Roles of Technology, Innovation, and Finance in Small and Medium-sized Enterprises (SMEs) in Sri Lanka

Jayasooriya, Sujith

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S.P. Jayasooriya[1]

Abstract: Roles of technology, innovation and finance in Small and Medium Enterprise (SME) sector for economic development process is critical in emerging Asia. Growth, innovation, and productivity enhancement of the SME sector is always limited, and not up to its potential in Asia; Sri Lankan SME sector is not deviated from this dilemma. The paper discusses the case of project in economic enterprises development services and its approaches in supply-side management of SMEs in Sri Lanka. A baseline evaluation survey of 1200 SMEs was conducted to identify the potential and constrains for the supply side of the SMEs to promote technology adoption, innovation and financing in line with the national SME sector development policies. The results are discussed in three distinguished theses: (i) *Enabling role of the technology and finance*: creating enabling environment for the smooth procedures, capacity building, venture capital, financial development and banks, credit to the private sector and loans; (ii) *Facilitative role of the finance and technology*: application of technology and adaptation to the skill development and connections, information flow, and financial capacity; (iii) *Innovative role of the finance and technology*: microfinance, microinsurance, and transactions. The evidences show that lack of access to finance and technology demotes capacity building and skill training, information flow, business environment and networking of the SMEs. Hence, integrative solutions of finance and technology increase management of risks, adoption and enhanced networking for the enterprise development. These two pillars, technology and finance, become catalyst in the supply-side of the SMEs. Provoking business environment through technology adoption and financial sector development policies improving human capital, entrepreneurship and innovation enhance the performance of SMEs to thrive sustainable growth and development.

Keywords: Business Environment, Finance, Innovation, SMEs, Technology

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[1] Chartered Economist (Economic Policy), Innovation4Development Consultants, Sri Lanka; Consultant, Asian Development Bank; spj0525@gmail.com

1. Introduction

1.1 Background

In many developing countries, Small and Medium-sized Enterprises (SMEs) play a significant role in the economic development. However, most of the SMEs are not performed at its potential to make an efficient and effective supply side management to achieve the growth in developing countries. Underline evidence is that even though the capabilities and capacities of the SMEs are extremely high, actual performances of the SMEs under the low supply-side support is insignificant. The main justifications for avoiding this upheaval in underperformances and inefficiencies can be resolved with the support of technology and finance as tools for the supply-side support. In this perspective, Sri Lanka is not deviated from the other developing countries to achieve maximum benefits from the SMEs to cater the needs of the economy. This research was focused on conducting a baseline evaluation for assessing and gathering evidences for the supply-side support to achieve its potential for the SMEs under the policy of Small and Medium sized Enterprise Development in Sri Lanka. Based on the results of the evaluation survey, this paper is developed to generalize the facts of the survey into evidences for policy development in influence of technology, innovation and finance in preforming the enabling, facilitative or supportive and innovative role.

This paper discusses the three key roles of the technology and finance to thrive in the economic development in line with the adoption segmentation and behaviour of the entrepreneurs in SMEs of Sri Lanka.
(i) *Enabling role of the technology and finance*: creating enabling environment for the smooth procedures, capacity building, venture capital, financial development and banks, credit to the private sector and loans.
(ii) *Facilitative role of the finance and technology*: application of technology and adaptation to the skill development and connections, information flow, and financial capacity for supporting the SMEs
(iii) *Innovative role of the finance and technology*: microfinance, microinsurance, and transactions. The evidences show that lack of access to finance and technology demotes capacity building and skill training, information flow, business environment and networking of the SMEs

Even though the technological improvement and capability of finance is elevated during last decade, adoption of the technology and finance for the SMEs are sluggish in many developing countries for supply side support for SMEs to growth. SMEs account for most employment and much of the production in emerging Asian economies. However, their potential for growth, innovation, and productivity enhancement is often stymied by lack of access to finance as well as inadequate capacity and training. Policy interventions and institutional developments that to ease these constraints could contribute substantially to the growth potential of these countries including Sri Lanka.

1.2 Small and Medium-sized Enterprises (SMEs) of Sri Lanka

Small and Medium Scale Enterprises (SMEs) make up a large part accounting for 82% of all businesses of Sri Lankan economy. These are found in all sectors of the economy, primary, secondary and tertiary and provide employment for persons of different skills, skilled, semi-skilled and unskilled. There are SMEs in the agri-business sector engaged in growing spices, fruits and vegetables and in the manufacturing sector engaged in numerous industrial activities accounting for 20% of industrial establishments. In the service sector SMEs accounts for more than 90% of business establishments. SMEs are an essential source of employment opportunities and are estimated to contribute about 35% of employment (NHREPSL, 2012). The SMEs play an important role in promoting inclusive growth. The focus on SMEs in policy discussions emanates also from their role in developing entrepreneurial skills, innovation and promoting economic growth. These are also seen as useful in promoting social cohesion. It is therefore considered essential that the environment these SMEs operate in be improved. Although SMEs role in the economy is substantial, many of them are plague by management problems (Hashim & Wafa, 2002). These management problems include financial management, human resource management, marketing management, operations management and strategic management etc.

Given that financial management is one of the key aspects of the wellbeing and survival of a business, it is a managerial activity concerned with the planning and controlling of the firm's financial resources (Pandey, 2004). SMEs have been identified to play a crucial role in the economic development process of both the developed and developing countries. It is even more important to developing countries as the poverty and unemployment are burning problems in those economies. SMEs perform a strategic role in Sri Lanka as it accounts for a higher percentage of the total number of industries and business establishments similarly in other developing countries. SMEs promote economic growth by import substitution as well as through direct exports, and they mostly supply goods and services to large directly exporting ventures and thereby contribute towards alleviating balance of payment difficulties (Hewaliyanage, 2001). SMEs account for 80% - 90% of the total number of enterprises in Sri Lanka and contribute 30% in terms of value added and account for 32.7% of the employment from agriculture sector, 26.3% of the employment from Industrial sector, 41% of the employment from Services sector (National strategy for small and medium enterprises sector development in Sri Lanka – White paper, 2002). It provides the requirement of enabling environment for the achievement of a broad based, resilient and internationally competitive SME sector. It has also set-in place policies and programs to further develop and integrate SMEs with various subsectors of the national economy and global markets.

1.3 Research Context

This research of baseline evaluation was conducted to assess the basic requirements, constraints in supply-side management of 1200 SMEs in Sri Lanka. This study generated ideation, adoption concept, roles of technology and finance, and possible alternatives and case studies for the development of the SMEs for the policy perspectives. A large number of enterprises are categorized under the SMEs to baseline evaluation. Provision of financial services of credit and savings and technology to the specialized SMEs are considered with the adoptive behaviour of the entrepreneurs of the particular SMEs. The existing literature on SMEs in Sri Lanka is limited to examining the current situation of the SMEs rather supply side of SMEs with the focus of roles of technology and finance in competitive business environmental context. Initiating from that point, the study takes a balanced approach to fill this gap by looking at the supply side of the SMEs for national policy development.

The outline of the remainder of this paper is as follows. Section 2 provides objectives of the study. Section 3 is an explanation of literature review. Section 4 presents the Data and evidence based analytical approach, and section 5 and 6 present conclusion and policy recommendations respectively.

2. Objectives

The main objective of the study is to evaluate the roles of technology and finance in supply side management of the SMEs to provide the policy framework for the new direction of SMEs in Sri Lanka.

The specific objectives of the research are to:

To review and identify the gaps in the supply-side management; to provide the theoretical and practical evidences in qualitative analysis of the results of the research; to recognize the constraints and possible solutions for the gaps in supply side management; to identify the roles of technology and finance in terms of enabling, facilitative and innovative roles; to develop a framework for the indication of the progress of the SMEs in the policy area; to understand the strategies to develop the cohesive policy for the development of the SMEs in Sri Lanka from the state capacity building in supply side of the SMEs and to support policy guidance to manage supply side of the SMEs though enabling, facilitative, and innovative roles are limited in the literature for SMEs, to fill the gaps for developing policy recommendations for the relevant organizations to reduce the knowledge gaps in SMEs.

3. Literature Review

3.1 Theoretical Background and Conceptual Framework

A large number of roles of finance and technology are discusses in different conceptual and contextual dimensions about supply side of SMEs. In early literature revealed that the price mechanism in a perfectly competitive market is the powerful mechanism to allocate resources efficiently (Wang, 2003) and assumed that rational consumers or producers with perfect knowledge exist (Hobbs, 1996; North, 1990). But, market mechanism is not perfect due to the existence of market failure and various government involvements (Shafaeddin, 2004; Storey, 1999). Therefore, consumers/producers fail to make full rational decisions, because imperfect market mechanism provides incomplete, imperfect or asymmetrical information which means that all parties to the transaction no longer possess the same levels of information (Hobbs, 1996; Hubbard, 2001; Spraakman, 1997). Due to the asymmetrical information, business firms need to incur cost to search the lowest prices to purchase and the highest prices to sale, the costs for negotiating, the costs of accurately specifying of a transaction in a long-term contract and the cost for monitoring the transaction agreements (Dyer, 1997; Hobbs, 1996; Williamson, 1985). Those costs for searching information and processing them are called as transaction cost (Coff, 2001; Dyer, 1997; Williamson, 1979b, 1985; Zhang, 2009). The technology and finance play significant roles in reducing the transaction costs of industries. Imperfect and asymmetrical information affects business firms in two ways: bounded rationality and opportunism, which lead to the existence of transaction costs (Williamson, 1981). Business firms face three constraints: a) limited and unreliable information is available, b) human mind has only limited capacity to evaluate and process the information that is available, and c) only a limited amount of time is available to make a decision. Bounded rationality explains that these constraints limit (bound) to make rational decisions (Macher and Richman 2008; Williamson, 1981). Technology is capable of resoling the issues of asymmetric information quickly and accurately.

In Developing Countries, market mechanism is not well developed and market support institutions are absent (Stiglitz, 1993; Storey, 1999). Therefore, market mechanism discriminates against small enterprises in favour of large enterprises in relation to both the factor market and the product market6 (Stiglitz, 1993; Storey, 1999). Transaction cost is also another reason that leads to discriminate against small firms (Carmel and Nicholson, 2005; Bijman, Ton and Meijerink, 2007; Nooteboom, 1993b; Storey, 1999). For small enterprises, it is often difficult and costly to obtain accurate information (Bijman, Ton and Meijerink, 2007). Therefore, small enterprises face two problems. One is the problem of having not enough or not accurate and reliable information, which help one to make full rational decision. Small enterprises fail to make full rational decisions due to lack of information, lack of education level of entrepreneur, lack of entrepreneur's knowledge to access information, lack of capacity to gather and handle the information and lack of resources to obtain necessary information (Hubbard, 2001; Pitelis, and Pseiridis, 1999: Spraakman, 1997). As a result, small enterprises suffer higher transaction costs than the large enterprises (Nooteboom, 1993). The second problem arise due to lack of information is the risk of opportunistic behaviour of exchange partners (Bijman, Ton and Meijerink, 2007). There is a high possibility that small enterprises suffer hazard from opportunistic behaviour of exchange partners due to the lack of information and business experience (Bijman, Ton and Meijerink, 2007). These finding clearly shows those SMEs fail to govern their transaction cost in economizing manner. Therefore, the risk of failure of SMEs is very high. Such failures can be avoided only with the government intervention (Storey, 1999).

The government support for SME development has been justified in growth and equity purposes (Gilaninia and Shahraki, 2011; Vadnjal and Nikolovski, 2011). In the growth perspective, there is a great public interest to support SMEs because they have a significant impact on economic growth and development (Maseko *et al*., 2012; Sharif, 2012). In the equity perspective, the government needs to support for SMEs since resources are not allocated in fair manner due to market failure (Storey, 1999; Vadnjal and Nikolovski, 2011). Therefore, the public support for SMEs is acceptable in transaction cost perspective as well. Public support plays an important role in developing favourable transaction environment for SMEs to avoid hazard from opportunism of exchange partners and to improve the capacity to process and assess information in order to make more rational decisions which lead to minimize transaction cost.

3.2 SMEs and Resource Constrained Innovations

The role of SMEs towards economic development was not duly recognized in the early stages of the industrial economy as the role of management of large organizations with consideration of sophisticated technology, mass production and mass marketing were prioritized as the main focal point of policy makers, academics and researchers in the field of economic development (Thirkawala, 2008: Stokes, 2003). However, the importance of SMEs was recognized in the 1970s and 1980s attracting the attention of the main key players in the field. The economic growth of developing countries is directly correlated with the success of the private sector, and recognized as the engine of economic growth (Dutz and Connell, 2013). These private sector enterprises mostly consist of SMEs which play a crucial role in modern economies attracting the attention of policy makers and researchers towards the need of accelerating SMEs for sustainable economic growth. SMEs were neglected and large enterprises were prioritized in the initial stage of transforming agricultural economies to industrial economies in the 1950s and 1960s. The sector was considered as an outdated economic activity and the owners/managers of SMEs were labeled as the lesser flame running with inadequate resources and backward technologies (Stokes, 2003). Government policies were more oriented to encouraging FDI and were more liberalized to attract large-scale investments. The role of the SMEs was recognized in the 1970s and 1980s as the new rescuers of industrialized economies attracting the attention of researchers and scholars who started to study the various aspects of SMEs and their behavior. A significant role in the economy is played mainly by the SMEs scattered worldwide today (Philip, 2010; Islam et al, 2011). The vibrant SME sector is recognized as the engine of economic growth, innovation, employment generation and poverty reduction (Stokes, 2003; and Prasad, 2004). Micro, small, and medium-sized enterprises in the European Union provide around 75 million jobs and represent 99 percent of all enterprises as playing a central role in the region (European Commission, 2003).

More liberalized economic policies, which enabled Sri Lanka to open up her import, and export markets were introduced in 1977. However, economic performance of Sri Lanka is still far behind compared to her counterparts in the region such as Korea and Taiwan (Dutz and O'Connell, 2013). Shortage of capital, poor infrastructure, low technology-based labor-intensive production, less potentiality to mobilize and divert financial resources in the economy, influence and the impact of neighboring countries, inadequate entrepreneurial talent and spirit, and the influence of large organizations can be considered as critical factors affecting the growth and development of SMEs in Sri Lanka (Gamage, 2003). SMEs in Sri

Lanka need to be dynamic, robust innovative and technology driven for the purpose of improving competitiveness in domestic and global markets (White paper, 2002).

SME sector accounts for around 80 to 90 percent of the total number of enterprises and 75 percent of employment in the private sector in Sri Lanka (ADB Report, 2007). The banking survey conducted by the International Finance Corporation in 2006/2007 has revealed that 80 to 90 percent of total establishments are SMEs and they generate 70 percent of employment opportunities in the country. Moreover, the contribution of the SME to the GDP of Sri Lanka has increased from 40 percent in 2010 to 52 percent in 2011 (Ministry of Finance and Planning, 2011). Paying attention to this increased importance of the SME sector, the Sri Lankan government formulated a SME policy in 2002 to provide institutional support for the growth of SMEs (Gamage, 2003). However, SMEs are challenged by globalization of trade and the growth of Internet and information technology (Prasad, 2004). Further, inadequate access to capital and finance, inadequate industrial infrastructure, lack of market-based information, obsolete technology; lack of modern management skills and lack of labor training restrict the growth of the sector (Antonio and Gregoria, 2005). More than 85 percent of SMEs face significant survival challenges and more than 75 percent fail within five years of startup (Asian SME Summit, 2009). Being proactive and innovative is necessary for addressing the challenges and long-term survival and growth of SMEs.

Berger and Udell (1995) suggested that older firm accesses credit easier than younger firms because those firms are unconfined from asymmetric information problems. National financial structure and lending infrastructure and technologies influence SMEs' credit availability (Wu et al, 2008). Libby (1979) employs three major sources of information to inform credit worthiness variables, which are financial statement data, management evaluation, and outside credit ratings. The banks are reluctant to give a loan to small firms not having formal financial statements and audited accounts because those are struggled with asymmetric information and no establishment of credible credit (Sacerdoti, 2005). The SME sector has reported barriers in access to finance (Bebczuk, 2004; Slotty, 2009; Balling et al., 2009; Irwing & Scott, 2010; Yongqian et al., 2012). Several studies show that in developed and developing economies SMEs contribute on average 60% of formal employment in the manufacturing sector (Ayyagari et al., 2007). Le, Venkatesh and Nguyen (2006) pointed out that the achievement stage for any particular SME is to have adequate access to external sources of finance. Another study revealed that financing is a major constraint for SMEs to grow than for larger firms, mainly in the developing world (Beck et al., 2005; Beck et al., 2006; Fatoki & Assah, 2011, Kira & He, 2012).

The following figures show that the sources of financing and firm growth. Access to finance along with the firm growth. (Source: Grichnik, 2014)

(i) SMEs at initial stage with no collaterals or records: Own savings, funds from friends, family members or business-related earnings, minimum trade credit finance.

(ii) SMEs with possibly high growth potential with limited track record: venture capital, trade credits, short term financial loans, intermediate term financial institutions loans, minimum access to private placements

(iv) SMEs with some information Records and collaterals: venture capital, trade credits, low level public equity, minimum commercial paper, short term financial institution's loan, medium term financial loans, private placements, minimum level public debt

(v) Large firms with known records and track records: public equity (Stock Materials), commercial paper, medium term notes, trade credit, and public debt.

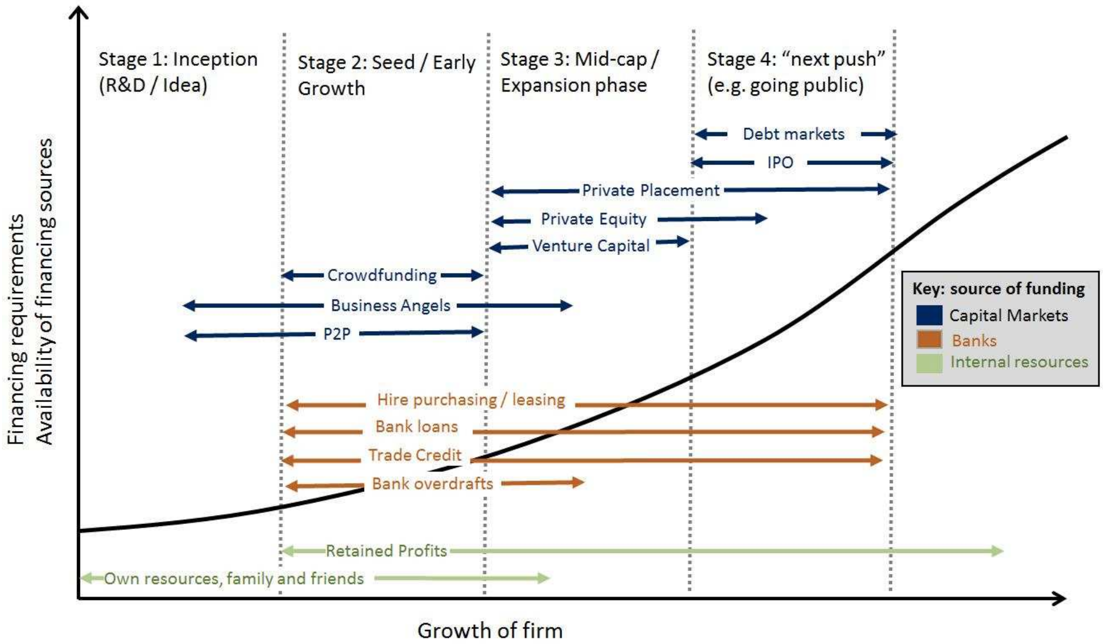

Figure 1: Firm growth and finance
Source: Fritsch, 2008

Atieno (2009) showed that the development of SMEs as one of the strategies for generating industrialization, employment generation and poverty reduction in Kenya. Levy (1993) pointed out that the consequences of limited access to financial resources. Normally SMEs face higher transaction costs than larger enterprises in obtaining credit (Saito and Villanueva, 1981) and availability of funds to finance working capital (Peel and Wilson, 1996). SMEs have to own tangible assets, maintain proper business information and improve their management skills to accelerate access of debt financing from lenders (Fatoki and Assah, 2011). Colluzi *et al.* (2009) found out that young and small firms are significantly facing financial constraints in their study on the significance of firm characteristics on access to external finance. Atanasova and Wilson (2004) proposed that firm's total asset collateral is an essential determinant to access credit. Having higher levels of financial intermediary development, efficient legal systems, higher GDP-per-capita and more liquid stock market report lower financing obstacles (Beck *et al.,* 2006). Some other studies under the UK manufacturing firm between 1989 and 1999 by Bougheas *et al.* (2006), noticed several firm characteristics including collateral, age, profitability, riskiness and size do influence accessibility of debt financing. Harrison and McMillan (2003) evidenced that listed firms and foreign owned firms encounter financial constraints compared to unlisted and locally firms. An industrial sector in which a firm conducts business does play an influential role in determining accessibility to external capital markets (Hall et al., 2000).

Composition of Sample

Factors		**Sub-causes**	
Low rate of return	Poor complementary factors	Geography	
		Human Capital	Availability of skills
		Infrastructure	
	Government failures	Micro risks	Customs taxes, crime, corruption, regulation
		Macro risks	Macro-policy, stability
	Market Failures		
High cost of	Poor access to		Macro-policy stability

finance	international finance		
	Poor local finance	Poor intermediation	Access to & cost of finance
		Low domestic savings	

Table 1: Author's calculations based on the sample

The survey study of determinants of finance access to SMEs in ECB and the European Commission resulted that firm's ownership structure and age are vital determinants of the perceived financial constraints regardless in which industry firm operate or the firm size Ferrando and Griesshaber (2011).

	Variable	No of Observations	Percentage
Industry	Manufacturing	568	46%
	Services	647	54%
Size	Small	851	70%
	Medium	364	30%
Age	Less than 5 years	168	14%
	From 5 to 10 years	475	39%
	From 10 to 19 years	521	43%
	From 20 to 49 years	39	3%
	Over 50 years	12	1%
Ownership	Public	38	3%
	Private	736	60%
	Other	441	37%

Table 2: Composition of Sample

3.3 Finance in SMEs

Finance has been identified in many business surveys as the most important factor determining the survival and growth of small and medium –sized enterprises in both developing and developed countries. Access to finance allows SMEs to undertake productive investments to expand their businesses and to acquire the latest technologies, thus ensuring their competitiveness and that of the nation as a whole. Poorly functioning financial systems can seriously undermine the microeconomic fundamentals of a country, resulting in lower growth in income and employment. Despite their dominant numbers and importance in job creation, SMEs traditionally have faced difficulty in obtaining formal credit or equity. For example, maturities of commercial bank loans extended to SMEs are often limited to a period far too short to pay off any sizeable investment. Meanwhile, access to competitive interest rates is reserved for only a few selected blue-chip companies while loan interest rates offered to SMEs remain high. Moreover, banks in many developing countries have traditionally lent overwhelmingly to the government, which offered less risk and higher returns. Such practices have crowded out most private sector borrowers and increased the cost of capital for them. Governments cannot expect to have a dynamic private sector as long as they absorb the bulk of private savings. In the case of venture capital funds, they have been concentrated in high technology sectors. Likewise, the international financial institutions have ignored the plight of SMEs. For example, the Basle capital accords have not been analyzed and framed with any consideration for their impact on the ability of the commercial banks to service the SME sector. These preferences and tendencies have exacerbated the lack of financing for SMEs.

3.4 Theoretical Framework for Segmentation of Adopters

The basis for the role of technology and finance is the adoption behaviour of the entrepreneurs of SMEs.

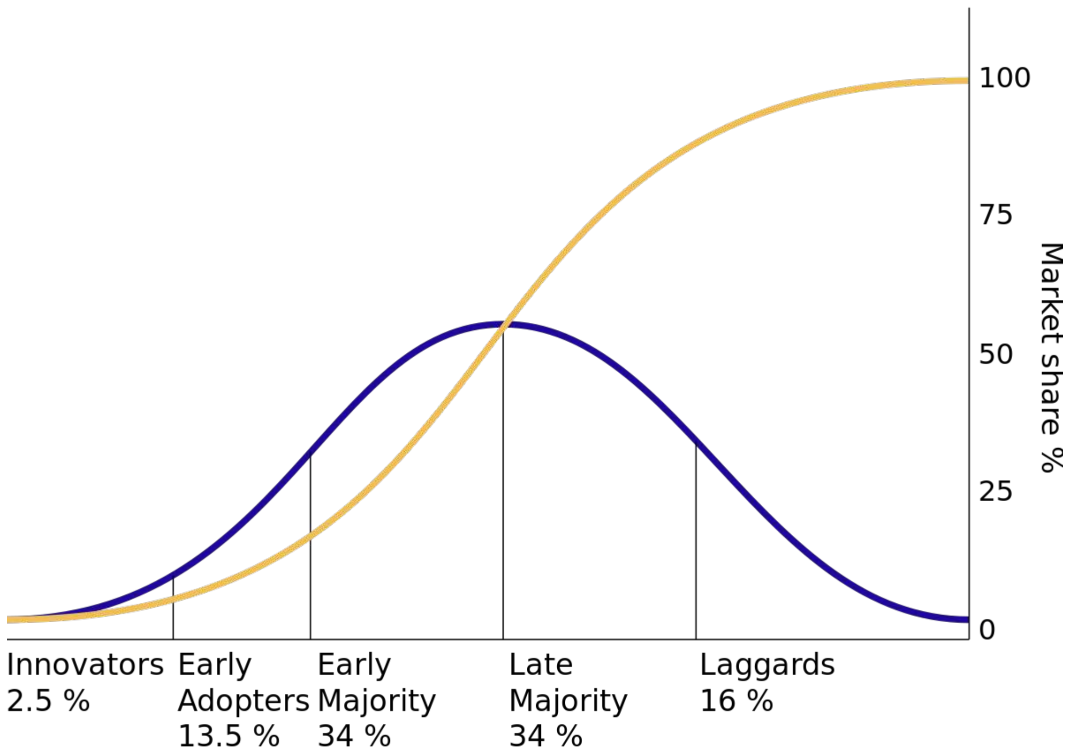

Figure 2: adoption behaviour of entrepreneurs
Source: The adopter Segments (Rogers, 1995)

Five major phases of the adoption can be observed in the theoretical frame, those are Development, introduction, growth, maturity, and decline. Each adopter segments are defined by Innovators: Resources, Desire, and willingness to take on risk to try new things; Early adopters: Opinion leaders: selective about technologies they adopt; Early majority: Willing to embrace: tool to understand how it fits with their lives; Late majority: Adopts with skepticism: most of the uncertainty must be resolved; Laggards: Last to adopt with aversion to change. The results are derived basically based on the adoption to the technology and finance in SMEs for three roles in the SMEs development process.

The reasons to use adoption phenomenon in this study are to describe the theoretical basis for explaining the adoption segmentations and reasons behind the roles to be played for the SMEs to obtain higher market share and thereby increase profit maximization objectives. In terms of finance, SMEs are regarded by creditors and investors as high-risk borrowers due to insufficient assets and low capitalization, vulnerability to market fluctuations and high volatility and Information asymmetry arising from SMEs' lack of accounting records, inadequate financial statements or business plans makes it difficult for creditors and investors to assess the creditworthiness of potential SME proposals. This provides the rationale behind the adoption behavior of the SMEs to enhance the supply-side management for the growth and development.

4. Data and Approach

The study is based on both qualitative and quantitative research methods, which supplement each other. Data was collected using desk reviews, key informant interviews and a baseline survey of 1200 SMEs, where samples were drawn from enterprises/businesses listed members of the project categorized as SMEs.

Though with a limitation of a comparative control group due to funding, the information gathered through the questionnaire survey for the study provides a critical insight, which has not been captured in the previous literature, into examining the technology, innovation and finance in supply side of the SMEs in Sri Lanka. Hence, the study establishes the basis for the design and development of demand-driven risk managing enterprises. In terms of sampling, this study derives the SMEs through stratified sampling approach to make sure that the sample representatives all sectors across the SMEs and then applied random sampling techniques to choose 1200 SMEs from the large sample. This study is designed to examine the supply-side of SMEs that develop resource use maximization and constrained innovations to the bottom of the SMEs in the Central province, Southern Province of Sri Lanka. The idea behind this research is also to recognize or build a theoretical background for adoption in roles of technology and finance in supply-side of the SMEs.

The descriptive nature of the research problem requires a combination of descriptive and explanatory research designs. The main reason for selecting the enterprise sector was that SMEs account for highly heterogeneous in terms of use of technology and finance in theory business since the business categories are also varied. The enterprise database maintained by the project was used to develop sample frame of the study due to its wide coverage and reliability of data. Basically this study employs the survey method based on questionnaire to gather quantitative data and qualitative reasoning. Further, it consists of focus group discussions and key informant interviews to collect qualitative information, which supports the entrepreneurs to explain the non-quantifiable values in qualitative ways.

5. Results and Discussions

This section of the paper discusses about the evidences of the supply-side of the SMEs in Sri Lanka can be managed with the adoption behaviour of technology and finance in terms of enabling, facilitative and innovative roles.

The study approximates the adopter segmentation of the entrepreneurs of the SMEs to support the behavioural movements in the market share. Even though, this is a raw estimation of number of entrepreneurs based on the adoption questions, the qualitative evidences support with the justification of number of segments. The innovators are 0.5%, early adopters are 5.5%, early majority are 16.5%, and late majority are 32% and laggards are 45.5%. It is skewed towards laggards. It is not only because of financial deficiencies to adoption but technical skills for technology adoption. Based on each steps of the adopters, the entrepreneurs of the SMEs can be identified playing three different roles of technology and finance for the enterprise growth. Therefore, the adoptive behaviour of the SME entrepreneurs in terms of technology and fiancé create the access and growth in market share to proceed with the business development. The results of the paper discuss about the three key roles of technology and finance in enabling, facilitating, and innovating the SMEs of Sri Lanka for policy makings.

From the baseline survey, technology, innovation and finance are measured to achieve the sustainability of the SMEs in three distinguished theses such as enabling, facilitative and innovative roles of technology and finance in adopter segmentations. The following table provides a summary of the matrix for the roles of technology and finance in SMEs development extracted from the research study.

Table 1: Summary of Roles of Technology and Finance

MATRIX - SMEs	TECHNOLOGY	FINANCE	INTEGRATION OF TECHNOLOGY AND FINANCE
ENABLING ROLES	-Integrative solutions -Supply chain management	-Venture Capital -Infrastructure development	-Access to information -Access to market -Identification of suitable networking partner -Joint ventures -Barriers to enter into foreign markets -Technology transfer -Shearing information -Shearing products -Sharing market -Common services -Training (Specialized) -Capacity building (Specialized)
FACILITATIVE ROLES	-Time management -Financial Management	-Accounting/ management - Record keeping -Capacity building -Training programs -Skill development -Entrepreneurship and innovation -Market orientation -Enterprise development -Leasing	
INNOVATIVE ROLES	-Induce new approaches and procedures -New product development -Market – niche markets	-Investment -New opportunities -Competiveness	

Table 3: summary of the roles of finance and technology
Source: Author calculation

(i) Enabling role of the technology, Innovation and finance:

After technological penetration for the business enterprise development, most of the technologies are focused on enhancing the efficiency and effectiveness of the transaction processes of the businesses. Even though, the adoptive capacity of the SMEs of Sri Lanka is very slow, the evidences show that they are adopting being the technology such information and communication technology, and other Internet of Things (IoTs) application for the entrepreneurs of the SMEs to thrive the business development. It includes how to create enabling environment for the smooth procedures of the SMEs development and introduction phases of adoption. This includes how technology has been penetrated into the SMEs in creating cohesive business environment for the smooth transactions as given in the summary table. Human development is one of the critical factors in any businesses to thrive towards the growth and maturity. The project's capacity building programs related to the technology enables capacity building in entrepreneurs of the SMEs are essential for sustainability of the business climate under competition. Technology enables business owners to build capacities in participating the training programs offered. Further, the project is composed of training programs for its members and groups of entrepreneurs in different arenas in the business development including technology adoption and technology use for the operation of the businesses. Technology also plays a role in enabling the private sector credit to the business inducement and incentives.

Technology and finance play critical enabling roles for the expansion of the SMEs in the developing countries like Sri Lanka. This baseline evaluation mainly considered about the key features of the enabling role played by the small and medium enterprises for the national policy development based on the evidences of project implementation. The project is composed of financial management training programs for its members and groups of entrepreneurs in different financial matters in the businesses including the operation of the financial management practices for long-term benefits and training. Venture capital as financial intervention also pay a significant role in enabling the businesses to create capital formation for the secure business procedures towards sustainability. Not only venture capital support the SMEs to secure the capital stock but also to further build capital attracting the new ventures taking the risk management. Therefore, it enables to take the risks of the entrepreneurs to improve the business capacity of SMEs in long term. Financial development and linkages with banks with new technology enables SMEs to spend little time for the transactions since its capacity to get involve with the technological applications. This enables SMEs to operate financial management with less opportunity cost and get bank loans easily since their secure transactions are easily accessible to the banks. Finance also play a role in credit to the private sector and loans through financial structure development and promotion as one of the key investment for SMEs to build the supporting services. But in broader terms, credit to the private sector is an indicator of the financial development in the economy and structural performance of the economy. Since SMEs are the biggest role in the economic development, the credit to private sector enables the business environment to attract the finance from the different sources. Technology and finance together creates unified environment for the SMEs to growth through institutional development and organizational management strengthening the networking and building contacts with other corporates. Financial development is not only develop the partnerships for enabling new opportunities but also develop trust in the banking systems, keeping the records properly and systematically for the innovations.

> ***Case Study: enabling role***
>
> *"I use technologies to produce coir products in my enterprise, established in 2006, with the use of technical skills given by the training program which enables me to improve the production capacity more than three times, and also initial capital and credits under credit-plus program enables to increase the access to the finance and new employees than when I initiated this enterprise. However, I have not developed new techniques to improve the firm or adopt new approaches in the production process yet. The project helped me a lot in the successful expansion of the enterprise development process through training programs introducing technologies and new markets, as a result of adoption to the technologies, with higher quality products".*

(ii) Facilitative role of the technology, Innovation and finance:

Facilitation of the SMEs is essential part for the integration of the SMEs and incentives for growth promotion. However, the SMEs can be promoted if those enterprises are creating the return on business ventures. It means that the facilitation roles of the technology and finance are possible at certain level of the business development since the SMEs have to invest initial capital for technology adoption. This is a constraint that most of the SMEs are playing at the moment. This is the major reason why most of the entrepreneurs are late adopters of the market share of their enterprises. Adoption of technological applications for many industries is expecting to use the technology as facilitation of the services provided and the development of the necessary skills for the SMEs. The effort of the project to enhance the technical capacities of the SMEs for the technological adoption is significant even though the business owners are not interested to apply these technologies due to lack of understanding of the procedures and lack of comprehension of technical know how. Only certain, medium size businesses are practices new technological applications in their businesses while using some innovative tools from other successful business networks. These evidences explicitly provide gaps for the technological applications for the business development through capacity building with national wide programs for the training, exchanging the skill development and adoption for the entrepreneurs.

Adaptation to the skill development facilitates the necessary competencies for entrepreneurial skills, innovation, leadership in businesses, pluriactive and proactive business development of the SMEs through numerous training programs with the support of financial administration and technology use. These facilitative roles are proven that these enterprises can enhance the profit maximization objectives several times in comparison to the control groups in the literature. This study was also originally planned to use a control group, but it was not approved under the limited budget. But, in terms of the segmentations, the results clearly show that the profit motive enterprises are more likely to use the technology and finance for facilitating the businesses to cope up with the competition in the market. Most of the entrepreneurial businesses are record keepers and they maintain the inventory and the price fluctuations for necessary goods and services for the improvement of their capacities and to get higher margin under the competition and scarcity. Project has orientation for customized and special skill development programs for technology usage for the enterprises and communication, marketing, and product development and diversification for targeted small-scale businesses.

Interconnections among SMEs are key for business to be succeeded; it is essential to network in the business climate to minimize the risk associate with the trends, which is also convinced by the information flow, and financial capacity for facilitating the business environment to be more efficient and effective. Further in order to face the competition, SMEs need complete and rapid information flow since the market is being changing highly competitive business climate. Financial capacity is no doubt that it facilitates the all transactions of the SMEs in all aspects.

Case Study: facilitative role

"I use technologies to apply ICT facilities in home-made garment industry, established in 1990, with the use of technical skills given by the training program which facilitates to coordinates sellers and improve business network, and also financial assistance though credit facilities to join with the wholesalers to buy bulk of raw materials under low cost to prepare wearable/garments which could be sold at higher price to induce the profits. Further, I am using online banking and financial transactions after the training program which helped me to save the cost as well as time, and facilitated the basic computer skills to use for accounting in daily basis and record keeping to plan the production and marketing process successfully".

(iii) Innovative role of the technology, innovation and finance:

The results provide evidences that the technology and finance induce the innovation in terms of product and process. Even though the product development is not significant in the adoption to the technology and finance for the SMEs growth and development, process innovation is significant factor for considerable number of SMEs. The enterprises have developed mechanisms to cope up with the promotion of the business environment and to cope up with the competitiveness when similar products are provided to the market. Therefore, the process innovation has been significantly influenced by the technology and finance in the SME development progression. Microfinance as an innovative tool, many SMEs are adopted with the financial risk management under the critical and unexpected circumstances. Therefore, many entrepreneurs have identified microfinance as an innovation for them to adopt technology and finance for sustainable business in highly fragile market conditions.

Innovation is the drive for the SMEs to be sustained in the competitive business environment to reach its maximum capacity for the SMEs to innovate further in the business expansion. The microinsurance and transactions are considered as risk tolerance strategies as key determinant for the SMEs to thrive though the business climate Firms not only adopt the successful applications in other sectors or country but also develop research and development capacity for further development of the businesses. Transaction cost and time taken for the transaction is critical for the SMEs to adopt the business environment rapidly.

A distinguishable business minds are those who use new expansion of the businesses with the research and further development of the new business models. These groups of entrepreneurs are not only developed higher business networks but also used adoptive business models for their enterprises to flourish under the competition. The supply chain management is considered as one of the mechanism that these groups of innovators use the process innovation for development of the SMEs. Financial capacity is one of the critical factors that promote the innovation of the businesses under the limitation of the constraints for the SME business development. The catalytic roles of the innovation are the financial sector development through the banking support in Sri Lanka. The private sector capital for the business development considered as the one of the main determinant for the enterprises to thrive through the bottlenecks. The economic enterprise development project support the SMEs in term of the financial structure development and inclusion for the business capacities for the development of the strong capacity for the sector development. However, the financial inclusion for the business sector plays a major role in upgrading the potential of the sector.

Financial capacities of the SMEs are basically development and the expansion of the business of the enterprises. But, its capacity not only induces the innovation but also support in the process of innovation through absorption of new technologies and integration with smooth operations. Process innovation is one of the distinguished characters of the adoption to the technologies and business processing of the market development. The development of the business networks and learning from other enterprises is also one of the significant evidence in the study. Not only it induces the innovation process but also increase the rate of adoption to the business climate and tolerance to the risks. The research and development of the new approaches to reach the targets are also in the innovation since the medium sized enterprises are used certain proportion of the budget to research and development for being competitive in supply chain management.

In some firms, new information for market development and marketing processes are also used as innovative ways for thrive for the competition even in global market in the supply chain. But, the development progress in inductive environment for the new arrays of the economic development of the SMEs is at the inception of the adoption behaviour. Inclusion of the new arrangements for the implementation of the different business techniques for the development of the SME initiatives or start up being diversified or pluriastic approaches for new ventures are also significant among the innovators. Most of the successful stories behind SMEs are due to diversification of the operations, functions and building strong links with other groups or firms for the supply-side management of the SMEs in Sri Lanka.

Case Study: innovative role

"I use technologies to produce cut-foliage in my firm, established in 2006, with the use of technical skills given by the training program which enables to improve and innovate all aspects of cut-foliage production, and also enables to increase the access to the finance getting new employees than when I initiated this enterprise. I have developed new techniques to improve the production, transportation, and delivery with protecting the freshness adopting new approaches in the production process since these products are perishables. The project helped to innovate and develop entrepreneurial skills to expand the business into medium scale production for new international markets".

5.1 Integrational function of the Technology and Finance in SMEs

As in the summary table above, the integration of the roles of the technology and finance is key factors in the business growth of the SMEs. The common approach that many SMEs share this type of integration for routine works and operations in the technology adoption and financial management. In terms of adopting the business climate, many entrepreneurs have used an integrative approach of finance and technology for their SMEs in Sri Lanka. The main reason for this adoption behaviour is that they believe that the finance is essential but it is not sufficient to expiation of the businesses rapidly. Thus, even though, the survey has identified the roles of the technology and finance in adoption for the higher market share, the impacts of integrated approach is significant for the business promotion. However, it seems like the project is also promoting both approaches as mixed approach for the induced gain from the SMEs.

As given in many literatures, this study also supports that facts that the technology and finance cannot be considered as a separate entitles that bolster the supply side management of the SMEs. In fact, the integration of those two factors, which can't be explicitly separated, are promoting the all three roles discussed above in enabling, facilitative and innovative firms to be succeed in the development process of SMEs.

5.2 The Knowledge Gaps in Supply-side Management of SMEs – constraints

The study revealed that presence of large number of barriers to supply-side of the SMEs to adopt the technology and finance in terms of enabling, facilitative and innovative roles in the economic development process even thought the SMEs contributes significantly to the economic growth in Sri Lanka. This section is intended to support the existing literature and provide evidences for the gaps in supply-side of SMEs to advance through the adoption of technology and finance as tools in the three distinguishable roles. However, the SMEs are not thoroughly understand in terms of the gaps in the roles of technology and finance in adoption behaviour for the growth and maturity of the business in developing countries. Many studies have been developed for the development and introduction phases, but limited to the development or maturity to create sustainable SMEs as national policy. In order to fulfill this gaps in the adoption of SMEs for supply-side of the development, this paper provides significant policy instruments, which can be used to develop polices for the SMEs to be sustainable and growth in a competitive environment.

One of the major constraints is the lack of access to finance and technology, which demotes many SMEs in enabling, facilitative and innovative roles for thrive in the changing business environment to be competitive. The results predict that the main constraints of the businesses to growth are the financial constraints to reach business expansion. However, the financial support given by the banks are not meeting the requirement of the financial need of the enterprises. The one of the main constraints of the financial sector development is the not having properly planned government policies to support the financial capacity development of the SMEs. Therefore, the business enterprises are not capable of investing on the technologies to build the adoption to the competitive environment. Technological advantages cannot be obtained from these firms to meet the needs of the business firms to make higher profits. Necessary capacity building and skill training for improving absorptive capacity of the technologies for entrepreneurs while increasing the confidence of their investment for technology and innovation is essential. The incentives and risk management via microinsurance or new policies for supporting the fragile industries can provoke the adoption. The critical factor behind any SMEs to growth is information flow, which can be easily supplied with the information and communication technologies in the businesses to provide decision making more efficient and effective. Networking of the SMEs are also essential at macroeconomic level since similar SMEs are shearing common resources as well as they face similar constraint which can be harmonized through implementing success stories directly with the laggards for business to be rapidly adopt to the competitive environment through lessons learned.

5.3 Barriers for Supply-side of SMEs to adopt Technology and Finance

This baseline evaluation study is mainly focused on identification of barrier to reach the roles of technology and finance for promoting the SMEs for economic growth. As an infant industry, the finance and technology adopters face abundant obstacles, which prevent them from being versatile. Versatility of the business involves high risk and cost, which can be minimized with the technology and finance as risk managing tool. Skilled human capital is a major setback in the expansion of the SME sector due to movement of the skilled entrepreneurs towards the higher wage employment. Networking of the providers would overcome the problem to a certain extent through collective approaches. Limitations in finance hinder the expansion/ diversification of the SMEs products being innovative and process innovative. The SMEs sector requires a strong regulatory policy framework for its expansion through technology and finance based strategies for rapid adoption to the market behaviour. Lack of information and flow of information discourages quick adoption and decision making of the business owners. Lack of a regulatory framework for SMEs is a reason for the unwillingness of the private sector to engage in investing in technologies and financial tools for business to growth. Creation of an enabling environment would increase the entry of new types of regulatory institutes for the cohesive policies to facilitate the business environment. The government can play a leading role in promoting SMEs among the vulnerable groups, creating awareness and popularizing the skills for technology and finance adoption to the SME sector. Further, the growth and expansion of SMEs are constrained by problems emanating from product and factor markets and the regulatory system under competitiveness. These problems fall into broad areas of access to finance, physical infrastructure, level of technology, regulatory framework, access to information and advice, access to markets, business development services, industrial relations and labour legislation, intellectual property rights, technical and managerial skills, linkage formation and environmental issues. High interest rates and the emphasis on collateral by lending institutions are the most frequently cited constraints affecting SME development. The inadequacies of skills in key roles for the technology and finance to access and difficulties in accessing information and markets are also highlighted. Compounding these difficulties, the prevailing business and regulatory environment raises costs and creates unnecessary hurdles.

5.4 Lessons Learned from Supply-side of SMEs

(i) SMEs are highly diverse, and consequently have different needs. Some are active while some are essentially dormant.
(ii) SMEs offer higher potential to drive substantial employment growth as well as wealth creation in the economy, contributing to poverty alleviation. These objectives are sufficiently coping up with the adoption to the technologies and finance in their roles of the SMEs supply side management.
(iii) Focus on SMEs is usually guided by their usefulness for raising employment as the capital investment needed.
(iv) The adoption to technologies and finance in their roles of the SMEs supply side management which is important in policy relevance regarding employment in SMEs: Entrepreneurs do not have sufficient knowledge and experience of human resource management practices.
(v) Most of the successful stories behind SMEs are due to diversification of the operations, functions and building strong links with other groups or firms for the supply-side management of the SMEs in Sri Lanka.
(vi) SMEs can be promoted if those enterprises are not creating return on business enterprise. It means facilitation roles of the technology and finance are possible at certain level of the

business development since the SMEs have to invest initial capital for technology adoption.
(vii) Policy relevant: Most entrepreneurs are lack in adoption of technologies and financial inclusion to develop and expand. The government needs to clearly recognize the needs and roles of SMEs.

6. Conclusion

The main objective of this explorative and analytical study was to identify the roles of technology and finance in terms of enabling, facilitative, and innovative behavior of SMEs in Sri Lanka. It was found that the adoption behaviour in segmentation is skewed towards the laggards, supply side SME policies can induce the changes of the SMEs to thrive the economic growth under the constrains with the adoption to the technology and finance. As discussed under the theoretical frame, each adopter segments are defined by innovators: resources, desire, and willingness to take on risk to try new things; early adopters: opinion leaders: selective about technologies they adopt; early majority: willing to embrace: tool to understand how it fits with their lives; late majority: adopts with skepticism: most of the uncertainty must be resolved and laggards: last to adopt with aversion to change. These segmentations and behavioural patters are observed under the adoption to the technology and finance form the SMEs with slow movements in the absence of incentives and cohesive policy framework.

The findings have supported to conclusion of roles played by the technology and finance can be enhanced the shift of the SMEs to be more innovative in the process of growth with highly adoptive groups. There is a need for sufficient knowledge and information infrastructure and assistance being provided by the government, and educational firms, and R&D institutions to cater these needs. Further there should be a mechanism to stay closer to SMEs through intermediation for high absorptive capacity of the technology and fiancé while building the trust among the entrepreneurs for higher investment. Moreover, SMEs also need to collaborate with other firms, universities, technical centers and R&D firms to bring new knowledge into the firms and share information about new products/ services, technology, and markets to be sustainable under the competitive business climate.

Hence, integrative solutions of finance and technology increase management of risks, adoption and enhanced networking for the enterprise development. These two pillars, technology and finance, become catalyst in the supply-side of the SMEs in Sri Lanka and possibly in the developing countries in the similar context.

7. Recommendations and National Policy Framework

Several important points of policy relevance regarding employment in SMEs are noted from the study: SME entrepreneurs do not have sufficient knowledge and experience of personnel management practices. Most entrepreneurs are lack in adoption of technologies and financial inclusion for the business to develop and expand. The key policy documents of the government clearly recognize the role of SMEs. Proposed measures for their promotion include subject areas like skills development, tax concessions, entrepreneurship development, sub-contracting, marketing and access to finance. Focus on SMEs is usually guided by their usefulness for raising employment numbers as the capital investment needed in this sector to provide an additional work place on average is normally substantially less than in large enterprises. SMEs are very diverse, and consequently have different needs. Some are active while some are essentially dormant. There are issues of defining the size of enterprises. The SMEs are considered to offer the potential to drive substantial employment growth as well as wealth creation in the economy, contributing greatly in the area of poverty alleviation as well. These objectives are sufficiently cope up with the adoption to the technologies and finance in their roles of the SMEs supply side management.

Based on these strong evidences in the supply side of the SMEs, key recommendations can be proposed for the policy development of the SMEs to be accelerated the growth and development. They can be contemplated as:

(i) Provoking business environment through technology adoption and financial sector development policies improving human capital, entrepreneurship and innovation enhance the performance of SMEs to thrive sustainable growth and development.

(ii) Service sector based SMEs need to be promoted in the economics growth which is driven by the competitive service growth and unless otherwise finance and technology can play roles in enabling, supportive and innovative with the links to the other sectors.

(iii) Barriers to SMEs to drive towards enabling, facilitation and innovation for the business development need to be supplemented with the technology and financial inclusion.

(iv) National policy amendments for the practical applications of the SMEs promoting factors like impacts of finance and technology in the enabling, facilitation and supporting functions for the economic growth and development.

(v) Need to design functional Credit Guarantee System (CGS) for Sri Lanka. Manage the risk allocation of credit grantee schemes and make credit support schemes known to enterprises.

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