35**	0.47**	0.39**	0.34**	0.58**	1				
L	0.38**	0.61**	0.41**	0.69**	0.53**	0.45**	1			
SC	0.39**	0.41**	0.40**	0.43**	0.55**	0.46**	0.56**	1		
WC	0.40**	0.49**	0.46**	0.48**	0.38**	0.28**	0.44**	0.33**	1	
IB	0.41**	0.66**	0.36**	0.88**	0.52**	0.52**	0.79**	0.58**	0.47**	1

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

removed because they haven't got any relationship with innovative behavior (IB). And H2, H4, H5, H6, H7 and H8 were identified as supported hypothesis. They showed a positive influence as their regression coefficient and t values were positive ($\beta > 0$, $t > 0$). In terms of variability of the, the R2 of 0.89 indicates that 89 percent of variability of the innovative behavior can be discussed by the six most significant variables (SC, L, OSU, RA, PC, and R). Model was reconstructed according to proven results as shown in Figure 2. Results of regression analysis are shown in Table 4

IV. DISCUSSION

In this study, innovative behavior was measured via nine possible dimensions which were briefly discussed in the literature. Past researches have considered only limited factors, and most of the studies have followed a qualitative methodology. But in this study quantitative research methodology was used. Analysis of the results showed that almost 75% of respondents have engaged in innovative activities in software companies. From them
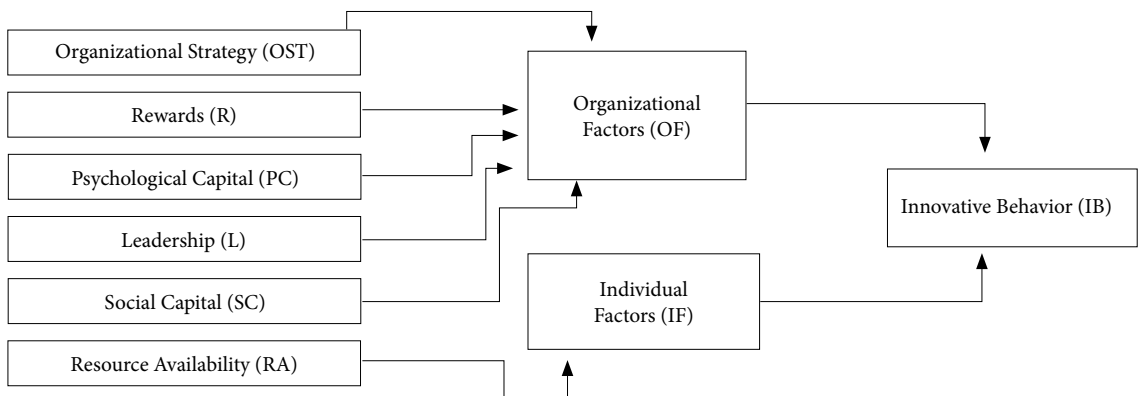

Figure 2. Reconstructed Research Model

Table 4. Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.842	.255		-3.299	.001
	OC	.006	.049	.005	.118	.906
	PC	.207	.076	.140	2.742	.007
	OST	-.092	.055	-.081	-1.656	.101
	OSU	.591	.050	.611	11.827	.000
	R	.100	.048	.118	2.082	.040
	RA	.111	.051	.098	2.163	.033
	L	.198	.066	.171	3.002	.003
	SC	.124	.059	.096	2.091	.039
	WC	-.040	.050	-.036	-.808	.421

a. Dependent Variable: Avg_Innovative behavior

about 20% of respondents have frequently engaged in innovative activities. In this study both individual and organizational factors that affect innovative behavior have been considered and also hypothesis related them have been proven. Monterio in his research has mentioned that both these factors affect employee innovative behavior (Monteiro et al. 2016).

Psychological capital comprises of confidence, attitude, hope, recovery (tolerance) which are crucial factors that affect innovative behavior of an employee. Results have proven that it has a significant relationship with innovative behavior. Correlation between psychological capital and innovative behavior is relatively high comparing with other values. Therefore importance of this factor can be proven using above results. These results are also consistent with Dorner's results (2012). Hamdy's study (2015) has stated that tolerance for risk has no relationship with innovative behavior, but in this study we have considered tolerance for risk combining the other factors. Results have highlighted that social capital which can be described as interaction and trust between employees and customers has a significant positive influence on innovative behavior. Shahzad

(2017) in his research has proven that team work has a positive relationship between innovation performance. This study's results also shows that social capital has a significant relationship with innovative behavior. Results of this research indicated that leadership is positively influencing the innovative behavior of employees in the regression analysis. Hamdy (2015) in his research has proven this relationship. Usually employees get motivated if manager is evaluating their ideas (Li & Zeng, 2014). Monteiro (2016) in his research has discussed this. Resources are important to improve innovative behavior of employees. Results prove that resources are limited in Sri Lankan software companies as it has the least mean value. But it has significant positive effect on innovative behavior. Organizational support also has a positive relationship with innovative behavior according to the results. It has the highest correlation with innovative behavior. Chatchawan (2017) has mentioned this factor as an important one in his proposed model. So according to the results, innovative behavior of employees are highly depending on factors such as social capital, leadership and organizational support under the Sri Lankan context because they have the most significant relationship with innovative behavior. The results of this research indicated

that reward also has positive relationship with innovative behavior. The correlation between reward systems and innovative behavior is significant. These results are consistent with Hamdy's (2015) and Shahzad's (2017) studies. In the Sri Lankan context it is very important to motivate employees. Hamdy (2015) also have highlighted that higher rewards will lead to more innovative behaviors demonstrated by employees. Organizational commitment, work characteristics and organizational strategy have been pointed out as factors that affect innovative behavior from previously done research (Li & Zeng, 2014; Smith, 2008), but according to the results of this study, they have no relationship with innovative behavior. Therefore in Sri Lankan software companies there is no need to concern above three factors. This study provides six factors that affect employee innovative behavior in Sri Lankan software companies and their degree of effect and interrelationship. Most of the researches have been done by checking less number of factors. But this study covers a broad area using many factors. As this research also examined both individual and organizational factors, research gap is covered considerably.

V. CONCLUSION

Innovative behavior of employees is a crucial factor which leads to drive towards innovation. The aim of this study is to check the effect of organizational and individual factors on employee innovative behavior in Sri Lankan software companies. In conclusion, psychological capital, organizational support, rewards, resource availability, leadership and social capital are proved as the most important factors influencing employee innovative behavior in Sri Lankan software companies. This research has provide strong evidence to prove their relationship. The research model has been reconstructed according to the findings. Also the results emphasize that both individual and organizational factors effect on employee innovative behavior. According to the results individual's psychological characteristics have a significant effect on employee innovative behavior. And from the organizational view point it is important to have good support from the company and adequate resources must be there for employees. Strong management support should be provided in order to evaluate employee ideas and to motivate them. Another important thing is encouragement and appreciation of employees who engage in innovative activities in the company by giving rewards for them. So employee innovative behavior can be improved by positively influencing the factors that have been identified by this research study. This study also have found that organizational structure, organizational commitment and work characteristics have no relationship with innovative behavior of employees. Therefore future research should be done on investigating above factors to find more evidence to say that. And this study only focused on employees in Sri Lankan software companies. Therefore more studies should be done by covering other organizations also. As a conclusion finding of this study emphasize that psychological capital, organizational support, rewards, resource availability, leadership and social capital positively influence on employee innovative behavior in Sri Lankan software companies.

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