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Innovation Success Recipes Configuration to Apparel Industry: Evidence from Apparel Manufacturing Multinational Firms Operating in Ethiopia

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Abstract

This study ultimately aspires to examine how different innovation capability components can be configured to give high innovative performance in the context of apparel industry. Since apparel industries need specific innovation capabilities due its time-sensitive nature to ensure their sustainable competitiveness, innovative capability configuration is thus a hub to boost up its competitiveness. To this end, this study has considered 17 apparel manufacturing multinational firms operating in Ethiopia to configure the innovation capabilities of the industries. Hence, the study has obtained five factors through principal component analysis (PCA) method. In so doing, through fuzzy set qualitative comparative analysis (fsQCA), the five factors have been configured towards best recipes that enable apparel firm's innovation performance in ensuring their sustainable competitiveness. Finally, three alternative solutions are revealed that could bring high innovation performance in apparel industry. To this effect, improvisational and transactional capabilities are believed to be found in all three alternative solutions. Eventually, the findings of this study are expected to have paramount contribution to the ongoing literature in a way that sustainable competitiveness schemes for apparel industries are needed to build innovation capabilities, whereas improvisational capability is essential to stabilize in the dynamic and ever changing global market.

Keywords: fsQCA, low-tech firms, innovation capabilities, success recipe

1 Introduction

As uncertainty and change are major features of today's business scenario, innovation is thus a vital strategic weapon to combat challenges imposed by the environment. Firms need to build its innovation performance to ensure sustainable competitiveness. In this regard, firm level innovation studies so far acknowledged two perspectives: innovation as research and development (R&D) born and a result of different innovation capabilities(Ruffoni et.al., 2018). Regarding the first perspective, there is a misconception in understanding innovation and R&D(Arundel et.al., 2007). This confusion might thus lead to the conception so far that prioritizes R&D to get the main emphasis of developmental and policymaking research in the field of innovation(Huang et.al, 2010). In practice, R&D is neither a necessary nor a sufficient condition for innovation(Barge-Gil et.al., 2011). In this respect, a surprising evidence identified by Arundel et.al., (2007) asserts that almost half of manufacturing firms across Europe do not perform R&D but they are still innovative.

Concerning the second approach, innovation performance comes as a function of different innovation capabilities. Richardson (1972) defined innovation capability as "firm's accumulation of knowledge, experience and skills, which will be responsible for the acquisition of competitive advantages." Regarding low-tech firms, their innovative performance comes from their specific innovation capabilities

(Reichert et.al., 2016). Several recent studies suggested a set of capabilities: operational capability (OC) (Zawislak, Padula, et.al., 2012), transaction capability (TC) (Zawislak, Alves, et.al., 2012), developmental capability (DC) (Zawislak, Alves, et.al., 2012), management capability (MC) (Zawislak, Alves, et.al., 2012), improvisation capability (IC) (Cao, 2013; L. Kung, 2015; L. A. Kung & Kung, 2019; Wang, n.d.).

Among the aforementioned studies, only Reichert et.al., (2016) used Zawislak's et.al., (2013) four dimension innovation capabilities to explore and suggest success recipes of high innovation performance in Brazilian low-tech industries. They confirm that innovation performance of a firm cannot be attained via a single competence. Whereas, for low-tech industries innovation capability, they formulated a success recipes by configuring innovation capabilities using 24 items: developmental capability (6 items), operations capability (6 items), management capability (7 items), and transaction capability (5 items) by using Brazilian industry data for years from 2010-2014. In so doing, though they have attempted to reduce heterogeneity problem by excluding 17 firms having employee number more than 500, heterogeneity to the sector specificity within the low-tech industries arises. Consequently, it can be deduced that it is due to heterogeneity problem that Pavitt's (1984) taxonomy of industries was criticized by scholars in the regard.

In this study, it has been aimed to understand the causal relationships between important aspects of apparel firms' innovation capabilities with their innovation performance. In order to find out causal conditions, more importantly configurations of causal conditions, and how these conditions contribute to innovation performance of apparel firms, the PCA (principal component analysis) and fsQCA (fuzzy set qualitative comparative analysis) have been employed. To this end, information gathered from 17-apparel manufacturing multinational firms (all are 100% export oriented and working in industrial park) were used. From this study analysis, it has been identified three possible configuration of improvisational, developmental, operational, management, and transaction capabilities that can lead apparel firms to achieve high innovative performance. Hence, from all the three alternative configurations, improvisational and transactional capabilities are identified as core elements. This study finding contribute to the ongoing literature in a way that sustainable competitiveness schemes for apparel industries are needed to build improvisational capabilities to stabilize in the dynamic and ever-changing global market and also provided three alternative combinations of innovation capabilities for the success of apparel industries.

For formulating best innovation capability recipes that can lead apparel firms towards higher innovation performance, the study used structured questioner administered through the help of IPDC (industry park development office). In general, this paper is organized into literature review, the methodological approach, the result, discussion and finally the conclusion parts.

2 Literature review

2.1 What is Innovation?

What the big names tell us about innovation in the playfield is that, it is difficult to get a common definition for it. Lorenz (2010) asserted this as; "The diverse understanding of the term 'innovation' may be due to different research goals, but may also be caused by the nature of the interdisciplinary research field of innovation management." The multi-view nature of innovation among scholars emanated from every author, as s/he perceives innovation differently. However, the term innovation as it has been magnified by the great economist Joseph Schumpeter (1883-1950); was originally a Latin term, which means 'to create something new'.

This catchword is currently active and seems to continue in the future. Rajegopal (2013) pointed out the reasons for importance of innovation as; 'uncertain and turbulence business environment, the fall of information costs as the web becomes more fully adopted, and consumers are demanding more, greater focus on cost-cutting'. Moreover, today there is a consensus among scholars that innovation is an essential driver of the growth and well-being of nations, affecting and providing benefits to consumers, businesses and the economy as a whole (Cornell University, INSEAD, 2017).

2.2 Innovation Capability

Ulrich (2002) as cited on (Lorenz, 2010) point out that innovation shall not be considered as an event, rather it depends upon the culture of an organization. Organizational culture is an important moderator for creating consistent and sustainable environment for innovation to flourish. This organizational culture becomes essential for firms for managing and creating innovation in the long term and termed as innovation capability(IC) (Smith et.al., 2008). Consequently, now a day's IC has attracted scholars from many disciplines. Lawson & Samson (2001) defined IC as; "the ability to continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the firm and its stakeholders."

2.3 Innovation capability's influence on apparel industries

Innovation capability measures so far backward tracked to Zawislak's (2013) work in a way that they used four capability measures and assumed innovation as a result of any combination of these capabilities. Reichert et.al., (2016) used these four dimensions (operational, management, transaction, developmental) innovation capability to low-tech industries.

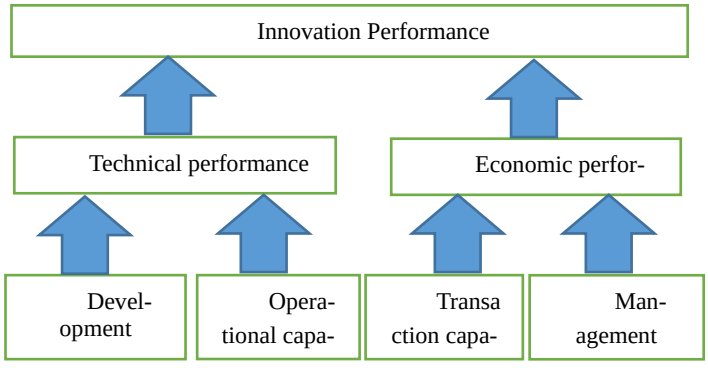

Figure 8Zawislak's innovation capability dimensions

Source Zawislak's (2013)

Operational capability (OC) of a firm can leverage the firm's skill, knowledge, and technical know-how for success in its innovation realm. This competence can align the firm's business strategy to strategic market orientation. As a result, delivery time and overall quality of service can be improved. To reduce costs with suppliers and customers through commercial strategies, improve relationships with suppliers, and streamline market knowledge, transaction capability (TC) can be considered as a critical competence of a firm. According to Tello-gamarra & Antônio (2013), it is just a set of skills, knowledge, and routines that the firm develops to operate in the market with minimum possible cost. Furthermore, it engages the firm to interact with the external environment, both to buy inputs, and to sell its finished goods and services. For low-tech manufacturing industries like the apparel industry, these innovation competencies are vital since the industry is more of a market-oriented type(Pavitt, 1984).

Conforto et al., (2016) defined improvisational capability as; "the ability to create and implement a new or an unplanned solution in the face of an unexpected problem or change." It is often seen as a spontaneous, intuitive, and creative problem-solving behavior. Kung (2019) show improvisational capability as innovation capability for tackling uncertainty and change in today's business environment and future competitiveness schemes. Sara Öhlin (2018) proved that for apparel firms' time-sensitive nature, IC is a vital for sustainability. Furthermore, today point-of-sale technologies have enabled retailers to analyze trends and act accordingly. This information enabled them to act, quickly produce, and stock goods according to the market needs with efficient cost and time. Therefore, apparel industries need to improvise as today's customers have less patience to wait. cturing/speed to market/ to apparel industry is just one of the significant competitive weapons over its competitors.

Development capability (DC) is the firm's ability to absorb and internalize new knowledge and apply it to new products (i.e., not only using technology but also generating and managing technical changes)(Reichert et.al., 2016; Zawislak et.al., 2013). On the other hand, management capability (MC) is the ability to coordinate efforts to transform technological outcomes into a coherent operational and transactional arrangement(Zawislak et.al., 2013; Zawislak, Alves, et. al., 2012). This competence has the potential to affect the competitiveness of apparel industry.

2.4 Innovation Success Recipes Configuration

Several recent studies have showed that the influence of single R&D based innovation approach cannot be sound enough for maximized innovation performance of a firm. In the same analogy, single innovation capability approach is inconsistent and no single innovation capability attains overall innovation performance of a firm. Recently there is a tendency in scientific community to investigate multiple innovation capabilities configuration for innovation performance of a firm. Thus, there may be many ways to achieve this outcome, grounded upon configuration of innovation success recipes. Woodside (2015) suggested that no single factor is likely to be sufficient or necessary when analyzing the complex phenomenon of success. Therefore, it is expected that multiple success recipes can result in higher innovation performance. This issue is hardly addressed so far. Reichert et. al., (2016) have used fsQCA and PCA analysis to explore low-tech innovation capability success recipes towards higher innovation performance of a firm. Fotiadis et. al., (2016) also used this approach to explore activities necessary for success in rural tourism. Bacon et.al., (2019) also configured conditions required for the success of knowledge transfer.

The conceptual framework developed in this work is based on the (L. A. Kung & Kung, 2019; Zawislak et. al., 2013) innovation capability articulation. The existing innovation success recipes developed by Reichert et. al., (2016) is generally for low-tech industry, but within the low-tech industries, heterogeneity problem was not considered. Moreover, the sustainability issue is not addressed in the existing work. Based on this gap this work developed a conceptual framework considering those gaps.

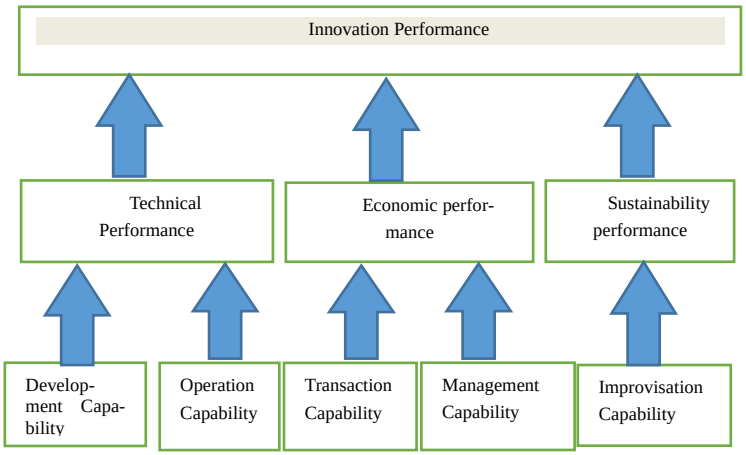

Figure 9 Study conceptual framework

Source authors conceptualization from (Kung, 2019; Zawislak et al., 2012, 2013) work

2.5 The lessons from the studies and gaps

Cao (2013) find that well organized and initiative-taking improvisational capability can speed up the process of business model innovation activity of a firm. Whereas, Wang suggested a model that describes the role of improvisational capability in generating new product development through product effectiveness and process efficiency. Both of these studies considered the improvisational capability as the best organizational competence to be competitive via high innovation performance in the dynamic and turbulence environment. The other im-

portant dimensions like operational, developmental, management, and transaction capability suggested so far need to be seen in a comprehensive way for new product development as well as business model innovation within organizations. Furthermore, Sara Öhlin (2018) was very much interested in how innovation happens, or does not happen, in every-day work. She analyzed the fashion industry in her study to exploit the significance of improvisational capability for high innovation performance in the sector. She also analyzed the enablers and barriers of innovative activities in a creative yet routinized characterized fashion industry. She suggested that the combination of the change in elements, the alignment among practices, and the way practitioners respond in innovative ways all together form improvisational capability and practice based approach to innovation in the fashion industry setting. Her proposal to fashion industry innovation performances ascertains that innovation shall be perceived both as planned and improvised approach.

Reichert et.al., (2016) innovation success recipes configuration used the four conventional innovation capability dimensions and come up with two alternative solutions for higher innovation performance for low-tech industries. Their study lacks the sustainability dimension in a way that firms shall respond to the uncertain and turbulent environment. For example, in the current global scenario covid-19 pandemic, those firms that have not built the improvisational capability can easily be perished from the market.

Therefore, this study tackled to integrate this all discrepancies of innovation capability dimensions required for higher innovation performance of a firm. No prior studies have attempt to include all this five innovation capability dimensions (management, operational, developmental, transactional, and improvisational) capabilities all together to prepare best ingredients for apparel industry innovation success.

3 Method

3.1 Data

Considering the scarcity of well-organized non-R&D innovation evidence, the study conducted survey. The authors collaborated with industry park development corporation (IPDC) office for operationalizing the survey. The information gathered for this study was obtained by a structured questioner survey administered through the help of IPDC office. IPDC office facilitated both the online survey and paper-based survey (i.e. for industry parks located in Addis Ababa). The survey included more than one informant per firm to mitigate individual perception and aiming to obtain more appropriate feedback (Simons et. al., 2001). From the 17 companies included in the survey, on average 6.412 surveys were received from each company, for an average response rate of 71.22% from each company with a minimum of one and a maximum of eight with median response of six. Furthermore, the responses were filtered out according to the criteria. As a result, incomplete or missing data, questionnaires filled with abnormal response, and not innovative firms were excluded. Totally, 109 complete responses were analyzed.

3.2 Measures

The quantitative survey approach was employed and the developed questionnaire was a structured type. The items in the questionnaire were quantified and constructed to be measured with a seven-point Likert scale (one=not very important, seven=very important). The questionnaire contained four sections covering (1) respondent and company profile, (2) innovation capability of the company, (3) non-R&D innovation practices, and (4) innovation performance of the company.

The survey questionnaire were tested by three experts each from academic institution, ETIDI research center, and industry consultants to make sure whether the respondents understood the questions or not. Accordingly, minor formatting and presentation modifications were made. Subsequently, the questionnaire was distributed to middle level and top level managers electronically through the online survey tool called Google docs. ETIDI and IPDC webpage were referred to get the address of the selected respondents. Furthermore, the respondents were allowed to invite the questionnaire to another expert in the field if they were sure that s/he was unfit to answer the questionnaire. The respondents were contacted through email first and then reminded through phone. To get respondents trust on the data gathering process, cover letter sealed and signed by the school dean and supervisor were sent with questionnaire.

3.3 Estimation strategy

3.3.1 Principal Component Analysis (PCA)

From the conceptual framework developed from the literature analysis, 28 items was originally presented to three experts before the survey conducted and finally 23 items were included in the survey. Respondents rated their concern about the importance to each innovation capability item using a seven-point scale ranging from "not very important" to "very important." principal component factor analysis used with varimax rotation to extract factors from these items.

Innovation performance measure described by Schumpeter (2008) were applied. Net profit growth, market share growth, and revenue growth constructs taken from Schumpeter to capture economic performance of the firm. We let the respondents to reveal their level of satisfaction using seven point Likert scale ranging from one to seven. One is indicating for 'very dissatisfied' and seven for representing 'very satisfied'.

3.3.2 Fuzzy-set Qualitative Comparative Analysis (FsQCA)

FsQCA first introduced by a social scientist Charles Regain (2008) and it uses qualitative and quantitative assessments to compute the degrees during which a case belongs to a certain set. This method mainly focuses on the complicated and complex relations between the result of interest and its antecedents. Furthermore, fsQCA is employable on a various sample sizes starting from very small (i.e. below fifty cases) to a very large sample size (i.e. thousands of cases) and it is also suitable for various styles of data (e.g., Likert-scale, click streams and multimodal data)(Pappas & Woodside, 2021). In this study, for the purpose of appropriate combinations of innovation capabilities, fsQCA method was employed. It uses Boolean algebra and fuzzy-set theory to identify each case with a set of specific traits, causal conditions, and outcome. Using fsQCA 3 software, the study identified innovation capability causal recipes that lead to high innovation performance.

Since the variable construct in this study is measured through multiple items, it needs to be computed to one value per construct that could be suitable input to fsQCA software. Therefore, we have calculated the mean of our desired outcome high innovation performance (High InnP), and other five conditions (IC, MC, OC, DC, and TC). Therefore, the study aspires to test the following fsQCA model;

$$\text{High InnP} = (\text{IC}, \text{MC}, \text{OC}, \text{TC}, \text{DC}) \qquad \text{Eq (1)}$$

Data calibration was done through direct method by choosing threshold values 0.95, 0.50, and 0.05 as break points to transform data from Likert scale to fuzzy set. The fsQCA manual (Ragin, 2008) were followed to perform fuzzy-set calibration and three breakpoint criteria's (0.05 for the full non-membership threshold; 0.50 for the

crossover point; and 0.95 for the full membership threshold were used(Ragin, 2008). Accordingly, the variables were calibrated from zero to one.

In this study, the truth table has 32 rows, which is from all logically possible configuration of the five conditions, where 2k=5 (Ragin, 2008). After feeding the converted data to the software the outcome sorted by frequency and consistency. In order to reduce the quantity of rows in QCA analysis of sufficiency, a range of a consistency level and a frequency threshold is needed. Ragin (2008) suggested a consistency level of higher than 0.75 as a rough benchmark. This study applied a consistency cut-off from 0.79.

FsQCA software calculated number of observation per each combination as frequencies. Following this truth table sorted by frequency and consistency. Next to this, all combinations with smaller frequency were removed for further analysis. After removing configurations with low frequency, the truth table have been sorted by raw consistency. FsQCA software also provides all three solutions every time. The combined solutions of both parsimonious and intermediate revealed in detail and aggregated view of the findings. To simplify and improve presentation of the findings, the outcome of fsQCA transformed into a table that is easier to read.

3.4 Research framework

This study aims at understanding the causal relationships between important aspects of apparel firms' innovation capabilities with their innovation performance. Ethiopian apparel industry recently attracted billions of dollar from FDI. The multinational apparel firms working in Ethiopia's industry park created an opportunity to capture primary data for the study. The study at initial stage focused on understanding the theoretical perspective of low-tech innovation capability. After identifying relevant information; questionnaire development, questionnaire validation, data gathering, and compiling carried out. Following this, compiled data were estimated using PCA and fsQCA. Finally, the result validated by sub-group analysis. The methodological framework followed is presented in Figure 3 below.

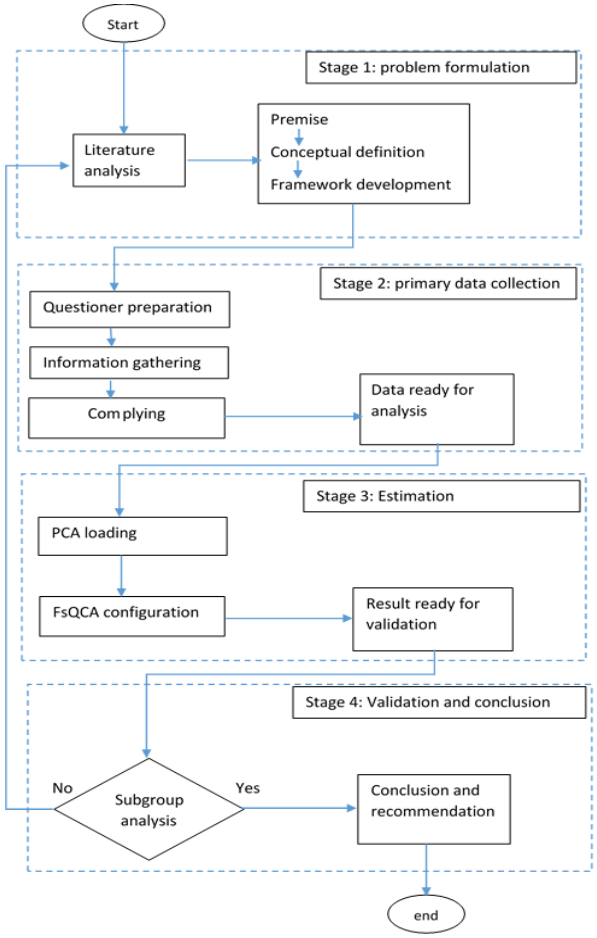

Figure 10 research framework

4 Results

4.1 Summary of Survey data

The list of low-tech innovation capabilities practiced by apparel manufacturing multinational firms operating in Ethiopia is shown on Table 1 below. Totally 109 complete responses were used for analysis. As pointed out by the mean scores, 'to respond in the moment to the unexpected problems' together with 'coming up with

new ideas' and 'to successfully reconfigure resources to react to customers demand' are most practiced low-tech innovation capabilities. Whereas, 'to impose its price on the market' and 'to use formal criteria to select its suppliers' are the lesser-practiced innovation capabilities.

Table 5 Summary of Survey Data

Variable	Obs	Mean	Std.Dev.
Designs its Own products	109	5.56	1.6
Develop creative solutions for unperceived situations	109	5.36	1.08
Develop products in partnership with STI	109	5.21	1.6
Establishes a productive routine that does not generate rework	109	5.34	1.43
Formalizes procedures of planning and production control	109	5.30	1.44
Imposes its negotiating terms on its customers	109	5.39	1.25
Imposes its price on the market	109	4.84	1.23
Maintains its personals well trained for company functions	109	5.68	1.16
Maintains statistical control of its process	109	5.42	1.00
Maintains the material stock level appropriate to the process	109	5.63	0.87
Makes CSR its core agenda	109	5.44	1.30
Measures its customers satisfaction	109	5.25	0.93
Monitors the latest technological trends in the sector	109	5.91	0.92
Resolve problems using available resources	109	5.65	1.15
Respond in the moment to the unexpected problems and come up with new ideas	109	6.25	1.01
Skillful in reusing existing resources to serve customers	109	5.39	1.31
Standardizes and documents its different working procedures	109	5.37	1.47
Successfully reconfigure resources to react to customers demand	109	5.94	0.97
Traces the market to monitor	109	5.15	1.17
Updates its management tools and techniques	109	5.27	1.44
Uses current financial management practices	109	5.57	1.25
Uses formal criteria to select its suppliers	109	4.81	1.90
Uses formal project management methods	109	5.64	0.92

The survey result also reveals there are a wide range of variation among the companies in innovation capabilities like 'design its own products', 'use formal criteria to select its own suppliers', and 'develop products in partnership with STI'.

4.2 PCA loadings

From the PCA loading, the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy is 0.899 and the Bartlett's Test of Sphericity is significant (pb 0.000) and the results confirm five capabilities. The items loading: improvisational capability (five items with Cronbach's α = 0.922), management capability (five items with Cronbach's α = 0.898), operational capability (four items with Cronbach's α = 0.929), developmental capability (four items with Cronbach's α = 0.796) and transaction capability (five items with Cronbach's α = 0.895). Table 1 below shows list of innovation capability item loadings.

Table 6 Principal component analysis loading

	Component				
Rotated Component Matrix	MC	IC	TC	OC	DC
Updates its management tools and techniques	0.923				
Standardizes and documents its different working procedures	0.896				
Maintains its personnel's well trained for company functions	0.802				
Uses current financial management practices	0.623				
Makes CSR its core agenda	0.563				
Resolve problems using available resources		0.899			
Respond in the moment to the unexpected problems and come up with new ideas		0.865			
Successfully reconfigure resources to react to customers demand		0.713			
Skillful in reusing existing resources to serve customers		0.694			
Develop creative solutions for unperceived situations		0.626			
Imposes its negotiating terms on its customers			0.956		

Imposes its price on the market			0.919		
Traces the market to monitor			0.864		
Measures its customers satisfaction			0.860		
Uses formal criteria to select its suppliers			0.620		
Maintains the material stock level appropriate to the process				0.915	
Maintains statistical control of its process				0.885	
Establishes a productive routine that does not generate rework				0.680	
Formalizes procedures of planning and production control				0.660	
Designs its Own products					0.921
Develop products in partnership with STI					0.898
Monitors the latest technological trends in the sector					0.662
Uses formal project management methods					0.615
Cronbach alpha	0.898	0.922	0.895	0.929	0.796
Eigenvalues	4.83	4.73	4.5	3.77	2.54
Percentage of variance explained	20.13	19.69	18.74	15.72	10.56
Mean	5.54	5.41	5.09	5.58	5.72
SD	0.595	0.587	1.06	0.576	0.282

4.3 FsQCA results

From the fsQCA analysis, three configurations of innovation capability recipes that lead to high innovative performance in apparel manufacturing firms were drawn: IC*MC*TC (solution 1), IC*DC*TC (solution 2), and IC*OC*TC (solution 3). The consistency for the three solution and for the overall solution exceed 0.75(Ragin et.al., 2008). Therefore, these recipes are sufficient to cause high innovative performance. The combined recipes for the first solution account for 78.2% of membership in the high innovation performance outcome. The second and third solutions are 75.6% and 75.1% respectively.

Table 7 Recipes for achieving high innovation performance in apparel industry

	Solution configuration	Consistency	Raw coverage	combined
	IC*MC*TC	0.887522	0.650773	0.782130
	IC*DC*TC	0.886314	0.607818	0.755876
	IC*OC*TC	0.874652	0.606959	0.751313

One major challenge of fsQCA is the robustness and validity of the results. So far scholars suggested that the sensitivity of fsQCA is sever if slight parametric change occurs, the outcome from fsQCA can easily be deteriorated (Krogslund et.al., 2015; Lucas & Szatrowski, 2014; Skaaning, 2011). There are two robustness tests which are commonly applied(Meier, 2017). The first one is by sub-sampling which aims to address concerns about fsQCA application in large sample size setting and to increase confidence of results(Meier, 2017). The second robustness test applied by Emmenegger & Schraff (2014) aims at demonstrating that the results are insensitive to small changes in data and rather the data is analyzed for about 1,000 runs while randomly deleting 10% of the data in each run(Meier, 2017).

This study employed the first approach for the robustness test. Therefore, the robustness test is conducted by following the approach of Reichert et.al., (2016). First, the study randomly split the total sample into two equal sub-samples and modeled each sub-sample by using the results of sub-sample 1 to predict the scores in sub-sample 2 and performing the reverse procedure for cross-validation. Table 3 and Table 4 show the predictive validity for each sub-sample.

Table 8 Using sub-sample 1 to predict scores in sub-sample 2

	Solution configuration	Consistency	Raw coverage	combined
	IC*MC*TC	0.877522	0.640773	0.772130
	IC*DC*TC	0.856314	0.597818	0.752876
	IC*OC*TC	0.844652	0.596959	0.750313

Table 9 Using sub-sample 2 to predict sub-sample 1

	Solution configuration	Consistency	Raw coverage	combined
	IC*MC*TC	0.867522	0.630773	0.762130
	IC*DC*TC	0.854445	0.597818	0.753876
	IC*OC*TC	0.854652	0.586959	0.750013

5 Discussion

For low-tech industries, innovation is born out of a set of innovation capabilities of a firm. In addition to the four conventional sets of low-tech innovation capabilities, we have added one extra dimension and configured to bring the right set of success recipes that can lead apparel industries to higher innovation performance. Configuring success recipes is a recent phenomenon for exploiting higher performance in various sectors(Bacon et.al., 2019; Fotiadis et.al., 2016; Nguyen, 2017; Oliveira et.al., 2019; Reichert et.al., 2016).

Regardless of the machinery and labor, from which cloth is made, lately, the apparel is expected to be produced with the concept of quick response. Therefore, the entire apparel supply chain needs to be more agile, which means that stakeholders need to have better visibility, speed, and flexibility. Furthermore, today's point-of-sale technologies have enabled retailers to analyze trends and act accordingly. This information enabled them to produce quickly and stock goods according to the market while attaining efficiency interms of cost and time. Therefore, the improvisational capability (IC) of a firm comes here to address this issue.

Apparel industry, due to its labor-intensive nature, needs a large workforce. Therefore, a favorable work environment and safe conditions are essential for the betterment of the workers to ensure fast, reliable, and efficient production environment. The Rena Plaza 2013 incident that caused thousands of deaths in Bangladesh initiated stakeholders to introduce several multi-stakeholder workplace safety compliance initiatives. Following this, global consumers mostly US and UK buyers have become increasingly concerned about the treatment of workers in the apparel industry. In response to increasing pressure from the international and local media, international buyers and traders have become more sensitive to the working conditions in the supplier factories and are now considering the issue with more importance. Thus, better working conditions have become one of the main competitive factors along with low cost and preferential market accesses(Selvanathan et.al., 2019). Accordingly, management capability and operational capability can enhance the competitive advantage to the firm.

The bargaining power of buyers today is powerful than manufacturers. Therefore, consumers dictate when, what, how, and where they wish to shop. That resulted a threat to the traditional apparel readymade product business model. Therefore, apparel industries in current scenario need to create a means to predict their customer's buying experiences. Connecting individual items via a digital thread, products, and sellers will be able to communicate directly with the customers, with customized communication that is based on the customer's needs and concerns. Therefore, transaction capability and developmental capability can enhance innovative performance of the firm in this regard.

Therefore, the first alternative with improvisational capability, management capability, and transactional capability (IC*MC*TC) recipes leads to better innovation

performance of apparel firms. Improvisational capability enables agility of the firm and ensures apparel firms dynamic response in market. The second element management capability secures firm's innovation performance through proper human resource utilization and it can go hand in hand with improvisational capability element. The third component of this alternative solution that is transaction capability in apparel industry can lead to better innovation performance by tracing the ongoing market trend and imposing negotiating power on its customers.

The second alternative innovation capabilities recipe for higher innovation performance in apparel industry comprises improvisational capability, transaction capability, and developmental capability (IC*TC*DC). The only difference of this set of capabilities from the first one is the substitution of management capability to developmental capability. Developmental capability can lead the firm launch their own products and collaborate with other institution for firm's new product development success.

The third set of capabilities configured to higher innovation performance comprises improvisational capability, operational capability, and transactional capability (IC*OC*TC). Like the second alternative, the only difference in the third recipe is the appearance of operational capability to substitute management capability of the first recipe and developmental capability of the second recipe. Operational capability ensures firms innovation performance through higher process efficiency and reduction of rework.

Improvisational and Transaction capability are among the core conditions of success recipe in all of the three alternative solutions. Improvising in this ever-changing environment and volatile global market can be supported through information technology assisted organizational memory and cross-functional teams(Wang, n.d.), and it enhances innovation performance through process efficiency and product effectiveness. Whereas, transaction capability is a result from the learning process through which firms measure its customer satisfaction and track the market to respond accordingly(Zawislak, Alves, et.al., 2012). The difference of results from this study and Reichert et.al., (2016) is in a way that they considered low-tech industry in general and in this work apparel industry in particular was scrutinized. Furthermore, in their work they only considered only four innovation capability dimension and this study added one more improvisational dimension which is vital for apparel firms performance (Sara Öhlin, 2018).

6 Conclusion

The main target of this study is just to investigate the best innovation success recipes that can lead to higher innovation performance of apparel industry. Overall, the results provided evidence that, there are three possible alternative pathways to higher innovation performance of the sector. These innovation success recipes can be applied for better innovation performance.

Within low-tech industries apparel industry is one among them. Innovation in this context is triggered by different factors. Time sensitive nature of the industry and the technological dynamics greatly affected this sectors innovation approach. The findings revealed that for apparel industry sustainable competitiveness through high innovation performance there has to be one more innovation capability, which is improvisational capability.

The PCA result gives five capabilities (improvisational capability, management capability, operational capability, transaction capability, and developmental capability). Whereas, the fsQCA analysis configured these

five low-tech innovation capabilities to figure out best recipes that enable apparel firm's innovation performance in ensuring their sustainable competitiveness. Three alternative solutions configured that can bring high innovation performance in apparel industry. Improvisational and Transactional capabilities found in all three alternative solutions.

A couple of limitations are believed to exist in this study: First, the self-reported nature of the study data may lead to an over-optimistic assessment of the levels of innovation capabilities and innovative performance. Second, fsQCA approach is too sensitive to the specific conditions included in the configuration analysis and consequently adding or removing conditions can significantly alter solutions. Therefore, as future study it is possible to cross validate the results of fsQCA with other approach such as fuzzy in Stata. Likewise, this work can be advanced through a large set of data for more significant outcome and the approach can be applied to other low-tech sectors.

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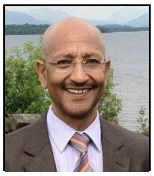

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