

Moderation effect on Innovation capability: Intellectual Capital and Innovation capability of the Apparel Industry in Sri Lanka

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Abstract: The main purpose of this study is to exhibit the moderation influence of organization characteristics between intellectual capital and innovation capability by constructing the relationship based on Intellectual capital of the Apparel industry in Sri Lanka. The shift of the traditional tangible assets the intellectual capital creates a crucial factor for the achievement of the innovation capability and successful firm performance. This study has been explored: First previous works have almost exclusively focused on the co-alignment between intellectual capital and innovation capability as compelled to deliver competitive advantage and firm performance. Second, while the relationship between intellectual capital and organizational characteristics has been theoretically inspected, and analyzed empirically. Third, the paper investigates the effect of intellectual capital on innovation capability by moderating role. The study was conducted in Sri Lanka. Random sampling technique was used for data collection. The structured questionnaires were administrated as a research instrument to collect the data from the respondents. The results demonstrated that the component of intellectual capital has significant positive relationship and moderated by organization characteristics on innovation capability. The findings of this research will be useful for Apparel Industry to understand and apply intellectual capital to create innovation in their organizations.

Keywords: Intellectual capital, Innovation capability, and Organization characteristics.

1 Introduction

The emergence of the knowledge economy, intense global competition and considerable technological advance has seen innovation become increasingly central to competitiveness. Innovation is diverse and pervasive. It is applicable to every facet of business activity of each enterprise. The importance of innovation to both individual organizations and the economic development of society have been highlighted in the literature as far back as. Huber (1984) [1] postulated that innovation, and institutionalized experimentation, will take on an added importance in post-industrial organizations, whose environments will be characterized by increasing knowledge, complexity and turbulence. More recent research has established a positive link between innovation and business performance [2]. The ability to innovate on a sustained basis, an innovation capability, is important as research has shown that organizations possessing innovation capabilities have a sustained

competitive advantage [4] and use it to achieve higher levels of performance [5].

Today, the intellectual capital is recognized as the most important and vital ingredient for the success of organizations in a competitive environment. Present economy is a knowledge-based economy. The main ingredients of the production-based economy were land, labor, capital and physical assets. However, in a knowledge-based economy intellectual capital has become more important to add values when it is compared to physical assets [6], [7]. And also the intellectual capital is the most powerful source to influence positively on the performance of organizations [8], [9].

The Apparel industry is very important for the development of economy in Sri Lanka. The role of Apparel industry in economy is highly acknowledged. The apparel sector around the world has grown as a knowledge concentrated sector in dynamic and competitive environment. The Apparel sector is a good sector for research on intellectual capital issue because this sector is knowledge intensive and its entire staff are moreover are identical intellectually. From the last decade, the Apparel sector has been undergoing dramatic change in both organizational and technological advancement pushing top management to reformulate their business strategies [3] (Cabrita and Bontis, 2008). In addition, Bhartesh and Bandyopadhyay (2005) [10] pointed out that it is very important for organizations to understand their intellectual capital assets and should need to be properly managed if the organizations want to compete successfully in competitive environment. Therefore, it is indispensable that the executives of the apparel industry learn to employ the intellectual capital to improve their Innovation capability in a knowledge-based economy.

Sri Lanka is a developing country and a small tropical island off the southern tip of India which is situated in South Asia. Today apparel industry has become one of the largest incomes generating avenue in the country. In fact apparel industry is one of the most lucrative foreign exchange earnings for the Asian region. It has contributed to the 52% of the country's export earnings. In addition to that the industry directly employs nearly more than 330,000 people as workforce all over the country. There are 891 garment factories of which 177 are small, 468 – medium, and 266 – large scale factories and also the industry produces around 500 mn. pcs. per annum of which woven accounts for 55% and knitted 45% [13]. The industry spreads the huge area of the

country and can be seen number of factories are operating in every district in the country. The significant character of this industry is 85% young women employees are been employed as workforce. Talking about apparel industry, industry use low technology & it can be introduced as labour intensive industry [14], [15]. The apparel industry is labour intensive industry, so individual behavior & attitudes of these industry workers are very important to identify.

Therefore, the overarching research question of this paper is, "What are the factors and intellectual capital practices that facilitate the development of innovation capability of the Apparel Industry of Sri Lanka?" in answering this question. We draw on the theoretical approaches of the resource based theory of the firm [16] (Barney, 1991) and the innovation literature that focuses on the organization level of analysis [17] [18].

2 Literature

2.1 Intellectual Capital

The importance of intellectual capital in a knowledge-based economy is widely accepted and Stewart (1997) [19] pointed out that intellectual capital is referred as to the accumulation of all knowledge, skills and expertise of employees that can lead to take competitive advantages. Intellectual capital is essentially defined as the knowledge assets that can be converted into value [20]. In addition, Bontis (1998) [11] illustrated that intellectual capital comprises three components: human capital, customer capital and structural capital. Moreover, researchers argued that intellectual capital is mainly based on intangible assets for example knowledge, skills of employees, customer satisfaction, loyalty, policies, procedures, social value, intellectual property, industrial property, faith, ethics etc., [12],[21],[11]. They argued that intellectual capital is mainly based on human capital, customer capital, structural capital, social capital, technological capital and spiritual capital. In this study, only three components of intellectual capital namely human capital, organizational capital and social capital were tested empirically.

Human capital is mainly based on the individual abilities, knowledge, know-how, talent, education, skills and experiences of employees in organizations [22], [12]. Human capital is a critical factor that create intellectual capital in organizations. Human capital is the most important component of intellectual capital, and it is critical for creativity and innovation [11], [12], [19]. Human capital is creative, bright and skilled employees with expertise in their function [23].

Organizational capital is also one of the most important components of intellectual capital. Organizational capital is a glue of organization. It based on the internal structure of the organization, to the processes and procedures, guidelines, rules and etc. It encompasses of all non-human storehouse of knowledge in organizations including organizational competitive intelligence, routine, formula, policies, procedures and

databases [24].

Social capital is recognized as one of the most important components of intellectual capital and as a sum of resources accumulated in the organization by a stable network of intra organizational relationships. Naphat and Goshal, [18] argued that organizations having high social capital can take more competitive advantage and they pointed out that it mainly based on three dimensions which is widely accepted such as structural, cognitive and relational. These dimensions of social capital create the value of the intellectual capital of an organization. Social capital represents the value of human connections based on confidence and on personal networks [25]. This includes relationships, attitudes and values that manage interactions among people and contribute to economic and social development in a society. These set of relationship with the remaining social agents which are playing highly significant role in the development of intellectual capital in an organization.

The dimensions of intellectual capital are the main sources of firm competitive advantage and superior performance [11]. The literature stressed that the one or several dimensions of intellectual capital can effect on the performance of organizations. However, the effect of dimensions of intellectual capital have varying magnitudes [22], [26]. Previous studies have found that intellectual capital has significant relationship with the Innovation capability and organizational performance [22], [3].

Human capitals refer to processes that relate to training, education and other professional initiatives in order to increase the levels of knowledge, skills, abilities, values, and social assets of an employee which will lead to the employee's satisfaction and performance, and eventually on a firm performance. Rastogi [27] stated that human capital is an important input for organizations especially for employees' continuous improvement mainly on knowledge, skills, and abilities. Thus, the definition of human capital is referred to as the knowledge, skills, competencies, and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being [28]. Human capital enhancement will result in greater competitiveness and performance. Meantime, there is a significant relationship between innovativeness and firm performance under the human capital philosophy [3]. The human capital focuses two main components which is individuals and organizations. This concept have further been described [29] that human capitals have four key attributes as follows: (1) flexibility and adaptability (2) enhancement of individual competencies (3) the development of organizational competencies and (4) individual employability. It shows that these attributes in turn generate add values to individual and organizational outcomes. Hence, all this debates fundamentally focuses on individual and organizational performance.

There is no doubt that social capital can be regarded as a conceptual innovation in contemporary management and other social science disciplines. Social capital has

facilitated a series of very important empirical investigations and theoretical debates which have stimulated reconsideration of significance of human relations, of networks, of organizational forms, of trust for quality of life and of developmental of performance of an organization.

New knowledge creation that results from learning from internal and external sources can help firms attain superior performance because of first mover advantages, responsiveness to customers, and the ability to adapt to changing and uncertain environments. Innovation capability is further not tradable in factor markets, path dependent, and is influenced by a firm's previous experiences [30], [31]. The key to competitive advantage lies in a firm's ability to identify and respond to environmental changes in advance of competitors. Therefore, the intellectual capital for Innovation capability in advance of motivation should lead to superior performance.

2.2 Innovation Capability

Innovation capability is defined by Kim [32] as the ability to create new and useful knowledge based on previous knowledge. According to Burgelman [33], innovation capability is the comprehensive set of characteristics of an organization that facilitate and support innovation strategies. An innovation capability is a higher order integration capability, that they have the ability to mold and manage different key organizational capabilities and resources that successfully stimulate the innovation activities [34].

The innovation capability is critical for competitive advantage; however, we still do not know how to develop it. This capability has been discussed as "dynamic capability" [35], "core capability" [36], "core competence" [37], and "integrative capability" [17], and these authors consider it as key for competition. However, despite the extensive debate about its importance, there is still limited understanding of how organizations develop it. It is difficult to say how one should invest to build a competitive advantage.

Knowledge creation in this study denotes an intellectual capital to apply knowledge that has been acquired and learned, to commercial ends. It refers to the capability to exploit acquired knowledge through finding out new, improved, and refined ways of doing things that create organizational value or increase operational efficiency [31]. Knowledge exploitation in this sense is evident, for example, in new ventures which have the ability to capture knowledge from their customers, and then use it to create new competencies. The knowledge creation perspective taken in the literature as an incremental innovation. Incremental innovations refine and reinforce existing products, services, and processes typically by exploiting the existing knowledge base of a firm [38].

The resource that can be useful for innovation is important. There are important resources to innovation such as knowledge and the abilities and competencies of

employees and managers. Innovation also is defined as the capability to develop new products that satisfy market needs; applying appropriate process technologies to produce these new products; developing and adopting new products and processing technologies to satisfy future needs; and responding to accidental technology activities and unexpected opportunities created by competitors. Organizations with innovation strategy are the creators of change in their industries.

The potential impact of a firm's innovation capability on its competitive advantage has been widely recognized and documented in the international management and strategy literatures. An important source of competitive advantage for firms is to utilize organizational resources that are rare, valuable, inimitable, and non-substitutable [16]. Organizational resources are rare as long as the number of firms that possess a particular valuable resource is less than the number of firms needed to generate perfect competition. Thus, it follows that a firm's ability to create knowledge should be related to its competitiveness.

Therefore, an importance of management literature indicated that innovation capability has also come to be an important part of the competitive power of the competitive power of the firms. Innovation capability refers to the firm's ability to transform and knowledge and ideas into new products, processes systems for the benefit of the firms [34]. Concisely, innovation also needs the transformation and exploitation of existing knowledge. Nonaka [39] suggested, main importance of innovation occurs in organization when employees share their knowledge.

2.3 Organizational Characteristics

Several firm-level variables that can potentially affect the outcomes of the organization. In this study we were used organization characteristics such as size of firm, age of firm, award winner, and union present are as moderate variables. Firm size was measured as the total number of employees of the operation. Firm age was measured as the age when the firm was originally established in. Presence of an upstream value activity was measured by combining two items which asked about the firm status and the employee involvement in the business process. Numerous organizational factors beyond intellectual capital may influence innovative capabilities. For example, large organizations may be more likely to develop innovative capabilities owing to their extensive resource bases; however, smaller organizations may be more innovative owing to their flexibility. Thus, we controlled for any extraneous effects of organization size. Size was measured as the natural logarithmic transformation of the number of fulltime employees. Additionally, we controlled for age of organization, whether the organization has been established before. We measured status of organization by asking question that has been awarded. Lastly, nature of the organization, we measured how employee can contribute effectively to achieving organization goals. The nature of the

organizations and employee contribution are competing in environment control which is known to influence their innovative capabilities.

Therefore, an organization should develop the human capital that cannot be imitated by the competitors easily, converting the wisdom and capabilities it has accumulated into its core competencies: operating the functions of organizational capital to create distinct characters of an organization. It establishes an irreplaceable external relationship to enhance an organization's social capital, and the synergy created from the interaction among human capital, organizational capital and social capital is a key for an organization to build competitiveness.

In order to identify the relationship of intellectual capital and the Innovation capability of apparel industry in Sri Lanka, three components of intellectual capital, namely human capital, organizational capital and social capital were employed. Previous studies revealed that intellectual capital is positively associated with the Innovation capability of organizations [22], [40]. The research model adopted for this study is mainly based on three independent variables namely human capital, organizational capital, social capital and a dependent variable, innovation capability. The flow of relationship between the variables is depicted in Figure 1.

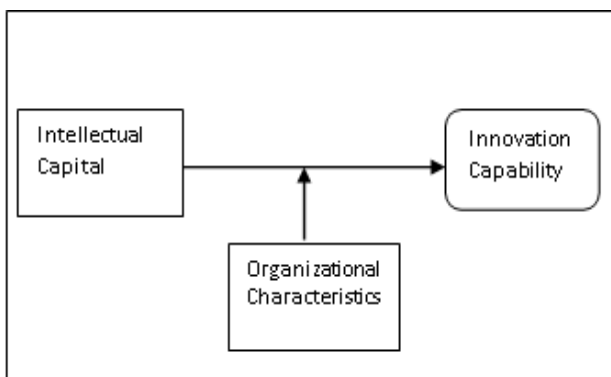


Figure 1: Conceptual Framework

Source: Author developed

Based on the above model, the following two research hypotheses were constructed.

H1: Intellectual capital has a significant, positive effect on Innovation capability of the Apparel Industry in Sri Lanka.

H2: Organizational characteristics will moderate the relationship between Intellectual capital and Innovation capability of the Apparel Industry in Sri Lanka.

3 Methodology

3.1 Research Instruments

A structured questionnaire based survey having 42 items was used to collect the data from Apparel Industry in Sri Lanka. The amended version of [11], [41], [42],

[43], questionnaires items were used for this study. The amendments were made to ensure that the constructs is relevant to this research in Sri Lankan context. A total of 150 set of questionnaires were distributed in Sri Lanka. A total of 70 set of complete questionnaires were returned. The response rate was 47% which was considered as a good.

The questionnaire design of the research follow each observable dimension and the measurement of questionnaire adopted five-point Likert scale, a score of 1 to 5 was given according to the extent of agreement and disagreement, a 5-point represents a strong agreement, a 1-point represents a strong disagreement, the higher the extent of agreement, the higher the score; conversely, lower scores. With regard to the questionnaire design of intellectual capital the about three dimensional scales of intellectual capital were used to design 15 questions. With regard to the questionnaire design of organizational characteristics, the scales of 4 questions were designed, such as size, age, rewards winner, and union present. As to the measuring indicator of Innovation capability a total of 6 questions were used.

The research divided the questionnaire into three concept variables of intellectual capital, organization characteristics, and innovation capability. And each concept variable can be divided into the following observable variables, and each observable variable has several questions in the survey. The data obtained from the survey was then processed, and the original questionnaire data file was established; as to the construction of the measurement system of the research model, although the questionnaire design followed the method of itemized measurement.

The data were screened and cleaned, to ensure the reliability of the instrument Cronbach Alpha was used. Cronbach Alpha value is widely used to check the reliability of the construct. The results showed that intellectual capital had a coefficient of 0.904, and Innovation capability had 0.857 coefficient. All constructs had showed above the suggested value 0.5 [45]. Therefore, on the basis of reliability test it was assumed that the scales used in this research is reliable to capture the constructs. Then, Pearson correlation analysis was used to test the relationship between independent and dependent variables and, to test the interaction between the independent variables and the moderating variable, the Baron and Kenny methods was used.

3.2 Moderation Analysis

Moderator variable is an interaction variable that affects the strength of the relationship between an independent variable and dependent variable. Specifically within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables. In the more familiar analysis of variance (ANOVA) terms, a basic moderator effect can be represented as an interaction between a focal independent variable and a factor that

specifies the appropriate conditions for its operation [44]. Another way to think about this issue is that a moderator variable is one that influences the strength of a relationship between the two other variables. A moderator variable is a variable that moderates the relationship between other variables, Example; the relationship between X and Y depends on the level of some third variable, Z. size of the firm (Z) may moderate the relationship between intellectual capital (X) and Innovation capability (Y).

$$Y = i_1 + aX + eY \quad (1)$$

$$Y = i_2 + aX + bZ + eY \quad (2)$$

$$Y = i_3 + aX + bZ + cXZ + eY \quad (3)$$

4 Results and Discussions

As indicated earlier this research study attempted to explore the relationship between the components of intellectual capital and innovation capability of apparel industry and two research hypotheses were constructed. To test research hypotheses Pearson correlation was used. The results of the study indicate that the components of intellectual capital are positively related to the innovation capability of apparel industry in Sri Lanka. The result also shows that intellectual capital has more positive relationship with Innovation capability as compared to other variables. Moreover, judging from the findings of the Pearson correlation size and age have negative relationship on Innovation capability and Awards win and Union present have positive relationship with innovation capability. Therefore, the findings supported these research hypotheses of the study. The results of Pearson correlation are depicted in Table 1.

Table 1: Pearson Correlation analysis

Variables	IC	InC	Size	Age	Awards	Union
InC	0.822					
Size	-0.680	-0.537				
Age	-0.738	-0.580	0.888			
Awards	0.661	0.420	-0.448	-0.538		
Union	0.614	0.618	-0.299	-0.384	0.339	

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

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

Source: Survey data

A single-factor analysis of variance on the innovation measure reveals the expected effect of Intellectual capital

on Innovation capability, $F(1, 68) = 141.605, p < 0.000$. All possible pairwise comparisons between group means using a pooled error term reveals that those assigned to the highly had a significantly more positive on innovation capability.

Table 2: Regression statistics and Model summary

Variables	Mean	SD	M1	M2	M3
IC	3.76	0.701	0.822**	0.865**	0.213
			(0.000)	(0.000)	(0.777)
InC	3.88	0.714	<i>a</i>	<i>a</i>	<i>a</i>
Size	2.457	0.943		-0.011	-1.101
				(0.941)	(0.373)
Age	1.729	0.479		0.022	0.070
				(0.889)	(0.936)
Awards	3.171	1.560		-0.199*	-1.208
				(0.031)	(0.087)
Union	3.728	1.350		-0.160	0.538
				(0.070)	(0.462)
IC x Size					0.869
					(0.422)
IC x Age					-0.036
					(0.960)
IC x Awards					1.317
					(0.157)
IC x Union					-0.516
					(0.632)
β			0.731	0.505	3.242
R^2			0.671	0.719	0.732
F			141.605	32.717	18.249
Sig			0.000**	0.000**	0.000**

a-(Constant) dependent variable,

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

Source: Survey data

We illustrate the causal steps strategy using our pilot study data. First recall that it has already been established above that Intellectual capital (X) affected Innovation capability (Y), as revealed by a statistically significant single-factor ANOVA. There is also evidence from a single-factor ANOVA that X affects organization characteristics (Z) influenced on innovation capability, $F(5, 64) = 32.717, p < 0.000$. All possible pairwise comparisons between group means reveals that the Intellectual capital on Innovation capability as significantly more interactive by moderating variable organizational characteristics as Size, Age, Awards winner, and Union present. There is a relationship between Intellectual capital and Innovation capability

after controlling for condition, such that the organizational characteristics had a significantly positive and negative impact on innovation capability about the value, $b = 0.505$, $p < 0.000$. This establishes that Z is related to Y, holding X constant.

5 Conclusion

The main purpose of study was to find out the impact relationship of intellectual capital with the Innovation capability and this impact result was moderated by organizational characteristics of Apparel Industry in Sri Lanka. Generally, the study concludes that intellectual capital is a very important factor for the success of the organizations in a knowledge based economy. On the basis of findings the study suggests that the intellectual capital can play a significant role and organizational characteristics are moderating to enhancing the innovation capability of Apparel Industry in Sri Lanka.

The findings of the study will be helpful to practitioners, policy makers and top level managers to understand the concept and role of intellectual capital in depth. This is a preliminary study in apparel industry to analyze the role of intellectual capital in apparel industry in Sri Lanka. Therefore, this study will be a milestone for practitioners to explore their intellectual capital in more appropriate way. This study also has some limitations like sample size was small, therefore the findings of the study may not be applicable in all industries. The researches would like to suggest future researchers to extend the sample size for more generalized results.

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