A STUDY OF THE PREVALENT TYPES OF CREATIVE THINKING, ENTREPRENEURIAL BEHAVIOR, AND METHODS OF MANUFACTURING IN LOW-TECHNOLOGY SECTORS

Wang Yu[1], Swapan Kumar Majumdar[1]

[1]Lincoln University College, Petaling Jaya, Malaysia.

ABSTRACT

The purpose of this research is to examine the effect of external organization cooperation on technically feasible, non-technologically feasible, and economically viable innovations in seven different EU member states' standard manufacturing sectors. In this study, the surveyed a representative sample of small and medium-sized businesses (SMEs). The fact that these four forms of innovation could complement one another is something that the empirical approach accounts for. Studies have shown that when businesses work together, they are more likely to come up with novel ideas and see substantial financial gains. More specifically, when the number of cooperative relationships increases, all innovation performance measures improve. The researcher concluded that demand should be the driving force behind innovation support programs and that a portfolio approach to collaboration yielded the best results for improving innovation performance.

Keywords: Creative thinking, innovation, PME, competitive advantage.

INTRODUCTION

There were fast changes happening in every aspect of the global financial environment, but technological advancements stood out as the central concern that was influencing business plans (Almeida et al., 2020). Businesses in the modern global economy must be flexible enough to respond to changing internal and external conditions if they want to maintain their current level of market share and compete successfully. Under these conditions, businesses had to think outside the box in every facet of their operations, from management to products to marketing. It was their hope that by coming up with fresh ideas for innovations, they might set themselves apart from the competition and gain an edge. Among the many things that may be categorized as "innovation" are new products, procedures, advertising strategies, organizational structures, philosophies, and countless more. These and other kinds may help businesses get an edge in the market and boost their profits. Since products and services have always been the backbone of businesses, and since customers are

typically recognized as a company's most asset, this article mostly focuses on product innovation. As previously said, scholars have examined this decade's attributes, such as the emphasis on creativity and innovation, as organizations strive to better their internal and external environments. During their many operations, firms across the economy took advantage of a wide range of inventions. Also, the researcher was attempting to define innovation and creativity in all its forms before getting into that. Many people may have various conceptions of what innovation is. This may be anything from the debut of an enhanced product or process to the first commercial implementation of an idea. Both creativity and innovation are interdependent; the former describes how one generates novel and unanticipated ideas for solving issues, while the latter describes how one puts these ideas into practice. "Invention" was one of many phrases the researcher encountered; the others were "innovation" and "invention," both of which denote inventiveness (Klewitz, 2019).

BACKGROUND OF THE STUDY

Technological progress in the contemporary age has been characterized by the exponential growth of both new knowledge and the intensity of competition in the corporate world. Products, procedures, technology, and relationships are just a few areas that are always evolving, and this diversity helps to keep the economy thriving. The biotechnology and ICT industries, which depend substantially on research and development, are the primary focus of studies that investigate innovation and the creation of new knowledge. It was thought that high-tech companies were the main engines of economic growth, new job creation, and higher productivity. This group of authors argues that lawmakers paid less attention to and supported low-tech companies since they were not vital to the growth and innovation of the economy. The study's authors said that low-tech businesses lacked research and development independence, according to the findings published by the OECD. Their internal research and development spending was inadequate, and they also lacked the manpower, capital, and investments necessary to adequately finance R&D. The term "innovation in low-tech industries" seemed out of place, so it's safe to say. It was not surprising that Hirsch-Kreinsen et al. found less interest in researching innovation-related activities in low-tech companies. Using the phrase "low-tech industry" as a title search term yielded only 111 documents from five databases. According to the authors, low-tech industries have survived and even contributed to the economic development and trade success of developed nations because of the constant technological advancements brought about by little but important improvements in products and processes (Tönnies, 2020). A few sectors and companies in the high-tech European Union have successfully created low-tech products, according to Hirsch-Kreinsen, Jacobson, and Robertson. Continuous improvement, which allows for informal cooperation among firms and does not need extravagant R&D investments, was king in these areas. Since both high-tech and low-tech businesses contributed to innovation, most scholars who have focused on the latter have pushed for a broader definition of innovation that does not just mean cutting-edge tech or

groundbreaking R&D. The purpose of this article is to build on the concepts presented above to improve the understanding of the activities connected to innovation in low-tech industries and the specific talents that influence them. They had planned this by investigating the ESTI, a low-tech industry in industrialized nations. This study draws on prior work on low-tech industries, survey results, and interviews with a Swedish expert in the field and a small company owner/manager (Chen et al., 2020).

PURPOSE OF THE RESEARCH

The study's main objective was to learn more about the production methods and the various kinds of innovation and entrepreneurship prevalent in low-tech industries. Analyzing the emergence of innovation in contexts characterized by minor technical advances allowed us to discover critical approaches that enhance competitiveness and sustainability. The study's secondary objective was to learn how low-tech industries might benefit from an interaction between entrepreneurial strategies and production methods to increase their development and flexibility.

LITERATURE REVIEW

For China's economic success, greater recognition should go to the innovative companies and the entrepreneurial spirit that permeates the country. Over the last forty years of reform and opening-up, China has produced a plethora of brave and innovative businesspeople. These people have been instrumental in the country's economic growth, helping to foster an environment conducive to innovation and paving the way for the economy to undergo a radical shift. Efforts were being spearheaded by the owners of innovative Chinese enterprises to establish their company as the bedrock of innovation. Firms have been more prominent players in innovation, industrial chain integration, and market competitive competency in recent years. The goal of entrepreneurs is to maintain a competitive edge in their sectors via the creation and development of market-based technology supply. Furthermore, they stay abreast of market developments and respond quickly, allowing them to provide more creative goods and services. The relentless concentration of internal and external resources, together with an entrepreneurial mentality, has allowed Chinese enterprises to gain market awareness and a competitive advantage. This was true even though Chinese companies were far behind their industrialized-country counterparts in terms of capital, human capital, and technological advancement. Because of this, Chinese companies have created innovative products and services that are superior to their competitors in terms of efficiency, affordability, and quality. They imported whole sets of mature technology, accelerated the process of commercializing and localizing foreign ideas, and generally sped up the process during this period of economic boom. Through their entrepreneurial endeavors, Chinese entrepreneurs were able to meet the technological needs of the local market, create employment opportunities, get

access to worldwide markets, and expedite China's transformation into a global manufacturing powerhouse. They fearlessly explored foreign markets and new technology amid the new wave of industrial growth, sprinted to catch up to the top in their field, and boosted imaginative vitality. They acted in this way to seize the strategic openings presented by the paradigm change. The end consequence is that they have achieved cross-cyclical development, created new paradigms in technology, nurtured an abundance of creative people, and established autonomous innovation skills inside their organization. Businesses, thanks to their pioneering spirit, have long been at the front of technological advancement, industry modernization, and industrial development toward premium production and high value addition. For ages, this has been the situation. Economic growth, social progress, and more global competitiveness have all resulted from this (Cao et al., 2019).

RESEARCH QUESTIONS

What is the role of leadership in low-technology industries?

METHODS

RESEARCH DESIGN

Quantitative data was analyzed using SPSS version 25. The odds ratio and 95% confidence interval were used to identify the direction and severity of the statistical connection. At $p < 0.05$, researchers found a threshold of statistical significance. A descriptive analysis was used to determine the main characteristics of the data. Mathematical, numerical, or statistical quantitative approaches are often used to evaluate data obtained from surveys, polls, and questionnaires, or by changing existing statistical data using computer tools.

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

Questionnaires were the primary means of data collection for the research. In Part A, the researchers requested basic demographic information; in Part B, the researchers used a 5-point Likert scale to ask respondents to score different parts of the online and physical channels. Many other sources, with a focus on internet databases, provided secondary data.

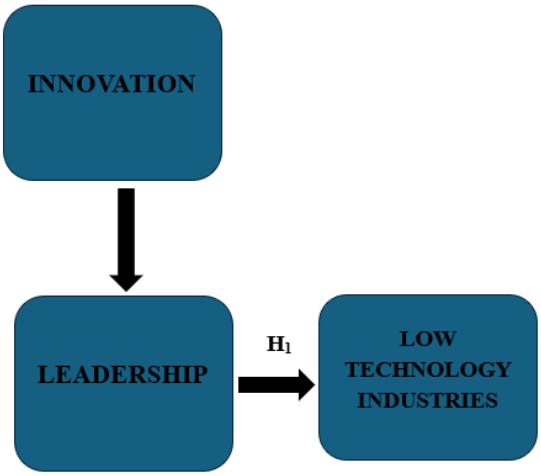
STATISTICAL SOFTWARE

The statistical analysis was conducted using SPSS 25 and MS-Excel.

STATISTICAL TOOLS

To grasp the fundamental character of the data, descriptive analysis was used. The researcher is required to analyze the data using ANOVA.

CONCEPTUAL FRAMEWORK



RESULTS

FACTOR ANALYSIS

One typical use of Factor Analysis (FA) is to verify the existence of latent components in observable data. When there are not easily observable visual or diagnostic markers, it is common practice to utilise regression coefficients to produce ratings.

In FA, models are essential for success. Finding mistakes, intrusions, and obvious connections are the aims of modelling. One way to assess datasets produced by multiple regression studies is with the use of the Kaiser-Meyer-Olkin (KMO) Test. They verify that the model and sample variables are representative. According to the numbers, there is data duplication. When the proportions are less, the data is easier to understand. For KMO, the output is a number between zero and one. If the KMO value is between 0.8 and 1, then the sample size should be enough. These are the permissible boundaries, according to Kaiser: The following are the acceptance criteria set by Kaiser:

A pitiful 0.050 to 0.059, below average 0.60 to 0.69

Middle grades often fall within the range of 0.70-0.79.

With a quality point score ranging from 0.80 to 0.89.

They marvel at the range of 0.90 to 1.00.

Table1. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.950
Bartlett's Test of Sphericity	**Approx. Chi-Square**	3252.968
	df	190
	Sig.	.000

Testing for KMO and Bartlett's

Sampling Adequacy Measured by Kaiser-Meyer-Olkin .90

The results of Bartlett's test of sphericity are as follows: approx. chi-square

df=190

sig.=.000

This establishes the validity of assertions made only for the purpose of sampling. To ensure the relevance of the correlation matrices, researchers used Bartlett's Test of Sphericity. Kaiser-Meyer-Olkin states that a result of 0.950 indicates that the sample is adequate. The p-value is 0.00, as per Bartlett's sphericity test. A favorable result from Bartlett's sphericity test indicates that the correlation matrix is not an identity matrix.

The results show that the assertions made to carry out the sample are valid. To make sure the correlation matrices were useful, the researchers utilized Bartlett's Test of Sphericity. If the result is 0.950, then the sample is acceptable according to Kaiser-Meyer-Olkin. The p-value is 0.00, as per Bartlett's sphericity test. A statistically significant result from Bartlett's sphericity test shows that the correlation matrix does not equal an identity matrix.

INDEPENDENT VARIABLE

Innovation

The phrase "innovation" covers a broad spectrum of endeavors that result in unique and beneficial products or services, including but not limited to concepts, commodities, and services. New technology, improved procedures, or alternative perspectives on long-standing problems are all examples of innovation. At its core, innovation was about adjusting established methods of thinking to meet the needs of new circumstances. The effects of innovation may range from minor adjustments to existing solutions to massive upheavals of whole industries or even society. Opportunities and needs would often come together to spur innovation. The inevitable societal, economic, and environmental shifts that occur throughout history have affected every civilization. These kinds of problems inspire companies and individuals to be creative, which often results in innovations that have little but significant impacts on people's lives. Think about how the rise of digital technology has changed communication and disrupted industries as varied as retail and education to illustrate how innovation may disrupt long-standing paradigms and create whole new markets. Businesses need to innovate all the time if they want to stay competitive. Companies that foster innovation tend to be the nimblest when it comes to reacting to changes in the market. To do this, it is necessary to foster an environment that encourages creative expression in addition to providing financial backing for research and development. Companies with a culture that values collaboration, innovation, and risk-taking tend to produce better results. Potentially emerging from this culture are new products and services that meet the evolving needs of consumers. Healthcare, education, and manufacturing were just a few of the numerous non-technological sectors that saw innovation. Technology advancements in areas such as telemedicine and wearable health devices have greatly improved people's access to and ability to tailor their healthcare. The proliferation of online learning platforms has given students more convenient and tailored access to course materials. Thanks to advancements in sustainable practices and agricultural methodologies, traditional sectors like agriculture were able to discover answers to food security and environmental stewardship challenges. Collaboration is very important in the innovation process. The many perspectives brought together by interdisciplinary teams often led to more comprehensive and effective solutions. Working together, public institutions, private businesses, and government agencies may create an atmosphere that is conducive to innovation. Collaboration in this fashion facilitates the sharing of knowledge, tools, and expertise, which in turn speeds up the generation and implementation of new ideas.

Despite the many benefits, the path to creation isn't always easy. Problems that organizations may face include resistance to change, bureaucracy, or insufficient resources. In addition, companies could be afraid to do new things when it comes to experimenting with innovative concepts. Striking a balance between innovation and stability may be challenging for many organizations. Failure might come from taking too many chances without proper management, whereas stagnation can happen from not inventing enough (Buera & Oberfield, 2020).

FACTOR

Leadership

The capacity to mobilize others to realize a shared vision or objective is at the heart of what it means to be a leader. It entails guiding people in the right way, making smart choices, and inspiring them to give their all. A leader is someone who inspires followers via their deeds, interactions, and interpersonal abilities; leadership is not limited to positions of power or formal titles. Trust and cooperation are fostered among teams by effective leaders who display attributes including empathy, communication, flexibility, and honesty. Adapting one's style of leadership to fit the requirements of the moment is a common leadership characteristic; another is striking a balance between the wants and needs of individuals and the overall objectives of the group or organization (benedetti et al., 2019).

DEPENDENT VARIABLE

Low Technology Industries

The relative simplicity of their production methods and the technologies they utilize make these sectors accessible to many individuals. They have a significant effect on global economies, particularly in regions without an adequate technical infrastructure. In low-tech industries, human labor was paramount. People in low-income or rural areas were especially fortunate to have access to the many jobs that were available in these sectors. It was common practice for laborers to pass on traditional skills including handicraft and local knowledge from one generation to the next. Due to their reliance on human labor rather than automation, many low-tech industries can react quickly to changes in demand or market conditions. That way, they can meet all their customers' varied needs. Businesses that did not rely on advanced technology included those dealing with textiles, food processing, construction, woodworking, and agricultural production. For instance, in the textile and apparel sectors, traditional garment manufacturing often employs hand assembly and uses rudimentary sewing processes. Rather than focusing on mass production, this business produces unique, handmade items for specialized markets. Traditional food processing methods, such as artisanal baking and canning, prioritize the use of sustainably produced ingredients and methods. Skilled craftspeople in various regions of the globe continue to employ age-old techniques and equipment while constructing buildings. Beyond their monetary worth, low-tech firms are

significant. When individuals have jobs, they have a better chance of lifting themselves out of poverty and making a positive impact on their communities. Several of these industries place an emphasis on sustainability via the use of local resources and the reduction of waste, in response to growing consumer demands for environmentally friendly methods. In addition, communities can maintain their identity via the preservation of cultural assets and traditional skills, which is typically seen in low-tech industries. This cultural feature promotes smaller businesses by bringing customers and vendors closer together, which is a win-win. Nevertheless, low-tech businesses must overcome a few challenges. As competition increases on a worldwide scale, the viability of domestic businesses is being threatened by the emergence of low-cost imports. Businesses in these industries must contend with rivals that provide superior products at lower prices without sacrificing quality or innovation. Financing expansion or modernization could be difficult to come by for low-tech companies due to their sometimes-precarious profit margins. This limitation has the potential to obstruct progress and innovation. In addition, if consumer preferences change, certain industries can have a shortage of skilled workers who can adapt to new market demands (Bai et al., 2020).

RELATIONSHIP BETWEEN LEADERSHIP AND LOW TECHNOLOGY INDUSTRIES

The relationship between leadership and low-technology industries is critical, as effective leadership drives innovation, efficiency, and competitiveness even in sectors that rely on simpler technologies. Low-technology industries, such as agriculture, textiles, or basic manufacturing, often operate in environments with limited access to advanced tools or automation. In such settings, strong leadership becomes essential for optimizing resources, improving processes, and ensuring sustainability. Leaders in these industries must exhibit adaptability, resourcefulness, and the ability to inspire their teams to achieve goals despite constraints. Leadership in low-technology industries also plays a vital role in fostering innovation through non-technological means, such as improving supply chain management, enhancing worker skills, or creating more efficient workflows. Visionary leaders can identify market opportunities, introduce sustainable practices, and build resilience to external challenges such as economic shifts or environmental changes. Additionally, good leadership promotes collaboration and empowers employees, which is essential for maintaining morale and productivity in industries where technological advancements are slower. In summary, leadership is a driving force behind the growth and sustainability of low-technology industries. It enables organizations to navigate challenges, maximize available resources, and remain competitive in an evolving global market (Anokhin et al., 2021).

H01: There is no significant relationship between Leadership and Low Technology Industries.

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

Table 2: H_1 ANOVA Test

ANOVA					
Sum					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	40128.964	353	5655.517	1156.458	.000
Within Groups	456.687	503	5.356		
Total	40585.651	856			

The outcome of this research was noteworthy. With a p-value of.000 (less than the.05 alpha level), the value of F, which was 1156.458, approaches significance. By rejecting the null hypothesis and accepting "H1: There is a significant relationship between There is no significant relationship between Leadership and Low Technology Industries" is accepted and the null hypothesis is rejected.

DISCUSSION

Many forms of innovation, entrepreneurial endeavors, and production methods that were common in low-tech sectors are examined in this article. Even though they depend on basic technology and conventional production methodologies, these sectors demonstrate remarkable innovation via the optimization, modification, and creative use of current processes. Businesses in low-tech sectors generally rely on in-house expertise and the skills of locals to provide unique, high-quality goods that satisfy customers' demands for durability. Conventional manufacturing practices in these sectors tended to center on tasks that required large amounts of physical labor and stuck to antiquated practices. However, a growing number of companies were using improvements in materials, efficiency, and supply chain management to stay ahead of their competitors. These businesses are better equipped to adapt to market shifts because of the increased stimulation of new practices made available via community involvement and collaborations with local organizations. Even low-tech businesses have shown that innovation can happen anywhere, not simply in high-tech settings. These sectors were vital to the maintenance of cultural traditions and economic viability since they relied on embracing new ways of doing things while still having a deep familiarity with the local environment.

CONCLUSION

Adaptability and originality are highly valued in the low-tech industry, according to studies on innovation, entrepreneurship, and manufacturing methods. Despite frequent reliance on manual processes and long-standing procedures, these sectors show that innovation may take many forms, from little tweaks to big concepts that boost product quality and longevity. When it comes to meeting the ever-changing

expectations of their clients, entrepreneurs of low-tech enterprises rely on the local skills and expertise. On top of that, they encourage teamwork and civic engagement to cultivate a growth mindset. Finally, this investigation proves that innovation wasn't limited to tech companies and emphasizes the role of low-tech businesses in sustaining economies and preserving cultural practices (Daneji et al.,2019).

REFERENCES

1. Daneji AA, Shavarebi K, Yap JBH. Owner-manager characteristics influence on the SMEs innovation orientation of SMEs: a literature exploration. Int J. 2019;1(2):1-12.
2. Almeida A, Golpe A, Martín Álvarez JM, et al. A spatial analysis of the Spanish tobacco consumption distribution: are there any consumption clusters? Public Health. 2020;186(2):28-30.
3. Anokhin S, Chistyakova N, Antonova I, Spitsina L, Wincent J, Parida V. Flagship enterprises, entrepreneurial clusters, and business entry rates: insights from the knowledge spillover theory of entrepreneurship. Entrep Reg Dev. 2021;33(3-4):353-67.
4. Bai O, Wei J, Yang X, Chen R. Third-party relational governance and collaborative innovation performance: the role of IPR protection. Int J Innov Stud. 2020;4(1):1-15.
5. Benedetti R, Palma D, Postiglione P. Modeling the impact of technological innovation on environmental efficiency: a spatial panel data approach. Geogr Anal. 2019;52:1-23.
6. Buera FJ, Oberfield E. The global diffusion of ideas. Econometrica. 2020;88(1):83-114.
7. Cao X, Zeng G, Ye L. The structure and proximity mechanism of formal innovation networks: evidence from Shanghai high-tech ITISAs. Growth Change. 2019;50:569-86.
8. Chen J, Su YS, de Jong JPJ, Hippel E. Household sector innovation in China: impacts of income and motivation. Res Policy. 2020;49(4):103931.
9. Davis DR, Dingel JI. A spatial knowledge economy. Am Econ Rev. 2019;109(1):153-70.
10. Fan F, Lian H, Wang S. Can regional collaborative innovation improve innovation efficiency? An empirical study of Chinese cities. Growth Change. 2020;51:440-63.
11. Feng Y, Wang X, Du W, Wu H, Wang J. Effects of environmental regulation and FDI on urban innovation in China: a spatial Durbin econometric analysis. J Clean Prod. 2019;235:210-24.