Do skills and training drive business performance among Singapore SMEs?

An investigation using the Singapore Business Performance and Skills Study II

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Executive Summary

Only **one in ten** Small and Medium Enterprises (SMEs) in Singapore have the capacity to **turn skills and training into business advantage**.

These findings, drawn from the Business Performance and Skills Survey II (BPSS2) involving 2,889 SMEs, show that while skills and training matter, they are most likely to deliver results when firms are strategically positioned to use them through a strong coupling of business and people strategies. Business performance improves not through the accumulation of skills alone, but through **absorption,** specifically the ability of firms to integrate skills and learning into high value-added products, services, and processes.

Firms with this absorptive capacity, described in this study as **Value Creators**, comprise only 9.8 per cent of Singapore SMEs, the smallest cluster in this study. These firms demonstrate a holistic and sustainable business advantage. Not only are they the most likely to report increases in profit, revenue, and market share, they also are more likely to achieve higher levels of employee engagement and staff retention.

In sharp contrast, firms that invest in training while sitting on weak business strategies **are most likely to bleed**—reporting declines in profits and revenue despite their training efforts. These firms, described as Traditionalists, represent the largest cluster of SMEs in Singapore, accounting for 34.1 percent or **one in three firms** in the sample.

In other words, the SME sector in Singapore demonstrates **a sharp divergence**: **strong SMEs train and get stronger, while weak SMEs bleed even when they train.** The findings overturn policy expectations that expanding skills and training participation correlates with better firm performance.

The five archetypes identified in the BPSS2 study are described below Figure 1:

- **Cluster 1: Value Destroyers (20.2%)** – These firm are weak in both business and people strategies. They often hire qualified professionals but design routine jobs that squander the skills of their workforce. They have the lowest levels of employee engagement, medium levels of attrition and turn in mediocre business outcomes for profits, revenue and market share.

- **Cluster 2: Traditionalists (34.1%)** – The largest cluster in the sample, these firms have a weak business strategy but a strong people focus. Alongside the Value Creators (C5), they are the firms most likely to invest in training and reward employees well. This shows up in their strong retention rates, yet they are the most likely to bleed financially being most likely to report falling profits and revenue. They are observed to have middling levels of employee engagement.

- **Cluster 3: Technical Plateauers (21.3%)** – These firms offer technically sound jobs but are operationally conservative. Limited innovation constrains growth, leading to stagnating profits and market share. Attrition is highest among all five clusters, with around half of their workforce existing the firm each year.

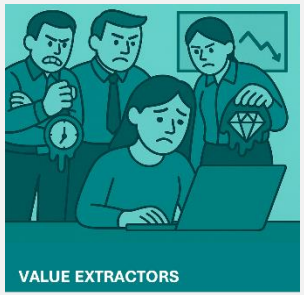
- **Cluster 4: Value Extractors (14.6%)** – These firms have strong business strategies but are reluctant to invest in skills. They avoid hiring high-skilled workers, putting low-skilled workers into jobs with high task requirements yet offering only medium levels of training. Although workers demonstrate good levels of employee engagement, C4 firms struggle with high staff turnover and are unable to turn their strategies into strong firm performance.

- **Cluster 5: Value Creators (9.8%)** – C5 firms are adept at turning skills and training into business value. They have the strongest coupling of business and people strategies. They recruit high-skilled workers and invest in extensive and diverse training. With the most engaged workforce and the lowest staff turnover, C5 firms achieve the strongest business outcomes, being the most likely to report increases in revenue, profit, and market share.

The sharp divergence in Singapore's SME landscape, where firms with strong business strategy train and get stronger while firms with weak business strategy bleed even when they train, underscores the need for a more targeted skills and training policy.

Three in four SMEs struggle to get business strategy right making it by far the biggest hurdle for SMEs. Policy levers to expand the supply of skills and training on their own will not raise firm performance or improve opportunities for workers in Singapore's complex SME environment. The real policy shift rests in building firms' strategic muscle to **connect people development with market purpose**—designing high value-added business strategies, creating complex jobs, hiring for higher skills, and engaging workers meaningfully. Without this approach, the SME sector's limited absorptive capacity **risks undermining Singapore's national skills strategy**, as firms are unable to effectively leverage and apply advanced capabilities.

Figure 1. Five archetypes of SMEs in Singapore

	C1	C2	C3	C4	C5
	n=583, 20.2%	*n=986, 34.1%*	*n=614, 21.3%*	*n=422, 14.6%*	*n=284, 9.8%*
					
Cluster Name	**Value Destroyers**	**Traditionalists**	**Technical Plateauers**	**Value Extractors**	**Value Creators**
Business Strategy	× Weak	× Weak	× Weak	✓ Strong	✓ Strong
People Strategy	× Weak	✓ Strong	– Mediocre	× Weak	✓ Strong
Specific Feature	Creators of low-value professional work	Perpetuators of low-skilled work	Offers good, technical jobs but not innovating	Driver of low-skilled workers	Creators of high-value professional work
Business Advantage	No clear trends for profits, revenue and market share Lowest employee engagement Medium attrition	Most likely to report decrease in profits and revenue Medium employee engagement Low attrition	Most likely to report stagnating profits and market share Medium employee engagement Highest attrition	No clear trends for profits, revenue and market share High employee engagement Medium attrition	Most likely to report increase in profits, revenue and market share Highest employee engagement Low attrition

1. Introduction

1.1. SkillsFuture and the SME sector

SkillsFuture is Singapore's national strategy for building a future-ready workforce and fostering a culture of lifelong learning, with the goal of providing Singaporeans with the opportunity to develop their fullest potential throughout life regardless of their starting points (Government of Singapore, 2025a).

Internationally, SkillsFuture is well-recognised for its strong individual focus, particularly through ground-up access to training via individual learning accounts namely the SkillsFuture Credit scheme (Kim et al., 2021). More recently, it has expanded to step up support to mid-career workers aged 40 and above through enhanced subsidies and specialised programmes to help them remain employable in a changing economy (Government of Singapore, 2025b).

Yet alongside its strong individual focus, SkillsFuture also places significant emphasis on enterprises. It recognises enterprises as a key pillar in workforce transformation, supporting them through initiatives such as job redesign, skills-first hiring, and systematic upskilling and reskilling efforts. These initiatives aim to help firms create quality jobs for Singaporeans while ensuring their workforce remains adaptable and future-ready.

The SME sector is a critical target for these enterprise-facing efforts. SMEs account for 99 per cent of all enterprises in Singapore and employ around 70 per cent of the resident workforce (Sadik et al., 2025). However, workers in SMEs are found to be less likely to participate in training compared to workers in larger firms (Chia et al., Upcoming).

Consequently, SkillsFuture's enterprise-facing strategy places a strong emphasis on SMEs. For example, the SkillsFuture Enterprise Credit (SFEC) scheme offers eligible enterprises a one-off credit of S$10,000 to support workforce transformation and enterprise transformation efforts—covering up to 90% of out-of-pocket costs (Government of Singapore, 2025c). Complementing SFEC, the Enhanced Training Support for SMEs (ETSS) scheme enables SMEs (defined as companies with no more than 200 employees or annual turnover of S$100 million) to receive course fee subsidies of up to 90% when sponsoring employees for approved training (Government of Singapore, 2025d). The National Centre of Excellence for Workplace Learning (NACE) network supports enterprises in Singapore to embed workplace learning practices—helping firms redesign jobs, foster on-the-job and mentoring systems, and build internal training capabilities that align with business transformation goals (Nanyang Polytechnic, 2025). Collectively, these initiatives are designed to lower the cost and increase the accessibility of training, workplace learning and transformation for SMEs—thereby promoting skills-intensive job design, job redesign, and capability development within these firms.

A key policy priority is to demonstrate how skills and training drive business performance, thereby strengthening the case for SMEs to partake more robustly in workforce development. The critical question remains: do skills and training translate into stronger business outcomes for Singapore's SMEs? Establishing a robust and demonstrable link would provide a compelling rationale for SME leaders to view training not as a discretionary cost, but as a strategic investment in competitiveness. Conversely, if the relationship proves weak or inconsistent, it may suggest that skills and training efforts are misaligned with business needs, or that organisational factors—such as workplace design, technology adoption, and management practices—are constraining the effective application of skills.

Understanding this relationship is complex. From a skills supply perspective, the challenge lies in ensuring that the workforce has the right capabilities to meet evolving business demands. From a

skills utilisation perspective, the focus is on whether those capabilities are effectively deployed to generate value. These dimensions are interdependent: an abundant supply of skills is of limited value if underutilised, and skills utilisation strategies alone cannot offset a shortage of relevant skills.

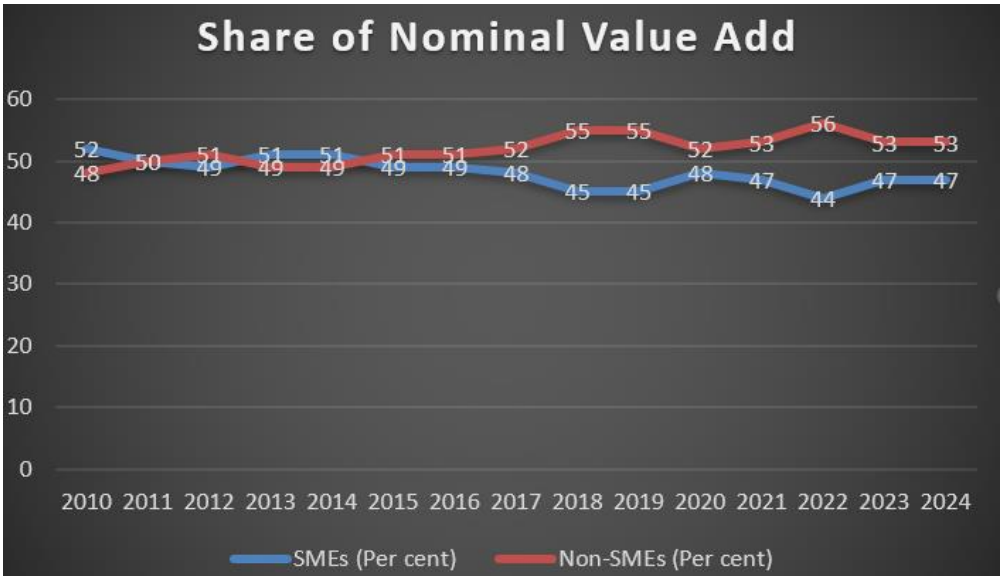
Earlier studies have examined the predictors of business performance in Singapore and found an interdependence. Findings from the first Business Performance and Skills Survey (BPSS1), Singapore's national level enterprise survey that was conducted in 2017, indicate that business performance is best predicted by the interaction between high value-added business strategies and a workforce characterised by high ability, motivation, and opportunity to use skills (Tan et al., 2020). Further mixed-methods analysis, combining BPSS1 data with qualitative firm interviews, identified a collaborative-customisation model, a business model distinguished by high levels of employee discretion and collaboration, which was strongly associated with superior business performance. Firms operating with this model also tended to report higher training participation rates. However, SMEs were found to be much less likely to operate such high-value, skills-intensive models (Sadik et al., 2025).

Earlier studies did not focus on SMEs, which left an important gap. This study helps address that gap by using a second, improved version of the BPSS survey. The updated survey looks more closely at the factors that affect business performance and provides a more detailed analysis of the skills and training advantages among SMEs.

1.2. Challenges of the Singapore SME sector

Singapore's SME sector is complex. Most local firms operate as suppliers within the value chains of foreign transnational corporations or are concentrated in the less profitable, non-tradable sectors (Bhaskaran & Chiang, 2020). From accounting for 52% of nominal value add in 2010, the SME sector's share has reduced to averaging only around 47% over the past decade (Figure 2). The trend signals a further weakening of an already fragile SME sector, as countries with strong SME sectors tend to have SMEs contribute as high as 60% to the GDP (OECD, 2019c).

Figure 2. SME's Share of Nominal Value Add in the Singapore Economy (2010 – 24)



Source: Data from Singapore Department of Statistics, analysed by IAL

Indeed, the weakness of the SME sector has contributed to Singapore's Total Factor Productivity (TFP) remaining negative over the past two decades, performing poorly even when compared with

other advanced economies (Bhaskaran & Chiang, 2020; DBS Asian Insights, 2025). This trend highlights deeper structural challenges in the economy's capacity to enhance productivity in terms of the efficient use of capital and labour or through technological and process innovation.

Job quality in Singapore SMEs is historically also disproportionately weaker. Using 2012 PIAAC data to compare Singapore SMEs with those in OECD countries, Freebody et al. (2017) finds the following:

- Wage difference between SMEs and non-SME jobs in Singapore is much greater than the OECD average;
- SME jobs in Singapore has substantially lower skills use than non-SMEs compared to OECD countries; and
- SME jobs in Singapore offers lower job autonomy than non-SMEs compared to OECD countries.

Analysis using more recent OECD's PIAAC (2021) data similarly highlight concerns about the underutilisation of human capital in SMEs. Professional roles in SMEs are found to have lower skills requirements compared to similar roles in larger firms, despite having workforces of comparable quality, as measured by a standardised skills proficiency test (Chia et al., Upcoming).

The Singapore SME sector therefore presents an interesting case: its structural weaknesses could mean that skills and training make little difference—or conversely, that they offer precisely the competitive edge needed to overcome these constraints. This tension makes Singapore's SMEs an especially rich context for examining whether skills and training truly translate into business advantage.

1.3. International Evidence on SMEs, Training, and Business Performance

International studies have consistently found that SMEs face distinct challenges in linking workforce training to improved business outcomes. Compared to larger firms, SMEs often operate with tighter financial constraints, smaller management teams, and less formalised HR structures (OECD, 2019a). These conditions limit their capacity to invest in structured training programmes, and when training does occur, it may be ad hoc or narrowly targeted to immediate operational needs rather than long-term capability building. The result is that training in SMEs is often less strategic, making its contribution to productivity and competitiveness more variable than in larger enterprises. Yet O'Regan et al. (2010) find that SMEs who utilise HR professionals to guide their investments in training perform better than those who invest in training without HR input.

Even so, using UK's 2015 Small Business Survey containing large-scale data from more than 15,000 owner-managers of SMEs, Idris et al. (2020) find a positive and significant relationship between training and SMEs' perceived performance. Additionally, they find that while both on-the-job and off-the-job training are positively and significantly related to firm performance, the effects become strong when these types of training are received simultaneously. Similarly in Germany, studying 983 SMEs, Demirkan et al. (2022) find a positive association between greater investment in employee training and enhanced product innovation capabilities among SMEs. This relationship, however, is weaker in industries with a higher proportion of employees holding university degrees, suggesting that training adds more value in contexts where formal education is less widespread. The researchers also find that when SMEs engage in continuous R&D, the marginal effect of training on innovation diminishes—suggesting that in firms already heavily investing in R&D, training alone adds less additional value. Specific workforce segments might also be key. Bekteshi (2019) finds that in Bosnia Herzegovina, managers' education levels are co-related with stronger export performance.

Taken together, the international evidence suggests that training can deliver substantial performance benefits for SMEs. Singapore presents a uniquely compelling context to study the relationship between skills, training, and business performance. Few economies combine such a comprehensive national skills strategy, through SkillsFuture, with an SME base that is structurally constrained. The coexistence of advanced human capital policies and a productivity-challenged SME sector creates an ideal testbed for examining whether skills and training can genuinely deliver competitive advantage. In this environment, the effects of training are far from predetermined: they may be amplified by national initiatives that promote workforce capability, or muted by the structural and organisational rigidities that limit skills utilisation. Understanding how these opposing forces interact makes Singapore an especially rich case for exploring how skills and training contribute to business performance.

This study will draw on the second iteration of BPSS survey to address these issues directly. It examines the relationship between workforce skills, training participation, and business performance in SMEs in Singapore, exploring also the organisational conditions that enable training investments to translate into measurable gains. By focusing on both skills supply and skills utilisation, the study aims to generate evidence that can inform SkillsFuture's SME engagement strategies, strengthen the alignment between skills and training policies and business outcomes, and contribute to a more competitive and resilient SME sector.

1.4. Research Questions

The key research questions guiding the study are as follows:

- What relationship exists, if any, among skills, training and business performance in Singapore SMEs?
- Which types of skills and training are most strongly linked to improved SME performance?
- What factors enable or hinder SMEs from translating skills and training into business gains?

The outcomes of these research questions aim to provide firms and policymakers with context-specific recommendations to support SMEs towards stronger workforce strategies and optimal performance.

1.5. Structure of Report

The report is structured as follows. Chapter 2 introduces the theoretical frameworks that underpin the study. Chapter 3 outlines the methodology. Chapter 4 presents the core results of the investigation. Chapter 5 discusses the implications of the findings for policy and business. Chapter 6 concludes the study.

2. Theoretical Frameworks

2.1. From Human Capital Theory to Resource-based View of Firms

Human capital theory was popularised by Becker (1962) and Schultz (1961) as an economic framework for understanding the role of education, skills, and training in enhancing individual productivity. The central assumption is that investment in human capital—through formal education, vocational training, or workplace learning—increases the knowledge and skills of individuals, thereby raising their potential output or productivity and earnings.

At the firm level, a more skilled workforce is expected to produce higher-quality goods and services, innovate more effectively, and operate more efficiently, leading to higher output per unit of input. In the context of SMEs, human capital theory predicts that upskilling the workforce should enhance efficiency, product quality, customer satisfaction, and innovation capacity. SMEs often operate with limited financial and managerial resources, making the productivity of their workforce a critical determinant of competitiveness. Training can thus be seen as a strategic investment, even for resource-constrained firms.

Human capital theory has been critiqued for assuming a relatively direct link between skills acquisition and productivity, without sufficiently accounting for organisational factors that shape the use of skills (Ashton & Green, 1996).

The resource-based view extends the analysis from the individual to the organisational level. Originating in the work of Wernerfelt (1984) and Barney (1991), the resource-based view argues that firms achieve sustained competitive advantage when they possess resources that are valuable, rare, inimitable, and non-substitutable. Resources encompass both tangible assets (e.g., machinery, capital) and intangible assets (e.g., skills, know-how, organisational culture).

From the perspective of the resource-based view of firm, a skilled workforce can be a strategic asset if those skills are scarce in the market, cannot be easily replicated by competitors, and are embedded in organisational processes and culture. The mere presence of skilled individuals is insufficient; competitive advantage arises when those capabilities are integrated into the firm's strategic routines and contribute uniquely to value creation.

In SMEs, this means that training and skills development should be linked to distinctive strategic positions—for instance, niche product specialisation or customised service delivery—rather than generic improvements. The theory of resource-based view of firms highlights that skills are only a source of advantage when they are leveraged in ways that are hard for rivals to copy. In this regard, it challenges the human capital assumption that individual investments in training will automatically translate into productivity improvements and, in turn, enhanced firm performance.

2.2. Skill Utilisation: The Operational Bridge

Skills utilisation can be understood as the operational bridge between human capital theory and the resource-based view of the firm. Human capital theory emphasises the accumulation of skills through education, training, and experience as investments that raise individual productivity, while the resource-based view of firm focuses on the deployment of valuable, rare, inimitable, and non-substitutable resources, human capital among them, to generate sustained competitive advantage. Skills utilisation links these perspectives by describing how the skills embedded in individuals are organised, applied, and integrated with other resources in the course of work. Without effective utilisation, the human capital skills remain latent; without a skilled base, the deployment of resources is constrained. In this way, utilisation transforms the stock of human capital into firm-level capabilities that drive performance.

Skill utilisation refers to the extent to which employees' skills are actually applied in their work. It encompasses the alignment between workers' capabilities and the tasks they perform, as well as the autonomy and resources they have to exercise those skills. Research from Australia and the UK (Buchanan et al., 2010; Green, 2013; Sung & Ashton, 2014; Warhurst et al., 2017) has shown that skill under-utilisation is common, even in organisations that invest heavily in training. This is particularly relevant in SMEs, where employees may not always be given opportunities to apply new skills due to low skills demand or low levels of task discretion — a pattern documented in OECD PIAAC analyses of Singapore, which show lower average levels of discretion compared to other advanced economies (Freebody et al., 2017)

Several factors influence whether skills are fully utilised:

- **Business strategy**: A firm's strategic orientation (e.g., innovation-led, quality-focused, cost-leadership) shapes job structures, task discretion, and decision-making authority — all of which affect how employees can use their skills.
- **Job design and task complexity**: Roles that involve problem-solving, decision-making, and non-routine tasks tend to make greater use of skills.
- **Task discretion**: Employees require autonomy to apply their judgment and expertise; low discretion constrains utilisation.
- **Management practices**: Supportive supervision, feedback, and opportunities for collaboration encourage skill use.
- **Technology and workflow fit**: Tools and systems must enable, rather than constrain, application of skills.

High skill utilisation is associated with greater productivity, innovation, and job satisfaction (Green & Zhu, 2010). For SMEs, where each employee's contribution carries proportionally greater weight, the returns to full utilisation can be significant. Conversely, under-utilisation represents a wasted investment in human capital and a lost opportunity for competitive advantage. Skill under-utilisation can occur when training is misaligned with job tasks, when organisational structures limit discretion, when technological systems deskill work, or when cultural norms discourage initiative.

The successful alignment of business and people strategies has been the subject of considerable academic research. Of these studies, a recurring conclusion states that the strategic integration of HRM and business strategy is critical for achieving superior performance (Schuler & Jackson, 1987). When business strategy and people strategy are aligned, organisations can optimise their human capital to meet the specific demands of their strategic goals. This alignment ensures that employees are equipped with the necessary skills, motivation, and direction to fulfil the strategic goals of the business.

The OECD (2016) has reported that in Singapore, levels of task discretion and problem-solving autonomy are lower than the OECD average, suggesting a potential structural constraint on skill utilisation despite high skill acquisition.

2.3. Ability–Motivation–Opportunity (AMO) Framework

The Ability–Motivation–Opportunity (AMO) framework provides a widely used model for understanding the determinants of individual and organisational performance. Originating in the human resource management and organisational behaviour literature (Appelbaum, 2000). AMO posits that employees perform effectively when three conditions are met: they possess the ability to do the work, they are motivated to apply that ability, and they have the opportunity to contribute meaningfully.

In this framework, ability refers to the skills, knowledge, and competencies that individuals bring to their roles, whether acquired through formal education, training, or workplace experience. Motivation reflects the willingness of individuals to apply their abilities, shaped by both intrinsic drivers, such as personal fulfilment, and extrinsic incentives, such as pay, recognition, and career advancement. Opportunity encompasses the organisational structures, job design, and workplace practices that enable individuals to deploy their abilities and motivation in productive ways. This includes access to resources, autonomy in decision-making, and participation in problem-solving and innovation activities.

AMO has particular relevance for the discussion of skills utilisation. While human capital theory emphasises the accumulation of skills (ability) and the resource-based view focuses on the strategic deployment of valuable resources, AMO underscores the conditions under which skills can be effectively applied. Skills utilisation sits most directly within the opportunity dimension, as it depends on the extent to which work is organised to allow employees to use their capabilities fully. However, the AMO framework makes clear that utilisation is not solely a matter of opportunity: it also requires that employees have the necessary skills and the motivation to apply them.

By framing performance as the outcome of an interaction between ability, motivation, and opportunity, AMO offers an integrative lens that links the stock of skills described in human capital theory to the value-creating deployment of resources emphasised in the resource-based view. It highlights that even in skill-rich environments, performance gains will be limited without motivation and opportunities for application, just as abundant opportunities will have little effect if the skills base is insufficient.

2.4. Configuration Theory of the Enterprise

Configuration theory views firms as integrated systems in which strategy, structure, processes, and resources must align to achieve high performance (Meyer et al., 1993; Fiss, 2007). Rooted in organisational design and contingency theory, it rejects the idea of a single best way to organise for success. Instead, it emphasises equifinality—the principle that multiple, internally consistent configurations of organisational elements can lead to superior performance. From this perspective, high-performing enterprises can differ markedly in their strategies, structures, and human resource practices, as long as these elements fit together coherently and are aligned with the external environment.

Applied to the skills–performance relationship, configuration theory highlights that there is no single model for translating skills and training into firm success. Some firms may combine high skills acquisition through intensive training with high skills utilisation and participatory job design; others may achieve similar outcomes by focusing on specialist expertise, targeted deployment, and tight coordination. In both cases, performance depends less on the presence of any one practice, such as training or utilisation, and more on how such practices are configured in relation to the firm's strategy, market position, and other resources.

By adding this lens, configuration theory extends the insights of human capital theory, the resource-based view, skills utilisation, and the AMO framework. It shows that the path from skills and training to competitive advantage is not linear but contingent on the internal fit between workforce practices and other strategic and operational choices. This explains why firms with different approaches to skills development and deployment can both succeed, provided their configurations are coherent and context-appropriate.

2.5. Summary

Taken together, these perspectives provide a layered understanding of how skills and training may relate to firm performance. Human capital theory explains the value of acquiring skills through education, workplace learning, and formal training as investments that increase individual productivity. The resource-based view shifts the focus to how those skills, as part of a broader resource bundle, are strategically deployed to generate sustained competitive advantage. Skills utilisation emerges as the operational link between the two, describing the processes by which the skills developed through training and experience are applied and integrated with other resources in the course of work.

The AMO framework adds a further dimension by specifying the conditions under which this application is effective: the presence of ability, the motivation to use it, and the organisational opportunities that enable employees to contribute fully. Configuration theory extends these insights by emphasising that there is no single best pathway from skills to performance; rather, multiple, internally coherent combinations of skills development, deployment, and workplace design can achieve success when they align with the firm's strategy and external environment.

The study will draw on these perspectives collectively to examine the relationship between skills, training, and firm performance. By drawing on these insights from human capital theory, the resource-based view, skills utilisation, the AMO framework, and configuration theory and applying them to Singapore SMEs, the analysis will consider not only how skills are developed and deployed, but also the organisational conditions and strategic configurations that enable their effective use.

3. Methodology

3.1. Design of the Business Performance and Skills Survey 2

The Business Performance and Skills Survey (BPSS) is Singapore's commercial establishment survey examining a complex system of workplace indicators for diagnostic, policy and practical purposes. The survey includes dimensions of business strategy, business performance, skills demand, talent management and training provisions. The survey is designed so that indicators may be understood in isolation and in relation to each other (Tan et al., 2018). Its design enables a study of the relationship between skills, training and business performance using a range of theoretical frameworks.

The first survey, BPSS1, was completed between January and December 2016. 3,801 commercial establishments were surveyed comprising large and small enterprises. The design of BPSS2 survey took reference from BPSS1 for the most parts with some crucial changes.

In terms of questionnaire, experts were consulted for the strategic revisions of the first BPSS questionnaire to cater to changing socio-economic contexts. For instance, a new set of questions on skills requirements were included referring to the tasks required of jobs in the organisations (e.g. planning tasks, social tasks). Expanding skills demand constructs to include job task requirements reflected a recognition that the earlier focus on qualifications in BPSS1 may become less distinctive, given Singapore's expansion of university education (Brown et al., 2019). For the most parts, the workplace indicators surveyed in BPSS2 followed BPSS1 closely to support trends analysis.

The sample frame in BPSS2 similarly followed the same approach set up in BPSS1. Establishments were selected for sampling from the Singapore Accounting and Corporate Regulatory Authority (ACRA) registry of live companies. Sole proprietors and partnerships were excluded from the sampling frame, as were de-listed entities. The eligible survey respondents are either the business owner or a senior manager of the establishment with a minimum of 1 year's tenure. Only establishments with ten or more workers are included.

The protocol for data collection entailed the interviewer approaching the business entity at the address listed in the sampling frame and checking that the entity was eligible and willing to participate. If the establishment was non-eligible (e.g. with fewer than 10 workers) or refused to participate, the interviewer checked the eligibility of the nearest neighbouring commercial establishment before inviting them to participate as a replacement firm.

Pilot testing with 200 establishments were first conducted for refinement to the questionnaire. The finalised BPSS2 questionnaire was then administered to a total of 4,000 establishments.

Initially, the data collection approach is to follow closely the approach in BPSS1, namely a computer-assisted personal interviewing method in which an interviewer uses a computer or mobile device to conduct a face-to-face interview.

However, data collection took place during the midst of the Covid-19 pandemic that required major adaptations (see Table 7). As an establishment survey, the sampling frame provided business location details only, necessitating initial contact through office visits. However, owing to widespread work-from-home arrangements during the data collection phase, most premises were unoccupied, rendering door-knock approaches ineffective. Several strategies were employed such as leaving 'calling cards' to facilitate establishment contact and conducting repeated door-knocks on varying days and times to accommodate 'split-team arrangements'.

Even when contact was successfully made, numerous participants declined or requested rescheduling/cancellation until the pandemic situation improved. Several safety measures were put in place to address their concerns about in-person interactions namely:

- **Protection**: Research team members and participants wore face masks and provided plastic shields.
- **Sanitisation**: Survey areas were sanitised before commencement.
- **Well-Ventilated Locations**: Open-air locations were chosen for interviews.
- **Vaccination**: All field interviewers were fully vaccinated, albeit with a slight delay in data collection due to vaccination timelines.

These measures proved to be insufficient to alleviate safety concerns in most cases. Due to the unprecedented situation, a decision was made to allow participants to opt for doing the survey non-assisted by the interviewer (i.e. fully independent online survey) if requested.

There are three major issues associated with data quality following the Covid-19 related challenges outlined above.

First, the project stretched over a longer period than planned—from August 2020 to December 2021, about 17 months in total and five months beyond schedule. This extended data collection window may have several implications for the interpretation of findings. The longer timeline increases the likelihood of temporal effects, where firms' responses reflect different stages of the business cycle or varying external conditions rather than stable organisational characteristics. In the case of BPSS2, data collection coincided with the COVID-19 pandemic, during which firms faced fluctuating restrictions, shifting market demand, and workforce disruptions. As a result, some reported business performance and training practices may capture short-term adaptations to crisis conditions rather than long-term strategic orientations. This does not invalidate the findings but suggests that patterns observed should be interpreted with caution, taking into account the contextual volatility and timing heterogeneity across respondents.

Second, without interviewer facilitation, respondents may have interpreted complex items differently or skipped questions they found unclear, leading to more inconsistent or widely dispersed answers, or incomplete responses. The absence of real-time validation by also limited the ability to detect straight-lining or inattentive responses; issues more easily identified in interviewer-administered surveys. As a result, while the online mode allowed data collection to proceed safely and at scale, it introduced a greater reliance on post-survey data cleaning and validation to ensure the robustness of findings. Indeed, out of the 4,000 establishments sampled, straight line responses were noted in 1,040 responses. This left us with 2,960 responses.

Third, while data sampling in BPSS1 enabled the inclusion of a reasonable number of large enterprises, this was not the case for BPSS2. A plausible reason is that large enterprises in Singapore tended to have stricter COVID-19 regulations, which limited access to them during the data collection period. After removing straight-line responses, only 71 large firms remained, too few for statistical comparability. This meant that analyses comparing SMEs and large enterprises were not feasible. However, this limitation did not affect the core research questions of this study, which focused primarily on understanding skills and training dynamics among SMEs.

For BPSS2, SMEs are defined as firms with 200 or fewer employees, following Enterprise Singapore's (ESG) definition in part. ESG classifies SMEs as enterprises with 200 or fewer employees or, alternatively, those with annual group revenue not exceeding S$100 million (Enterprise Singapore, 2025). The revenue criterion could not be applied in BPSS2 because, as seen in BPSS1, direct questions on revenue yielded unreliable or incomplete responses—likely due to respondents' limited access to financial data or reluctance to disclose sensitive business information in a self-administered survey.

In total, the response of 2,889 SMEs were used for analysis. Table 1 shows the sample profile broken down by industry, establishment size and type.

Table 1. BPSS2 SME sample profile (N=2,889)

Category	Sub-group	%	N	Total
Industry sector	Manufacturing, Mining & Agriculture	18.0	519	**2,887**
	Construction	16.4	472	
	Wholesale, Retail Tade & Transport	29.6	853	
	Information & Communications	6.6	190	
	Financial & Insurance	1.4	40	
	Real Estate	1.3	38	
	Professional, Scientific & Technical, Administrative and Support Service Activities	18.7	539	
	Public Administration & Defence, Education, Human Health & Social Work Activities	1.2	35	
	Other Services	7.0	201	
Establishment size	Very small (fewer than 20 employees)	73.9	2,136	**2,889**
	Small (between 20 and 49 employees)	19.4	561	
	Medium (between 50 and 199 employees)	6.7	192	
Family-owned entity	Yes	12.1	349	**2,889**
	No	87.9	2,540	
Make-up of Establishment Staff (self-reported in %)	Manager	16.9	-	**2,889**
	Professionals	24.6		
	Technicians and Associate Professionals	34.5		
	Others	24.0		

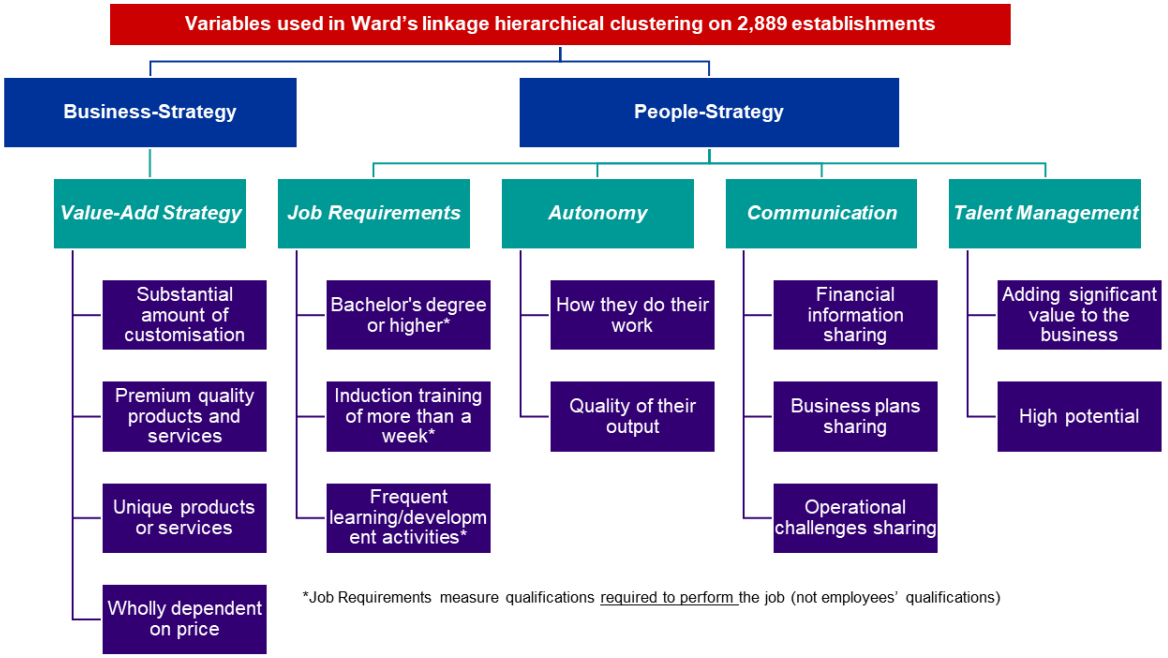
3.2. Analytical method taken

Initial linear analysis of the impact of skills and training on firms' financial performance using regression techniques were first undertaken. However, the findings yielded unsatisfactory response. Drawing on configuration theory that there may be multiple paths to firms' success, led the team to undertake a configuration analysis using a cluster analysis technique.

Agglomerative hierarchical clustering using Ward's linkage was used to identify the clusters. Drawing from theories of resource-based view of firms and skills utilisation, two key dimensions were employed namely business and people strategy. A factor analysis was undertaken of key dimensions relevant to business and people strategy to discern the relationships between the 14 variables and inform dimensionality reduction. Prior to analysis, all variables were standardised to ensure comparability and prevent scale differences from influencing cluster formation. As Everitt et al. (2011) observe, classifying a set of objects is not like a scientific theory and is best assessed in terms of its usefulness rather than whether it is 'true' or 'false'. The approach was adapted from studies by Holm and Lorenz (2015) and Sadik et al. (2025) that uses the agglomerative hierarchical

clustering using Ward Linkage to map out the key patterns of work organisations in Europe and Singapore respectively. The variables used for clustering are in Figure 3.

Figure 3. Variables used in Ward's linkage hierarchical clustering on 2,889 establishments



'Value-add strategy' is used to understand the extent to which establishments pursue competitive advantage through the creation of higher-value products and services rather than through cost minimisation. It provides a broad overview of firms' strategic orientation towards premium quality, product differentiation, customisation or price differentiation, reflecting the degree to which they enhance product or service value (UKCES, 2016).

It has been widely applied in studies examining the relationship between business strategy and organisational outcomes such as productivity growth, skills utilisation, and innovation performance (Keep & Mayhew, 2010). It is typically measured by assessing the degree to which firms report pursuing quality-focused, innovation-oriented, or knowledge-intensive strategies as opposed to low-cost or price-based approaches.

In this study, it is measured by the proportion of firms reporting a predominant focus on improving product or service quality, innovation, or customisation as their main source of competitiveness. In doing so, the study seeks to identify the prevalence of value-adding strategic orientations across establishments, distinguishing them from cost-reduction strategies. The three items: 1) product quality improvement, 2) innovation in goods or services, and 3) process efficiency through knowledge use, were adapted from the Establishment Skills Index developed in BPSS1 (Tan et al., 2018).

'Job requirements' is used to reflect the complexity of the jobs available in establishments by offering a broad overview of the technical and cognitive skills they require. It uses the learning inputs required to develop skills and knowledge to indicate skills demand by recognising the diverse roles of formal qualifications and other, non-formal or informal means of acquiring relevant skills, including work experience, on-the-job training, and frequent learning and development activities, as equally important means of acquiring relevant skills. It has been widely used in

research studies to examine the relationship between skills and various organisational outcomes such as productivity, innovation and market competitiveness (Felstead et al., 2007). It is typically measured by assessing the proportion of employees within an organisation who possesses certain skills. In this study, it is measured by the proportion of existing jobs (not employees) that require a certain level of skill reported by the firms. In this way, the study aimed at measuring the skill level requirements for the job to be performed adequately and not in terms of desirability. The three factors: 1) degree requirement, 2) initial training and 3) frequent learning, were drawn from the Establishment Skills Index developed in BPSS1 (Tan et al., 2018).

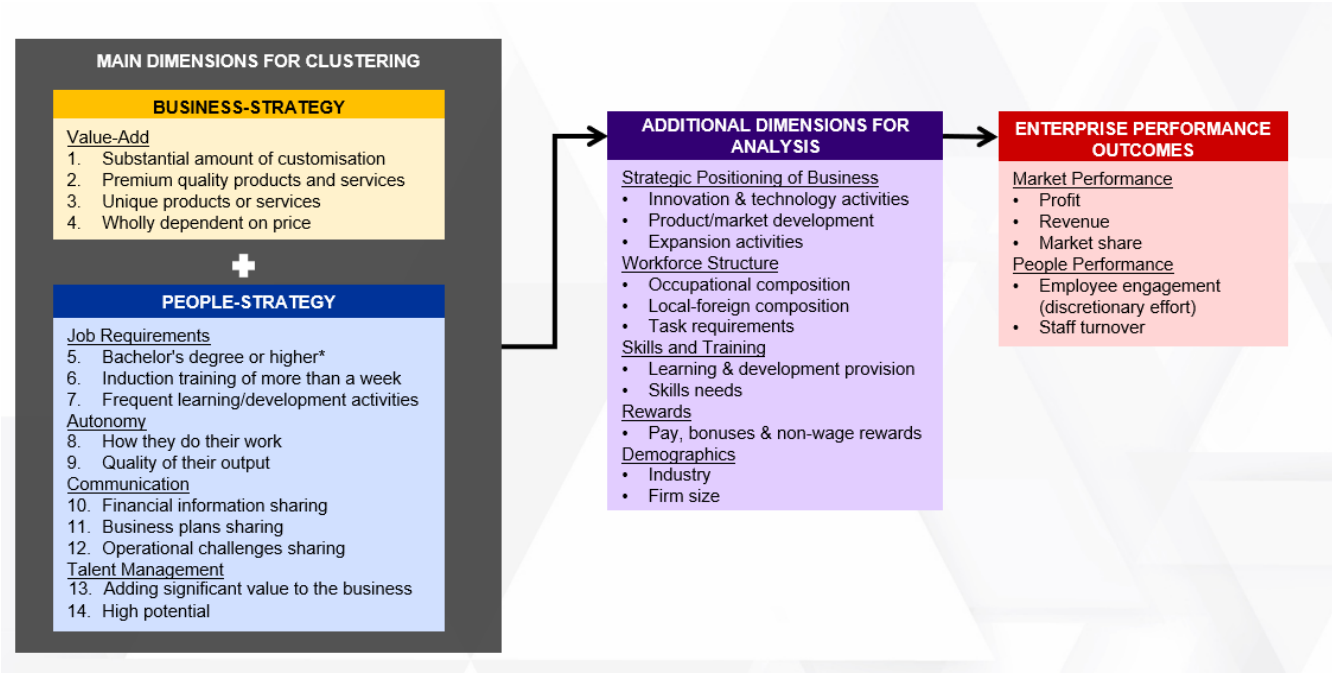
'*Autonomy'*, a fundamental concept in organisational research, has been defined as the degree of freedom and independence that employees possess in their work that enables them to make choices and decisions about their tasks and responsibilities (Hackman & Oldham, 1976). It has several ways in which it is crucial to the framework of this study. Higher levels of autonomy have been associated with jobs that are designed to be more complex and challenging, even affecting outcomes such as higher employee productivity and job satisfaction, leading to enhanced organisational competitiveness.

'*Communication'* and information sharing refer to the process of exchanging information, ideas, and feedback between employees, managers, and the organisation as a whole (Tourish & Hargie, 2004). As a HR strategy, effective communication and information sharing are essential for building trust, fostering collaboration, enhancing organisation performance and promoting employee engagement (Katz & Kahn, 2015).

'Talent management' has emerged as a vital HR strategy for organisations in identifying, development and deploying skilled employees to meet current and future organisational needs (Brown et al., 2019; Sadik et al., 2025). It is a key strategy for firms to gain competitive advantage in today's fast paced and rapidly changing business environment.

Following the results of the cluster analysis, a decision was made to cut the results at five clusters, as they offered good conceptual distinction, statistical stability, and interpretive clarity in capturing the diversity of business–people strategy configurations among Singapore's SMEs. Thereafter, further analysis was conducted linked to the following variables to provide more contextual information to the firm. Figure 4 summarises the approach taken in the study. The results of the cluster analysis are presented in the next chapter.

Figure 4. Analytical approach taken



As part of further contextualising the cluster analysis findings, we examined several organisational dimensions to better understand the underlying characteristics that distinguish each cluster. These dimensions were grouped into six broad areas reflecting firms' strategic orientation, workforce profile, human resources and capital practices, and enterprise performance outcomes.

'Strategic positioning of business' reflects how firms position themselves competitively in the market through innovation, market orientation, and growth activities. The indicators within this area capture firms' orientation towards innovation-led and growth-focused strategies rather than cost minimisation alone.

'*Workforce structure'* captures the composition and characteristics of employees within establishments, including the distribution of occupational groups, the reliance on foreign employees, and the nature and extent of task requirements of the jobs within the firm. These elements collectively indicate the skill intensity and diversity of the workforce, and reflects how human resources are organised to support business strategies.

'*Skills and training'* unpack how firms invest in human capital and respond to evolving skills demands. It considers the extent of learning and development provision and the types of skills gaps identified by firms, recognising the role of both formal and informal learning in sustaining workforce capability.

'*Rewards'* encompass the mechanisms used to reward, attract and retain talent, including pay, bonuses, and other non-wage rewards. These reflect not only firms' competitiveness in the labour market, but also their approach to motivating and recognising employees' contributions and skills.

'*Demographics'* includes characteristics such as industry and firm size, which are considered alongside the cluster analysis findings to contextualise variations across the clusters, and to account for potential structural influences on business strategies, workforce practices and performance outcomes.

'*Performance outcomes'* are assessed through both market and people dimensions. Market performance is measured through changes in profitability, revenue and market share, reflecting

financial and competitive outcomes. On the other hand, people performance captures the workforce-related outcomes such as employee engagement (measured through discretionary effort) and staff turnover.

3.3. Summary

In summary, the design and implementation of BPSS2 built upon the foundations of BPSS1 while introducing methodological and conceptual refinements to capture the evolving dynamics of Singapore's business and skills landscape. Despite the unprecedented challenges posed by the COVID-19 pandemic, which required adaptations in data collection and introduced constraints on sample representation, the survey successfully produced a valuable dataset offering insights into the interplay between business strategy, people management, and skills utilisation among SMEs. A cluster analysis is performed to provide in-depth insights into how different configurations of strategic and workforce practices shape firm performance, highlighting the pivotal role of skills and training within this context.

4. Results: Five archetypes of SMEs in Singapore

4.1. Business-People Strategies of Singapore SMEs

We begin by describing the overall findings around the five clusters of SMEs found in the study before providing a layered understanding of each SME cluster.

Drawing on agglomerative hierarchical clustering using Ward's linkage method, the analysis of 2,889 Singapore SMEs across 14 standardised variables representing business and people strategies yielded multiple configurations. Guided by Everitt et al. (2011) who argue that the value of a classification lies in its usefulness rather than whether it is objectively correct, the team determined a five-cluster solution. This cut-off provided sufficiently distinct and interpretable business–people strategy profiles, offering meaningful insights into how different strategy combinations relate to enterprise performance. The results are presented at Table 2.

Table 2. Mean standardised scores of 14 variables by SME cluster

Measures	Constructs	Variables Used	C1 *20.2%, n=583*	C2 *34.1%, n=986*	C3 *21.3%, n=614*	C4 *14.6%, n=422*	C5 *9.8%, n=284*
Business-Strategy (BS)	***Value-Add (VA)***	Substantial amount of customisation[1]	-0.57	-0.05	-0.46	0.82	1.04
		Premium quality products and services[2]	-0.57	-0.31	-0.11	0.99	0.90
		Unique products or services[2 3]	-0.45	-0.49	0.12	0.90	0.99
	Price	Wholly dependent on price[1]	-0.60	0.12	-0.35	0.78	0.40
People-Strategy (PS)	***Skills Required of Job***	Bachelor's degree or higher* [4]	-0.11	0.06	-0.28	-0.19	0.84
		Induction training of more than a week[4]	-0.49	0.82	-0.51	-0.56	0.12
		Frequent learning/ development activities[4]	-0.31	0.10	-0.31	-0.34	1.23
	Autonomy	How they do their work[1]	-0.71	-0.34	0.36	0.95	0.46
		Quality of their output[1]	-0.68	-0.34	0.40	0.94	0.26
	Communication	Financial information sharing[3]	0.12	0.25	-0.49	-0.27	0.29
		Business plans sharing[1]	-0.12	0.47	-0.66	-0.42	0.66
		Operational challenges sharing[5]	-0.55	0.67	-0.59	-0.18	0.38
	Talent	Who are adding significant value to your business[1]	-0.65	0.08	0.21	-0.45	1.18
		Who would you consider as high potential[6]	-0.53	-0.14	0.64	-0.12	0.38

* Measures qualifications required to perform the job and NOT employees' actual qualifications

Significance tests $p < .05$:

[1] All clusters are sig. different from each other

[2] Only differences between C4 and C5 are not sig.

[3] Only differences between C1 and C2 are not sig.

[4] Only differences between C1, C3 and C4 are not sig.

[5] Only differences between C1 and C3 are not sig.

[6] Only differences between C2 and C4 are not sig

Further correlation analysis was done on the five SME clusters using a wider range of dimensions (strategic positioning of business, workforce structure, skills and training, rewards and

demographics), alongside enterprise performance outcomes (market performance and people performance). Combined, the analysis leads to a rich description of the archetype in each cluster visualised in Figure 5 and described in Table 3. The rest of the chapter describes how we reach the conclusions described in Table 3.

Figure 5. Five typologies of Singapore SMEs

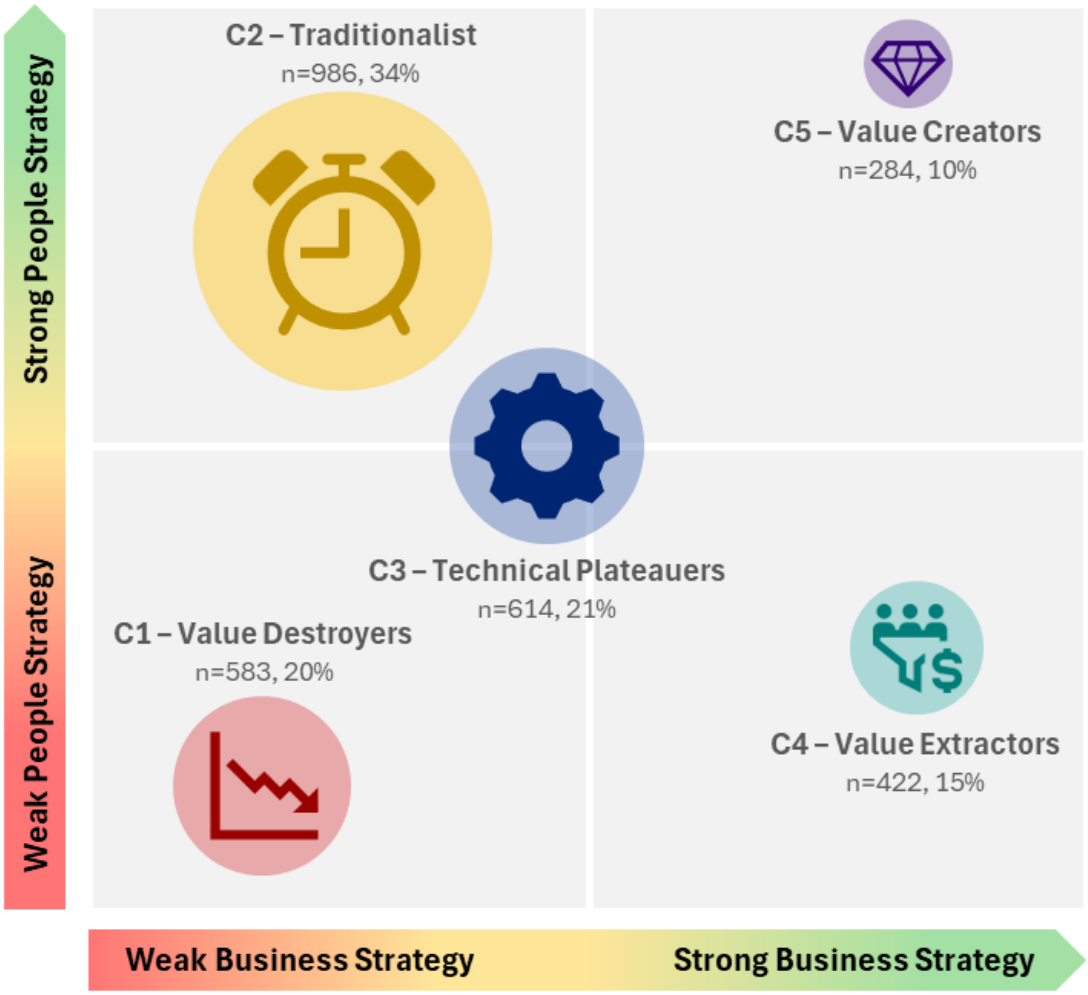


Table 3. Topline description of each SME cluster

Archetype	Description
 **C1 (Value Destroyers)** 20.2% – Weak business strategy – Weak people strategy – Weak enterprise performance	Value Destroyers uniformly underperform with negative scores recorded across all 14 business-people variables. This underwhelming performance is concerning. It is not only because Value Destroyers account for a substantial 20.2% of the sample. It is also because the analysis of workforce composition shows that close to half (42%) are degree and diploma holders in managerial and professional roles. In other words, Value Destroyers squanders high skills. They take in high-skilled workers but fail to utilise the skills due to a very weak business strategy of pursuing standardised products. Jobs created do not require continuous skills development and learning. The workforce is significantly disengaged with the lowest levels of employee engagement, and the firms do not achieve strong business performance either. *E.g. IT/AV firm offering end-to-end solutions; home service professionals (e.g. cleaning, babysitting, gym trainer, massages)*
 **C2 (Traditionalist)** 34.1% – Weak business strategy – Strong people strategy – Weak enterprise performance	By and large, Traditionalists exhibit a relatively average profile, with scores close to the mean for most of the 14 variables. Notable exceptions are negative scores for value-add measures such as "premium quality products/services" and "unique products/services". This suggests that Traditionalists struggle to differentiate themselves in a competitive market, demonstrating a weakness in business strategy. These firms represent the dominant group within the sample, constituting 34.1% of the total. Jobs in these firms have low task requirements yet the firms still offer substantial L&D opportunities. Despite the low task profile of jobs in the firms, they firm pay relatively well. These strategies may contribute to the firm reporting low staff turnover at levels comparable to C5 (Value Creators), the best cluster. However, its business outcomes are poor being the most likely to report declining profits and market share. *E.g. service provider to major shipyards in Singapore; interior design services for corporate and F&B establishments*

C3 (Technical Plateauer)
21.3%

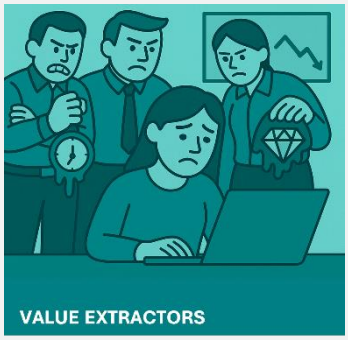
– Weak business strategy
– Mediocre people strategy
– Weak enterprise performance

Technical Plateauers display a mixed performance profile, with negative scores recorded for eight out of 14 measures.

Scores for two measures align with the mean, while four measures yield positive scores (i.e. autonomy for how staff do their work; autonomy for the quality of staff output; staff adding significant value to business; and staff considered high potential). This variability indicates that C3 firms experience challenges across multiple dimensions but also demonstrate strengths in select areas. They make up 21.3% of the sample.

These firms employ a technical workforce but is haphazard in developing them. This is due to a risk-averse business strategy being unwilling to innovate. Their skilled workforce responds by exiting the firm, leaving C3 firms to have the highest staff turnover among all the archetypes, and unable to achieve strong firm performance.

E.g. waterproofing specialists; video and photo production technical specialists



C4 (Value Extractor)
14.6%

– Strong business strategy
– Weak people strategy
– Weak enterprise performance

Alongside C5 (Value Creator) firms, C4 (Value Extractor) firms have a strong business strategy, with positive scores for all measures associated with high value-add strategies.

Interestingly, both Value Extractors and Value Creators report above average levels of being wholly dependent on price despite their complex business strategy linked to premium and unique products that have substantial customisation. These suggests the need for SMEs to have significant price discipline when operating with complex value-add strategy.

Value Extractors reports above average values only for two out of ten measures of people strategy. It eschews hiring high-skilled workers. It takes in low-skilled workers who are put into jobs with high task requirements with medium levels of training. Although workers are engaged, Value Extractors struggle with high staff turnover and are unable to achieve strong firm performance.

E.g. major global supplier of breeders; industry safety products supplier; fully automated food factory

C5 (Value Creator)
9.8%

– Strong business strategy
– Strong people strategy
– Best enterprise performance

Value Creators uniformly outperform across all 14 variables.

They have the strongest business strategy, competing based on unique, premium products with the highest level of substantial customisation. They recruit high-skilled workers and invest in extensive and diverse training.

With the most engaged workforce and lowest staff turnover, Value Creators shine, achieving the best business outcomes being the most likely to report increases in profits, revenue and market share. Unfortunately, they form the smallest cluster at only 9.8% of the sample.

E.g. AI and data-powered consumer and brand marketing specialists; interior design company with in-house specialists, carpentry, machineries and workshop; recycle and trading company that maximises scrap plastic potential

4.2. Business and innovation strategies

Consistent with academic literature on the structural weaknesses of Singapore's SME sector, most SMEs in the dataset scored below average on dimensions associated with high value-added business strategies. These are represented by **C1–C3** firms, which when combined comprise a substantial 75.6% of the sample. In contrast, **C4** and **C5** firms perform above average across all dimensions associated with high value-add strategies and collectively make up the remaining 24.4% of the dataset.

C1 firms demonstrate limited business strategy development. Their products and services tend to be standardised—neither premium, unique, nor requiring substantial customisation—and they do not exhibit price discipline.

C2 firms, in contrast, are closer to the average in offering customised products and services, but a majority (58.6%) report being wholly dependent on price. This suggests that **C2** firms are the most reliant on price-based competition, a low-value strategy. It is ,n approach widely regarded as unsustainable for SMEs in advanced economies.

C3 firms present an unusual profile. They report offering products that are somewhat unique or premium, yet do not attempt to customise them. This inconsistency suggests a form of strategic misalignment: while **C3** firms demonstrate elements of higher value creation, their unwillingness to pursue customisation undermines their capacity to fully capture value or differentiate in the market.

The ability of SMEs to offer customised, unique, and premium products is well-documented in academic literature, and this capability is clearly exemplified by **C4** and **C5** firms (Sung & Ashton, 2014). Products and services in **C4** and **C5** firms require substantial customisation, are of premium quality, and are unique. However, our analysis adds a new layer of insight on the role of price discipline among SMEs. Both **C4** and **C5** firms report being wholly dependent on price (81.8% and 65.8%, respectively)—a proportion even higher than that of **C2** firms (58.6%). This suggests that

high value-added SMEs exercise deliberate price discipline as part of a broader competitiveness strategy, allowing them to remain viable against larger firms while sustaining differentiation through quality.

Figure 6. Business strategies by SME cluster

Percentage (%) of firms that reported their products and services were:

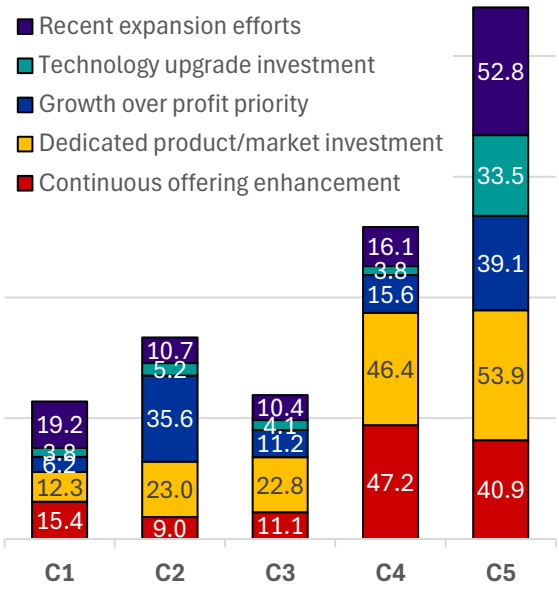
While both **C4** and **C5** firms excel in their high value-added business strategies, it is **C5** firms that stand out as the true innovators across all innovation dimensions (see Figure 7). **C5** firms prioritise continuous improvement (40.9%), dedicate staff and resources to product/market development (53.9%), emphasise sales and market-share growth over short-term profits (39.1%), and actively invest in new technology (33.5%) and business expansion (52.8%).

C4 firms too prioritise continuous improvement (47.2%) and dedicate staff/resources to product/market development (46.4%). However, they tend to value short-term gains over sales/market share growth, and tend not to invest in new technology (3.8%) and expansion (16.1%). This necessity to focus on immediate returns may be linked to the weaker market performance of **C4** firms, compared to **C5** firms (see Section 4.9). Indeed, although **C4** and **C5** firms share similar high value-added strategies, their market performance differs significantly—a point we will revisit later.

Mirroring their weak business strategies, **C1, C2** and **C3** firms tend to be stagnant in innovation. The top reason for not expanding in the last 12 months vary across these clusters (Table 4). **C1** firms are most likely to cite poor economic conditions (52.9%) as the main constraint, reflecting external market pressures. **C2** firms most often report having no desire or need to grow (35.2%), indicating limited growth ambition. In contrast, **C3** firms attribute their lack of expansion to insufficient investment or financial support (19.3%), a finding consistent with their positioning in more premium market segments that typically require higher capital outlays. Across the clusters, a lack of skills accounts for only a small share of the reasons cited for weak innovation, with just 2–7% of firms in each cluster reporting it.

Figure 7. Innovation strategies by SME cluster

Percentage (%) of firms that reported the following innovation strategies:



Note: Respondents were routed to these questions, therefore not a full 2889 firms responded. The sample sizes are as follows: Continuously improve business processes and offerings (n=562), Dedicate resources to product and market development (n=788), Growth prioritized over short-term profit maximization (n=633), Recently invested in new technology upgrades (n=209), Recently invested in business expansion efforts (n=499)

Table 4. Reasons for not expanding in the past 12 months, by SME cluster

	C1 Value Destroyers 20%, n=583	C2 Traditionalists 34%, n=986	C3 Technical Plateauers 21%, n=614	C4 Value Extractors 15%, n=422	C5 Value Creators 10%, n=284
No desire or need to grow	14%	35%	9%	15%	10%
Poor economic conditions	53%	48%	46%	60%	57%
Lack of investment / financial support	16%	5%	19%	11%	10%
Lack of skills	6%	2%	7%	2%	3%
Excessive regulations	3%	3%	8%	4%	3%
Excessive competition	7%	5%	10%	7%	12%
Others	1%	1%	0%	1%	5%

4.3. Skills profile

In the clustering analysis, variables related to the skills requirements of jobs covered degree requirements, induction training lasting more than a week, and frequent learning and development (L&D) activities. On closer examination, degree requirements did not provide sufficient granularity—an expected limitation in the SME context, where firms tend to rely more on technical or vocational qualifications rather than university degrees. Induction training and frequent L&D activities, while important, were found to reflect a firm's training practices rather than its underlying

skills profile. Instead, task requirements, occupational profile, and credentials of the workforce offer a more accurate and holistic representation of the skills profile of SMEs.

Job task requirements refer to the level, range, and complexity of tasks that a job demands from the worker. It reflects *what* an employee must do and how challenging or skill-intensive those tasks are. Occupational profile captures the composition of the workforce in a firm by occupational category. It reflects *skills demand* from the perspective of the responsibilities associated with different job roles. A workforce weighted toward managers, professionals and technicians generally indicates higher skills demand and a greater scope for complex work. *Credentials of the workforce* capture the formal qualifications of employees—whether university degrees, diplomas, or lower-level certifications—that serve as indicators of the workers' foundational skill attainment.

Table 5 summarises the skills profile of **C1-C5** firms that shows a sharp divergence**.**

By job task requirements, **C4** and **C5** firms exhibit strong business strategies, and this is corroborated by high task requirements in their job designs. **C1** firms reflect low task requirements and **C2** and **C3** firms have medium level task requirements. By credentials required of the job, **C5** firm has the highest demand for degree holders. **C3** firms have the highest demand for diploma holders, but generally the rest of the clusters are comparable at 31.9% - 36%.

Figure 8. Skills requirement profile by SME cluster

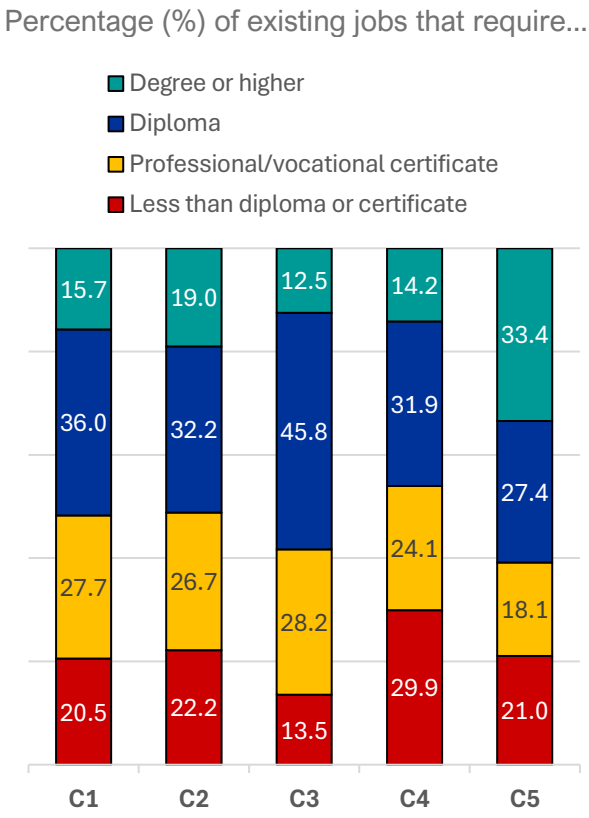


Table 5. Skills profile by SME cluster

		C1 Value Destroyers 20%, n=583	C2 Traditionalists 34%, n=986	C3 Technical Plateauers 21%, n=614	C4 Value Extractors 15%, n=422	C5 Value Creators 10%, n=284
SKILLS DEMAND						
Task requirements	*(Job design)*	▼ Low	— Medium	— Medium	▲ High	▲ High
Credentials required of jobs	*Degree*	15.7%	19.0%	12.5%	14.2%	33.4%
	Diploma	36.0%	32.2%	45.8%	31.9%	27.4%
	Vocational	27.7%	26.7%	28.2%	24.1%	18.1%
	Others	20.5%	22.2%	13.5%	29.9%	21.0%
Occupation profile	*Managers*	18%	15%	17%	16%	23%
	Professionals	27%	25%	24%	19%	28%
	TAPs	34%	36%	41%	26%	27%
	R&Fs	20%	25%	17%	39%	22%
SKILLS SUPPLY						
Workforce credentials		Largest category of employees are diploma holders (34.7%)	Largest category of employees have less than diploma (32.2%)	Largest category of employees are diploma holders (43.5%); next largest category are those with vocational certs (29.2%)	Largest category of employees are diploma holders (31.6%); next largest category are below diploma (30.0%)	Largest category of employees are degree holders (34.4%); next largest category are diploma holders (26.5%)

Yet despite their distinct task profiles, it is the best and the worst firms - **C5** and **C1** – that report the highest proportion of PME jobs at 51% and 45% respectively. **C1** firms require significantly lower task levels, with only 23% of their jobs demanding high-skill thresholds, whereas **C5** firms require substantially higher task levels, at an average of 66%. This stark contrast suggests that PME employees may find themselves in vastly different job roles, even within the same industry, with divergent skill demands. **C5** firms are designing high-skilled work for high-skilled workers, while **C1** firms squander skills by hiring high-skilled workers for low-skilled work.

C4 firms exhibit unusual hiring practices for R&F jobs. They employ the highest proportion of workers in R&F positions (39%) yet have high task requirements (60%) comparable to those in **C5** firms. These findings challenge conventional expectations, as R&F jobs are often associated with lower skill requirements. **C4** firms' approach may indicate a strategic effort to maximise the extraction of skills out of their workers.

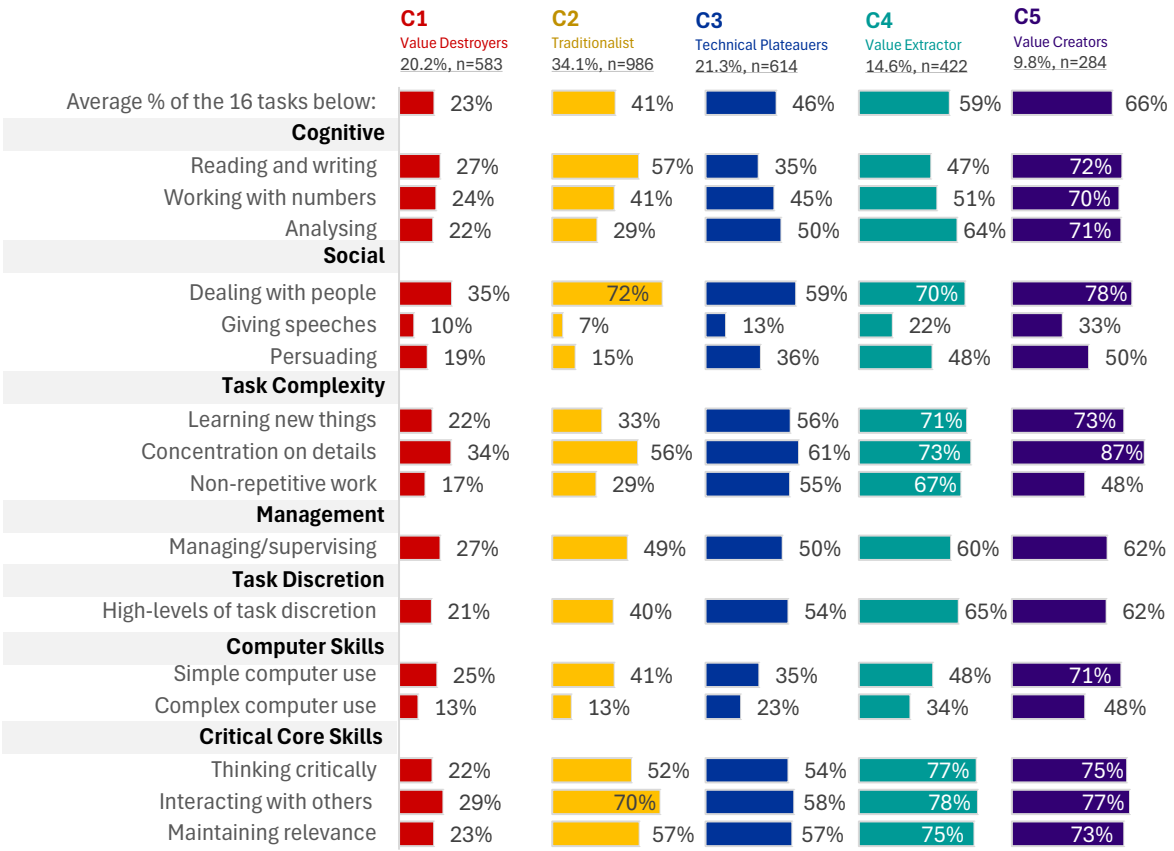
Analysis by credentials is less meaningful with unclear trends. As expected, **C5** firms employ the highest proportion of degree holders. **C1** firms employ diploma holders and put them into professional work but with low task requirements. **C2** and **C4** firms employ primarily diploma holders and those without vocational credentials but with high task requirements in C4 but not C2 firms.

Figure 9. Distribution of employee qualification levels, occupation levels and task requirements by SME cluster

	C1 Value Destroyers 20.2%, n=583	C2 Traditionalist 34.1%, n=986	C3 Technical Plateauers 21.3%, n=614	C4 Value Extractor 14.6%, n=422	C5 Value Creators 9.8%, n=284
Profile of employees: *Percentage (%) of staff members who are...*					
Managers	18%	15%	17%	16%	23%
Professionals	27%	25%	24%	19%	28%
Technicians and Associate Professionals	34%	36%	41%	26%	27%
Others (R&F)	20%	25%	17%	39%	22%
Qualifications attained by employees: *Percentage (%) of current employees that attained...*					
Degree or higher	17%	17%	13%	14%	34%
Diploma	35%	29%	43%	32%	26%
Professional/vocational certificate	27%	22%	29%	24%	17%
Less than diploma or certificate	22%	32%	15%	30%	22%
Qualifications required by employees: *Percentage (%) of existing jobs that require...*					
Degree or higher	16%	19%	13%	14%	33%
Diploma	36%	32%	46%	32%	27%
Professional/vocational certificate	28%	27%	28%	24%	18%
Less than diploma or certificate	21%	22%	14%	30%	21%
Job requirements of employees: *Percentage (%) of existing jobs that require...*					
Degree or higher	16%	19%	13%	14%	33%
Induction training of more than a week	10%	55%	9%	7%	31%
Frequent learning/development activities	6%	15%	6%	6%	41%
At least 3 years industry experience	39%	50%	65%	37%	43%
Task requirements of employees: *Extent of task required in the work of staff...*					
Average of 16 tasks listed	23%	41%	46%	59%	66%

Figure 10. Task requirements (job design) by SME cluster

Mean % of high to great extent the following tasks required in the work of the staff:



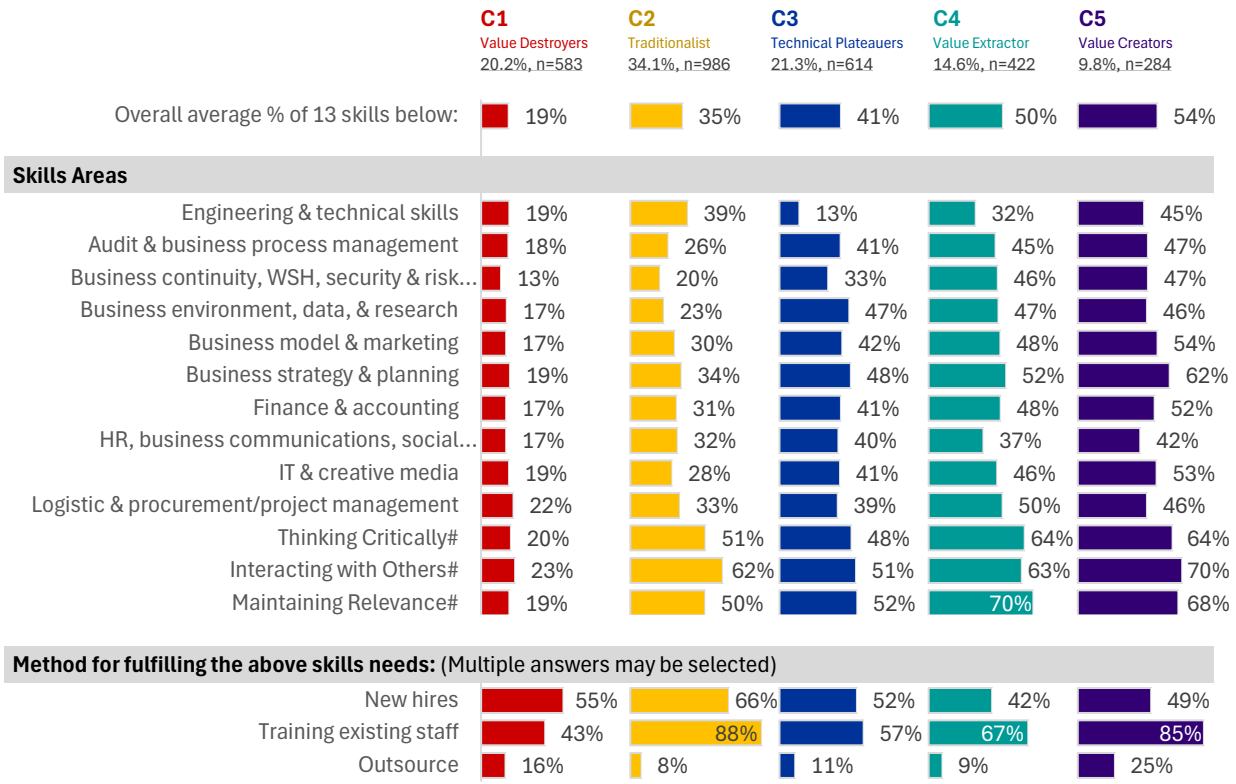
Combined, the deep dives contrasting task requirements with credential and occupational profiles of employees demonstrate how skills demand is shaped by business strategies, rather than the skill sets of workers.

4.4. Skills development needs

Business strategies shape skill needs too. **C5** has the highest skills development needs (53.5%), followed by **C4** (49.8%). **C1** has the lowest skills development needs (18.5%). All firms use a mix of build-buy strategies to fulfil their skill needs. However, **C5** is most likely to fulfil its skills needs by training its existing workforce (build). **C1** shows a slight preference to fill its skills needs by new hires (buy).

The notion that lower-skilled firms are the ones that require more training and development has been a long-held assumption in the literature on skills development. However, recent studies have challenged this myth, suggesting that the relationship between skill requirements and training needs are more complex. Instead of lower-skill requiring firms being more prone to skills gaps and needed more skills development, the rapid pace of technological change has caused higher-skill requiring firms to face greater skills gaps (Stephany & Teutloff, 2024). Our analysis similarly shows the role of business strategies in driving the skills development, with firms with complex business and innovation strategies requiring more skills to support their growth.

Figure 11. Skill development needs by SME cluster



Refers to Critical Skills while the others skills are Technical Skills
New hires: All not sig. except between C2-C3*; Training existing staff: All not sig. except between C2-C4* and C4-C5*; Outsource: All not sig. except between C3-C5**

4.5. Skills gaps

Skills gaps are assessed to offer room for policy action, arising when an establishment's existing employees are seen as lacking the necessary skills, knowledge, or competencies to perform their jobs adequately given the demands of their role (Marcolin & Quintini , 2023). In BPSS2, employers may assess their workforce to be *matched* (skills that were sufficient for their job but not beyond), *underskilled* (skills that are insufficient for their job) or *underutilised* (skills that are beyond that required of their jobs).

A comparative analysis across clusters reveals no coherent or theoretically consistent pattern, underscoring the limitations of the skills gap lens when interpreted from employer self-reports.

If the skills-gap framework were valid, we would expect:

- **C1 firms (employ high-skilled workers in low task-requirement roles):**
  → Highest levels of **skill underutilisation**, as workers possess more skills than their jobs require

- **C4 firms (employ rank-and-file workers in high task-requirement roles):**
  → Highest levels of **underskilling**, as job demands exceed the skill levels of the workforce

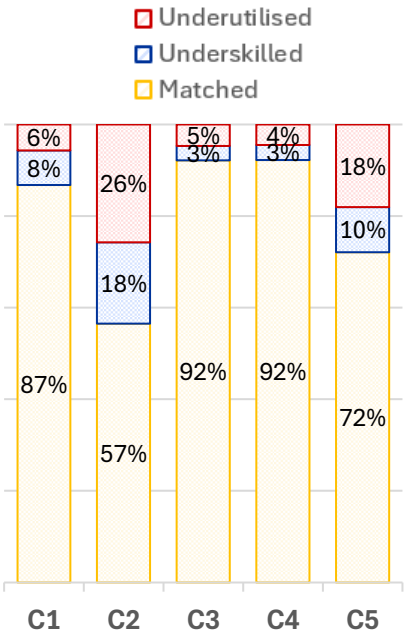
Yet this is not borne out in the data. Instead, we observe:

- **C1, C3 and C4 firms (weaker people strategies):**
  → Report the **highest proportions of well-matched staff**
  → This likely reflects **lower skill demand** or **static job design**, rather than genuinely effective skill alignment

- **C2 and C5 firms (stronger people strategies):**
  → Report the **lowest levels of skill matching**
  → Exhibit **comparable rates of underskilling and underutilisation**, despite businesses being **set up very differently** in terms of workforce profile and job design

The high levels of underutilisation in **C2** firms is expected given the low-value business model in the firm, but a similar level is also observed in **C5** firms that operate with high-value business model. These inconsistencies indicate that employer-reported skill gaps may capture perceptions rather than genuine skill deficiencies. Consequently, the skills gap lens offers limited explanatory value for understanding firm performance.

Figure 12. Distribution of reported skills gap by SME cluster



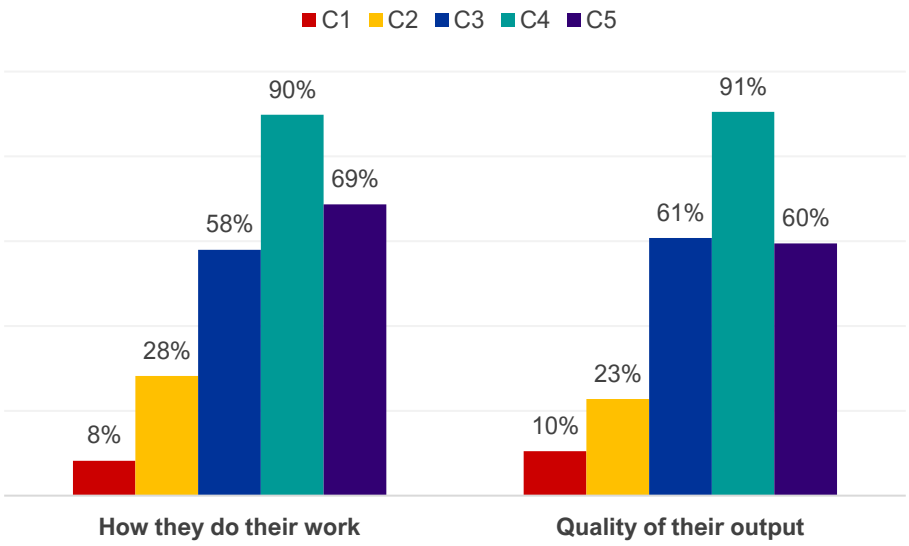
'Matched' refers to % of staff that have skills sufficient for the job but not beyond; ' Underskilled' refers to % of staff that have skills that are insufficient for the job; and 'Underutilised' refers to % of staff that have skills that are beyond that required by their job.
Note: A significance test conducted showed that for 'matched', all combinations of testing were statistically significant $p < .05$ except between C3-C4. For 'underskilled', all combinations of testing were statistically significant $p < .05$ except between C3-C4 and C1-C5. For 'underutilised', all combinations of testing were statistically significant $p < .05$ except between C1-C3-C4.

4.6. Autonomy, involvement and talent management

Autonomy, involvement and talent management reflet core aspects of job design, information flow, and human capital management, all of which, influences how effectively skills are deployed and developed within firms. Contextualising the cluster findings through these dimensions therefore helps to reveal mechanisms and organisational choices that drive variation across firms, strengthening the implications for skills use and the impact on organisational performance.

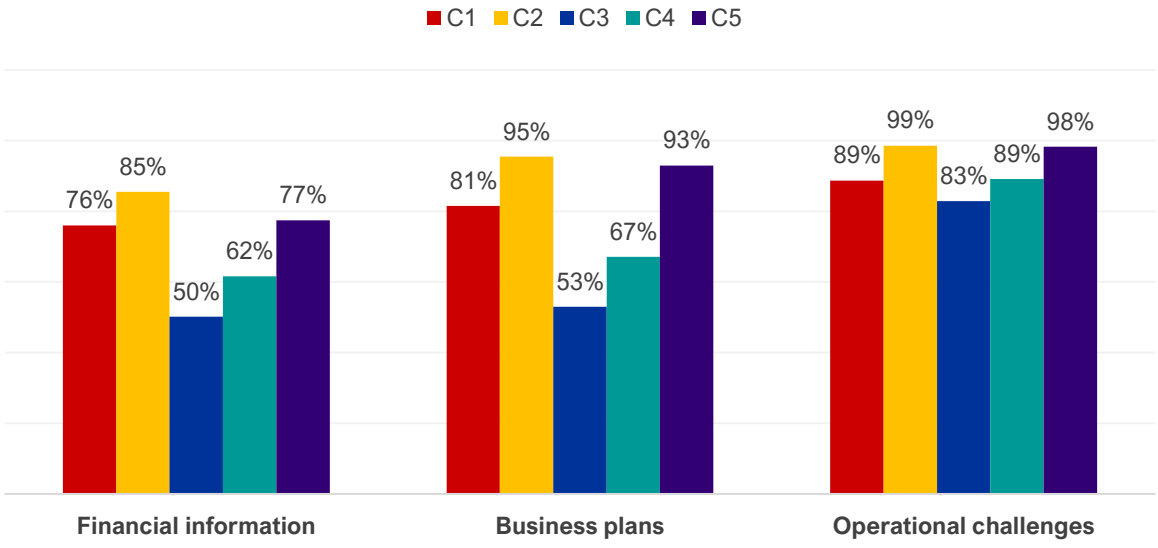
Patterns across these three areas reveal substantial variation. **C1** and **C2** demonstrate consistently low levels of autonomy, with less than 30% of workers on average in these firms having discretion over how work is performed and how output quality is managed. In contrast, **C3**-**C5** exhibit above-average levels of autonomy, with **C4** standing out as particularly high. These findings suggest that C3-C5 operate with more decentralised or empowered work environments, whereas **C1-C2** follow more standardised or tightly controlled job designs.

Figure 13. Autonomy practices by SME clusters



Involvement practices also vary markedly. **C2** and **C5** firms score highly across all three forms of information sharing, including sharing financial information, business plans and operational challenges with non-managerial employees in their establishments. This suggests a more transparent and participatory involvement practice. **C1** shows comparatively limited involvement practices, whilst **C3** and **C4** were particularly weak. The juxtaposition of high autonomy but low involvement practices in **C4** suggests that employees may have discretion in their own roles, but operate with limited access to organisational information, which might constrain alignment with broader strategic objectives.

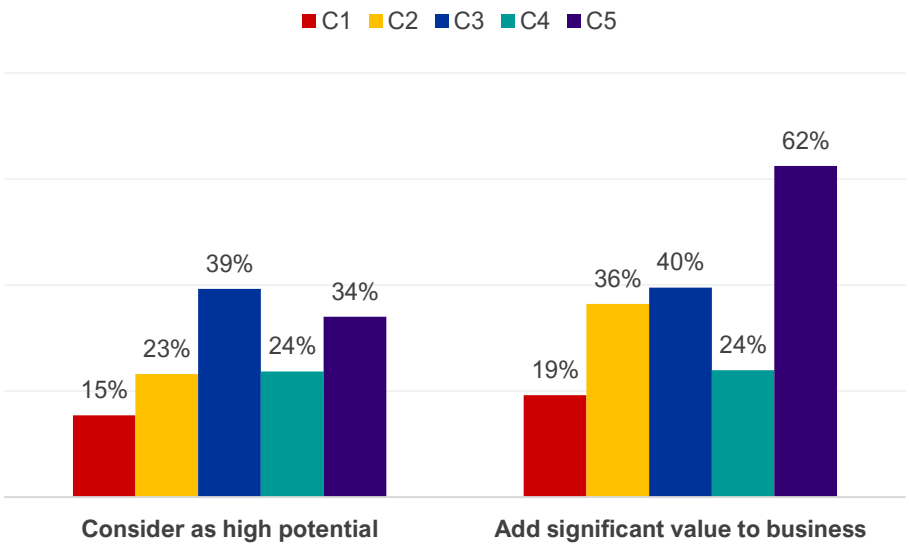
Figure 14. Involvement practices by SME clusters



Talent management patterns provide additional differentiation. **C5** firms report the strongest recognition of high-value employees, and the second highest recognition of high-potential employees, indicating a more deliberate and generous approach to identifying and leveraging talent. **C3** firms performs relatively well on identifying high-potential talent, though with less emphasis on high-value contributors. In contrast, **C1** and **C4** consistently report the lowest levels

of talent recognition, which aligns with their weaker involvement practices, and suggests less structured or formalised talent management systems.

Figure 15. Talent management practices by SME cluster



Taken together, these patterns show that **C5** firms emerges as the most strategically aligned, with strong autonomy, involvement and talent management. **C2** shows some strength in involving their staff, but less emphasis on autonomy or talent management. **C3** and **C4** firms offer high autonomy but limited organisational communication, with differing talent profiles. **C1** reflects a more constrained working environment overall.

4.7. Learning and development

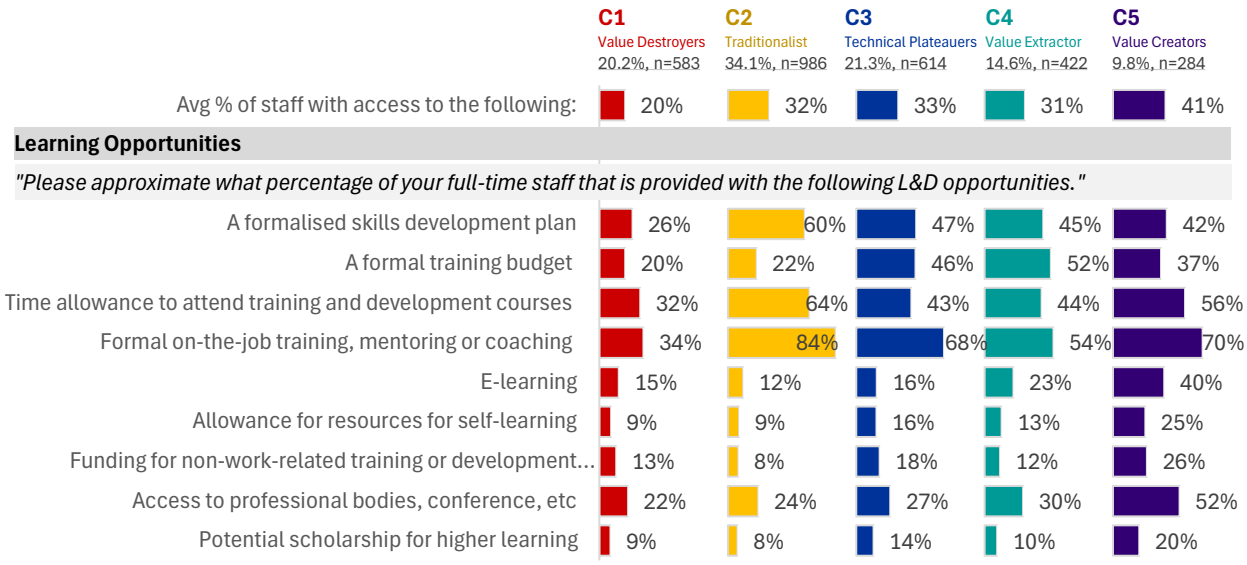
On-the-job training, mentoring, and coaching are the most common L&D modalities among Singapore SMEs, regardless of cluster type (Figure 16). However, a deeper examination reveals distinct differences in L&D strategies across firms.

In terms of access, **C2** firms achieve the broadest minimum coverage, with the largest proportion of their workforce (84.2%) able to access at least one L&D opportunity out of the nine L&D categories in BPSS. This is followed by **C5** (69.7%) and **C4** (55.6%) firms.

When considering breadth of L&D exposure, however, **C5** firms lead. They have the highest average proportion of employees (40.9%) with access to multiple L&D categories and offer the widest range of opportunities—combining organisational-led (top-down) and employee-initiated (bottom-up) learning. In contrast, **C2** firms, despite their broad coverage, rely heavily on top-down training provisions.

These findings indicate that L&D strategies serve different purposes across SMEs. In **C5** firms, L&D is performance-driven—integrated into business and people strategies to support value creation, innovation, and employee discretion. In **C2** firms, by contrast, L&D appears geared toward maintaining workforce stability rather than building transformative capability.

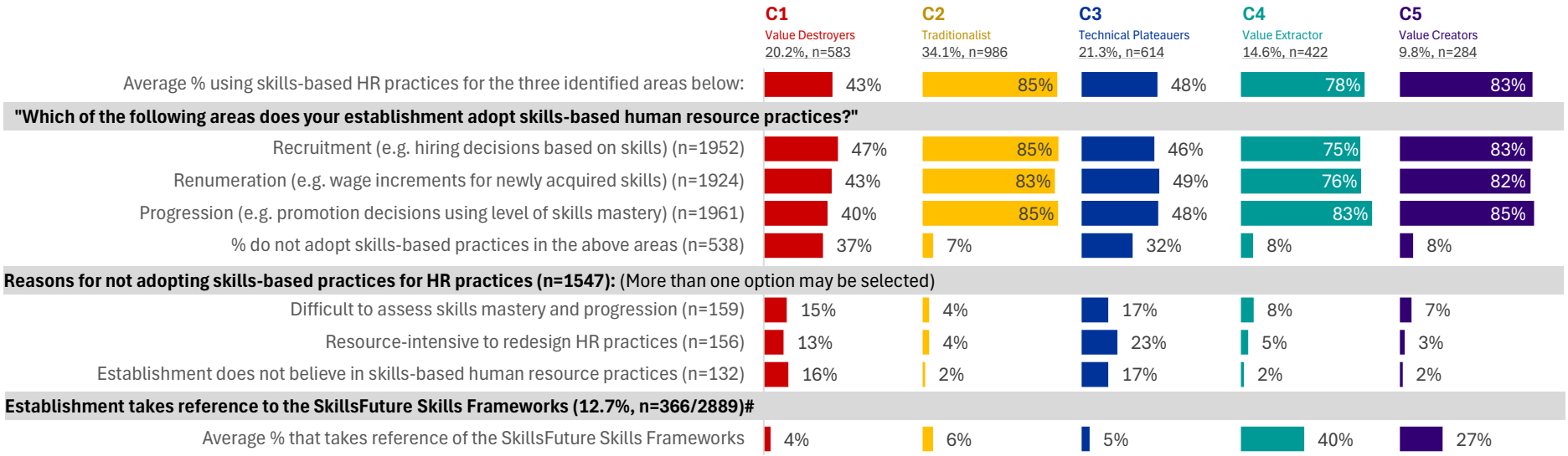
Figure 16. Distribution of learning and development opportunities offered by SME cluster



4.8. Skills-based hiring

Skills-based hiring is increasingly promoted, including by the OECD, as a mechanism to improve the use of skills by enabling employers to recognise workers' actual competencies rather than relying solely on formal qualifications, thereby enhancing the matching of skills to jobs (OECD, 2025c). It is posited to offer firms a strategic advantage as they could tap on the competencies of their workforce rather than rely on qualifications. However, this is not fully borne out in the cluster analysis. More than two-thirds of SMEs say they employ skills-based HR practice (Figure 17). A deeper dive shows that such practices are linked to firms with strong people strategies, **C1** (84.7%) and **C5** (83.5%). Although such strategies can be correlated to stronger staff retention, there is little evidence to link it to market performance as **C5** firms tend to perform well in terms of reporting increases in profits, revenue and market share, while **C2** firms perform the worst in terms of reporting declines in profits revenue and market share (see Section 4.9).

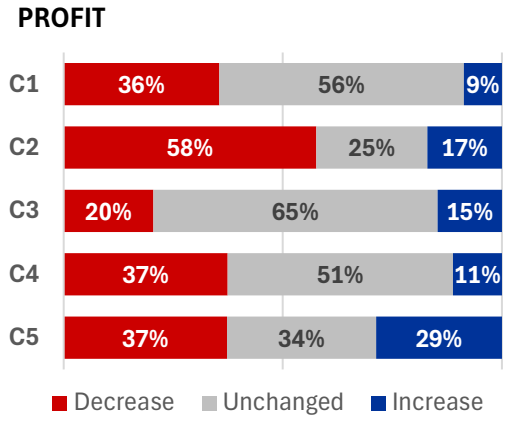
Figure 17. Skills-based hiring practices by SME cluster



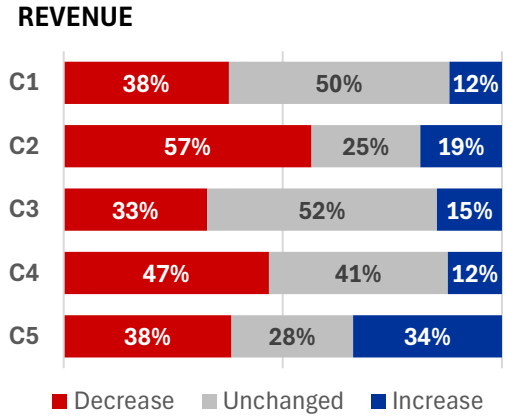
4.9. Business advantage: profit, revenue, market share

C5 firms is by far the best performer in terms of market performance (Figure 18). It is the most likely to report increase in business outcomes in terms of profit, revenue and market share. It is less likely to report stagnating business outcomes. It is generally comparable to **C1** and **C4** firms when reporting decline in business outcomes, suggesting possibly the effects of the external environment due to the Covid-19 pandemic. **C3** firms are the least likely to report profit declines but are more likely with **C1** firms to experience a fall in market share. This suggests a weakness in C3 firms to future-proof their business, consistent with their weak innovation strategy.

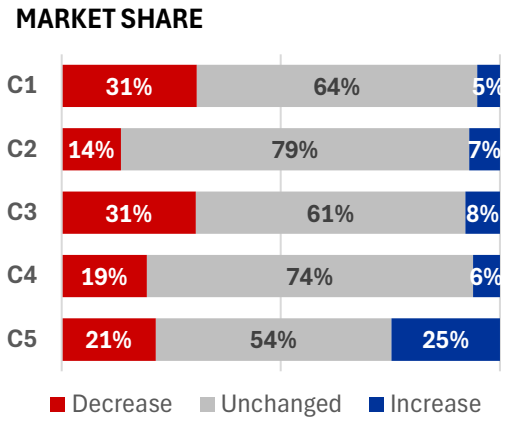
Figure 18. Market outcomes in reported profit, revenue and market share across clusters



Significance test for profit: Decreased [C1, C4, C5 not sig. C2 & C3 sig. diff from each other and the rest]; Unchanged [C1 & C4 not sig., but sig. for other combinations] ; and Increased [Sig. diff only if at least 5pp different from each other].



Significance test for revenue: Decreased [C1, C3 & C5 not sig. Sig. for all other combinations]; Unchanged [C1 & C3 not sig., C2 & C5 not sig. But sig. for other combinations]; and Increased [C1, C3 and C4 not sig. between each other, but sig. diff for the others]



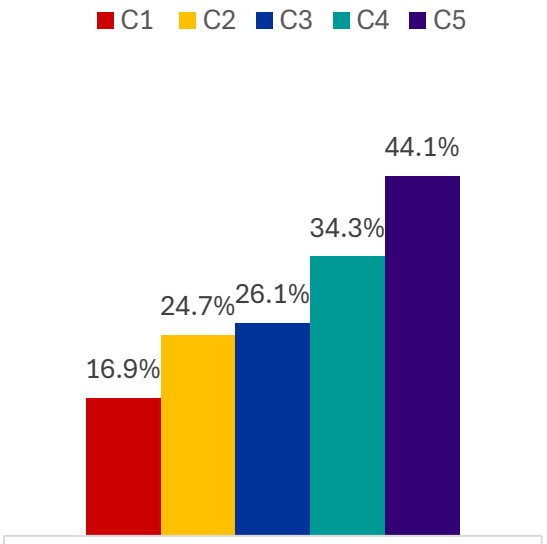
Significance test for market share: Decreased [C1 & C3 not sig. C4 & C5 not sig. Sig. for all other combinations]; Unchanged [C1 & C3 not sig. Sig. for all other combinations]; and Increased [C1 to C4 are not sig. except between C1 & C3. C5 sig. diff from all others]

4.10. Business advantage: employee engagement and staff turnover

C5 firms have the most engaged workforce with 44.1% of the workforce seen as demonstrating discretionary effort, which is the effort that employees choose to exert beyond the minimum required to perform their job (Figure 19). **C5** firms also have the best staff retention. Only 14.6% leaves the firm each year at comparable levels with **C2** firms (16.4%). This demonstrates that **C5** firms are able to fully use the skills and training of its workforce resulting in business advantage not just at the levels of market performance but also at the levels of organisational excellence. This is a major achievement despite its staff being the most qualified, it still can retain them.

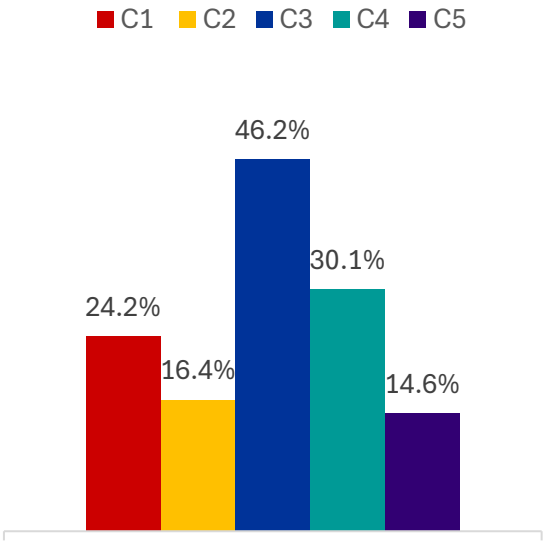
C1 firms have the lowest proportion of motivated staff (16.9%) that is not unexpected given that its highly-skilled workforce are not put to work in a high-skills environment. **C3** firms report the highest rate of staff turnover (46.2%).

Figure 19. Average proportion of staff exhibiting discretionary effort by SME cluster



Note: Discretionary ≠ Autonomy.
Discretionary effort measures how employees go beyond what is expected at work.
Differences between all clusters are sig. except between C2 and C3.

Figure 20. Average proportion of staff leaving every year (staff turnover) by SME cluster



Differences between all clusters are sig. except between C2 and C5.

4.11. Rewards strategy

Contrary to expectations, the findings suggest that **C5** firms are not the best paymasters. Instead, **C2** firms offer the most attractive **monetary rewards**, with the highest proportion of workers earning more than $2,000 and receiving bonuses. This provides evidence that in the context of Singapore SMEs, monetary rewards, while important, are not the key differentiator that sets high-performing firms apart from their peers.

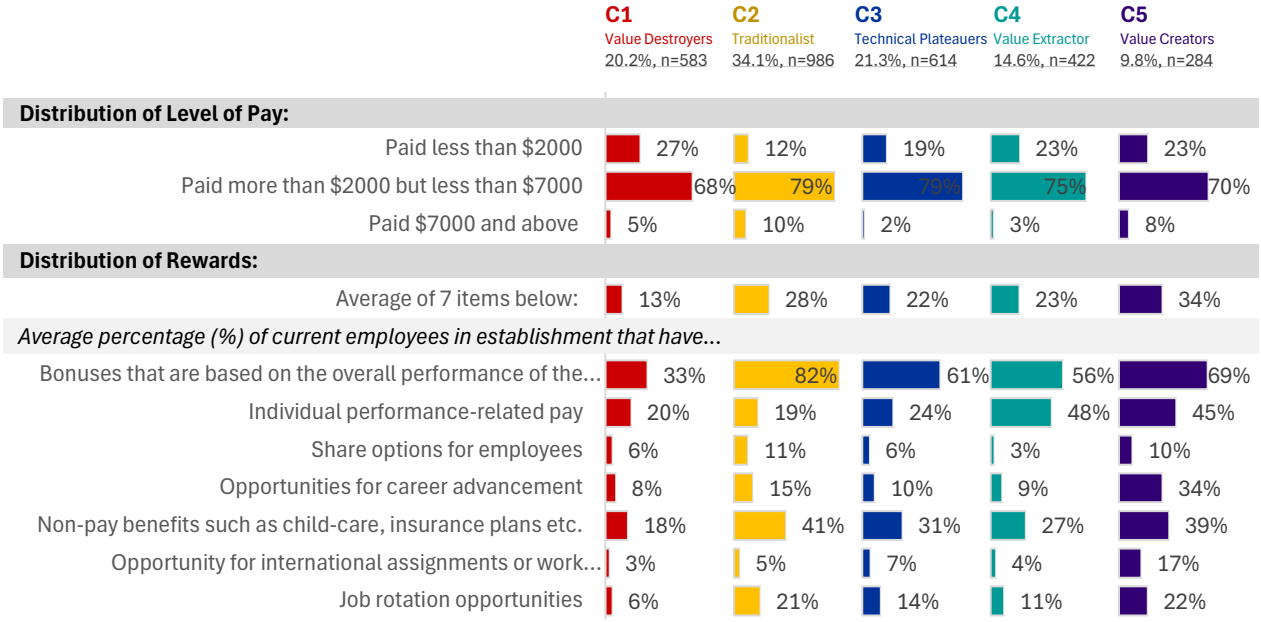
Instead, what sets **C5** firms apart is their emphasis on non-monetary rewards. On the seven items measured for **non-monetary rewards**, these firms consistently rank among the top two providers of these rewards. The differences of the mean response are significantly different from the other clusters. In particularly, these firms offer their employees significantly more opportunities for career advancement and international assignments.

Specifically:

- 1 in 3 staff in **C5** firms receive career advancement opportunities, compared to 1 in 10 staff in other clusters.
- 1 in 5 staff in **C5** firms receive international assignments, compared to 1 in 20 staff in other clusters.

These findings align with international literature highlighting SMEs' strengths in offering non-monetary rewards as a strategy to compensate for their relatively lower capacity to pay competitive wages compared to larger firms (CEDEFOP, 2020). These findings provide reassuring insight for firms seeking to emulate the success of **C5** firms. Replicating the strategies of these high-performing firms does not necessitate substantial investments into high levels of monetary rewards. By recognising that monetary rewards are not the sole driver of high performance, Singapore SMEs can develop a multifaceted approach to talent management with a range of motivators and incentives that resonate with their employees.

Figure 21. Pay and reward practices by SME cluster



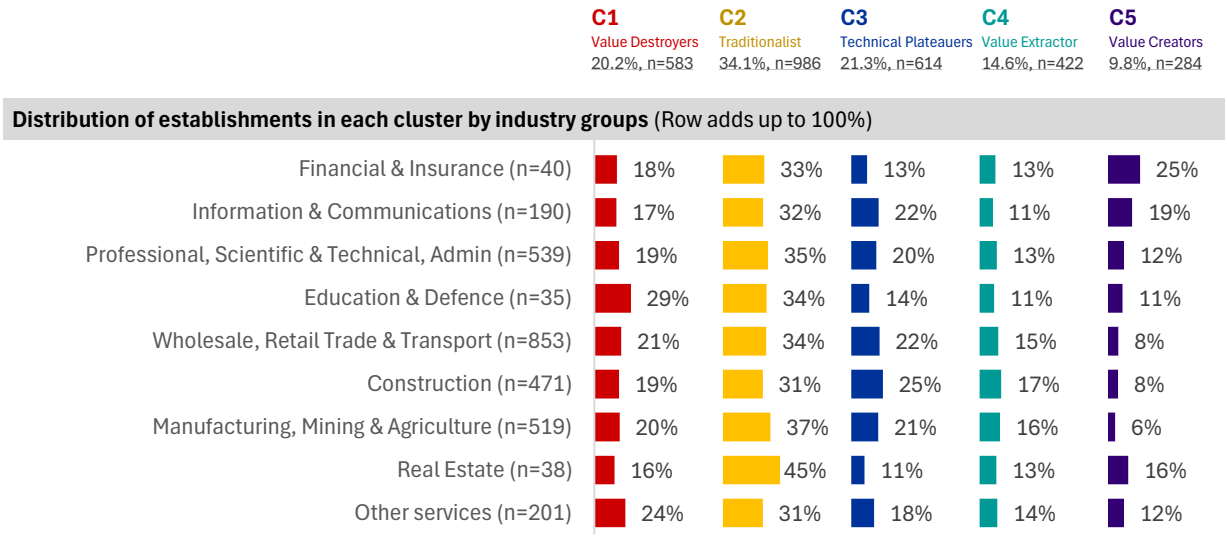
4.12. Demographics: industry, firm size, age

An analysis of the sectoral distribution of firms across the five clusters reveals a generally well-distributed pattern, with some intriguing variations (Figure 22). The finding suggests that firms from diverse industries can potentially adopt and benefit from the high-performance strategies employed by **C5** firms that stand out for their value creation strategies and higher competitiveness.

Although some variations in sectoral distribution were observed, a significance test revealed that these differences are not statistically significant. This finding has important implications, as it suggests that firms from various sectors can draw inspiration from the strategies employed by **C5** firms, without being constrained by their industry affiliation.

In essence, these results provide a compelling case for the transferability of high-performance strategies across industries, offering a pathway for firms to enhance their competitiveness and value creation, regardless of their sectoral affiliation.

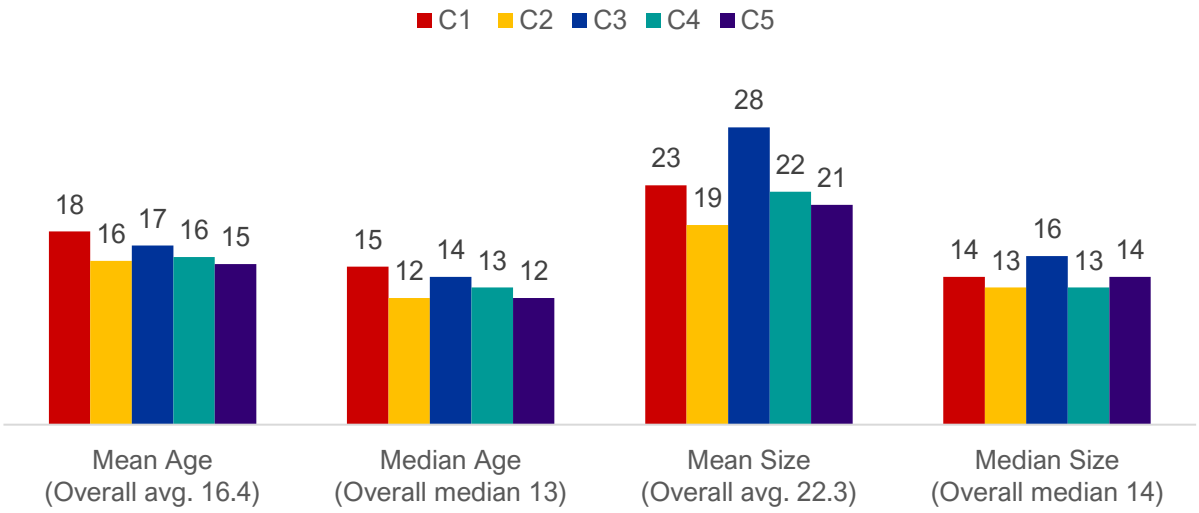
Figure 22. Distribution of SMEs in each cluster by industry groups (Row adds up to 100%)



Note: A significance test conducted showed that were no significant differences in the distribution of clusters within each industry group. A similar test of distribution was conducted within cluster across industry group, yielding similar results.

Differences in age and size across the five clusters are also limited. This suggests that firms of various ages and sizes can adopt strategies employed by high-performing clusters, such as C5 - Value Creators. The average age of firms across the whole sample population is 16 years, with a median age of 13 years. The only notable (statistically significant $p < .05$) exception is C1 - Value Destroyers, which tends to be slightly older, with an average age of 18 years. The average size of firms across the population is 22 employees, with a median size of 14 employees. The only notable exception (statistically significant $p < .05$) is C3 - Technical Plateauers, which tends to be slightly larger, with an average size of 28 employees.

Figure 23. Mean and median establishment age and size by cluster



Note: A significance test conducted showed that only C1 was statistically significant $p < .05$ different in **age** compared to the other clusters, and only C3 was statistically significant $p < .05$ different in **size** compared to the other clusters.

On the whole, the findings suggest that the strategies of C5 firms are not unique to specific sectors, firm size or the age of the establishment. Such strategies are accessible to all SME leaders with the interest to anchor their firms in high value-added business strategies coupled with strong empowering people strategies.

4.13. Summary

The findings reveal a pronounced divergence in how firms translate skills and training into business advantage. Only one cluster type, **C5** firms, demonstrates the ability to convert workforce capabilities into tangible financial outcomes and organisational effectiveness. These firms skilfully align strong business and people strategies by recruiting highly skilled professionals, assigning them to roles with demanding skill requirements, and providing broad-based learning and development opportunities. However, **C5** firms represent the smallest cluster in the sample. In contrast, **C1** firms squander skills by employing highly skilled professional workers in low-complexity jobs with limited task requirements, while **C4** firms exhibit the opposite pattern, assigning lower-skilled workers to high-task-demand roles with only moderate training support. **C2** firms, which invest substantially in training for workers engaged in medium-level task roles, are paradoxically the most financially vulnerable, forming the largest cluster. Finally, **C3** firms employ technically skilled workers in jobs of moderate complexity and provide corresponding levels of training, reflecting a balanced but less strategically distinctive approach.

5. Discussion

5.1. Integrating Empirical Findings with Theoretical Frameworks

The cluster analysis reinforces and extends the theoretical propositions outlined earlier, demonstrating that the relationship between skills, training, and firm performance is complex and contingent. From a **human capital theory** perspective, the variation across clusters highlights that investment in skills and training does not automatically translate into improved productivity or financial outcomes. While **C5** firms exemplify the human capital proposition—where a highly skilled and well-trained workforce contributes directly to superior business performance—**C1** firms show how high skills can be squandered. Additionally, **C2** firms illustrate how training investments can be underutilised when organisational systems fail to provide meaningful avenues for applying those skills. This affirms longstanding critiques of human capital theory, which emphasise the importance of context and opportunity structures in realising the returns to training. Yet, human capital theory retains validity, as evidenced by **C4** firms: despite pursuing high value-added strategies similar to **C5** firms, their weak people strategy to recruit and deploy highly skilled workers hold them back, constraining their capacity to convert these strategies into stronger financial performance.

The **resource-based view (RBV)** provides additional explanatory depth. Only in **C5** firms do skills operate as a strategic resource that is valuable, rare, inimitable, and embedded within the firm's routines and culture. These firms demonstrate how human capital becomes a source of sustained advantage when integrated into coherent business and people strategies. By contrast, **C1** and **C3** firms possess capable professional and technical workers respectively but fail to translate their skills into organisational value because of weak alignment between human capital and strategic orientation. This finding reinforces the RBV argument that competitive advantage arises not from the mere possession of skilled labour, but from the firm's ability to embed those capabilities in distinctive, hard-to-replicate configurations.

The findings resonate strongly with the concept of **skills utilisation**, which serves as the operational bridge between **human capital theory** and **RBV**. The divergent patterns across clusters—particularly the under-utilisation observed in **C1** firms—highlight that effective utilisation is essential for translating skill endowments into performance outcomes. **C5** firms stand out precisely because they achieve high levels of skill utilisation, aligning high value-added strategies with complex job requirements, broad-based learning opportunities and meaningful autonomy. Conversely, **C2** firms, despite substantial investment in training, record weak financial outcomes, suggesting that training disconnected from job design or strategic intent delivers limited returns. Yet, the findings also reveal the limits of skills utilisation, as seen in **C4** firms, where the overstretching of a relatively low-skilled workforce in high-demand roles constrains performance and underscores that skills utilisation strategy without adequate skill depth can be equally counterproductive.

Through the lens of the **Ability–Motivation–Opportunity (AMO)** framework, the clusters demonstrate how imbalances among these three factors constrain firm performance. **C5** firms achieve optimal alignment—employees possess the requisite skills (ability), are motivated to apply them (motivation), and operate within systems that enable their effective deployment (opportunity). The weaker outcomes of **C1** and **C2** firms reflect breakdowns in this alignment: in **C1**, limited opportunities undermine the use of existing abilities, while in **C2**, training creates ability but fails to stimulate motivation or connect to strategic purpose. This interaction supports the AMO view that

performance results from the synergy among all three elements rather than the presence of any one in isolation.

Viewed through **configuration theory**, the findings affirm that there is indeed no single pathway to firm success. In every cluster despite the varying combinations of business and people strategies, we do see firms doing well reporting improved profits, revenue, or market share—supporting the theory's principle of *equifinality*. Yet, the evidence also suggests that certain configurations—most clearly those represented by **C5** firms—are more consistently associated with superior outcomes in both market and people performance. These firms exemplify the value of strategic coherence, where business orientation, skills utilisation, and workforce development reinforce one another to create a stable basis for competitive advantage. While multiple routes to success exist, configurations that tightly align business and people strategies appear to offer a stronger foundation for sustained performance. Table 6 summarises the findings.

Table 6. Five archetypes of SMEs in Singapore

	C1	C2	C3	C4	C5
	n=583, 20.2%	*n=986, 34.1%*	*n=614, 21.3%*	*n=422, 14.6%*	*n=284, 9.8%*
					
Cluster Name	**Value Destroyers**	**Traditionalists**	**Technical Plateauers**	**Value Extractors**	**Value Creators**
Business Strategy	× Weak	× Weak	× Weak	✓ Strong	✓ Strong
People Strategy	× Weak	✓ Strong	– Mediocre	× Weak	✓ Strong
Specific Feature	Creators of low-value professional work	Perpetuators of low-skilled work	Offers good, technical jobs but not innovating	Driver of low-skilled workers	Creators of high-value professional work
Job task requirements	Low	Medium	Medium	High	High
Workforce profile	Majority are PMEs	Majority are Technicians	Majority are Technicians	Majority are Rank&File	Majority are PMEs
Learning and development provisions	Low	Highest	Medium	Medium	High

	C1	C2	C3	C4	C5
Business advantage	No clear trends for profits, revenue and market share Lowest employee engagement Medium attrition	Most likely to report decrease in profits and revenue Medium employee engagement Low attrition	Most likely to report stagnating profits and market share Medium employee engagement Highest attrition	No clear trends for profits, revenue and market share High employee engagement Medium attrition	Most likely to report increase in profits, revenue and market share Highest employee engagement Low attrition

5.2. Policy Implications

Strong SMEs train and translate those investments into tangible business gains, yet they form the smallest cluster. By contrast, weak SMEs continue to bleed financially even as they train, and they make up the largest share of the SME landscape.

In essence, these findings raise important questions about the effectiveness and efficiency of Singapore's extensive public investment in skills development. Over the past decade, SkillsFuture has built one of the world's most comprehensive and generously funded training ecosystems, anchored in the belief that continuous learning and upskilling drive business transformation and competitiveness. Yet the results suggest that this assumption does not hold evenly across the SME landscape. While state subsidies and credits have significantly expanded training access, much of this investment may not be translating into measurable business gains. The cluster analysis reveals that only a small proportion of firms, represented by **C5,** effectively convert training and skills development into improved profitability, revenue growth, and organisational effectiveness. In contrast, the largest cluster, **C2**, invests heavily in training but reports weak or negative financial outcomes, reflecting a limited capacity to apply or capitalise on new skills. This points to a risk of public funding inefficiency—where training is taking place, but without the business conditions required to generate returns. In effect, public resources may be supporting skill acquisition that is not integrated into viable commercial models, resulting in *skills wastage* within the system.

Beneath this pattern lies a deeper structural constraint: roughly three-quarters of Singapore's SMEs exhibit weak or incoherent business strategies, a finding that fundamentally limits the effectiveness of even well-designed skills policies. Clusters such as **C1**, **C2**, and **C3** typify this group—firms that operate with limited product differentiation, weak innovation focus, and narrow strategic horizons. Their problem is not a shortage of training, but a shortage of viable business strategy. Training alone cannot compensate for deficiencies in value creation, customer positioning, or competitive renewal. This structural weakness explains why SkillsFuture's enterprise pillar, while it may be effective in raising training participation, has struggled to lift overall productivity in the SME sector. Strong firms train and get stronger, while those with weak business models continue to bleed despite being supported with training. It should be a particular concern that the largest cluster, **C2**, comprises firms with high levels of training activity yet weak financial performance, reflecting the limits of price-based competition and unsustainable cost structures. These firms are not failing for lack of skills but because their business strategies leave little room for skills to create value.

Without a deliberate policy shift to strengthen business strategy as the foundation for workforce development, Singapore risks entrenching a dual economy—one that rewards a small cohort of capable firms while leaving the majority locked in low-value equilibria. The policy implication is clear: Singapore's next phase of skills development must move beyond subsidising training inputs toward supporting the design and scaling of strategic business models within SMEs. Enterprise-facing schemes such as the SkillsFuture Enterprise Credit and Enhanced Training Support for SMEs have been valuable in lowering training costs, but they cannot substitute for a sound commercial strategy. Skills policy must now focus on helping firms identify viable growth pathways—through innovation, internationalisation, and higher value-added market segments—and then align training to those goals. This means linking skills development with enterprise transformation programmes, capability-building partnerships, and sector-specific business model renewal. The evidence also cautions against overreliance on employer-reported skills gaps and skills-based hiring as drivers of workforce policy. As shown by **C2** firms, training volume and hiring of skilled workers achieve little when firms lack coherent strategies to deploy those skills productively.

Ultimately, SkillsFuture's policy renewal agenda must move from funding training to funding skills transformation through strategic business models. National resources should be directed toward firms prepared to pair workforce upgrading with clear plans for value creation and market positioning. This shift would ensure that public investment in skills utilizes Singapore's qualified workforce to build a more competitive and innovative SME base—one capable of turning skills into sustainable growth and contributing meaningfully to Singapore's long-term productivity and economic resilience.

5.3. Enterprise Implications

The findings reveal that SME performance is reflected in the strength of the firm's business and people strategies. Across the sample, roughly three-quarters of SMEs exhibit weak or incoherent business strategies—firms that lack clear value propositions, rely on price-based competition, and operate within narrow market horizons. These firms, represented by clusters such as **C1**, **C2**, and **C3**, struggle to translate skills and training into tangible business gains because their strategic direction offers little scope for differentiation or value creation. In such contexts, even substantial investments in training yield limited returns. The data make clear that no amount of skills upgrading can compensate for the absence of a viable business model. Firms that compete primarily on cost will remain trapped in low-margin cycles, unable to leverage their workforce capabilities for growth. The challenge for the majority of Singapore's SMEs, therefore, lies not in training participation, but in strategic capability—the ability to define, pursue, and sustain business models that create value beyond cost advantage.

However, while business strategy matters, the evidence also shows that business strategy alone is not sufficient. The case of **C4** firms demonstrates this clearly. These firms pursue ambitious, high value-added strategies but lack the workforce structures and skills base necessary to deliver on them. The result is overstretch: strategic intent unaccompanied by the people capabilities needed for execution. In contrast, **C5** firms show what success looks like when business and people strategies are aligned. They combine strong strategic direction with robust systems for workforce development, job design, and skill utilisation. This integration allows them to translate strategy into action, achieving superior performance in profitability, revenue, and organisational effectiveness.

For enterprises, the lesson is that competitiveness depends on coherence. A sound business strategy provides direction, but people strategy provides the means to realise it. SMEs must therefore design their workforce systems—recruitment, training, performance management, and workplace design—to serve clear strategic goals. When business and people strategies reinforce

each other, as in **C5** firms, skills become a driver of innovation and growth. When they diverge, as in **C4**, firms risk the opposite: ambitious plans undermined by inadequate capability.

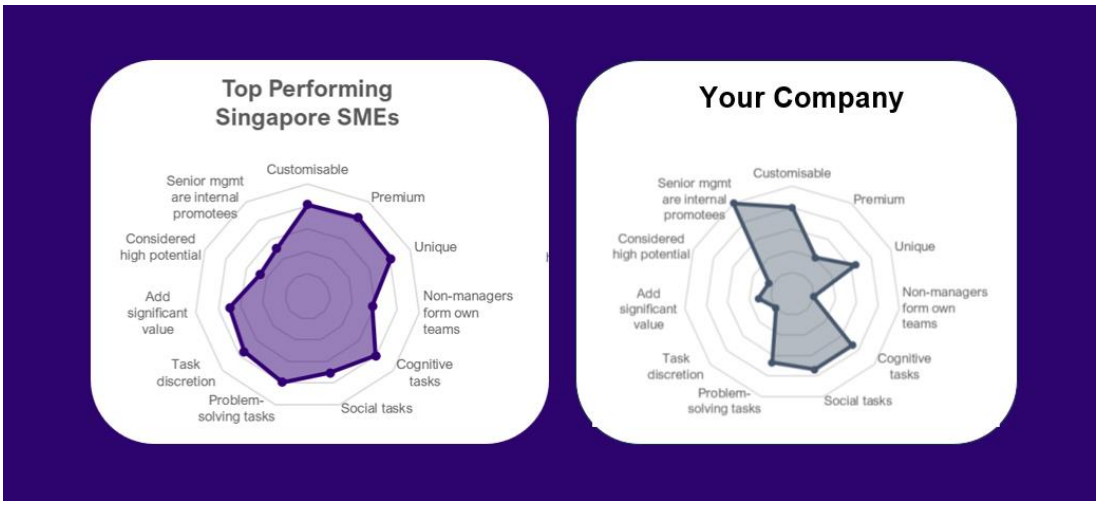
In short, business strategy must lead, but people strategy must complete the equation. Singapore's SMEs will only move beyond low-value competition when they learn to pair strategic clarity with workforce capability—turning skills into execution, and execution into performance.

5.4. Trialling in the Adult Learning Collaboratory

In support of developing new pathways to support SMEs to nudge them towards the strategies of **C5** firms, a strategic experiment is taking place at the Adult Learning Collaboratory (ALC). The ALC, an initiative of the Institute for Adult Learning and SkillsFuture Singapore, offers a practice-based approach to fostering adult learning innovations (Institute for Adult Learning Singapore, 2025). It brings together firms, researchers, and ecosystem partners to co-design, prototype, and test new enterprise learning models.

The findings from this study is informing the trialling in the ALC. A diagnostic tool has been developed based on the BPSS survey to nudge CEOs to shift their approaches (Figure 24). Firms are then guided to strategies towards **C5** firms. Twenty SMEs have used the diagnostic tools and 10 CEOs have acted on the diagnostic findings and currently going through a methodology to strengthen their business models. Results are expected by January 2026.

Figure 24. Enterprise diagnostics in the Adult Learning Collaboratory



5.5. Limitations

This study's findings should be interpreted with caution given several methodological constraints. Data collection for BPSS2 occurred during the COVID-19 pandemic, a period of exceptional business volatility. As firms operated under varying restrictions and disruptions, reported performance indicators may reflect temporary conditions rather than enduring organisational characteristics. The shift from interviewer-assisted to self-administered online surveys, though necessary, also introduced data quality issues. A notable share of responses showed straight-lining, suggesting respondent fatigue or inattentiveness, which complicates interpretation of nuanced items related to business performance and strategy. Furthermore, pandemic-related access constraints led to a sample heavily weighted toward SMEs, limiting the ability to compare results with larger enterprises as originally intended. Together, these factors mean that while the analysis provides valuable insights into SME dynamics, interpretations of business performance outcomes should be made with awareness of the unique context and data limitations of the period.

5.6. Summary

The convergence of findings across the five SME clusters offers a surprisingly strong affirmation of multiple theoretical frameworks, highlighting that no single theory can fully explain the complex dynamics between skills, training, and firm performance. Together, the human capital, resource-based, AMO, and configuration perspectives reveal that performance emerges from the interaction of capabilities, motivation, opportunity, and strategic coherence—a reflection of the real-world complexity of enterprise behaviour. Yet, despite this theoretical richness, the policy direction that emerges is unmistakable. The central challenge for Singapore's SMEs lies in skills utilisation, constrained by weak business models in roughly 75% of firms. The largest cluster, **C2**, exemplifies this weakness: firms that invest heavily in training but continue to bleed financially, showing that more training alone cannot compensate for the absence of viable strategy. This must be addressed decisively. The experience of C5 firms provides a clear and evidence-based direction for both policy and enterprise practice—demonstrating that when strong business strategies are coupled with robust people strategies, firms not only perform better but also build and fully utilise the skills of their workforce.

6. Conclusion

In conclusion, **C5** firms represent a pinnacle of achievement, boasting unparalleled business and people outcomes that set a new standard for Singapore SME excellence. Their remarkable performance serves as a testament to the power of a holistic approach, one that seamlessly integrates business- and people- strategies to drive sustained success. This research, with its innovative configurational approach, has yielded a unique framework for understanding the

complexities of SME performance in Singapore. The identification of five distinct archetypes, each with its strengths and weaknesses, offers a nuanced and actionable insights for policymakers, business leaders, and researchers. As we look to the future, it is imperative that this research continues to evolve and expand, informing evidence-based practices that empower SMEs to thrive in an increasingly competitive landscape.

Table 7. BPSS2 data collection and COVID-19 pandemic timeline

PILOT (n=201)	WAVE 1 (n=1000)	WAVE 2 (n=1000)	WAVE 3 (n=1000)	WAVE 4 (n=1000)
Collected between: 03.02.2020 - 03.04.2020 (44 days)	Collected between: 18.08.2020 – 30.10.2020 (53 days)	Collected between: 14.01.2021 – 05.04.2021 (55 days)	Collected between: 19.04.2021 – 19.07.2021 (63 days)	Collected between: 10.08.2021 – 17.12.2021 (92 days)
Average COVID-19 cases: 18 Highest daily COVID-19 count: 74	Average COVID-19 cases: 29 Highest daily COVID-19 count: 117	Average COVID-19 cases: 19 Highest daily COVID-19 count: 58	Average COVID-19 cases: 26 Highest daily COVID-19 count: 172	Average COVID-19 cases: 1612 Highest daily COVID-19 count: 5,324
7 February: (DORSCON) level raised from Yellow to Orange. All social gatherings are to be capped to eight. Working from home is encouraged, although capacity is cut to 65% at any one time in the workplace **20 March:** Only 50% of office workers allowed at work at any one time. 24 March: All social gatherings and home visits reduced to 5 persons; 1m (3.3 ft) of social distancing enforced. **28 March**: The government issued advice via WhatsApp that people should stay at home and should avoid malls except for buying essentials such as food and groceries. **3 April**: Prime Minister Lee Hsien Loong announced a much stricter set of measures that would be implemented from 7 April to 7 May, collectively called a "circuit breaker". All non-essential workplaces, including Singapore Pools, closed during this period; work from home became the default; schools moved to home-based learning.	**14 April:** Wearing a mask was compulsory when not at home, with fines and ultimately prosecution for offenders. **29 August**: Entry into shopping malls Lucky Plaza and Peninsula Plaza on weekends will only be allowed based on the last digit of a visitor's identity card or foreign identification card, as part of measures to limit crowds. **1 October:** The Singapore Tourism Board (STB) allow events in the MICE industry of up to 250 people from October 1, going downwards from Tier 3 to Tier 2, depending on the organisers' abilities to implement safe management measures.	**14 December**: Phase 3 of reopening would start from 28 December for social and economic reasons. Gatherings of up to 8 people will be allowed in all public places. **21 December**: The first shipment of the Pfizer–BioNTech COVID-19 vaccine arrives in Singapore. **30 December**: Vaccinations for frontline workers and vulnerable populations begun. **26 January**: Tightening of COVID-19 safety measures ahead of the CNY period; households will be allowed only a maximum of 8 visitors per day, and people should not visit more than 2 households per day. **17 February**: The first shipment of the Moderna COVID-19 vaccine arrives in Singapore. **23 February:** The first shipment of China's CoronaVac COVID-19 vaccine arrives in Singapore, with HSA's authorisation for use pending.	**4 May**: Singapore would temporarily revert to Phase 2 from 8 to 30 May due to multiple virulent strains worldwide. **14 May**: Singapore would enter Phase 2 (Heightened Alert) from 16 May to 13 June 2021. **10 June:** Singapore to move back to Phase 3 (Heightened Alert) in two steps on 14 June; the limit for social gatherings and distinct visitors allowed per household would be increased to 5. **21 June**: Dining-in and mask-off indoor fitness activities would resume in groups of up to 2 people. 12 July: Dining-in and social gatherings at the workplace in groups of up to 5 would resume; work from home remains the default. **16 July:** All nightlife establishments that have pivoted to F&B establishments would be suspended from 16 to 30 July; group limit for dining-in and mask-off activities would revert to 2 from 19 July to 8 August, though fully-vaccinated people may continue with the 5-people limit.	**20 July**: Singapore to revert to Phase 2 Heightened Alert from 22 July to 18 August. **10 August:** Limit on social gatherings and visitors to households, as well as the resumption of dining-in at restaurants, would increase to 5 persons for fully-vaccinated people; from 19 August, up to 50% of employees currently working from home would be allowed to return to the workplace. **13 October**: Non-vaccinated persons* would be barred from entering shopping malls and dining-in at hawker centres/coffee shops. **30 November**: In view of the global presence of the Omicron variant, MOH announced that it would halt relaxations on social measures until further notice. **14 December:** Singapore will ease work-from-home requirements, where all must be fully vaccinated from 1 January 2022, and priority will be given to those who took the third booster jab to return to office fully.

Table 8. Overview table of the behaviours of each cluster

C1 n=583, 20.2% **Value Destroyers** *Weak business strategy, weak people strategy*	C2 n=986, 34.1% **Traditionalist** *Weak business strategy, strong people strategy*	C3 n=614, 21.3% **Technical Plateauers** *Weak business strategy, mediocre people strategy*	C4 n=422, 14.6% **Value Extractor** *Strong business strategy, weak people strategy*	C5 n=284, 9.8% **Value Creators** *Strong business strategy, strong people strategy*
				
Weakest business strategy • Standardised products - lacking uniqueness, premium features nor requiring substantial customisation • Low discipline in maintaining competitive prices • Worst innovator **Worst people strategy** • Higher proportion of PMEs (diploma) • Jobs with lowest task requirements, discretion and learning • Lowest levels of L&D • Low skill development needs • Practice a buy model **Mediocre market outcomes**	**Weak business strategy** • Products are neither unique nor premium but still require some customisation • Some discipline in maintaining competitive prices • Weak innovator **Strong people strategy** • Higher proportion of TAP and RNF • Jobs have low task requirements, discretion and learning • High provisions of top-guided L&D • Practice a build & buy model **Weak market outcomes**	**Mediocre business strategy** • Products are somewhat unique and offer premium features, but do not require substantial customisation • Some discipline in maintaining competitive prices • Weak innovator **Weak people strategy** • Highest proportion of TAP • Jobs have mid-level task requirements, discretion, and learning • Practice a build & buy model **Weak market outcomes**	**Strong business strategy** • Highly unique, premium products that require substantial customisation • Highest discipline in maintaining competitive prices • Strong innovator **Weak people strategy** • Higher proportion of RnF and TAPs • Jobs have high task requirements, discretion and learning • High skill development needs • Practice a build & buy model **Weak market outcomes**	**Strongest business strategy** • Highly unique, premium products requiring the most substantial customisation • High discipline in maintaining competitive prices • Best innovator **Strongest people strategy** • Highest proportion of PMEs (degree) • Jobs have high task requirements, discretion and learning • Highest levels of L&D – both top-guided and bottom-up • Highest skill development needs • Practice a build model **Best market outcomes**

• Mediocre performance in profits, revenue and market share **Weak people outcomes** • Weak employee engagement • Medium staff turnover (24.2%)	• Most likely to report decline in profits and revenue **Weak people outcomes** • Mediocre employee engagement • Low staff turnover (16.4%)	• Most likely to report stagnating profits and revenue **Weak people outcomes** • Mediocre employee engagement • Highest staff turnover (46.2%)	• Most likely to report decrease in profits, revenue and market share **Weak people outcomes** • High employee engagement • High staff turnover (30.1%)	• Most likely to report increase in profits, revenue and market share **Best people outcomes** • Highest employee engagement • Low staff turnover (14.6%)
Industry: Generally well-distributed although some sectoral variations exist. **Firm age and size**: Limited difference across clusters.				

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