AN INVESTIGATION OF THE TYPES OF INNOVATION ENTREPRENEURSHIP AND MANUFACTURING METHODS THAT ARE PREVALENT IN LOW-TECHNOLOGY INDUSTRIES

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ABSTRACT

This study intends to investigate the impact that collaboration with external organisations had on technological innovations, non-technological innovations, and economically viable innovations in standard manufacturing industries across seven sections of the European Union (EU). Businesses that fall within the small and medium-sized companies (SMEs) comprise this inquiry's sample. This was something that our empirical method takes into consideration, given that there was the potential for synergy between the four different types of innovation. According to the findings of empirical research, collaboration increases innovativeness and generates significant economic benefits for firms. To provide a more particular example, the number of cooperation partnerships grows, which results in an improvement in all metrics of innovation performance. The researcher believed that innovation assistance programs need to be driven by demand and that a portfolio approach to cooperation was the most effective way to increase innovation performance than any other method.

Keywords: Innovation, Creativity, Competitive advantage, PME

INTRODUCTION

The global financial climate was characterised by rapid changes in all settings; nevertheless, technological improvements had emerged as the major issue point that was shaping the strategies of economic enterprises. If companies wish to maintain their market share and effectively compete in today's global economy, they need to be able to adjust to the changing internal and external contexts in which they operate (Huang, 2020). In such a setting, firms were obliged to innovate and be creative in all aspects of their operations, including management, goods, marketing, and other parts of their organisation. Identifying novel concepts for innovation that differentiate them from their rivals and provide them with a competitive advantage was the objective of this endeavour. New goods, processes, marketing tactics, organisational models, paradigms, and other types of innovations

were only a few of the numerous things that fall under the umbrella term "innovation." Businesses may get a competitive advantage in the market and improve their bottom line with the assistance of these and other types. In this article, they focus on product innovation since, as they have seen, the cornerstone of a business was based on its goods or services, and these items serve as a direct route to the consumers, who were often considered to be the most precious asset that the company had. The focus that was placed on creativity and innovation in this decade, as organisations attempt to improve both their internal and external surroundings, was one of the traits that researchers covered previously as examples of this decade's features. Many different kinds of innovations were used by businesses in the economy in the course of their varied activities. In addition, before the researcher got into that, the researcher was trying our best to define innovation and creativity in all of their manifestations. The concept of innovation might be understood differently by several individuals. This might be anything from the introduction of a brand-new, improved product or procedure to the execution of a concept for the very first time in a commercial setting (Xiaobo, 2019). Creativity and innovation go hand in hand; the former refers to the process of coming up with fresh and previously unrealised solutions to problems, while the latter refers to the process of actually putting these concepts into action. The researcher came across the term "invention" in addition to the terms "innovation" and "invention," which pointed out, refers to ingenuity (Klewitz, 2019).

BACKGROUND OF THE STUDY

The evolution of modern economies was marked by lightning-fast technical advancements, which in turn generate vast amounts of new information and drive up the level of competitiveness among businesses (Kaiser, 2021). Constant innovation in a wide variety of forms products, processes, technology, and relationships helps keep the economy growing. Research examining innovation and the generation of new knowledge mostly targets businesses that rely heavily on research and development, such as biotechnology and information and communication technologies (ICT). The primary forces behind economic development, job creation, and increased productivity were believed to originate from high-tech businesses. According to these writers, it would suggest that low-tech businesses were not as important to the economy's development and innovation processes, which was why they got less support and attention from policymakers. According to the research, which was put out by the Organisation for Economic Co-operation and Development (OECD), low-tech enterprises were said to had little or no autonomy in research and development. In addition to having low in-house R&D expenditures, they were short on staff, funds, and investments linked to R&D. Thus, it may be reasonable to assume that the phrase "innovation in low-tech industries" was incongruous. Hirsch-Kreinsen et al. note that there had been very little interest in studying innovation-related activities in low-tech businesses, which was not unexpected. Out of five databases, only 111 papers were found when the term "low-tech industry" was used as a keyword in the titles. The writers state that the ongoing improvement of technology via

incremental product and process breakthroughs was the reason why low-tech sectors have persisted in advanced countries and contributed significantly to their growth and trade performance (Tönnies, 2020). In addition, the authors Hirsch-Kreinsen, Jacobson, and Robertson provide several instances of industries and businesses in the high-tech EU that have effectively innovated low-tech goods. Continuous improvement, which does not need lavish R&D expenditures and permits informal collaboration across enterprises, was king in these sectors. Since innovation was influenced by both high-tech and low-tech companies, the majority of authors who have studied low-tech industries have argued for a more inclusive definition of innovation that should not be equated with excellence in high-tech and research and development. This essay aims to enhance our comprehension of innovation-related activities in low-tech sectors and the particular skills that impact them, based on the ideas mentioned above. They had researched the ESTI, a low-tech sector in a developed economy, to achieve this goal. Previous research on low-tech sectors, data from a self-administered survey, and insights from interviews with a Swedish sector specialist and a small-business owner/manager have all been used (Huergo, 2022).

PURPOSE OF THE RESEARCH

The primary purpose of the research was to get a deeper understanding of the manufacturing processes, as well as the many forms of innovation and entrepreneurialism that were often seen in low-tech sectors. It was possible to identify key methods that improve competitiveness and sustainability by analysing how innovation emerges in environments that were typified by smaller technological advancements. The secondary purpose of the research was to determine how the processes of manufacturing and the tactics of entrepreneurship interact to foster growth and adaptability in low-tech industries.

LITERATURE REVIEW

There should be more credit given to China's inventive firms and the entrepreneurial spirit that exists throughout the nation for the country's economic success (Bessant, 2018). There have been a great number of courageous and inventive businessmen who had arisen in China throughout the last four decades of reform and opening-up. These individuals have played a significant role in the economic development of the nation, contributing to the promotion of innovation and facilitating the transformation of the country's economy. The owners of forward-thinking businesses in China were leading an initiative to position their companies as the foundation of innovation via their efforts. For the last several years, firms have emerged as significant actors in the areas of innovation and industrial chain integration, in addition to market competitive competence. Entrepreneurs seek to create and push the market-based supply of technology to retain a competitive advantage in their respective industries. In addition to this, they provide more innovative products and

services by consistently watching the trends in the industry and reacting promptly. Chinese businesses have been able to achieve market awareness and a competitive edge because of the spirit of entrepreneurship and the unrelenting consolidation of both internal and external resources. Although Chinese businesses were at a significant disadvantage in terms of technology, human resources, and money when compared to international organisations originating from industrialised countries, this was the case (Hughes, 2019). As a consequence of this, Chinese businesses have developed cutting-edge goods and services that are better in terms of quality, efficiency, and cost-effectiveness. During this time of economic expansion, they sped up the process of commercialising and localising inventions from other countries, as well as importing whole sets of technology that had already reached maturity. Chinese entrepreneurs were able to address the technical demands of the local market, generate job possibilities, get exposure to global markets, and speed up China's transition into the world's manufacturing hub all of which were accomplished via their entrepreneurial efforts. They bravely examined new technologies and international markets during the new wave of industrial expansion, raced to catch up to industry leaders, and enhanced inventive dynamism. They did this to take advantage of the strategic opportunities that were brought about by a paradigm shift. As a result, they have been able to accomplish cross-cyclical development, build new technology paradigms, foster an abundance of inventive talent, and establish autonomous innovation capabilities inside their organisation. With their entrepreneurial spirit, businesses have always been at the forefront of pushing technical innovation, industry upgrading, and industrial growth towards high-end manufacturing and high value-added. This has been the case for a very long time. Because of this, there have been beneficial consequences on the economy, society, and the competitiveness of the global market (Calvo, 2022).

RESEARCH QUESTIONS

What are the specific forms of innovation observed in low-technology industries?

METHODS

The researcher used a random sampling technique in this study.

RESEARCH DESIGN

Quantitative methods of research design were employed. This approach involves a quantitative analysis of industry data of low-technology firms to comprehensively examine the interplay between innovation, entrepreneurship, and manufacturing methods in these sectors.

SAMPLING

Research participants filled out questionnaires to provide information for the research. Using the Rao-soft programme, researchers determined that there were 731 people in the research population, so researchers sent out 915 questionnaires. The researchers got 886 back, and they excluded 29 due to incompleteness, so the researchers ended up with a sample size of 857.

DATA AND MEASUREMENT

Quantitative analysis was used to gather primary data for the research project. The survey was broken down into two sections: (a) demographic data; and (b) factor answers for both online and offline channels using a 5-point Likert scale. Researchers gathered secondary data from a variety of sources, mostly the Internet.

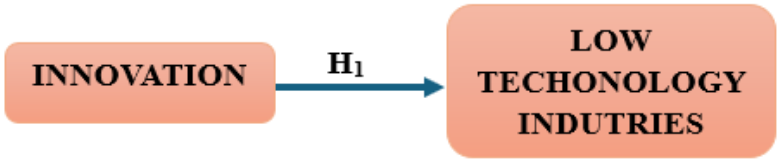
STATISTICAL SOFTWARE

For statistical analysis, SPSS 25 and MS Excel were used.

STATISTICAL TOOLS

To comprehend the fundamental characteristics of the data, descriptive analysis was used. The researcher used the logistic regression model, ANOVA, to assess the validity and reliability of the data.

CONCEPTUAL FRAMEWORK



RESULTS

FACTOR ANALYSIS

The process of verifying the underlying component structure of a set of measurement items was a widely used application of Factor Analysis (FA). The observed variables' scores were believed to be influenced by hidden factors that were not directly visible. The accuracy analysis (FA) technique was a model-based approach. The primary emphasis of this study was on the construction of causal pathways that connect observable occurrences, latent causes, and measurement inaccuracies.

The appropriateness of the data for factor analysis may be assessed by using the Kaiser-Meyer-Olkin (KMO) Method. The adequacy of the sampling for each model variable as well as the overall model was assessed. The statistics quantify the extent of possible common variation across many variables. Typically, data with lower percentages tends to be more suited for factor analysis.

KMO returns integers between zero and one. Sampling was deemed adequate if the KMO value falls within the range of 0.8 to 1.

It was necessary to take remedial action if the KMO was less than 0.6, which indicates that the sampling was inadequate. Use their best discretion; some authors use 0.5 as this, therefore the range was 0.5 to 0.6.

• If the KMO was close to 0, it means that the partial correlations were large compared to the overall correlations. Component analysis was severely hindered by large correlations, to restate.

Kaiser's cutoffs for acceptability are as follows:

A dismal 0.050 to 0.059.

• 0.60 - 0.69 below-average

Typical range for a middle grade: 0.70–0.79.

Having a quality point value between 0.80 and 0.89.

The range from 0.90 to 1.00 was stunning.

Table 1. KMO and Bartlett's

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.921
Bartlett's Test of Sphericity	**Approx. Chi-Square**	3252.968
	df	190
	Sig.	.000

The overall significance of the correlation matrices was further confirmed by using Bartlett's Test of Sphericity. A value of 0.921 was the Kaiser-Meyer-Olkin sampling adequacy. By using Bartlett's sphericity test, researchers found a p-value of 0.00. A significant test result from Bartlett's sphericity test demonstrated that the correlation matrix was not a correlation matrix.

TEST FOR HYPOTHESIS

DEPENDENT VARIABLE

Low Technology Industries

Many people can break into these fields because of the relative ease of their production processes and the tools they utilise. Especially in places where high-tech infrastructure was lacking, they have a big impact on the world economy. The reliance on human labour was a hallmark of low-tech sectors. Jobs in these industries were plentiful and important, particularly for those living in rural or low-income regions. Traditional skills, such as craftsmanship and local knowledge, were typically handed down through generations among workers. Many low-tech sectors can respond rapidly to changes in demand or market circumstances because they depend on human labour instead of automation. This allows them to fulfil the diverse demands of their consumers. Textile, food processing, building, woodworking, and agricultural production were examples of low-technology businesses (Olarreaga, 2021). Traditional garment production, for example, in the textile and clothing industries often makes use of simple stitching methods and requires hand assembly. Producing one-of-a-kind, handcrafted goods for specific consumer niches, this industry emphasizes quality and workmanship rather than mass manufacturing. Like artisanal baking and canning, the food processing sectors adhere to tried-and-true techniques that emphasise using only locally sourced products and environmentally friendly procedures. In many parts of the world, trained workers still use traditional methods and tools to complete building projects, including carpentry and masonry. The significance of low-tech businesses goes beyond their monetary value. They provide employment opportunities, which may help people escape poverty and contribute significantly to community stability. In line with rising customer preferences for eco-friendly practices, several of these sectors emphasize sustainability via the use of local resources and the reduction of waste. Furthermore, low-tech sectors often conserve cultural heritage and traditional skills, which helps communities retain their identity. Because it brings buyers and sellers closer together, this cultural element is important because it encourages patronage of small enterprises. However, there were some obstacles that low-tech enterprises must overcome. The sustainability of local firms was being jeopardised by the rise of cheap imports as global competition heats up. In these markets, companies face competition not just on pricing but also on product quality and originality. Since

many low-tech businesses run on razor-thin profit margins, obtaining funding for growth or modernisation may be a real challenge. Innovation and development may be impeded by this restriction. Furthermore, certain sectors may face a skills gap as a result of shifting customer tastes; that is, the current workforce may not have the expertise to meet the needs of the market as it develops (Inauen, 2020).

INDEPENDENT VARIABLE

Innovation

The term "innovation" encompasses a wide range of activities that lead to novel and valuable outcomes, including but not limited to ideas, goods, and services. Innovation may take many forms, such as new technologies, more efficient processes, or fresh ways of looking at old issues (Lin, 2019). To adapt current ways of thinking to new situations and demands was, at its heart, innovation. Innovation may be subtle, bringing about little tweaks to current solutions, or drastic, causing societal norms or whole sectors to shift. Innovation was often propelled by a confluence of opportunity and need. No society was immune to the economic, environmental, and social changes that come with time. Problems like these motivate people and businesses to think outside the box, which often leads to inventions that improve people's lives in little but meaningful ways. As an example of how innovation may shake up established models and give birth to whole new markets, consider how the proliferation of digital technology has altered communication while also causing a revolution in sectors as diverse as retail and education. To keep ahead of the competition, businesses must constantly innovate. When it comes to responding to shifts in the market, companies that encourage innovation were often the most agile. This requires not just financial support for R&D but also the promotion of an atmosphere conducive to creative expression. Innovative solutions were generally better developed by organisations that promote teamwork, risk-taking, and idea exchange. Innovative goods and services that satisfy customers' ever-changing wants and requirements might spring forth from this culture. Innovation was also present in many other fields outside of technology, such as healthcare, education, and manufacturing. Innovations like wearable health gadgets and telemedicine have made healthcare more accessible and personalised for people. With the rise of online learning systems, students now have easier and more personalised access to information (Hipp, 2019). Challenges with food security and environmental stewardship were finding solutions in more conventional industries, such as agriculture, thanks to improvements in sustainable practices and agricultural methods. The invention process relies heavily on collaboration. More thorough and efficient solutions were often the result of the varied viewpoints brought together by cross-disciplinary teams. An environment that was favourable to innovation may be created via collaborations between private companies, public universities, and government agencies. Working together in this way helps speed up the process of creating and implementing new ideas by allowing for the exchange of resources, information, and skills. The invention journey isn't always smooth sailing, despite all the rewards. Organisations could encounter challenges such as reluctance

to change, red tape, or inadequate funding. Furthermore, businesses may be hesitant to take risks when it comes to exploring creative ideas. It may be a complicated task for many organisations to balance the demand for innovation with the requirement of stability. Stagnation may occur by not innovating, whereas failures can occur from taking too many risks without adequate management (Garcia, 2022).

RELATIONSHIP BETWEEN LOW TECHNOLOGY INDUSTRIES AND INNOVATION

The relationship between low-technology industries and innovation was both intricate and significant, often revealing how traditional sectors can adapt and thrive in a rapidly changing economic landscape. While low-technology industries were typically characterized by simpler production methods and less reliance on advanced technologies, they were not devoid of innovation. These industries can demonstrate a unique form of creativity that emphasizes incremental improvements, process optimization, and the adaptation of existing practices to meet contemporary demands (Hansen, 2019).

Based on the above discussion, the researcher formulated the following hypothesis, which was to analyse the relationship There was no significant relationship between Low Technology Industries and Innovation.

H01: There is no significant relationship between Low Technology Industries

and Innovation.

H1: There is a significant relationship between There is no significant relationship between Low Technology Industries and Innovation.

Table 2. H1 ANOVA Test

ANOVA					
Sum					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	40128.964	489	5655.517	1121.357	.000
Within Groups	456.687	367	5.356		
Total	40585.651	856			

In this study, the result was significant. The value of f was 1121.357, which reaches significance with a p-value of .000 (which was less than the .05 alpha level). This means the “h1: there is a significant relationship between there is no significant relationship between low technology industries and innovation.” Was accepted and the null hypothesis was rejected.

DISCUSSION

This article takes a look at the several types of innovation, entrepreneurial initiatives, and manufacturing processes that were widespread in low-tech industries. These industries exhibit extraordinary innovation via the modification, optimisation, and inventive application of existing processes, even though they rely on fundamental technology and traditional manufacturing methodological approaches. Entrepreneurs in low-tech industries often take advantage of the local experience and talents available to them to create one-of-a-kind products that meet the requirements of consumers for quality that was long-lasting. The manufacturing processes that were typical in these industries focus emphasis on activities that demand a significant amount of manual labour and adhere to more traditional methods. Nevertheless, advancements in materials, efficiency, and supply chain management were being used by an increasing number of businesses to maintain a competitive advantage over their rivals. Through community participation and partnerships with local institutions, it was possible to achieve further stimulation of new practices, which in turn enables these enterprises to effectively respond to changes in the market. High-tech environments were not the only places where innovation may take place; low-tech firms demonstrate that innovation can take place anyplace. It was all about adopting methods and genuinely understanding the local environment, which was why these industries were so crucial for the preservation of cultural traditions and the sustainability of the economy.

CONCLUSION

The research on the innovation, entrepreneurship, and manufacturing practices of the low-tech sector reveals a dynamic environment that places a premium on adaptability and creativity. These industries demonstrate how innovation may take numerous forms, ranging from little adjustments to major ideas that increase product quality and lifetime, even in the face of regular dependence on manual processes and techniques that have been around for a long time. The entrepreneurs of low-tech firms take advantage of the local experience and talent to meet the ever-changing demands of their customers. In addition to this, they foster a culture of continuous improvement via the use of collaboration and community involvement. At the end of the day, this inquiry demonstrates that innovation was not restricted to high-tech industries and highlights the significance of low-tech firms for the preservation of cultural traditions and the maintenance of financially sustainable economies.

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