

A MODEL & FRAMEWORK FOR UNIVERSITY & SMES COLLABORATIONS

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Abstract

In the era of innovation and knowledge exchange, fostering effective collaborations between universities and Small and Medium-Sized Enterprises (SMEs) has emerged as a critical aspect for mutual growth and societal advancement. This paper introduces a robust model and framework meticulously crafted to enhance and streamline collaborative endeavors between universities and SMEs. Rooted in a thorough examination of existing literature and enriched by empirical findings from real-world case studies, the proposed model amalgamates pivotal elements crucial for the success of such partnerships. It encapsulates organizational structures, resource allocation mechanisms, and effective communication strategies, thus paving the way for fruitful and sustainable collaborations.

Keywords: Small and medium sized industry, SME, Industry Collaborations, University Industry Engagement.

1. Introduction

In recent years, the significance of SMEs has garnered increased attention, not only as drivers of economic growth but also as symbols of resilience and optimism within national economies. President Joe Biden's remarks underscore the pivotal role SMEs play in the United States. He remarks that “Every time someone starts a new small business, it’s an act of hope and confidence in our economy. Today, we learned that Americans filed 16 million new business applications during the first three years of my Administration. 16 million acts of hope, the strongest stretch on record. This is all part of a broader story of progress growing our economy from the middle out and the bottom up, not the top down. Our economy has added more than 14 million new jobs since I

took office, including many from small businesses, while the unemployment rate has been below 4% for the longest stretch in more than 50 years, American workers' wages and wealth are higher now than before the pandemic, and inflation is down by nearly two thirds from its peak" (The white house, 2024).

Amidst this backdrop, it becomes evident that even the government of the world's largest economy places significant expectations on the SME sector. Such recognition underscores the critical role SMEs play in fostering economic dynamism, job creation, and societal well-being.

This paper serves as a call, urging policymakers, industry stakeholders, and academia to prioritize the needs and aspirations of SMEs in their pursuit of inclusive and sustainable economic development. By embracing and nurturing the entrepreneurial spirit and innovative capacity inherent in SMEs, Sri Lanka can carve out a trajectory towards greater prosperity, resilience, and opportunity for all its citizens. Through strategic interventions and collaborative efforts, Sri Lanka can harness the full potential of SMEs to drive socio-economic progress and build a more equitable and vibrant future.

2. Literature Review

Hansjorg Herr and Zeynep M. Nettekoven (2017) have concluded the following facts in their study about the Role of the SME for the Development of the Country, Germany. According to them, the SME sector plays an important role for employment and economic development in every country in the world. The SMEs have been categorized into two main parts.

1. Schumpeterian SMEs, which include start-ups that bring about innovations, productivity increases and structural changes. Second,
2. Normal SMEs, which adjust to market pressure but do not innovate much of their own accord.

There is another important category called the poverty-driven SMEs, which reflect excess labor and a lack of social protection and entrepreneurship. According to the study, it has been identified that the policies for this last group fall under the rubric of poverty reduction strategies, which are not the focus in their study.

Most important directions identified through their analysis are as follows.

1. Developing countries must support SMEs as an important part of their development strategy.
2. The government must create a vision together with society as a whole: The vision must determine the direction of development, including economic and social upgrading. Only such a vision can allow the concerted action of societal forces to implement new developments.

Another study has identified the following key points which are crucial for the success of SMEs (Herr and Nettekoven, 2017).

1. An urgent problem of SMEs is access to sufficient, long-term finance with low interest rates. Germany's local banking system and development bank provide a model for delivering finance to SMEs.
2. SMEs need a qualified workforce. Aside from providing a university education, the German vocational apprentice system can shed light on how to upgrade the workforce.
3. Employers' associations, with their many positive functions for SMEs, must be strengthened and trained. The same is the case for trade unions, which should also upgrade their theoretical understanding of their role.
4. Sectoral wage-bargaining systems guarantee fair competition among firms, increase productivity, and stimulate progress.
5. SMEs need an environment of high demand to prosper.

HANSJÖRG HERR AND ZEYNEP M. NETTEKOVEN (2017) concluded that overall, SMEs provide a huge opportunity for developing countries to upgrade economically and socially. However, the market alone does not allow for the exploitation of this potential.

1. A package of policies is needed that creates institutions to support SMEs such as employers' associations.
2. improve the general environment for SMEs (e.g. infrastructure, finance, education).
3. Enforce social upgrading (e.g. sectoral wage bargaining, good working conditions).

4. Support existing Schumpeterian SMEs and start-ups in a selective way (e.g. development banks, subsidies for specific clusters or SMEs and start-ups).

La Hatani (2021) has done a broader analysis on how the Innovation of SME sector influenced by Knowledge Sharing, Competitive Advantage, and Strategic Location. According to the study, the improvement in knowledge Sharing can significantly improve innovation in SMEs. Strategic locations positively and significantly affect improving innovation and competitive advantage. Accordingly, the innovation has a significantly positive influence on improving competitive advantage in SMEs. This means that the high innovation of SMEs has a significant contribution towards increasing Competitive Advantage. The role of innovation has been proven to mediate the effect between knowledge sharing and strategic location on Competitive Advantage. More deliberately knowledge sharing and strategic locations can increase innovation, and increased innovation can increase competitive Advantage (La Hatani, 2021). According to the study of The Role of Innovation as Mediation from the Influences of Knowledge Sharing and Strategic Location towards Competitive Advantage in SMEs Southeast Sulawesi Province by La Hatani (2021), following recommendation were given.

1. The policymakers, namely the managers of SMEs should be responsive to knowledge, namely the ability of SMEs to acquire or develop intellectual assets, including personal understanding, expertise, experience, and social processes in organizational cultures that value knowledge sharing activities.
2. Indicate that the low transportation cost indicator least reflects strategic locations variables. Operationally, it can be achieved by SMEs managers, focusing on the efficiency of transportation costs to our business locations costs lower because of choosing strategic business locations.

According to the study “Small Businesses, Job Creation and Growth: Facts, Obstacles and Best Practices” by Organization for Economic Co-operation and Development in 2018, it has been observed that it is required to create an environment Conducive to research and development (R&D) to enhance the productivity and competitive advantage in the domain. However, as per the OECD (2018) it has been stated that the costs for R&D, technology generation and meeting associated standards are high or

increasing more rapidly than other costs. Therefore, it has been observed that the smaller firms and businesses may, due to inadequate resources, be (increasingly) excluded from R&D and technology development. In the study, it has been suggested that consideration be given to above mentioned issues by:

1. Ensuring, wherever possible, that compliance procedures associated with R&D and new technologies are not unnecessarily costly, complex, or long.
2. The competition regulations do not prevent SMEs from achieving economies of scale in R&D through consortia.

In addition, in the same report (OECD, 2018) it is stated that “Technological progress is not translated into economic benefits and jobs by governments, countries, or sectors, but by innovative firms. Innovative firms are not superior algorithms to maximise production functions, but efficient learning organisations that seize technological and market opportunities creatively to expand production frontiers. The single most important finding of recent economic research might be that new evidence from longitudinal microeconomic data reveals that firms that innovate more consistently and rapidly employ more workers, demand higher skills, pay higher wages and offer more stable prospects for their workforce.”

Figure 09 Company Types

Source: OECD, 2018

Research Performers	<ul style="list-style-type: none"> • Research department of equivalent • Able to take long run view of technological capabilities
Technological Competent	<ul style="list-style-type: none"> • Multiple engineers • Some budgetary discretion • Able to participate in technology networks
Minimum Capability SMEs	<ul style="list-style-type: none"> • One engineer • Able to adopt/adapt packaged solutions • May need help to implement
Low-technology SMEs	<ul style="list-style-type: none"> • No meaningful technological capability • No perceived need for this • May ne no actual need

Further, it has been concluded that among small innovative firms, technology-oriented business start-ups are a unique source of diversity and flexibility and ensure the long-

term performance of innovation systems. They play a vital role in pioneering and developing new markets and providing product diversity and innovation in fragmented existing markets, characterised by risk/reward ratios which are dissuasive to large firms (OECD, 2018). Analysis done by the Asian Development Bank stated that, the major challenge of SME development is the lack of R&D expenditure. However, collaboration is a key factor of innovation-related knowledge flows both for firms that use R&D (either internally developed or externally acquired) and for those that are not R&D active (Yoshino and Taghizadeh-Hesary, 2016). The following key factors have been identified.

1. In all economies for which data are available, R&D active firms tend to collaborate more frequently on innovation than non-R&D active firms, although in the Republic of Korea (manufacturing only) and Australia, both types of firms have similar rates of collaboration.
2. Collaboration with higher education or public research institutions is an important source of knowledge transfer for large firms. In most economies, these firms are usually two to three times more likely than SMEs to engage in this type of collaboration.
3. More than half of all innovating large firms in Finland, Slovenia, Austria, and Hungary collaborate with these institutions but less than one in ten in Mexico and Australia. Collaboration is more frequent with other market actors, in particular suppliers and clients.
4. Among large firms, suppliers play a key role as value chains become increasingly integrated, while in Finland, the United Kingdom, the Republic of Korea, South Africa, and Iceland, collaboration with clients is equally or more importantly, a potential indication of the growing importance of user-driven innovation.

Shivany. S (2020) in her international Case Study on Impediments and Approaches for Faculty and SME Linkage identified following key facts and they are more related to the Sri Lankan context. The following facts were summarized as the conclusion.

1. Faculty & Students should have linkage with SMEs to gain and share knowledge. Through their field work, they can share knowledge with the businesspeople to share knowledge on their experience.
2. Academic staff of the faculty should be encouraged through outcome-based performance, for instances number of SMEs protected by each staff, number of publications on solving the issues of SMEs, Number of consultations listed on SMEs, number of participations at the workshops for local business community.
3. Faculty should consider quality assurance policing protecting the links between the faculty and the business community. Students should be encouraged to have partnership with industries, and they can be allowed to make profit via collaborative works with SMEs during graduation.
4. The Research activities should be carried out under the guidance of both industry and academic supervisors and Students must receive clear directions for their Research studies via the collaboration and the Research findings can be easily commercialized to the respective SMEs.
5. Further, they intend to have consultation sessions for SMEs and other business communities on their request. This is a kind of consultancy for the issues in the organizations and Faculty can earn money in return.
6. Whether in terms of Research collaboration, building community relations, being good neighbors or making a positive contribution to the life of the faculty, community engagement is important on many levels not only from an ethical consideration of corporation with community yields rewards to students and community partners alike.
7. It is accepted that both University and SMEs considered that the concerted action of institutions within country and its social and economic impact beyond specific Research collaboration projects are of great importance.
8. The impact in terms of skill development and enhanced employment opportunities seem especially relevant and the University wishes to be the country wise knowledge hub by gathering.
9. Furthermore, the Faculty can consider that the specific outcomes and solutions of collaborative Research projects are needed to be commercialized for value,

to all relevant parties including government, policy makers, institutions and other external partners.

10. The Research outcomes can be acknowledged by Journal publications and Research conferences in order to concern on the industrial sector as the first priority in every agenda.

W. E. Dahanayake (2022) has done a deep analysis and a study on SME sector in Sri Lankan context and has stated in his conclusion that it's imperative to understand that Sri Lanka is undergoing a critical phase in terms of economy and serious concern must be given to sustain SMEs as it can affect the GDP. As per Dahanayake, Sri Lanka lags behind regional neighbors in SME share of total enterprises. In India, Malaysia, and Singapore, SMEs make up 95-99% of all businesses, but in Sri Lanka, they're only 80%. Despite their major contribution to the economy, SMEs in Sri Lanka still account for a small part of overall national exports, demonstrating a fundamental divergence between their desire to expand beyond the home market and their ability to do so (Dahanayake, 2022). W. E. Dahanayake (2022) has stated following conclusions related to SMEs in Sri Lankan Context.

1. SMEs are the backbone of the economy, but they need help to grow. Regulatory restrictions and insufficient information access hinder SME growth. Over 20 ministries serve Sri Lanka's business sector, each having many departments, authorities, and councils. This causes government fragmentation, information gaps, and poor private-public synergy.
2. Sri Lanka should mimic developed-world SME success stories if it wants to progress beyond middle-income status. Startups and SMEs are more dependent on their business ecosystem and more prone to market failures, policy inefficiencies, and inconsistencies owing to internal constraints.
3. A transparent regulatory environment, effective bankruptcy regulation, and judicial system are vital for start-ups and SMEs, especially in innovative, high-risk sectors.

As per the final report of the FINAL REPORT ON ASSESSING THE DIGITAL MATURITY OF SME EXPORTERS IN SRI LANKA done through the USAID (2022) following conclusions have been made.

1. This comprehensive study based on the Deloitte DMM found that there is a variety of digital maturity scores among SMEs in Sri Lanka, and only a small portion of SMEs have an ideal target level of digital maturity with a score above 75 percent.
2. Opportunities still exist to improve SMEs' organizational readiness to unlock the full potential digital has to offer. SMEs that incorporate digital practices into their operations and culture will be able to participate in the global e-commerce landscape, providing job opportunities for Sri Lankans and driving the country's economic growth.
3. Digital transformation needs to focus on fundamentally shifting an organization's operations and mindsets from "doing" digital to "being" digital.

According to the survey it is also revealed various digital maturity levels among SMEs across the five dimensions.

1. The Operations dimension had the highest digital maturity score, followed by
2. The Enabling Environment
3. Human Capital & Culture dimensions,
4. Next dimension is The Technology dimension,
5. Lastly the Strategy dimension, which was found to be the least digitally mature.

As per the study (USAID, 2022) The recommendations within this study were developed to meet the specific needs of Sri Lanka and supported by applications and best practices of international governments. SMEs can improve their digital maturity by updating their business strategies to incorporate technology adoption and utilizing technology to optimize their operations.

1. The digital transformation ecosystem is vast and complex, but there are opportunities for the Government of Sri Lanka and other organizations, including the private sector and donor community, to support SMEs by creating a digital ecosystem to help them navigate digital transformation.

2. Whether it be increased access to resources through webinars and training or establishing governance frameworks for technology implementation, SMEs would benefit greatly from digital initiatives to help them compete in the global e-commerce landscape.

In general, the SMEs and Academia collaboration has been clearly identified in the following study done by the Cooperation between Universities and SMEs by Rosivalda Pereira and Ma'rio Franco (2022). Findings have been concluded and they can be adapted to the any regional context. It will be aligned to the Sri Lankan SMEs and Academia appropriately and will be addressed the finding while developed the proposed customized model for Sri Lankan Context.

1. One conclusion from this research is that a primary issue is SMEs' difficulty in initiating cooperation with a university because they are not aware of the university's capacity to help them.
2. On the other hand, the university may not be communicating programmes that can benefit these firms, and so in this respect there is a communication problem.
3. These two types of actor are important for the ecosystem of regional innovation, and there is therefore a need to establish effective communication channels between both parties so that the knowledge produced in universities can be more accessible to SMEs.
4. SMEs are important for regional growth, and cooperation with universities can be an important means of development for them. U-SME cooperation can go beyond immediate problem-solving and attracting and training a qualified workforce and can be a source of innovation and development for industrial sectors.
5. Regarding future research, more attention could be paid to U-SME relationships. Understanding how cooperative relationships are formed can be a stimulating element of innovation ecosystems and effective network operation.

6. SMEs have management dynamics that are closer to consumers and suppliers, which can lead to the carrying out of innovation practices more related to a region.
7. University managers must go beyond supplying a qualified workforce and set up specific pro- grammes for SMEs.
8. Effective communication should be established to overcome the identified problem of a lack of awareness among SMEs about programmes provided by universities that could benefit them. Such an initiative could break down this barrier to U–SME cooperation and contribute to effective relationship networks.
9. SME managers need to find out more about the programmes developed in universities and benefit from that knowledge. They need to become acquainted with the university and take advantage of its resources. The formation of cooperation networks with universities can be a virtuous relationship for regional development.
10. Public policymakers need to align programmes to stimulate research in universities which respond to the specific characteristics of SMEs. Similarly, they can encourage SMEs to participate in cooperative programmes with universities. In this way, SMEs will benefit more from knowledge produced in universities and will have greater access to information, research and development.

3. *Analysis & Discussion*

Under the systematic review study done by Rosivalda Pereira and Ma'rio Franco (2022) about the Cooperation between universities and SMEs following facts were stated and concluded. The model or the framework that will be propose in this article is based on the all the findings indicated in the references and the following analysis related Sri Lankan Industrial and Higher Education Sector and focused into the SMEs and Academia Collaboration. There are two main projects it has been conducted by the Faculty of Engineering targeting the relatively large-scale enterprises in Sri Lanka, as well as SMEs in Sri Lankan Industry Sector. NSBM Industry Transformation Program

2022 it has been considered the industries in Western Province and in 2023 for SMEs in Homagama, Divisional Secretariat in Colombo Districts.

**Table 011: The University Industry Engagement Programs
and the Projects and Progress in 2022 and 2023**

Program	Purpose	Informed	Participant	Projects	Coordination
Industry Transformation Program 2022	Collaborative Research Project with Innovation and Technology Achievements	40 – 50 Industries including government entities. Western Province of Sri Lanka Directly to the Company CTO or relevant officials	25 – 30 Participated & Presented their products also.	Over 15 projects and development in Progress	Engineers and Higher Managers Continues Engagement
Technology Transfer Program for SMEs	To uplift the technology level and to solve the critical technical issues.	75 SMEs in the Homagama Through the Divisional Secretariate and Development officer	10 – 15 SMEs with their owners Few of them showcases the products.	5 Projects Diminishing the Coordination with them	Only the owner represented and interest for the project diminished

According to the fact that the Large-Scale Industries maintain the consistency between the company and university collaboration through the projects and other activities. The SME has already discontinued the progress of the project and collaborations. It is insisted that it is required appropriate model for Connecting SMEs and the University for the for the betterment of the SMEs which can support them to move to the higher-level category and expand their market overseas.

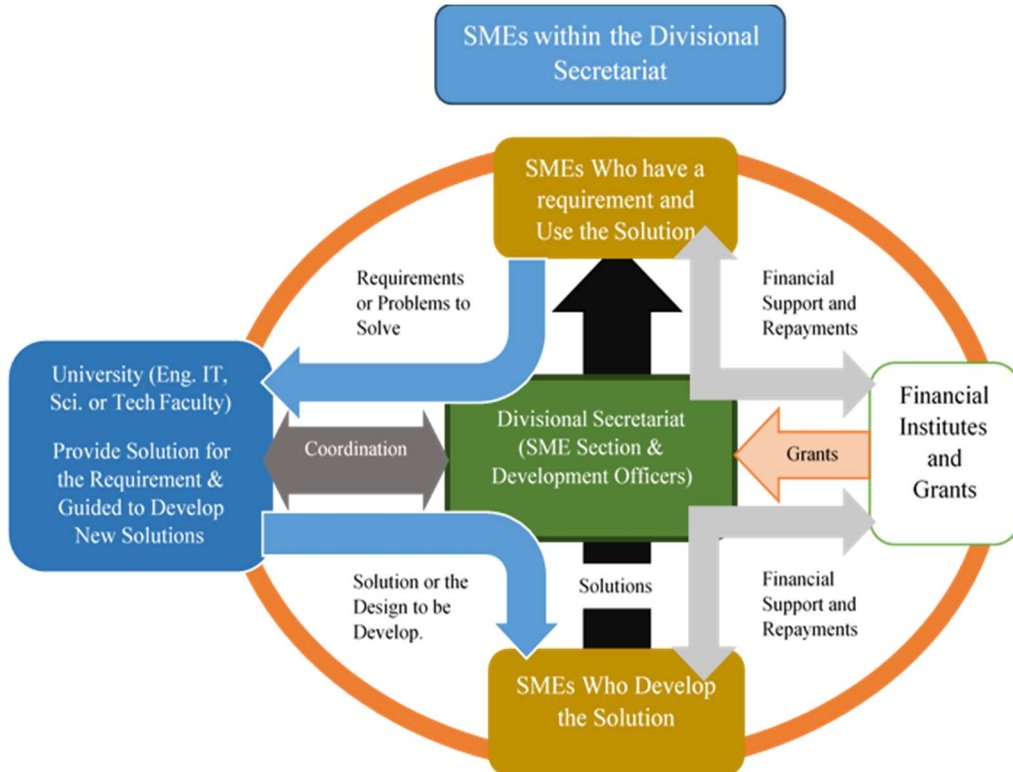
In this model (Figure 02) it has been addressed the Communication between the SMEs and University by considering the Divisional Secretariat as the mediator and the development officers as the key members of the process and set this as a Key Performance Indicator of the Development Officers.

The university read the requirements and problems which the SMEs are expecting solutions and try to give build a common solution which can derive the customized solution from the main design of the solution.

The designed solution will be built through another Capable SMEs and create a new business model among the SMEs through divisional Secretariats with the support of the Financial Institute. The university will solve the problems and provide solutions for the

requirements with a Grants or financial support with their own and finally will recover the cost through the IP rights.

Figure 02 The Model for SMEs and University Collaboration



4. Conclusion

This model or the framework enhances the communication between the SMEs and University and will give a government level assurance for both parties to achieve their goals. And this model will give a clear picture and sustainable model for investing in the innovation in through a process of through a series of assessing the all the aspects of the project and the solutions. This will support proper utilization of the knowledge, findings, human resources towards the success of each stake holder's ultimate goal of achieving the developed economy of institution, region and country.

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