

A FRUGAL INNOVATION MODEL ASSIMILATING BLOCK-CHAIN TECHNOLOGY IN THE MANUFACTURING SMES

Tarnima Warda Andalib^{1*}, Noor Azlinna Azizan², Jamshid Al Turi³, Nevi danilla⁴,
Zeittey Karmilla Kaman⁵

¹Assistant Professor, BRAC Business School, BRAC University

²Professor, College of Business, Prince of Sultan University

³Assistant Professor, Bahria Business School, Bahria University

⁴Associate Professor, Prince of Sultan University

⁵Senior Lecturer, Department of Business and Management, Universiti Tenaga Nasional

Abstract:

This paper's purpose is to construct and propose a frugal innovation model by assimilating block-chain technology in the manufacturing SMEs' of Bangladesh. The model showcases the linkages and relationships among the necessary components of the SMEs and triggers to enhance innovation performance of the SMEs. Mixed-method approach was adopted for the study to get its designed objective. In the first phase, sixty (60) SME owners and partners of Bangladesh participated in qualitative focused group discussion and later three (3) multiple case studies were included to make the study and result more reliable and transferable. Data has been analyzed through NVIVO and connections are established through soft systems techniques. Findings of the study assist the necessary components to flourish and others to diminish. The study has been dealt with original data, collected from the manufacturing SMEs' of Bangladesh.

Keywords: Frugal Model, SME, Bangladesh, Block-chain Technology, Multiple case studies, focused group discussion, soft systems

Introduction

In a smart city of any country, enterprises mainly SMEs are established, nation's expectation from them is to create employment vacancies and opportunities, diminish insufficiency, and initiate resilience in budget. Indeed, SMEs remain as one of the strongest pillars of Bangladesh's national economy, which contributes significantly in alleviating poverty of the country. SMEs are predominantly appropriate for over-populated Bangladesh. The International Monetary Fund (IMF) Country Report in 2012 signified that SMEs in Bangladesh has reportedly been observed as 99% of private sector industrial establishments specially in the manufacturing field, which has generated work prospects for 70%–80% of the nonagricultural labour force especially in the manufacturing arena (Andalib and Darun, 2018; Andalib et al, 2014; Andalib et al, 2013).

Sixty (60) SME owners and partners of Bangladesh participated in qualitative focused group discussion and three (3) multiple case studies have been done. Data has been analyzed through NVIVO. Findings of the study assist the necessary components to flourish, connect to each other, and build relationship and other unnecessary components to diminish (Andalib and Darun, 2018; Andalib, 2018; Andalib et al, 2019; Andalib & Halim, 2020; Aziz et al, 2014). In any smart city or smart country of the world, the manufacturing SMEs and their establishments are vital point for economy. The future techno world can create such re-engineered SMEs and its processes that the expansion of SMEs will become easier to broaden the scope of a successful smart city as well (Andalib et al (2019); Andalib et al, 2014). As per Andalib and Halim, the analysis of the manufacturing SMEs of Bangladesh puts great impact on national GDP, because SMEs are both profit-making and cost-conscious at the same

time towards channeling career and infusing vitality into manufacturing succession.

As per Jones and Wadhwani (2006), Entrepreneurship started to become widely popular area of research since 1980s, when expansion of entrepreneurship oriented research came into notice and extended to distinct, segregated areas. Among several areas, the frugal areas between entrepreneurship and economic progress became talk of the town and it got triggered when William and friend in 1983 discussed about the entrepreneurial creativity leads to economical progress. This indicates the creative entrepreneurs and their devotion to innovation help build up more entrepreneurs that eventually resolve the unemployment issue of the nation as per KritiKoS (2014). However, this pathway is not as smooth as it seems like and thus Kane (2010) mentioned that all the firms need to keep pace with their goal at first and earn profit because, many firms do not get to be in the creation process rather makes a difficult loophole while creating and destroying jobs. Madrid et, al (2009) discussed about two types of constraints for innovation, which are external and internal and scholars in this article has emphasized external dynamics more. Zulkifli-Muhammad et al. (2009) pointed out that expansion of global market has increased extremely competitive and volatile environment where technological upgradation has worked as a driving force. Because of super competitiveness, rapid changing speed in the global market is a noticeable prime factor, which is possible because of innovation is becoming core business strategy day by day (Bang and Markeset, 2011a); Bang and Markeset, 2011b; Vanhaverbeke and Peeters, 2005).

Meanwhile, business ambiguity and intimidation around workplace can collapse the ground rule of innovation badly. Scholars here explicate the components of the suggested framework: innovation performance and entrepreneurial bricolage, as well as explains its influence on the SMEs business uncertainty and hostility. Baker and colleague in 2005 argued that entrepreneurial bricolage referred to the conduct of entrepreneur to improvise and combine the available resources to overcome problems. Gopalakrishnan and Damanpour (1994) mentioned that innovation refers to 'idea, method, process or device'. Unlike large companies, SMEs are more likely

to have constraints in resources (Laforet and Tann, 2006; Garengo, Biazzo, and Bititci, 2005). In this sense, entrepreneurial bricolage is an appropriate platform in explaining innovation performance among SMEs. The collected data have gone through coding process to reveal the necessary finalized components. Therefore, the objectives of this research are 1) To recognize the necessary components of manufacturing SMEs of Bangladesh, 2) To create connections between these components and propose a framework and 3) To propose a frugal innovation model.

LITERATURE REVIEW

Manufacturing SMEs of the world has been always worthwhile since they create new concepts, products, or designs and adds value to the existing market chain. In Bangladesh in last decade the estimation of value addition in the manufacturing SMEs is 45 to 50 per cent in the manufacturing industry, which is quite higher. Furthermore, SMEs have contributed drastically in nurturing the new talents, entrepreneurial minds, inaugurating and progressing new businesses and concepts those in the end contributes to the nation's economy (Andalib et, al, 2019; Alauddin and Manir, 2015).

2.1 Previous Works on Manufacturing SMEs

At present time, the idea of SME business is also flourishing since SMEs bring new ideas in an established form with a different technique and in a fast manner that helps the entire national economy at the end. The SME commerce has a robust place in today's world. SME entrepreneurs are continuously upgrading themselves with a view to be competitive and to remain the best. In Bangladesh and in the south Asian countries' SMEs aid by developing separate agenda with visionary and systematic strategies for scarcity assuagement and for persistent development. Nevertheless, there are built in challenges like finance for SMEs in Bangladesh, there is critical need for financial credit or bank loan for the SMEs at initial stage. Usually, this credit system allows the credit worthiness of the borrowers by evaluating their non-liquid assets and transaction records of liquid assets. and continuous monitoring system

for an effective finance policy for the manufacturing SMEs for any smart city. Furthermore, primary lender also need to sign bonds of guaranteed return and rediscount opportunities (Andalib et, al, 2015 and Chowdhury et, al, 2013). Nevertheless, credit system must also incorporate with non-bank establishments like NGOs. Inclusion of female entrepreneurs to receive funds are additional strategies to harness sustainability and create healthy competitions among the SMEs. SMEs have significant hurdles and challenges besides its strengths and prospects; therefore, certain components like R&D, Finance, Management, Technology, Skills, Training, Infrastructural development, Market orientations are core to be handled appropriately.

Sulaiman (2005) perceived that near about 50% SMEs have no access to official funds or finance whereas only 36% SMEs enjoy this sort but rest of the 14% have thorough restrictions to recognized funds absolutely. Meanwhile, entrepreneurs who receives permission to use some bank credits need to return less than 20% of the borrowed credits, whereas Hasan and Islam recognized in 2018 that banks officially do not encourage or have interest towards SME financing. Even though 59.6 percent SMEs request loan regarding investment from banks, only a half-of these can the chance to acquire official loans whereas as per Rahman et

al, (2014) for Bangladesh SMEs work as the spine of the country. SMEs experience common constrictions like lack of capital, lack of raw materials or processing raw materials, lack of access to relevant business information, low technological capabilities, problems caused by burdensome and expensive bureaucratic regulations and procedures that generate market buckles (Andalib, 2018). Nevertheless, SMEs need appropriate domestic supporting policies those can help these SMEs flourish and reach to receive the rewards of globalization. The intention behindhand this conservativeness is greater OPEX, fewer return and susceptible financing. Therefore, these SMEs need intensive, sincere and motivation driven supervision. Problem lies elsewhere, entrepreneurs hardly can focus on complying with collateral regulations and this is why banking or non-banking institutes are aloof enough to provide loans to the SMEs (Andalib and Halim, 2019). According to Andalib et, al (2015) mentioned that in Bangladesh, SMEs' progression is a desired ambition due to constant professed support to decentralized job creation and local products. Bangladesh's economy reveals that the manufacturing SMEs construct the machine substitutes and machinery parts by saving huge amount of foreign currency for our country Andalib et, al, (2018).

Table 1. Scholars' Depiction

	Scholars	Necessary Components		
1	Sulaiman, 2005	Finance	Bank Loan, Funding Institutions	
2	Rahman et al,	Technology	IT	Backbone, Machineries
3	Chen et al, 2011	Manpower	Leaders and Innovative Employees	
4	Khan, 2014	Lenien Govt. Regulations	Employee	Rights Protocols, Company SME Act
5	Chowdhury et al, 2013	Creative products	Production	Cost, Innovation, new Strategy
6	Hasan and Islam, 2008	Marketing Skill	New concepts to Promote, R&D of Market	

Manufacturing SMEs in Bangladesh have various components but for a smart solution

the necessary components, which are required are mentioned in the following table.

Table 2. FGD Discussion

	Necessary	Sub-Component	Seek Smart Solution from
1	Finance (FN)	Bank Loan (BL) and Less Start up capital (LSC)	Bank, Top Business Companies, Individuals who invest
2	Technology (TN)	IT Backbone (ITB), Machineries (MC)	Local IT /Technology Markets
3	Human Resources (HR)	Leadership Style (LS) and Innovative Employees (IE)	Qualified Humane Leaders, Motivated and innovative employees
4	Lenient Govt. Regulations (GR)	Employee Rights Protocols (ER), Company SME Act (CSA)	Regulatory Board
5	Creative products (CP)	Production Cost (PC), mInnovation (Inno), New Strategy (NS)	Creative Entrepreneurial Team
6	Marketing Skill (MS)	Conceptual Promotions (CP) , R&D of Market	R&D and Marketing Team

2.3 Block Chain Technology for the Manufacturing SMEs

Usage of blockchain technology, especially in the SMEs is a new research field as this technology is considered applicable to bigger firms having strong financial, human resources and knowledge management capabilities (Ilbiz and Durst, 2019). Blockchain has been considered as an innovative solution provider for many businesses, however there is an argument whether SMEs should be skeptical about this technology adoption ending up with waste of resources (Tedjakusuma and Yahya, 2020). Despite of global challenges faced by SMEs, if they develop new strategies with improved efficiency and product quality will be able to compete with rivals. SMEs need to rely heavily on the knowledge management capabilities in order to achieve competitive advantage.

Methodology

Scholars here have used the multiple case studies research methodology as per Eisenhardt and Melissa to build knowledge about innovation model discussed by Andalib and Darun (2018), where data derived from emergent SMEs. As per Yin, three cases are adequate to consider a research as ‘multiple case

studies. Hotho & Champion in 2011 described about the manifold viewpoints those can be perceived from thorough and detailed qualitative data. Therefore, researchers here have applied qualitative approach in the SMEs’ natural site with slight interference in their regular operations. Multiple case studies answer all the subjective questions regarding how, why or what by explaining the complex and compound theories and leading to discover the necessary components, processes, practices and relationships of the SMEs.

Several steps got incorporated in here. As per Andalib in 2018, the steps are selection of cases, gaining access with the participants, collecting data, storing and analyzing in NVIVO Mac, validating the data constructs, developing the model (Andalib and Darun, 2018). The philosophical paradigms like ontological, methodical and epistemological have been considered for this research.

Researchers gathered by implementing case studies replication, where case study protocols got designed before doing the fieldwork to gather the necessary components of SMEs that can drive towards successful operation and innovation in the SMEs, how to converge these components into a model to assist the SMEs, and how to sustain in the market being an SME with innovative products. Unambiguously, usage of

the heavy machineries in these SMEs are of significant concerns. Researchers collected primary data from each case from the semi-structured dialogues where employees of the companies' got chosen by purposeful sampling (key role of innovation in these SMEs) as per Sternberg, et al., and Yin and collected secondary data from the archives and direct observations, where researchers did some

introductory inquiries about the company and its profile, establishment year, successful projects, product launches, machineries usage and employees' number, tenure, turnover and etc. SME foundation of Bangladesh has assisted during this sampling phase.

Table 3. Cases, their types and found components

Case	Type of Manufacturing SME	Found Factor
1 Case 1	Garments Manufacturing	Bank, Top Business Companies, Individuals who invest
2 Case 2	Tiles Manufacturing	Local IT /Technology Markets
Case 3	Food Manufacturing	Qualified Humane Leaders, Motivated and innovative employees

After collecting the primary data from the interviews, secondary data were collected from several company profiles, archives, other documents and previous scholars' works. Other documents were collected from discrete multiple sources such as websites, books, research reports and print media such as newspapers or magazines. Few alternative lists of data got collected like invoices, work orders, presentation files, documentations and events. Observations were made to strengthen the data collected. Researchers applied the observation tactic while interviewing, communicating and dealing with respondents in a face-to-face interaction especially.

Researchers created distinct databases for distinct SME to stress significant innovative events at distinct phases conceptualized by Van de Ven et al, in 2008, which are initiation, development, and implementation. Researchers did thorough analysis and described each case's

scope to find unique patterns, to compare the patterns-theories and to comprehend the whole idea (Yin, 2014). At the first phase open coding, Neuman (2006) mentioned word and phrase frequencies are identified to understand the phenomena; During the second phase axial coding, patterns with explanations are identified from the phenomena and then grouped together to comprehend the association and event. In the final phase, the theoretical foundation is evaluated, conceptual understanding is developed and formed where the construction process of innovation is observed. Biased and redundant data has been omitted along with confirmation of required data for validation purpose. The innovation model was resultant from the capture technique where triangulation method has been applied to validate these case studies. Soft systems methodology has been applied to connect the necessary components, sub-components with the operational body for innovation purpose Checkland and Poulter in 2010.

Table 4. Cases and Blockchain Technology

Case	Type of Manufacturing SME and explanation	Block chain technology
Case 1	Garments Manufacturing	Employee DB, Transformational Leaders' DB, Creative Wing, Talent Group, Tunrover Record, Traceability, default detection, Investment record

Case 2	Tiles Manufacturing	Transparency, waste reduction, technology market, Capex-Opex DB, IT-Technological Solutions, Talent Group, Entrepreneurial Employees, Turnover, Bank Loan, Investment Record, Waste reduction, Super-Performed Employee DB
Case 3	Food Manufacturing	Transformational Leaders' DB, Creative Wing, Talent Group, Capex-Opex DB, Waste reduction, traceability, productivity, resource capabilities, Innovative and Entrepreneurial employees, humane leadership

Results and Hypothesis Testing

4.1 Cases, Participants and Components

Here, narrative of each case including the basic profile, their necessary components and aspects those are related to innovation are discussed Aziz et al in 2014. *Case 1: pseudo-Name NG:* Established in 1990. They have been producing garments' clothing for years but last decade they brought the same clothes with new design, new concept and new marketing outlook. Therefore, their products got a huge scale in the international market. Being an SME it is indeed difficult to channelize all selling and distribution points evenly. However, their success mainly came for financial stability and constant financial support from non-business institutions and because of creative and highly motivated employees who successfully completed the new design conceptualization and implementation not because they earn a lot of remuneration, but they have enough freedom and flexibility to showcase their talents. Fifteen (15) participants from this case participated in the focused group discussion. The components like Finance, Human Resources, Creative Products and Marketing skills have been identified as '++' or 'strongly inclined', whereas Govt. regulations and Technology have been identified as '+' or 'weakly inclined', which means these need a lot of assistance to improve. However, Technology has been in this zone because of the factory location and the technological incapability in certain fields.

Case 2: pseudo-Name RT: Established in 1989. Their product line is toiletries and tiles of all kinds. The SME just recently in last 8 years has

been supported and financed by UAE Company and since then, the SME has been doing better. They have Human resources of various kinds to support their business as a result employee' rights and roles issues are much in concern. Since, tiles production is a very tedious and risk oriented job, regulations are also quite complex and high, therefore when a new concept is through the production various compliance issues need to be resolved. Twenty-five (25) participants from this case participated in the focused group discussion. The components like Finance, Human Resources. Technology and Marketing skill have been identified as '++' or 'strongly inclined', whereas Govt. regulations and Creative Product has been identified as '+' or 'weakly inclined', which means these need a lot of assistance to improve. However,

Case 3: pseudo-Name PN: Established in 1981. Their product line is food and beverages. Processing various sorts of food, spices, beverages in different packages. They started their journey as a distinct homemade food and catering SME. Now, the SME has established them as a brand of the country. Nevertheless, their SME has issues regarding employees' rights, production cost and marketing protocols. The production has distinct kinds of machineries for each kind of food processing. Twenty (20) participants from this case participated in the focused group discussion. The components like Finance, Technology and Creative Product has been identified as '++' or 'strongly inclined', whereas Govt. regulations, Human Resources Technology and Marketing skills have been identified as '+' or 'weakly inclined', which means these need a lot of assistance to improve.

Table 5. Necessary components for Frugal innovation Model for SMEs

Necessary Component	Case 1	Case 2	Case 3
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Finance (FN)	No Bank Loan, Individual Capital ‘++’ Strongly inclined	No Bank Loan , Received Foreign Financing ‘++’ Strongly inclined	Received Bank Loan against personal property ‘++’ Strongly inclined
1 Technology (TN)	Less fund for technology ‘+’ weakly inclined	No Local Technology ‘++’ strongly inclined	Usage of Local Technology but not
Human Resources (HR)	Qualified employees but not interested in new challenges ‘++’ strongly inclined	Creative Human resources with less opportunities and fund ‘+’ weakly inclined	Lack of Creative Human Resources ‘+’ weakly inclined
Govt. Regulations (GR)	Regulations are difficult to comply With ‘+’ weakly inclined	Regulations are difficult to comply with ‘+’ weakly inclined	Regulations are difficult to comply With ‘+’ weakly inclined
Creative products (CP)	Various materials of cloth with local style ‘++’ strongly inclined	Distinct designed tiles ‘+’ weakly inclined	Same food in similar packaging boxes ‘++’ strongly inclined
Marketing Skill (MS)	New concept implementation ‘++’ strongly inclined	New concept implementation ‘++’ strongly inclined	New concept implementation ‘+’ weakly inclined

4.2 An Frugal design of Innovation Model

Researchers here have developed the Frugal Innovation Model by connecting the core necessary components, the sub-components of the SMEs with the Operational bodies or teams or supporting hands. These operational body can work directly in the component area or can work in the sub-component area. From data analysis,

mainly the axial codes are the sub-components and the themes are components of the SMEs by using Check land’s soft systems technology. *Phases of the Integration of the Innovation Model for Manufacturing SMEs in Bangladesh* (a) Necessary Components /Themes, (b) Core Sub-Components, (c) Operational Body, (d) Connections.

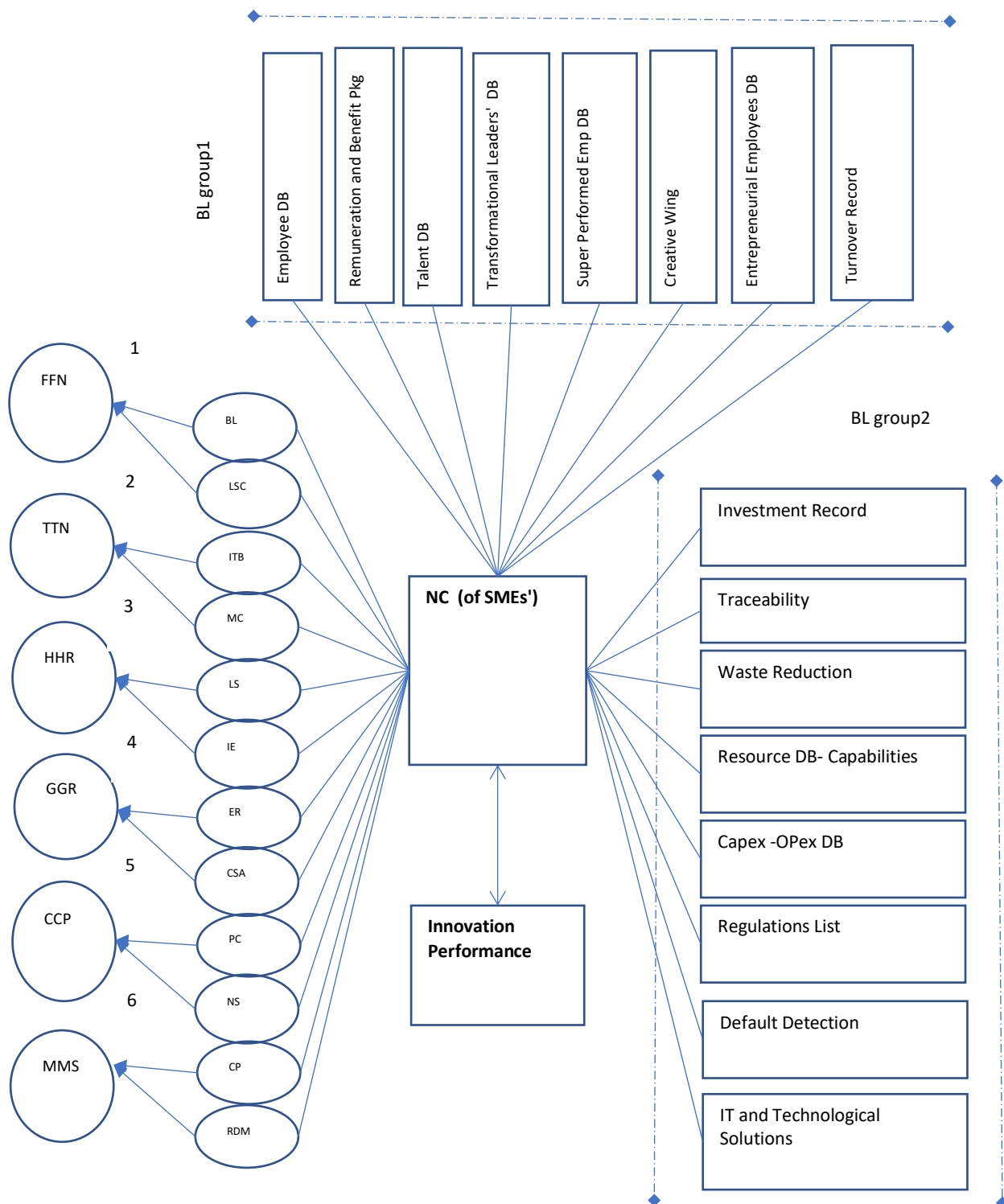


Figure 1: A Frugal Innovation Model

Note: In the Above Figure 2, FN (Financial), TN (Technology), HR (Human Resources), GR (Govt. Regulations), CP (Creative Products), MS (Marketing Skill), NC (Necessary Components)

In the above figure, researchers tried to reveal that the necessary components of these SMEs' positively work on the innovation performance and also gets reciprocated. Nevertheless, for each necessary component there are distinct

DBs or list of records which are connected through block-chain technology.

Researchers also focused on two dependent dimensions named entrepreneurial bricolage and innovation performance those put impact on these necessary components of the SMEs and tried to measure the movement of data through this frugal innovation model to comprehend the effect of these on the frugal model. Meanwhile, Smart-PLS has been used to find the measurement model based on entrepreneurial bricolage and innovation performance. This reveals that the relationship between

entrepreneurial bricolage and innovation performance is positively significant. A closer inspection R^2 value has shed some light on the predictive capabilities of entrepreneurial bricolage in explaining innovation performance. According to the R^2 value, the construct of entrepreneurial bricolage is able to explain half of the variance in the construct of innovation performance. This outcome implies that the entrepreneurial bricolage beholds a capability to explicate the innovation performance among manufacturing SMEs in Bangladesh.

Table 6. Necessity of Innovation Performance (IP)

Dimension	RSquare, R^2	CrossValidated redundancy, Q^2
Entrepreneurial Bricolage (EB)	0.063	0.044
Innovation performance (IP)	0.503	0.365

The above Table 6, shows that EB's R^2 is 0.063 (since, value is in between $0.3 < r < 0.5$), that means it has low impact on the necessary components but IP's score is 0.503 (since, value is in between $0.5 < r < 0.7$) that proves that it has a moderating effect on the necessary components of the SMEs; meanwhile, the cross validated redundancy Q^2 for Eb is less than 0.5, means indicative of a lack of predictive model but works as a mediator whereas, the cross validated redundancy Q^2 for IP is above 0.5, means indicative of a predictive model (Wold, 1975-1988). Nevertheless, in this study, this particular portion has been derived from empirical data besides in-depth quali-data to demonstrate the relationship-condition between entrepreneurial bricolage and innovation performance.

4.3 Discussions, Limitations and Future Research Directions

Researchers assembled the necessary components of the successful SMEs for a smart city. The components are gathered up together, brought under the same umbrella and then frugal together. The sub-components are also identified and connected with the operational bodies. Azis et al. proposed a managing innovation model in 2014 where he mentioned

about the four key components as in the four functioning areas of the SMEs, like human resource management, operations, marketing, and finance etc. But, in this study, rather focusing on the functions the entire SMEs' necessary components are identified that is related to employees' innovation provocation. The relationships among the significant components are obtainable in the frugal integrated model as a stage-oriented model for flourishing and sustaining innovation. Researchers contributed to this study by endorsing and improving the connected components as per Aziz et al (2014).

Furthermore, researchers also build hypothetical relationships among those components depending on thorough comprehension about the SMEs. It is believed by focusing on these core necessary components and sub-components, following each stage and performing the iteration, practitioners in the manufacturing SMEs will be able to be effective to sustain, and grow their businesses. Furthermore, researchers have also observed limitations and restrictions in this study. In general, data from some open-sources are used thoroughly because of confidential and secrecy some scholarly works and reports are unavailable. Managerial bodies controlled some of the dialogue-sessions took place in the SMEs

because managers were afraid to participate in the in-depth interview process rather, they agreed to the focused group discussion and after a lot of declaration of confidentiality. Ideally, while examining the successful and necessary components before developing the innovation model, researchers removed the less essential ones due to the thought of smart city generation and installation.

However, most of the SMEs got wiped out in time and couldn't hold fast their businesses, those SMEs and their components need to be observed as well to find and compare the two extreme states so as to apprehend alternatives of success components further holistically, the researchers apply a meticulous tactic to indulgent the components towards SMEs' success thus, researchers find out how innovation works are operated in Bangladesh. Future studies are necessary for each SME to modify and go towards more achievement as well as to have better understanding about the components and their characteristics in other industries to build any other integrated model as well. Researchers can also apply the simulation on another kind of industry to evaluate the components over there. including the Internet of Things (IoT) concept with today's developed model can be a prominent direction as well.

Conclusion

Researchers intended to develop an innovation management model concerning the manufacturing SMEs in Bangladesh by identifying their key necessary components. The model was developed through an investigation of best practices in the chosen SMEs. The main finding of this research is a Frugal model for the manufacturing SMEs' of Bangladesh that presents a connections and relationships of the components and sub-components with the operation teams. These connections between the codes have been established by the soft systems technology, that *triggers to enhance innovation performance of the SMEs*. This model would help to sustain and growth more SMEs in manufacturing industry. Developed using a case study approach, the model is intended to help the people who are trying to accomplish a business to accelerate the competitiveness of their business in the industries. Data were collected

from each SME by using mainly qualitative but also quantitative analysis of the dimensions through semi-structured interviews, archives and observations, all subject to triangulation (Andalib and Halim, 2019 and Andalib and Darun, 2018).

The progression activity of transforming the available resources and components into a treasured product, services and systems is known as bricolage (Baker and Nelson, 2005). Embracing innovation becomes prime focus of the SMEs' since it not only assists to survive but also maintains the competitive-edge (Cordeiro and Vieira, 2012). In the context of manufacturing SMEs, most of them entered market with single product line or with limited financial capacity. In a limited resource environment, firms that have the capacity to improve and to innovate new product, services or systems based on available dynamics, factors and resources at hand could somehow boost the innovation performance. Therefore, this study strived to propose and construct an frugal innovation model for the manufacturing SMEs' of Bangladesh where these necessary components to trigger entrepreneur bricolage and enhance innovation performance are brought into one platform. To keep appropriate record of these components and to utilize these components for innovation performance of the SMEs' block-chain technology is introduced and frugal in the innovation model as well. A framework has been proposed, which could help us to acknowledge the influence of environmental factors toward entrepreneurial bricolage and eventually innovation performance. The proposed framework consists of three constructs namely, necessary components, innovation performance and block-chain technology and latent variable is entrepreneurial bricolage. The coding mechanism from NVIVO tool has identified 6 themes from 12 sub-components, which are considered as the necessary construct components of the SMEs. These NCs are derived from the Sub-components and furthermore, linked and connected with the BL Group 1 and BL Group 2, which are the block-chain database groups.

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