PAHAL HORIZON
An International Research Journal
Homepage: www.pahalhorizon.com

Advancing Human Capital for Strengthening Export Potential of MSMEs and Start-ups

Prof. S.D. Sharma [1], Dr. Saman Khan [2], Gaurav Sharma [3]

[1] Former Pro VC, IIMT University, Meerut

[2] Associate Professor, Sharda University, Greater Noida

[3] Research Scholar, Sharda University, Greater Noida

ABSTRACT

This study examines the role of human capital in enhancing innovation capacity and export readiness of Micro, Small and Medium Enterprises (MSMEs) and start-ups, with a particular focus on the experience of top managers, general education of employees, and formal employee training. Using firm-level data across selected ASEAN economies, the research categorizes innovation outcomes into three levels: non-innovation, "new-to-the-firm" innovation, and "new-to-the-market" innovation. Descriptive statistics and cross-tabulation results reveal that firms engaging in innovation consistently demonstrate higher levels of managerial experience, employee education, and training intensity compared to non-innovative firms. To empirically validate these relationships, the study employs the Ordered Logit Model (OLM), Multilevel Ordered Logit Model (MOLM), and Generalized Ordered Logit Model (GOLM). The findings indicate that prior work experience of top managers significantly increases the likelihood of radical innovation, supporting the argument that industry-specific knowledge enhances strategic decision-making and innovation outcomes. Employee general education shows a strong positive association with innovation intensity, highlighting the importance of formal education in building absorptive capacity. Additionally, employee training emerges as a crucial determinant of both incremental and market-level innovation. Robustness checks using a Multinomial Logit Model confirm the consistency of these results. The study concludes that targeted investments in human capital are essential for strengthening innovation capability, improving export preparedness, and enhancing the global competitiveness of MSMEs and start-ups.

Keywords: Moonlighting, MSMEs, start-ups, enterprise, global.

1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) constitute the backbone of modern economies, contributing extensively to economic dynamism and inclusive development. They are broadly renowned as appliances of economic growth (Suparji, 2021; Natalia Arta Malau & Teguh Pamuji Tri Nur H, 2022) and a main sources of employment generation (Kakkar & Kumar, 2020). Beyond their economic role, MSMEs actively support social equity by reducing regional and income disparities (Hayati & Fatarib, 2022) and by strengthening national income, living standards, competitiveness, and economic resilience (Shetty & S., 2022). Their presence across semi-urban and rural regions enables them to effectively bridge the urban–rural development divide (Dwi Nata et al., 2022), while their substantial contribution to GDP and ability to attract foreign direct investment underscores their macroeconomic importance (Lamba & Jain, 2021). MSMEs also exhibit remarkable adaptability in times of economic crisis (Syal, 2015) and play a crucial role in mitigating income inequality (Rekha & Jain, 2022). Their emphasis on technological adoption, investment-driven productivity, and operational flexibility provides them with a competitive advantage over larger enterprises (Risnawati et al., 2022). Moreover, MSMEs serve as essential suppliers and support service providers to large industries, thereby reinforcing industrial linkages and strengthening the overall business ecosystem (Nasser, 2022). Small and medium-sized enterprises (SMEs) play an essential role in the economy, but they face many obstacles on their path to growth and development, including a lack of skilled workers. With the right assistance, SMEs can overcome these obstacles and become more competitive and inventive, allowing them to break into the global market. Small and medium-sized enterprises (SMEs) confront several obstacles, including those related to finances, product marketing, technology utilisation, human resource competencies and skills, operational procedures, and reaching export markets (Khatri, 2019). In terms of funding, micro, small, and medium-sized enterprises (MSMEs) struggle to meet working capital requirements (Yang et al., 2019; Berk & Gultekin, 2019; Yoshino & Taghizadeh-hesary, 2018). Low technological proficiency hinders product marketing (Othman et al., 2022; Marka, 2021; Kurniawan & Asharudin, 2018). According to Mas'ud and Tenriyola (2023) and Woolgar et al. (1998), there is a dearth of competent and capable human resources. Issues with raw material, facility, and infrastructure procurement hampered the operating process, leading to subpar output (Wahab et al., 2016; Gunasekaran et al., 2000; Eleftherios et al., 2016). The export market is not an easy place for MSME products to break into due to their lack of innovation and competitiveness (Bell, 2012; Mkenda & Rand, 2020; Ardito et al., 2021).

Several approaches exist for addressing the difficulties encountered by micro, small, and medium-sized enterprises (MSMEs) and enhancing the caliber of their human resources. One way is to learn more about the mentality of MSMEs and enhance their business and financial management skills (Prastyabudi et al., 2022). Supporting and empowering micro, small, and medium-sized enterprises (MSMEs) through initiatives like community empowerment programs can have a significant impact on economic growth (Wikantari & Supriadi, 2022). According to Dixit et al. (2021), small and medium-sized enterprises (SMEs) may improve their performance and efficiency by using big data and business analytics to make better decisions and put effective policies into place. Sumaryanto and Widajanti (2023) found that micro, small, and medium-sized enterprises (MSMEs) may have a greater economic effect if they invest more human resources into marketing innovation, empower their interaction capabilities, and improve their capacity to communicate with consumers.

Companies often prioritize investments in human capital as a means to enhance core competitiveness and people quality (Latifah et al., 2022). People are more productive and earn more money when money is invested in their human capital. Companies may strengthen their competitiveness, respond to changes in the market, and attain sustainable growth by investing in their human resources (Dui, 2020). Several methods exist for enhancing human resources. In order to expand the amount of human capital, one option is to develop knowledge and skills via professional training and education (Abdullayev, 2023). Health care is also crucial since it prolongs life, lowers mortality rates, and helps build human resources (Somko et al., 2023). Organizational investment in HR, new product development, and training and education all have a role in HR growth (Zhuravlev et al., 2018). Education, healthcare, institutionalization, and investment in information and skills are all essential components of a holistic strategy for human resource development.

A number of studies have demonstrated that MSMEs are more likely to succeed and operate at a high level when they have access to human resources, such as knowledge, competence, expertise, and leadership abilities. Rokhman et al. (2023) found that HR has a significant effect on MSME performance, and that better leadership abilities lead to better performance.As a result of their expertise and experience, human resources play a crucial role in micro, small, and medium-sized enterprises (MSMEs) (Hamsani et al., 2022). Government policies, business capital assistance, and human resource capacity enhancement may all help small and medium companies (SMEs) thrive, which in turn

can boost economic growth (Surya et al., 2021). This study's major objective is to analyze the relationship between MSMEs' and startups' export preparedness and global competitiveness as a function of human capital variables including education, skill development, management capacity, workforce competency, digital literacy, and institutional training assistance. The purpose of the research is to determine whether and how these businesses might benefit from investing in their employees' human capital in order to break into, stay in, and grow within global markets. Additionally, it hopes to shed light on the topic and offer policy recommendations for enhancing export potential via targeted human capital development programs.

Problems and Difficulties Encountered by Indian MSMEs

Despite the sector's fundamental growth possibilities and high levels of excitement, there are many barriers that hinder its development story. One of the biggest challenges that micro, small, and medium-sized businesses (MSMEs) have is getting the money they need, both quickly and enough, to meet their operational and expansionary goals. Micro, small, and medium-sized enterprises (MSME) have a concerning lack of financing, according to several assessments. Nearly 56% of India's SME loans will go unapproved. In spite of an anticipated demand of 2,803,628 crore, the available bank funding stands at 1,038,948 crore, according to data out of the US-based Entrepreneurial Finance Lab (EFL). Private and foreign banks account for little more than 20% of MSMEs' loan funding, while public sector banks account for 70%. Micro, small, and medium enterprise (MSME) units are only receiving 47% of loans, despite the Reserve Bank of India's (RBI) directive that banks lend 60% of their total capital to these firms. Some say that banks are hesitant to lend to MSMEs because of the large number of nonperforming assets (NPAs) in this industry; yet, loans to MSMEs only make up around 15% of total NPAs in the country.

In contrast to large corporations, whose access to capital is almost limitless, micro, small, and medium-sized enterprises (MSME) rely primarily on loans from banks and other financial institutions. Micro, small, and medium-sized businesses (MSMEs) face a number of challenges when trying to secure loans from financial institutions. These include unreliable data, a lack of fiscal discipline, the high administrative costs linked to small-scale lending, an inflated risk perception, and the inability to provide collateral. Micro, small, and medium-sized enterprises (MSMEs) lack market recognition despite their internal strength. Micro, small, and medium-sized enterprises (MSMEs) have a low survival rate because of their small size and inherent vulnerability to

market shifts. More than 12.2 lakhs of India's 3.62 crore MSMEs are deemed unfit entities according to the updated criteria set by the Reserve Bank of India. The numbers show that every year, a startling 29,000 units are added to the sick list. These sick micro, small, and medium-sized enterprises have amassed a whopping 7,000 crore in unpaid bank loans. Since banks are concerned about the sustainability and growth potential of the firms they lend money to, they are likely to be selective in their lending practices and require extensive due diligence from prospective investors. It is more difficult for creative and expert-based businesses to secure funding due to a lack of transparency, making them less likely to avoid the credit rationing trap. The sector is underfunded due to the low credit amounts and poor market circumstances. Financial institutions usually only lend the maximum amount permissible to priority sectors as part of their lending requirements.

As a result of the challenges in getting bank loans, MSMEs are compelled to explore alternative finance sources. According to research by Assocham and Resurgent India, just one-third of MSMEs have access to conventional finance mechanisms like banks and other institutional channels; the other two-thirds use personal resources or take out expensive loans from relatives and friends. A popular alternative finance option for MSMEs in India is trade credit. The interest and processing fees associated with alternative financing tend to be higher than those associated with bank financing. It is difficult for many Indian SMEs to secure the capital they require for operations and growth (Peter and Jasmina 2011). Many development constraints, including out-of-date technology, inadequate infrastructure, and weak market linkages, affect micro, small, and medium-sized companies (MSME), according to research. One of these factors is limited access to financing.

Many micro, small, and medium-sized enterprises (MSMEs) have limitations due to both financial and non-financial factors. The Small Industries Development Bank of India (SIDBI) conducted a research on the MSME Sector in 2010 and found that one of the main problems preventing MSMEs from growing and developing is the absence of infrastructure support. The primary challenges to corporate expansion in the Indian MSME sector, according to a PHDCCI Survey, are the "intransigent attitude" of government officials, inadequate infrastructure, and antiquated labor regulations. Many marginalized small and medium-sized enterprises (MSMEs) in rural and semi-urban areas still do not have access to basic amenities like electricity, transportation, and communication. Because of this, they have been unable to make adequate development or behave appropriately in their daily activities. Frequently, individual products do not have any packaging options.

Salaries are declining due to shrinking markets, especially in more traditional industries.

Micro, small, and medium-sized businesses in India have additional challenges. They are utterly unprepared to deal with the issue of intellectual property theft and the theft of their ideas and merchandise. Many Indian MSMEs usually choose not to pursue intellectual property protection because of the substantial financial investment that is necessary. The costs associated with gaining patent rights, for example, include not just the application, publication, and maintenance fees, but also the costs of things like translation and legal support. Obtaining a patent is also an involved, time-consuming, and challenging process. Most MSMEs in India have no idea what intellectual property (IP), infringement rights are, or how to defend their IP. Some micro, small, and medium-sized enterprises (MSMEs) may find it difficult to even identify and describe their IP assets. The initial stage in protecting and valuing intellectual property is to learn about its history, characteristics, present and future applications, and potential for financial gain. In addition, most Indian businesses, including notably micro, small, and medium-sized enterprises (MSMEs), don't know what intellectual property (IP) is and how it might provide them an edge in the market. Consequently, they risk having their reputation tarnished in both domestic and global marketplaces.

Startups and MSMEs in India are very worried about the increasing competition from Chinese imports. A massive bilateral trade imbalance of about $99.2 billion—the biggest India has ever recorded with any country—was caused by a sharp increase in Chinese imports to India to around $113.46 billion in fiscal year 2024–25, as compared to Indian exports to China of just about $14.25 billion. There is heightened competition in Indian markets due to the high concentration of Chinese exports in some product categories, such as electronics, equipment, chemicals, and industrial goods. Many of these items are also made by Indian enterprises, particularly MSMEs. Imports of industrial products from China have increased dramatically over the last decade, with the country now accounting for about 30% of India's total imports, up from 21% fifteen years ago. Indian exports to China have increased somewhat in 2025, but the ongoing and expanding trade imbalance highlights the difficulties Indian exporters encounter when trying to compete with cheap imports from China. According to a research (2024) released by the business group FICCI, which was based on a poll of more than 100 SMEs, 22 different product categories were identified as having Chinese imports that were 10–70% less expensive. Also, Chinese imports have shifted in recent years from cheap, low-value commodities like crackers

and toys to expensive, high-value things like equipment and electronics. One of the greatest dangers faced by small local businesses is the import of machinery, particularly textile machinery. Machines for spinning, weaving, knitting, and processing are among the many products made by India's approximately 1,500 such firms. The Textile Machinery Manufacturers Association (TMMA) reports that, due to price differences of 30–50%, low-tech textile machines imported from China have grown in recent years. The textile machinery that India buys from China has seen a significant growth in value over the past several years. Imports of textile machinery from China reached $2,213.87 million (about Rs 18,000 crore) in FY 2022–23, making up roughly 44% of India's total textile machinery imports. This development was particularly noticeable in winding, knitting, and printing machines, among others. Domestic producers in India were under persistent competitive pressure during this era, as China maintained its position as the top supplier of textile machines to the country.

Similarly to how large-scale enterprises seldom encounter marketing-related challenges, MSMEs in India encounter a plethora of them. The ability to purchase an item in bulk allows large-scale businesses to save money, while small-scale businesses may not have the resources or demand to order in such a huge number, which can cause the item's price to rise. As a result, a marketing challenge arises: how can a smaller business charge more for the same product while still making a profit? This is why a lot of mom-and-pop shops provide products of superior quality compared to their mass-produced counterparts. Various other reasons contribute to marketing challenges, including insufficient understanding of marketing tactics, an absence of standards, competition from units with superior technical capabilities, the exorbitant expense of product certification, and so on. Cost of advertising is another issue that small-scale marketing campaigns face. While it may not be out of the question for some major corporations to afford to run full-page newspaper ads or television commercials, the expenses associated with doing so definitely put tiny enterprises out of business. As a result, many will find ways to get around this problem, such as joining forces to share advertising expenses or relying on word of mouth and local ads.

Additionally, a lot of MSME business owners who are second-generation do not wish to continue their parents' footsteps. While some have made their homes in other countries, others have decided they don't care and are instead pursuing higher-paying careers. People also don't want to be in charge of the factory or company since they don't think they'll make enough money. Take Mumbai's grocery stores as an example; they're struggling to attract the next generation to work for

them. Some of them lack their parents' business spirit and refuse to work in an unconditioned warehouse. Further investments are not being made to elevate the MSME firm to the next level due to a lack of commitment from the following generation. Because the upcoming generation isn't committed, neutral gear vs. top gear becomes relevant (Shah 2012).

A number of factors are preventing Indian micro, small, and medium-sized enterprises (MSMEs) from expanding their operations. These include a lack of knowledge about intellectual property (IP) protection and exploitation, an unreliable and unstable infrastructure, an ineffective marketing network, insufficient and unpredictable raw material supplies, and outdated technology. The high cost structure that has emerged from all these restraints puts this industry at a disadvantage when compared to large enterprises.

Just how important is Human Capital?

Human capital has been around for a while. The investment and result metrics, however, remain topics of interest and contention. The dominance of human capital in economic performance has already tasted success for a number of nations. Up until the 1950s, economists believed that the size of the workforce had a greater impact on output than any other factor. When discussing productivity, the work of Adam Smith, Alfred Marshall, and Milton Freidman—who analyzed investments in education and other forms of training—was ignored. Following this, trailblazers in the field of economics, like T. W. Schultz, started to investigate how investments in human capital may affect GDP growth and other relevant issues. "The human capital approach" was described by Nobel laureate Gary Becker in his 1992 speech as the study of how "investments in education, skills, and knowledge change the productivity of people in the market and non-market situations." Thus, the capacity to perform labor in a way that generates economic value is embodied in the stock of knowledge, habits, social and personality attributes, including creativity; this stock is known as human capital. Human capital is essential to the efficiency of a society's political, social, and civic institutions; as a result, knowing its present status and potential is beneficial to numerous stakeholders; and productive human resources are among the most important resources that contribute to an economy's long-term success (The Human Capital Report, 2016). A person's knowledge, skills, talents, and competences are the inalienable parts of their human capital, which is described as the resource people provide to an organization (Alexandreet al., 2012).Many theoretical and empirical studies, as well as related policy decisions, have demonstrated the significance of human capital concepts (Kenneth, 2006). This is due to

the fact that developing nations, whether due to a lack of natural resources or the need to acquire sufficient physical resources for economic development, view investing in human capital as a strategy to boost their endowment and eventually become globally competitive. As an example, Japan's massive investment in human capital has allowed it to grow into a global powerhouse in the manufacturing sector. There are essentially two kinds of human capital. The first view sees people only as an input into the production process; the second sees them as creators of value who shape our collective body of knowledge, expertise, and experience (Kwon and Dae-Bong, 2009). The second kind is seen as a key component that, via different means, improves commerce and, consequently, economic growth. International commerce, bolstered by human capital, is one of several avenues that are contributing to economic growth (Harris and Boopen, 2016). The UNDP (2000) states that adjusted real income, life expectancy, and educational attainment are the three pillars upon which human progress rests. Human capital was defined for the analysis by Felix and Matthias (2004) to include not just education but also work-related human capital, occupational training, past academic performance, and socioeconomic status. In developing human capital, Barro (2001) argues that technical capability is supplementary to secondary and higher education. Economic development in the long run, according to Grossman and Helpman (1990), will come from investments in human capital and new technology. Developed nations don't have the same impact on human capital as Asian nations (Farok and Susan, 2008). Accordingly, South Asian economies care on human capital development in addition to focusing on good policies to solve trade problems

2. LITERATURE REVIEW

Pankajakshi and BM (2025) wrote: The effect of training and development programs on the efficiency and effectiveness of small and medium-sized enterprises (SMEs) in India is investigated in this research. The study examines the training and development landscape's present practices, major obstacles, and strategic prospects based on strong secondary data analysis. It emphasizes that HR services like capacity building and skill upgrading are really important for driving innovation, retention, and productivity. The results highlight the critical need for immediate organizational and policy-level reforms and reveal a notable void in organized training programs. If academics, business executives, and politicians are serious about coordinating workforce development with industrial expansion, this study will provide them with useful information. In the end, it promotes a strategy for enhancing

human capital in MSMEs that is more inclusive, adaptable, and tech-integrated.

Musthafa and colleagues (2024) Micro, small, and medium-sized businesses (MSMEs) are the focus of this study, which seeks to identify human capital factors that impact their success. This study drew on a literature review of indexed journal databases to identify critical components of "human capital" and "MSME performance." The investigation was thorough, and it uncovered a complex interplay between human capital features and MSME performance, as well as important factors influencing the latter. There is a vast array of human capital factors that have been shown to significantly impact MSME success. Included in this category are things like knowledge, abilities, attitudes, and values; diversity in the workplace; education and training; health and wellness of employees; ability to think creatively and communicate effectively; proficiency with digital tools; and a strong work ethic and commitment to the organization's values and principles. Policymakers seeking to improve the human capital capacities of MSME entrepreneurs can benefit greatly from the findings of this study. Policymakers may improve the human capital landscape for MSMEs by focusing on these particular elements. As a result, this focused strategy is expected to make micro, small, and medium-sized enterprises (MSMEs) more efficient, resilient, and prepared to enter global markets.

Susilo (2024), In Indonesia, SMEs still have a long way to go before they can be considered an important contributor to the country's exports due to their low levels of export development. To improve SMEs' export performance, various players and government agencies are actively pursuing programs. Promoting the incorporation of digital technology into the operations of SMEs and enhancing the quality of human and social capital are part of these endeavors. This examination evaluates the impact of human capital (HC), social capital (SC), and the utilization of digital technology on the export performance of SMEs. The study surveyed all small and medium-sized enterprises (SMEs) with an eye on exporting that were listed on the website of Bank Indonesia. Questionnaires were sent out to 614 SMEs in order to collect data. The PLS SEM was used for data analysis. Human capital, social capital, and digital technology all have a positive and important role on the export performance of SMEs in Indonesia, according to the research.

Wicaksono et al., (2024) argues Using data from 2016 to 2020, this study examines how labor and capital investments affect productivity in Indonesia's Micro, Small, and Medium Enterprises (MSME) sector. The study looks at the efficiency of MSME exports and how much of their

products are exported in comparison to all exports. The results show that investments in both labor and capital have a favorable and substantial effect on the productivity and export ratios of MSME. According to these findings, the micro, small, and medium enterprise (MSME) sector may make a bigger impact on the economy if it receives more funding and more workers. So, lawmakers need to think about ways to help micro, small, and medium-sized enterprises (MSME) get access to export markets, increase investment, and improve employee skills. This study adds to what is already known about small and medium-sized enterprise (SME) economics and growth in the literature, and it lays the groundwork for future research into other aspects, including innovation and technology, that impact SME success. Policymakers in Indonesia might use the study's findings to promote inclusive and long-term economic growth. Policymakers may better support growth and resilience in the micro, small, and medium enterprise (MSME) sector—and the economy as a whole—by gaining a better grasp of the dynamics of labor and capital investment in this sector.

Muhammad (2017), This study looked at the connection between high-performance work systems (HPWS) and the performance of export-oriented small and medium-sized firms (SMEs). The authors found that HC development mediates the association between HPWS and company success.

3. RESEARCH METHODOLOGY

Research Design: The study adopts a quantitative, explanatory research design to analyze the relationship between human capital variables and firm-level innovation outcomes. The approach is empirical in nature and relies on secondary firm-level survey data. Innovation is treated as an ordinal outcome variable to capture varying degrees of novelty, ranging from no innovation to radical market-level innovation.

Data Source and Sample Selection: The dataset consists of 3,633 firms operating across five ASEAN economies—Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. After accounting for missing observations, 3,452 firms were retained for regression analysis. Firms of varying sizes—micro, small, medium, and large—were included to ensure representation across enterprise categories. The data captures firm characteristics, workforce attributes, training practices, and innovation behavior.

Measurement of Variables:

The dependent variable, innovation, is measured as an ordinal variable with three categories:

(0) No innovation,

(1) "New-to-the-firm" innovation, and

(2) "New-to-the-market" innovation.

The key independent variables represent human capital dimensions. Top manager's prior work experience is measured in years of experience in the current industry. Employee general education is measured as the average years of formal schooling of employees. Employee training is a binary variable indicating whether the firm provides formal training programs.

Control variables include firm age (log-transformed), firm size (log-transformed number of employees), industry dummies, and country dummies to account for sectoral and national heterogeneity.

Descriptive and Preliminary Analysis: Descriptive statistics and cross-tabulations were conducted to examine patterns of innovation across countries, firm sizes, and training status. Correlation analysis was performed to test for multicollinearity among explanatory variables. Since all correlation coefficients were below the accepted threshold of 0.5, multicollinearity was not found to be a concern.

Econometric Models: Given the ordinal nature of the dependent variable, the study primarily employs Ordered Logit Models (OLM). However, due to violations of the proportional odds assumption identified through the Brant test, two advanced models were applied:

- Generalized Ordered Logit Model (GOLM) – to relax the proportional odds assumption,
- Multilevel Ordered Logit Model (MOLM) – to account for hierarchical data structure with firms nested within industries and countries.

These models allow for more flexible and accurate estimation of innovation determinants.

Robustness Testing: To validate the robustness of results, a Multinomial Logit Model (MLM) was estimated by treating innovation as a nominal variable. The consistency of coefficient signs and significance levels across models confirms the reliability of the findings.

Hypothesis Testing: The estimated results support all three hypotheses. Top managers' prior industry experience, employees' general education, and formal employee training significantly and positively influence the likelihood of higher-level innovation. These findings highlight the strategic importance of human capital development in fostering innovation-led competitiveness.

Objectives of the Study

- To examine whether the prior work experience of top managers/entrepreneurs influences the export readiness of MSMEs and start-ups.
- To analyze the role of general education of employees and entrepreneurs in enhancing the export capability of enterprises.
- To evaluate the impact of employee training and skill development on improving the export preparedness and global competitiveness of MSMEs and start-ups.

Hypothesis of the study

- The probability of innovation inside a company is positively correlated with the level of experience held by top managers.
- Chances of creativity in the workplace are positively correlated with employees' levels of general education.
- There is a positive correlation between employee training and the chance of creativity inside a corporation.

4. FINDINGS & DISCUSSION

Statistical Descriptions

The level of innovation per nation is displayed in Table 1. With almost 35% of enterprises engaging in innovation, Vietnam and the Philippines have the greatest rate of innovation among the five economies. On the other hand, fewer than 8% of Thai businesses are actively involved in innovation, making it the country with the worst innovation rate.

	No innovation	"New-to-the-firm" innovation	"New-to-the-market" innovation	Total
Indonesia	885	27	96	1,008
Row %	87.8	2.68	9.52	100
Malaysia	403	21	39	463
Row %	87.04	4.54	8.42	100
Philippines	593	129	188	910
Row %	65.16	14.18	20.66	100
Thailand	603	7	48	658
Row %	91.64	1.06	7.29	100
Vietnam	389	70	135	594
Row %	65.49	11.78	22.73	100
Total	2,873	254	506	3,633
Row %	79.08	6.99	13.93	100

Table 1 Innovation by Country
Source: Author Compiled

Table 2 shows the level of innovation based on the size of the business. Companies with less than five employees engage in the least amount of innovation. Specifically, just over 10% of micro enterprises innovated, and even fewer (about 6%) introduced novel market innovations. More than 31% of big enterprises engage in innovation activities, making them the most inventive type of organization. Also, when it comes to radicalness, big companies rule the roost. Nearly 21% of big companies have reported market-first innovations.

	No innovation	"New-to-the-firm" innovation	"New-to-the-market" innovation	Total
Micro	354	17	23	394
Row %	89.85	4.31	5.84	100
Small	1,150	93	162	1,405
Row %	81.85	6.62	11.53	100
Medium	997	100	194	1,291
Row %	77.23	7.75	15.03	100
	No innovation	"New-to-the-firm" innovation	"New-to-the-market" innovation	Total
Large	372	44	127	543
Row %	68.51	8.1	23.39	100
Total	2,873	254	506	3,633
Row %	79.08	6.99	13.93	100

Table 2 Innovation by Company Size
Source: Author Compiled

Companies are cross-tabulated according to their innovation and staff training level in Table 3. Formal training for employees was offered by nearly half of innovative businesses (both categories of innovation), compared to just 28% of non-innovative enterprises. Employee training appears to have a favourable correlation with improved innovation outcomes.

Innovation	Employee training		
	No	Yes	Total
No innovation	2,048	814	2,862
Row %	71.56	28.44	100
"New-to-the-firm" innovation	137	116	253
Row %	54.15	45.85	100
"New-to-the-market" innovation	266	239	505
Row %	52.67	47.33	100
Total	2,451	1,169	3,620
Row %	67.71	32.29	100

Table 3: Disruption as a Function of Employee Training Level
Source: Author Compiled

For each kind of innovation, Table 4 displays a cross-tabulation of companies by innovation status together with the average of top managers' previous work experience and employees' general education. Table 4 shows the similar trend. To be more specific, innovative companies have longer average management tenures and greater rates of general education among their employees than non-innovative companies. Therefore, it might imply that innovation success is favourably correlated with the education level of employees and the level of experience of senior managers.

Innovation	Top manager's prior work experience (mean of years)	Employee general education (mean of years)
No innovation	17.68	10.20
"New-to-the-firm" innovation	20.53	10.61
"New-to-the-market" innovation	19.86	10.62

Table 4 Innovation via the General Education of Employees and the Work Experience of Top Managers
Source: Author Compiled

Here are the summary statistics: Table 5. A great manager often has more than 18 years of experience in their present field. On average, a typical employee holds a bachelor's degree. In addition, formal staff training was organized by 32% of the companies. Firms typically have been around for more than 19 years, and on average, they employ around 187 people.

	Number of observations	Mean	Std. Dev.	Min.	Max.
Innovation	3,633	0.348	0.711	0	2
Top manager's prior work experience	3,460	18.187	10.225	2	70
Employee general education	3,633	10.284	2.684	0	20
Employee training	3,620	0.323	0.468	0	1
Age	3,633	19.579	11.416	1	80

Age (log)	3,633	2.800	0.623	0	4.382
Size	3,633	187.529	688.284	2	20000
Size (log)	3,633	3.985	1.444	0.693	9.903

Table 5 Data of statistics
Source: Author Compiled

Both the independent and control variables' pairwise correlation coefficients are displayed in Table 6. There is no substantial link between the variables since all of the correlation values are less than 0.5. Consequently, the potential issue of multicollinearity has not been found (Dormann et al., 2013).

	The top manager's prior work experience	Employee general education	Employee training	Age (log)	Size (log)
The top manager's prior work experience	1				
Employee general education	0.0051	1			
Employee training	0.0582***	0.0671***	1		
Age (log)	0.4065***	-0.0306*	0.1251***	1	
Size (log)	0.0335**	0.1232***	0.3445***	0.2092***	1

Table 6 Correlations of Pairwise
Source: Author Compiled

5. RESULTS

The results of the estimation are presented in Table 7. The MOLM's extremely significant likelihood-ratio statistic suggests that hierarchical organization is an issue, and the MOLM outperforms other methods when it comes to predicting our particular dataset. Not presented here for brevity, but the "Brant test" of the "parallel regression/proportional odds" assumption reveals evidence of a violation of this assumption. So, instead of the regular OLM, they prefer the MOLM and GOLM. The results are more solid, though, because all three models provide comparable outcomes.

There are three main takeaways on how human capital affects innovation in firms. To begin, across all three models, the level of radical product innovation is greatly enhanced by a top manager's previous job experience in the present industry. Therefore, in the ASEAN setting, hypothesis 1 is well supported. Previous studies have shown that top managers who work in the same industry for a longer period of time have a better grasp of the latest innovations, consumer tastes, market rivalry,

and relationships with innovation-related organizations (such as universities and research institutes). This, in turn, improves innovation performance (Kato et al., 2015; Marvel & Lumpkin, 2007; Protogerou et al., 2017). Table 5 shows that top managers of innovative firms have more experience in the current sector than non-innovative ones. Specifically, top managers of "new-to-the-firm" and "new-to-the-market" firms have an average of 20.53 and 19.86 years of experience, respectively, compared to 17.68 years for non-innovative firms.

Secondly, in all three models, the employee general education coefficients are positive and highly significant, suggesting that a higher degree of formal education is positively associated with a greater predisposition for more radical innovation. As a result, Hypothesis 2 is confirmed. According to previous studies (Fonseca et al., 2019; Lund Vinding, 2006; McGuirk et al., 2015; Protogerou et al., 2017), this finding lends credence to the idea that formal education helps workers gain advanced, specialized knowledge and make use of technical advancements for creative endeavors. Given that ASEAN is fast becoming one of the world's most dynamic commercial and trade areas and is highly integrated into the global economy, this is particularly pertinent in a climate where consumer tastes and technology advancements occur at a breakneck pace (The ASEAN Secretariat, 2019). Consequently, enterprises need to improve their technology and innovation capacity to remain competitive (OECD, 2013), and the educational background of workers, particularly those engaged in research and development, is a key factor in this regard. Table 5 reveals that both innovative and non-innovative businesses in our sample had greater average years of employee general education. Specifically, "new-to-the-market" innovative enterprises had 10.62 years of education, while non-innovative firms had 10.20 years.

	GOLM		MOLM	OLM
	Non-innovative firms versus firms with “new-to-the- firm” or “new-to-the-market.” innovation	Non-innovative firms or firms with “new-to-the-firm” innovation versus firms with “new-to-the-market” innovation		
The top manager’s prior work experience	0.015***	0.009*	0.013***	0.013***
	(0.005)	(0.005)	(0.005)	(0.005)
Employee general education	0.074***	0.074***	0.066***	0.072***
	(0.020)	(0.020)	(0.020)	(0.020)

Employee training	0.395***	0.395***	0.372***	0.390***
	(0.103)	(0.103)	(0.103)	(0.103)
Age (log)	0.233***	0.233***	0.228***	0.235***
	(0.085)	(0.085)	(0.085)	(0.085)
Size (log)	0.182***	0.182***	0.188***	0.181***
	(0.033)	(0.033)	(0.033)	(0.033)
Industry (dummies)	Yes	Yes	Yes	Yes
	GOLM		MOLM	OLM
	Non-innovative firms versus firms with "new-to-the- firm" or "new-to-the-market" innovation	Non-innovative firms or firms with "new-to-the-firm" innovation versus firms with "new-to-the-market" innovation		
Country (dummies)	Yes	Yes	Yes	Yes
Constant	-3.509***	-4.012***		
	(0.851)	(0.854)		
/cut1			3.995	3.500
			(0.468)	(0.847)
/cut2			4.539	4.044
			(0.470)	(0.848)
Country (var(_cons))			0.590	
			(0.386)	
Country > Industry (var(_cons))			0.049	
			(0.032)	
			LR test versus ologit model: $\chi2 = 253.33$	
			Prob >= $\chi2$ = 0.0000	
LR $\chi2$	520.48			449.01
Wald $\chi2$			122.79	
Prob > $\chi2$	0.000		0.000	0.000
Number of observations	3,452		3,452	3,452

Table 7 Results of Estimation

Note: Standard errors are in parentheses. *, **, and *** indicate significance at 10%, 5% and 1% levels, respectively.

Source: Author Compiled

Thirdly, it appears that staff training has a favourable impact on business innovation, since the coefficients of this variable are extremely significant and positive across all three models. This lends credence to

Hypothesis 3. This finding lends credence to earlier claims that formal training improves workers' ability to understand and implement complex technological information and advances, which in turn helps businesses get closer to the cutting edge of technology and achieve better results in innovation, particularly in the realm of radical innovation (Bauernschuster et al., 2009; McGuirk et al., 2015; van Uden et al., 2017). This confirms what we suspected from looking at Table 4: innovative companies are far more likely to use the staff training method than non-innovative ones. Specifically, 47% of "new-to-the-firm" and 46% of "new-to-the-market" firms, compared to 28% of non-innovative firms, use this technique. Table 9 reveals that innovative enterprises placed a greater priority on staff training than non-innovation firms in all four ASEAN nations except Malaysia. The "Quality of vocational training" ranks (rank/140 economies) of ASEAN nations are typically poor, according to the 2018 Global Competitiveness Report.

According to Schwab (2018), which is the first year that data on this metric was released by the World Economic Forum, other countries besides Malaysia score poorly, including Indonesia (34), the Philippines (26), Thailand (75), and Vietnam (115). Formal employee training may not be crucial for innovation in Malaysian enterprises, which might explain why there is a low rate of employee training among innovative firms. This could be because vocational training in Malaysia is generally high-quality. Businesses who are at the forefront of innovation often do formal employee training to ensure that their staff are up-to-date on the latest technology information and skills. This is particularly true in Vietnam, where vocational training is of medium to low quality. Indicators such as "Quality of vocational training" (i.e., rank/141 economies, Malaysia (12), Indonesia (37), the Philippines (29), Thailand (74), and Vietnam (102) follow a comparable trend in the 2019 Global Competitiveness Report (Schwab, 2019).

Innovation	Indonesia		Malaysia		Philippines		Thailand		Vietnam	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No innovation	90.50	9.50	63.59	36.41	51.61	48.39	61.06	38.94	83.20	16.80
“New-to-the- firm” innovation	85.19	14.81	80.95	19.05	40.63	59.38	42.86	57.14	60.00	40.00
“New-to-the- market” innovation	76.04	23.96	79.49	20.51	29.41	70.59	52.08	47.92	60.74	39.26

Table 8: Innovation by Country and Employee Training Status
Source: Author Compiled

Referring to the statement by Long and Freese (2014, p. 310) that "you always compare the results from ordinal models with those from a model that does not assume ordinality," we employ a multinomial logit model

(MLM) to assess the robustness of the main findings when the ordinal feature is disregarded. In Table 10, you can see the estimated outcomes. All three of these assumptions are supported by positive and statistically significant correlations: the number of years of experience for top managers in the sector, the levels of general education among employees, and the training that employees get. The results of the robustness tests corroborate the main conclusions, as shown in Table

6. TEST OF ROBUSTNESS

Based on the suggestion made by Long and Freese (2014, p. 310) that "you always compare the results from ordinal models with those from a model that does not assume ordinality," we use a multinomial logit model (MLM) to see how well the primary conclusions hold up when the ordinal feature is ignored. The results of the estimation are reported in Table 10. Top managers' years of experience in the field, employees' levels of general education, and employees' training all have positive and statistically significant correlations, lending credence to the first three hypotheses. According to Table 7, the primary conclusions are confirmed by the robustness test results.

	MLM	
	"new-to-the-firm" innovation versus no innovation	"new-to-the-market" innovation versus no innovation
Top manager's prior work experience	0.021***	0.010*
	(0.007)	(0.006)
Employee general education	0.101***	0.067***
	(0.036)	(0.024)
Employee training	0.290*	0.442***
	(0.163)	(0.121)
Age (log)	0.114	0.289***
	(0.134)	(0.101)
Size (log)	0.099*	0.204***
	(0.054)	(0.039)
Industry (dummies)	Yes	Yes
Country (dummies)	Yes	Yes
Constant	-17.416	-3.825***
	(1004.310)	(0.863)
LR chi2	538.37	
Prob > chi2	0.000	
Number of observations	3,452	

Table 9 test of Robustness
Source: Author Compiled

7. CONCLUSIONS AND IMPLICATIONS

The study investigates the function of human capital in company innovation using three distinct ordinal logistic regression models: GOLM, MOLM, and OLM. According to the results, there is a positive correlation between human capital in general and human capital in particular and the probability of more radical innovation. The findings hold up under many types of robustness evaluations. Two significant conclusions are suggested by the study in light of the empirical data. To start, businesses should invest more in training, particularly formal training, so workers can keep their extensive knowledge of technology up-to-date and apply it to better goods and processes. Official education shouldn't cover too much ground; rather, it should focus on the two sets of abilities deemed most crucial by the OECD (2011): (i) "digital-age literacy" abilities, which enable workers to access, absorb, and create with the massive amounts of data used in today's knowledge economy, and (ii) "technical skills" that enhance workers' competences in products and services. Second, on a societal scale, governments should increase funding for education since it is a key component in fostering creativity. Investing in digital technology for education should be a breakthrough since it can improve E-learning, open educational materials, and creative pedagogic methods. This opens up exciting new possibilities for education and training, leading to a more imaginative and original workforce.

8 REFERENCE

[1] Suparji, S. (2021). Investment climate for MSMEs towards a green economy. International Journal of Research in Business and Social Science (2147- 4478), 10(6), 153–158. https://doi.org/10.20525/ijrbs.v10i6.1360

[2] Natalia Arta Malau, & Teguh Pamuji Tri Nur H. (2022). Strategy Marketing Development of Umkm (Case Study in Boyolali District, Central Java). Proceedings of The International Conference on Business and Economics, 1(1), 128–147. https://doi.org/10.56444/icbeuntagsmg.v1i1.293

[3] Kakkar, M., & Kumar, A. (2020). MSMEs – a mainstay for the developing economy. Economics of Development, 19(3), 12–18. https://doi.org/10.21511/ed.19(3).2020.02

[4] Hayati, S., & Fatarib, H. (2022). The Role Of Small And Medium Micro Enterprises (Msmes) In Economic Development In Bandar Lampung. International Journal of Environmental, Sustainability, and Social Science, 3(3), 571–576. https://doi.org/10.38142/ijesss.v3i3.247

[5] Shetty, M. O., & S., G. B. (2022). A Performance Analysis of Indian MSMEs. International Journal of Applied Engineering and Management Letters, 6(2), 197–216. https://doi.org/10.47992/ijaeml.2581.7000.0153

[6] Dwi Nata, M. A., Pritandhari, M., & Octavia Rosa, F. (2022). Digitization of MSMEs in Improving the Economy in the Era of the COVID-19 Pandemic. International Journal of Research and Review, 9(5), 95–101. https://doi.org/10.52403/ijrr.20220516

[7] https://pdfs.semanticscholar.org/4a4e/0303b41440c368cdd4735f3697cb6a740a8a.pdf

[8] Lamba, J., & Jain, E. (2021). Pivotal Role of MSME and Professionals in Fabricating

Self-Reliant India. Asian Journal of Management, August 2021, 253–257. https://doi.org/10.52711/2321-5763.2021.00038

[9] Syal, S. (2015). Role of MSMEs in the Growth of the Indian Economy, Foreign Direct Investment (FDI) Policy De-reservation. Global Journal of Commerce & Management Perspective, 4(5), 40–43

[10] rekha, & Jain, A. (2022). Do MSMEs Create Employment? Attestation from India. RESEARCH REVIEW International Journal of Multidisciplinary, 7(7), 75–82. https://doi.org/10.31305/rrijm.2022.v07.i07.010

[11] Risnawati, R., Selvi Fauzar, Ahmat Rahman, Andi, A., Mohammad Farhan Mahyansah, & Titik Jernih Hia. (2022). Business Innovation in Micro, Small, Medium Enterprises (MSMEs) (Case Study on Putza Coffee Shop). Proceeding of The International Conference on Economics and Business, 1(2), 448–462. https://doi.org/10.55606/iceb.v1i2.197

[12] Nasser, A. T. (2022). Competitiveness of Micro, Small and Medium Entrepreneurs during Economic Disruption. JPAIR Multidisciplinary Research, 49(1), 81–105. https://doi.org/10.7719/jpair.v49i1.641

[13] Khatri, P. (2019). A Study of the Challenges of the Indian MSME Sector. IOSR Journal of Business and Management (IOSR-JBM), 21(2), 5–13. https://doi.org/10.9790/487X-2102050513

[14] Yang, Z., Xie, L., & Shen, Q. (2019). Research on Financial Financing Mode of SME Supply Chain based on B2B E-commerce Platform. 68 (Ssmi 2018), 507–512. https://doi.org/10.2991/ssmi-18.2019.85

[15] Berk, C., & Gultekin, R. (2019). Obstacles in SME Financing: The Case of Masko. Research Journal of Finance and Accounting, 10(20), 111–118. https://doi.org/10.7176/rjfa/10-20-11

[16] Yoshino, N., & Taghizadeh-hesary, F. (2018). Asian Development Bank Institute. 768, 78–78. https://doi.org/10.1007/978-1-349-70154-4_121

[17] Othman, Z., Abu, N. H., Shafie, S., Zaman, N. B. K., Alias, E. F., & Yahaya, W. A. J. W. (2022). Challenges of Social Media Marketing in Digital Technology: A Case of Small Traders of Agricultural Products in Malaysia. Journal of Advanced Research in Applied Sciences and Engineerin.

[18] Marka, M. M. (2021). Improving Business Performance of Getuk Nyimut SMEs in Kudus Regency by Marketing, Capital, Production Technology and Product Diversification. BISNIS : Jurnal Bisnis Dan Manajemen Islam, 9(1), 17. https://doi.org/10.21043/bisnis.v9i1.10306

[19] Kurniawan, A., & Asharudin, M. (2018). Small and Medium Enterprises (Smes) Face Digital Marketing. Muhammadiyah International Journal of Economics and Business, 1(2), 115–120. https://doi.org/10.23917/mijeb.v1i2.9367

[20] Mas'ud, A. A., & Tenriyola, A. P. (2023). HR Competency Analysis on Increasing MSMEs Performance In Supporting Industrial Era 4.0. Jambura Science of Management, 5(2), 86–96. https://doi.org/10.37479/jsm.v5i2.19778

[21] Woolgar, S., Vaux, J., Gomes, P., Ezingeard, J. N., & Grieve, R. (1998). Abilities and competencies required, particularly by small firms, to identify and acquire new technology. Technovation, 18(8–9), 575–584. https://doi.org/10.1016/s0166-4972(98)00049-2

[22] Wahab, M. H. A.-A. A., Ismail, M., & Muhayiddin, M. N. (2016). Factors Influencing the Operational Excellence of Small and Medium Enterprise in Malaysia. International Journal of Academic Research in Business and Social Sciences, 6(12), 285–297. https://doi.org/10.6007/ijarbss/v6-i12/2496

[23] Gunasekaran, A., Forker, L., & Kobu, B. (2000). ACE Epigenetics Reading - Epigenesis and weight loss.pdf. International Journal of Operations & Production Management, 20(3), 316–335.

[24] Eleftherios, A., Nikolaos, E., Antonios, G., & Anastasios, T. (2016). RD activity and operating performance of small and medium-sized enterprises (SMEs): The case of a small open economy. Journal of Accounting and Taxation, 8(4), 40–50. https://doi.org/10.5897/jat2016.0233

[25] Mkenda, B., & Rand, J. (2020). Examining the Ability of Tanzanian Small and Medium Enterprises (Smes) To Increase Their Penetration into Export Markets. Business Management Review, 23(1), 79–102.
[26] Bell, R. S. (2012). The Identification of the Perceived Difficulties in Overcoming the Barriers to Direct Export When Moving From Indirect Export: The Case of Chinese SMES. INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES, 4(2), 225–236.
[27] Ardito, L., D'Angelo, V., Petruzzelli, A. M., & Peruffo, E. (2021). The role of human capital in the foreign market performance of US SMEs: does owner ethnicity matter? Journal of Intellectual Capital, 22(7), 24–42. https://doi.org/10.1108/JIC-09-2020-0312
[28] Prastyabudi, W. A., Yuda, A. E., Fauzi, M. D., & Nurdin, A. (2022). Strengthening MSMEs crafting soft skills through the implementation of system thinking business model innovation. Abdimas: Jurnal Pengabdian Masyarakat Universitas Merdeka Malang, 7(2), 230–241. https://doi.org/10.26905/abdimas.v7i2.6815
[29] Wikantari, M. A., & Supriadi, Y. N. (2022). Peningkatan Kewirausahaan Ekonomi Keluarga melalui Pemberdayaan UMKM. Batara Wisnu : Indonesian Journal of Community Services, 2(2), 262–269. https://doi.org/10.53363/bw.v2i2.96
[30] Dixit, A., Sharma, S. K., & Sharma, D. P. (2021). Impetus on Big Data to Boost Indian MSME Sector and Economy using Cloud Storage. International Journal of Computer Applications, 174(21), 17–23. https://doi.org/10.5120/ijca2021921110
[31] Sumaryanto, S., & Widajanti, E. (2023). MSME Marketing Performance during the COVID-19 Pandemic: The Role of Empowered Interaction Capability. Journal of Economics, Business, & Accountancy Ventura, 25(3), 382. https://doi.org/10.14414/jebav.v25i3.2799
[32] Latifah, L., Setiawan, D., Aryani, Y. A., Sadalia, I., & Al Arif, M. N. R. (2022). Human Capital and Open Innovation: Do Social Media Networking and Knowledge Sharing Matter? Journal of Open Innovation: Technology, Market, and Complexity, 8(3). https://doi.org/10.3390/joitmc8030116
[33] Dui, H. (2020). Review of Human Capital Theory. IJARIIE, 6, 87–89.
[34] Abdullayev, E. B. (2023). Attention To The Issue Of Human Capital In The Constitution And National Legislation. American Journal Of Social Sciences And Humanity Research, 3(02), 68-71.
[35] Somko, M. L., Epikhin, A. I., & Epikhina, G. V. (2023). Elements of the theory of knowledge management as a basis for the development of staff competencies. SHS Web of Conferences, 164, 00050. https://doi.org/10.1051/shsconf/202316400050
[36] Zhuravlev, P. V., Epishkin, I. A., Chernukhina, G. N., Zavyalov, M. V., Varlamova, V. V., & Voronkova, O. Y. (2018). Development of human capital in the system of economic categories of work. European Research Studies Journal, 21(Special Issue 3), 107–117. https://doi.org/10.35808/ersj/1365
[37] Rokhman, M. T. N., Ratnawati, R., & Rahayu, Y. N. (2023). Relationship between Human Capital and Msmes Performance with Competitive Advantage as a Mediation. Jurnal Aplikasi Manajemen, 21(1), 191–204. https://doi.org/10.21776/ub.jam.2023.021.1.14
[38] Hamsani, H., Reniati, R., Wibawa, D. P., & Yusnita, M. (2022). Human Capital Development Strategy in the Covid-19 Pandemic Era of MSMEs in Pangkalpinang City. Integrated Journal of Business and Economics, 6(3), 212. https://doi.org/10.33019/ijbe.v6i3.561
[39] Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic growth, increasing productivity of smes, and open innovation. Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 1–37. https://doi.org/10.3390/joitmc7010020
[40] Peter Siegesmund and Jasmina Glisovic (2011) Estimating Funder Support for Small and Medium Enterprises (SMEs). Report accessed on http://www.slideshare.net/CGAP/estimating-fundersupport-for-small-and-medium-enterprises-smes-12117027

[41] PTI (2014), Domestic MSMEs Facing Stiff Competition from China, Business Line, March 14.
[42] https://textileinsights.in/indias-textile-machinery-trade-rises-in-fy2022-23
[43] Shah, Nilesh (2012), Challenges that SMEs Face Today, Live Mint, April, 25.
[44] Pankajakshi, Dr., & BM, M. (2025). Transforming Human Capital in Indian MSMEs: A Comprehensive Study on Training and Development Initiatives in the Industrial Landscape. Indian Scientific Journal of Research in Engineering and Management, 09(08), 1–9. https://doi.org/10.55041/ijsrem51775
[45] Musthafa, I., Elfindri, E., Anas, Y., & Ariyanto, E. (2024). Human capital and performance of micro, small and medium enterprises: a literature review. CASHFLOW CURRENT ADVANCED RESEARCH ON SHARIA FINANCE AND ECONOMIC WORLDWIDE. https://doi.org/10.55047/cashflow.v3i2.1028
[46] Susilo, D. D. B. (2024). The influence of human capital, social capital, and digital technology on the export performance of SMEs. Uncertain Supply Chain Management, 13(2), 227–236. https://doi.org/10.5267/j.uscm.2024.8.009
[47] Wicaksono, B. B., Hermawan, A., & Evien, E. (2024). Unveiling Labor and Capital Investment Potential: How to Impact Productivity in Indonesia's MSME Sector? International Journal of Digital Entrepreneurship and Business, 5(1), 29–37. https://doi.org/10.52238/ideb.v5i1.149
[48] Hamid, Z. (2017). Impact of High - Performance Work Systems on Export - Oriented SMEs Performance: The Mediating Role of Human Capital Development. South East Asian Journal of Management, 11(2), 142. https://doi.org/10.21002/SEAM.V11I2.8524
[49] Acemoglu, D., 1997. Training and innovation in an imperfect labour market. The Review of Economic Studies, 64, pp.445-464.
[50] Barney, J.B., 1991. Firm Resources and Sustained Competitive Advantage. Journal of Management, 17, pp.99-120.
[51] Bauernschuster, S., Falck, O. and Heblich, S., 2009. Training and innovation. Journal of Human Capital, 3, pp.323-353.
[52] Becker, G.S., 1964. Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. Chicago: The University of Chicago Press.
[53] Blundell, R., Dearden, L., Meghir, C. and Sianesi, B., 1999. Human capital investment: the returns from education and training to the individual, the firm and the economy. Fiscal studies, 20, pp.1-23.
[54] Coad, A., Segarra, A. and Teruel, M., 2016. Innovation and firm growth: Does firm age play a role? Research Policy, 45, pp.387-400.
[55] Cohen, W.M. and Levinthal, D.A., 1990. Absorptive capacity: A new perspective on learning and innovation. Administrative Science Quarterly, 35, pp.128-152.
[56] Dormann, C.F., Elith, J., Bacher, S., Buchmann, C., Carl, G., Carré, G., Marquéz, J.R.G., Gruber, B., Lafourcade, B. and Leitão, P.J., 2013. Collinearity: a review of methods to deal with it and a simulation study evaluating their performance. Ecography, 36, pp.27-46.
[57] Edwards-Schachter, M., 2018. The nature and variety of innovation. International Journal of Innovation Studies, 2, pp.65-79.
[58] ERIA, 2018. Innovation Policy in ASEAN. Jakarta: Economic Research Institute for ASEAN and East Asia. Available at: <https://www.eria.org/uploads/media/Innovation_Policy_in_ASEAN.pdf> [Accessed 10 November 2019].
[59] Fagerberg, J., Fosaas, M. and Sapprasert, K., 2012. Innovation: Exploring the knowledge base. Research policy, 41, pp.1132-1153.
[60] Fonseca, T., De Faria, P. and Lima, F., 2019. Human capital and innovation: the importance of the optimal organizational task structure. Research Policy, 48, pp.616-627.
[61] Gallié, E.-P. And Legros, D., 2012. Firms' human capital, R&D and innovation: a study on French firms. Empirical Economics, 43, pp.581-596.
[62] Gault, F., 2018. Defining and measuring innovation in all sectors of the economy.

Research Policy, 47, pp.617-622.
[63] González, X., Miles-Touya, D. and Pazó, C., 2016. R&D, worker training and innovation: firm-level evidence. Industry and Innovation, 23, pp.694-712.
[64] Hashi, I. and Stojčić, N., 2013. The impact of innovation activities on firm performance using a multi-stage model: Evidence from the Community Innovation Survey 4. Research Policy, 42, pp.353-366.
[65] IMF, 2018. World Economic Outlook Database. [online] Available at: <https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases> [Accessed 08 October 2019].
[66] Jiménez-Jiménez, D. and Sanz-Valle, R., 2011. Innovation, organizational learning, and performance. Journal of business research, 64, pp.408-417.
[67] Kasseeah, H., 2013. Innovation and performance in small-and medium-sized enterprises: evidence from Mauritius. Innovation and Development, 3, pp.259-275.
[68] Kato, M., Okamuro, H. and Honjo, Y., 2015. Does Founders' Human Capital Matter for Innovation? Evidence from Japanese Start-ups. Journal of Small Business Management, 53, pp.114-128.
[69] Long, J.S. and Freese, J., 2014. Regression Models for Categorical Dependent Variables Using Stata, 3 Ed.
[70] Lund Vinding, A., 2006. Absorptive capacity and innovative performance: A human capital approach. Economics of Innovation and New Technology, 15, pp.507-517.
[71] Lundvall, B.-Ä. And Johnson, B., 1994. The learning economy. Journal of Industry Studies, 1, pp.23-42.
[72] Ma, L., Zhai, X., Zhong, W. and Zhang, Z.-X., 2019. Deploying human capital for innovation: A study of multi-country manufacturing firms. International Journal of Production Economics, 208, pp.241-253.
[73] Marvel, M.R. and Lumpkin, G.T., 2007. Technology entrepreneurs' human capital and its effects on innovation radicalness. Entrepreneurship Theory and Practice, 31, pp.807-828.
[74] Mccoach, D.B., 2019. Multilevel Modeling. In G.R. Hancock, Stapleton, L. M., Mueller, R. O. (ed.) The reviewer's guide to quantitative methods in the social sciences 2ed. NY: Routledge, pp.292-312.
[75] Mcguirk, H., Lenihan, H. and Hart, M., 2015. Measuring the impact of innovative human capital on small firms' propensity to innovate. Research Policy, 44, pp.965-976.
[76] Mincer, J., 1962. On-the-job training: Costs, returns, and some implications. Journal of Political Economy, 70, pp.50-79.
[77] Moagăr-Poladian, S., Folea, V. and Păunică, M., 2017. Competitiveness of EU member states in attracting EU funding for research and innovation. Romanian Journal of Economic Forecasting, 20(2), pp.150-167.
[78] Murovec, N. and Prodan, I., 2009. Absorptive capacity, its determinants, and influence on innovation output: Cross-cultural validation of the structural model. Technovation, 29, pp.859-872.
[79] OECD, 2001. The Well-being of Nations: The Role of Human and Social Capital. Paris: OECD. Available at: <https: //www.oecd-ilibrary.org/education/the-well-being-of- nations_9789264189515-en> [Accessed 15 August 2019].
[80] OECD, 2005. The measurement of scientific and technological activities Oslo Manual Guidelines for collecting and interpreting innovation data, 3 ed. Paris: OECD Eurostat. Available at: <https://www.oecd-ilibrary.org/science-and-technology/oslo-manual_9789264013100-en> [Accessed 25 August 2019].
[81] OECD, 2010. Ministerial Report on the OECD Innovation Strategy Innovation to strengthen growth and address global and social challenges Key Findings. Paris: OECD. Available at: <https://www.oecd.org/sti/45326349.pdf> [Accessed 18 September 2019].
[82] OECD, 2011. Skills for innovation and research. Paris: OECD. Available at: <https://www.oecd-ilibrary.org/science-and-technology/skills-for-innovation- and-research_9789264097490-en> [Accessed 25 September 2019].

[83] OECD, 2013. OECD Reviews of Innovation Policy Innovation in Southeast Asia. Paris: OECD Publishing. Available at: <https://www.oecd.org/sti/inno/innovation-in- southeast-asia-2012-9789264128712-en.htm> [Accessed 12 September 2019].
[84] OECD, 2018. Enterprises by business size. [online] Available at: <https://data.oecd.org/entrepreneur/enterprises-by-business-size.htm> [Accessed 12 October 2019].
[85] Pelinescu, E., Pauna, C., Saman, C. and Diaconescu, T., 2019. Human capital, innovation and economic growth in the EU countries. Romanian Journal of Economic Forecasting, 22(4), pp.160-173.
[86] Protogerou, A., Caloghirou, Y. and Vonortas, N.S., 2017. Determinants of young firms' innovative performance: Empirical evidence from Europe. Research Policy, 46, pp.1312-1326.
[87] Rodil, Ó. Vence, X. and Del Carmen Sánchez, M., 2016. The relationship between innovation and export behaviour: The case of Galician firms. Technological Forecasting and Social Change, 113, pp.248-265.
[88] Santi, C. and Santoleri, P., 2017. Exploring the link between innovation and growth in Chilean firms. Small Business Economics, 49, pp.445-467.
[89] Schumpeter, J.A., 1934. The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle. MA: Harvard University Press.
[90] Schwab, K., 2018. The global competitiveness report 2018. Geneva: World Economic Forum. Available at: <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitive nessReport2018.pdf> [Accessed 22 November 2019].
[91] Schwab, K., 2019. The global competitiveness report 2019. Geneva: World Economic Forum. Available at: <http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019. Pdf> [Accessed 20 November 2019].
[92] Shane, S., 2000. Prior knowledge and the discovery of entrepreneurial opportunities. Organization Science, 11, pp.448-469.
[93] Statacorp, L.P., 2017. Stata multilevel mixed-effects reference manual release 15. TX: Stata Press.
[94] Sun, X., Li, H. and Ghosal, V., 2020. Firm-level human capital and innovation: Evidence from China. China Economic Review, 59, 101388.
[95] The Asean Secretariat, 2019. ASEAN Integration Report 2019. Jakarta: ASEAN Secretariat. Available at: <https://asean.org/wp-content/uploads/2019/11/ASEAN-integration-report-2019.pdf> [Accessed 20 December 2019].
[96] Tidd, J. and Bessant, J.R., 2009. Managing innovation: integrating technological, market and organizational change, 4 ed. John Wiley & Sons.
[97] Unger, J.M., Rauch, A., Frese, M. and Rosenbusch, N., 2011. Human capital and entrepreneurial success: A meta-analytical review. Journal of business venturing, 26, pp.341-358.
[98] Van Uden, A., Knoben, J. and Vermeulen, P., 2017. Human capital and innovation in Sub- Saharan countries: a firm-level study. Innovation, 19, pp.103-124.
[99] Williams, R., 2006. Generalized ordered logit/partial proportional odds models for ordinal dependent variables. Stata Journal, 6, pp.58-82.
[100] World Bank, 2019a. About Us. [online] Available at: <https://www.enterprisesurveys.org/about-us> [Accessed 11 November 2019].
[101] World Bank, 2019b. Survey Methodology. [online] Available at: <https://www.enterprisesurveys.org/methodology> [Accessed 11 November 2019].
[102] Ziemnowicz, C., 2013. Joseph A. Schumpeter and innovation. Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship, pp.1171-1176.