INSTITUTE FOR ADULT LEARNING SINGAPORE

Are SME Transformations Skills-biased?

Evidence from Singapore on High- and Low-Road Transformation Pathways

A Research Report

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Executive Summary

Drawing on the most extensive study of SME transformation in Singapore to date, this report shows that SME transformations are indeed skills-biased. Firms that engage in business transformation activities increase their demand for higher skills. However, only SMEs that pursue high value-added transformation pathways generate deeper, more sustainable skills upgrading at scale—through more complex jobs, greater autonomy, and sustained talent development.

Based on a mixed-methods design combining quantitative analysis of 2,886 firms with qualitative evidence from 11 case-studies of SMEs comprising 17 employer interviews and 11 employee interviews, the study uncovered two pathways to SME transformation – low value-added and high value-added pathways. SMEs pursuing low value-added transformation typically raise skills requirements in a narrow or short-term way, without fundamentally improving job quality at scale or building long-term capabilities. In contrast, SMEs that follow high value-added pathways create roles that require more complex skills, make fuller use of employee capabilities, and provide stronger reasons for workers to join and remain in the SME sector.

Specifically, the following is observed:

- Transforming high value-added firms make substantially larger and stronger upgrades in skills demand than transforming low value-added firms (**Table 1**). A critical differentiator is job autonomy: transforming high value-added firms are far more likely to increase employees' job autonomy, whereas transforming low value-added firms show no meaningful change. For SMEs that cannot match the wage levels of larger firms, greater autonomy is an important non-wage attribute that helps attract and retain skilled workers.

Table 1: Skills strategy differences in Singapore SMEs

Skills indicator	Transforming, low value-added SMEs^	Transforming, high value-added SMEs^
Increase in jobs requiring a degree	**+2.3 pp** *(weakly significant, $p \leq 0.1$)*	**+5.2 pp** *(strongly significant, $p \leq 0.01$)*
Increase in jobs requiring frequent learning	**+3.8 pp** *(moderately significant, $p \leq 0.05$)*	**+11.8 pp** *(strongly significant, $p \leq 0.01$)*
Increase in job autonomy	**No significant change**	**+0.65 index points** *(strongly significant, $p \leq 0.01$)*

^ *When compared to non-transforming low value-add firms*

Source: Business Performance and Skills Survey II

- Transforming high value-added firms also invest far more deeply in talent than transforming low value-added firms (**Table 2**). Transforming low value-added firms rely primarily on 'buy' strategies—bringing in professionals, managers and executives (PMEs) to fill gaps—while transforming high value-added firms complement hiring with 'build' strategies that develop internal talent and strengthen workforce capabilities over time. Importantly, transforming high value-added firms are much more likely to report higher levels of workers' discretionary effort, suggesting that their strategies are more effective in motivating their workforce.

Table 2: Talent strategy differences in Singapore SMEs

Skills indicator	Transforming, low value-added SMEs^	Transforming, high value-added SMEs^
Hires more PMEs	**1.72× more likely** *(moderately significant, $p \leq 0.05$)*	**3.97× more likely** *(strongly significant, $p \leq 0.01$)*
Adopts 'build' strategy	**0.63x less likely** *(weakly significant, $p \leq 0.1$)*	**3.42× more likely** *(strongly significant, $p \leq 0.01$)*
Increase in discretionary effort	**No significant change**	**+0.57 points** *(strongly significant, $p \leq 0.01$)*

^ *When compared to non-transforming low value-add firms*

Source: Business Performance and Skills Survey II

- Because the qualitative interviews were conducted during the Covid-19 period with strict safe distancing policy, a clear contrast emerged: transforming high value-added firms felt most constrained by the need for workers to co-locate to support complex, interdependent work, whereas transforming low value-added firms expressed the greatest enthusiasm for the new possibility of hiring PMEs from the region at lower cost. This divergence indicates that high value-added transformation is far more likely to generate sustained future demand for local, high-skilled talent within Singapore's SME sector.

The findings show that while business transformation activities raise skills demand across SMEs in Singapore, only high value-added transformation delivers sustained gains in job complexity, autonomy, talent-building and reduced risk of high skills offshoring. The results underscore that ***what*** firms transform into matters as much as whether they transform ***at all***. This yields three major policy implications.

Enterprise and skills development policy must move beyond a generic 'transformation is good' stance and begin to steer SMEs toward high value-add business models that corelate with stronger utilisation of skills. Skills upgrading policies must be tied to the business models SMEs are transforming into; skills demand is more sustained in high value-added transformations. Crucially, increases in job complexity in such firms also translate into greater job autonomy. With autonomy as one of the key non-wage advantages SMEs can offer to be a preferred employer, high value-added transformation is essential for sustainable SME jobs.

The Covid-19 qualitative findings show that high value-added firms depend on co-located teams to support complex, interdependent work, whereas low value-added firms are better positioned to benefit from offshoring high-skilled work. This has major implications for Singapore's future PME labour market: only high value-added firms create sustainable domestic demand for high-skilled work, while low value-added models risk shifting PME roles to the region where labour is cheaper.

Combined, these insights highlight that a shift toward high value-added strategies in Singapore's SMEs is essential for robust socio-economic gains from Singapore's SME transformations, underscoring the need for policymakers to prioritise high value-added transformation in enterprise and skills strategies rather than relying on a generic 'transformation is good' discourse.

1. Introduction

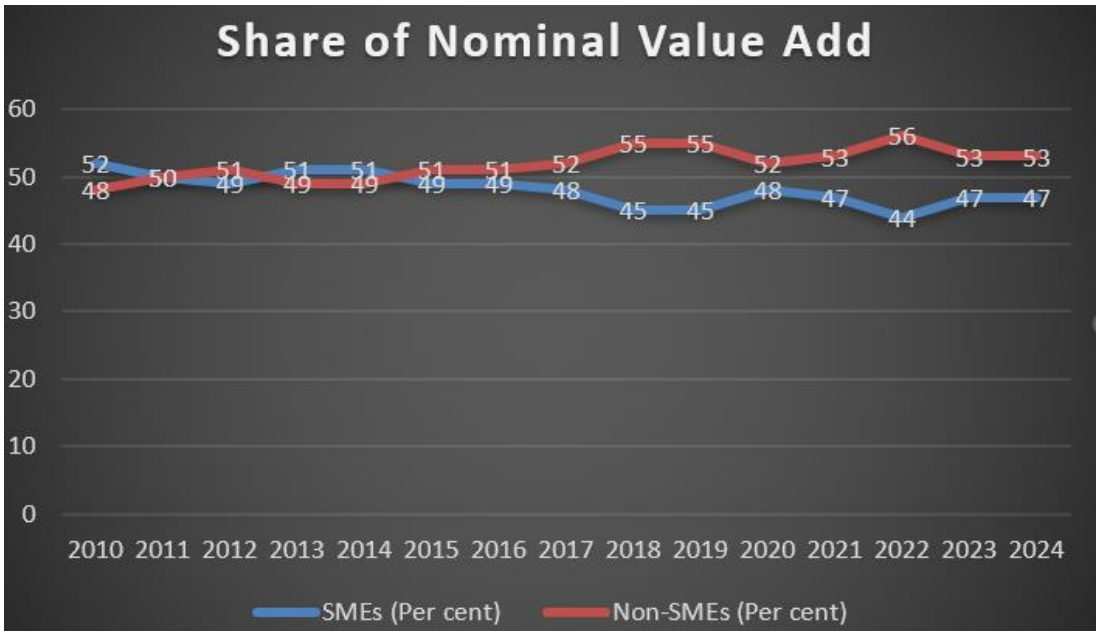
Supporting SMEs' business transformation activities

This research was conducted arising from interest by public sector agencies in Singapore to design robust human capital initiatives to support business transformation activities in Singapore's small-and-medium sized enterprises (SMEs).

Globally, there is a push for governments to introduce enhanced measures to support growth in SMEs with the objectives of strengthening job creation and job quality (OECD, 2019a; OECD, 2025). SMEs account for 90 percent of businesses and more than 50 percent of employment worldwide, making them a crucial employer (World Bank, 2025). In most OECD countries, 60-70% of jobs are created by SMEs (OECD, 2019a). This is likewise the case in Singapore, with SMEs making up 99% of Singapore's businesses and employing 70% of the workforce based on data by the Singapore Department of Statistics 2024.

Historically, the SME sector has played a limited role in Singapore's rapid economic transformation that has been driven primarily by transnational corporations and government-linked corporations (Cheang, 2022; Sadik, 2023; Van Elkan, 1995). Singapore's transition into a 'global city' since 2015—centred on attracting high-value activities such as regional headquarters, research, and advanced manufacturing—has further accentuated the structural challenges confronting SMEs (Sadik, 2023). 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 1**). In contrast, the average GDP share for SMEs in the European Union was 56.4% in 2019 (OECD, 2019a). In fact, in OECD countries with a comparable population size and economic bases as Singapore namely Finland and Demark, the contribution to GDP by SMEs could exceed 60% (OECD, 2019a).

Figure 1. SME's share of nominal value-add in the Singapore economy (2010 – 24)



Source: Singapore Department of Statistics

Correspondingly, labour productivity in Singapore SMEs is weak (Bhaskaran & Chiang, 2020; Cheang, 2022 Tan & Tan, 2014). Indeed, SMEs in Singapore are not seen as employers of choice with locals preferring to work with larger private enterprises and the public sector. This structural weakness shows up in job and skills data. Using 2014-15 PIAAC data to compare job quality patterns in Singapore SMEs with those in OECD countries, Freebody et al. (2017) found significant weaknesses:

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

More recent analysis using OECD's 2022-23 PIAAC data similarly highlight concerns about the underutilisation of human capital in Singapore SMEs. Chia et al. (forthcoming) find that in Singapore, professional roles in SMEs are found to have lower skills requirements compared to similar roles in larger firms. This is despite both non-SMEs and SMEs having PME workforces of comparable quality, as measured by PIAAC's standardized skills proficiency test in literacy, numeracy and adaptive problem-solving.

Public discourse in Singapore therefore have identified a need to simultaneously strengthen the SME sector to enhance its productivity while also becoming a source of 'good jobs' for Singaporeans (Bhaskaran & Chiang, 2020; Sadik, 2023; Tan et al., 2025). A recurring view in public policy is that the weakness of the SME sector arises from the lack of business transformation activities. SMEs are widely seen as a laggard when it comes to technology adoption and internationalisation (Ho, 2019). Consequently, a range of initiatives have been designed to support SMEs' business transformation activities such as the Enterprise Development Grant by Enterprise Singapore and the SMEs Go Digital Programme by the Infocomm and Media Development Authority of Singapore (Government of Singapore, 2025; Infocomm and Media Development Authority of Singapore, 2025).

However, there is little systematic evidence on whether business transformation in Singapore SMEs lead to better jobs, including substantive improvements in job quality. One exception is a study of talent models and technology outcomes in Singapore enterprises (Sadik et al., 2025). Using data collected in 2016, the authors found that many SMEs operated with a restricted view of talent shaped by narrow business models underpinned by price competition. Within this context, firms tended to adopt automation primarily as a labour-automation strategy, removing jobs but not upgrading remaining ones despite lower underlying levels of skills demand. This finding calls into question the assumption that business transformation and technological change necessarily translate into improved job quality in SMEs. It highlights the role of structural business model constraints in shaping workforce outcomes. Indeed, a more updated enterprise survey conducted in 2021 highlighted that the major weakness of Singapore's SME sector is their business models (Tan et al., 2025). The authors find that 3 in 4 SMEs in Singapore have a business model challenge in which their products are not sufficiently bundled as customised, premium and unique, making them unable to stand out in a globally competitive economy.

Yet, weaker job outcomes following business transformation may not stem solely from structural factors such as business models, but also from capability constraints within SMEs themselves. Compared to larger firms, SMEs typically operate with tighter financial resources, smaller management teams, and less formalised human resource systems (OECD, 2019a). As a result, even when business transformation activities have the potential to generate higher-skilled and better-quality jobs, these gains may not be

realised due to limitations in HR capabilities, including workforce planning, skills development, and job redesign. Understanding how business transformation interacts with SMEs' capabilities to manage their workforce development is therefore critical to identifying the key levers for fostering stronger job and skills outcomes as Singapore SMEs transform.

Taken together, the evidence points to a clear knowledge gap: while business transformation is widely promoted as a solution to improve SMEs' labour productivity and workforce challenges, neither its effects on job quality nor its skill outcomes can be assumed. Structural constraints such as business models and internal capabilities such as human resource may shape whether transformation translates into better jobs or reproduces structural weakness. This underscores the need to have a more precise understanding of *how* SMEs transform, *what* they transform into, and *with what implications* for jobs, skills, and talent development. Against this backdrop, this study is guided by a set of research questions to investigate SMEs' transformation pathways, workforce strategies, and job outcomes in a systematic and evidence-based manner.

Research questions

The research questions (RQ) guiding this study is as follows:

RQ1. **How do SMEs in Singapore manage their talent & skill needs as part of their business transformation?**
This RQ seeks to understand SMEs' manpower strategy and needs at the point when they embark on a business transformation initiative (e.g. buy, build, borrow, bot).

RQ2. **What are the consequences of business transformation with regards to jobs, skills and training?**
This RQ seeks to understand the longer-term impact of business transformation initiative to SME's talent, jobs and skills profile with a view to identifying changes to job quality. Are there changes to the work processes and/or workforce requirements, and if so are the changes incremental or transformational?

RQ3. **How is job redesign managed as part of SMEs' business transformation?**
This RQ seeks to go in-depth into the process of how SMEs embark on job redesign as part of their business transformation, including how SMEs transit their workers into new roles.

RQ4. **How has the COVID-19 pandemic impacted SMEs' business transformation needs/priorities, and what is the impact on jobs, skills and training?**
This RQ seeks to understand if SMEs have evolved their business transformation needs/priorities as a result of the Covid-19 pandemic, and the impact (if any) on jobs, skills and training.

Scoping the study

Research design

A mixed-method approach is adopted to study the relationship between business transformation activities in Singapore SMEs and the impact on talent, jobs, and skills as follows:

- An initial analysis of Enterprise Development Grant (EDG) administrative data was used. EDG is the top public grant in Singapore for supporting strategic transformation in Singapore SMEs. However, as the data is confidential, the findings are not published in this research report.

- The EDG analysis then guided the purposive sampling of SMEs in the qualitative investigation. 11 case studies of such SMEs that had been recipients of the EDG data were conducted, comprising 17 employer interviews and 11 employee interviews.

- Findings from the qualitative analysis informed the quantitative investigation using the Business Performance and Skills Study II (BPSS2). BPSS is Singapore's commercial establishment survey examining a complex system of workplace indicators for diagnostic, policy and practical purposes (Tan et al., 2018; Tan et al., 2025).

More details are in the methodology section of this report (Chapter 3).

SME definition

There is no universal definition of what constitutes an SME (Ardic et al., 2011; Berisha & Pula, 2015; Gibson & van der Vaart, 2008). Common approaches rely on quantitative thresholds, most frequently employee size and financial indicators. Across OECD countries, the most common upper bound is 250 employees, although national thresholds vary; Singapore adopts a limit of 200 employees, while the United States and Canada include firms with up to 500 employees (OECD, 2021).

In this study, SME boundaries are aligned with policy-relevant definitions and data availability. For the qualitative component, case-study firms were drawn from recipients of the Enterprise Development Grant (EDG) and therefore met Enterprise Singapore's SME criteria: at least 30% local shareholding, group employment size of no more than 200 employees, and group annual sales turnover below $100 million. For the quantitative analysis using BPSS2, SMEs are operationalised as establishments with 200 or fewer employees, as revenue-based measures are not consistently reliable in establishment surveys (Tan et al., 2025).

This pragmatic approach ensures consistency with national policy frameworks while maintaining comparability across qualitative and quantitative components of the study.

Approach to understanding business transformation

The literature on business transformation is dominated by conceptualisations that assess transformation ex post, often requiring evidence of fundamental changes in organisational logic, processes, or value creation (e.g. Gouillart & Kelly, 1995; Westerman et al., 2014). While analytically valuable, such approaches are less suited to studying SMEs where business transformation frequently unfolds through experimentation, partial reconfiguration, and uncertain outcomes rather than clearly bounded end states. Prior research has noted that frameworks developed primarily from large enterprises may understate the significance of incremental, exploratory, or aborted transformation efforts in SMEs (Chau & Turner, 2001; Lee et al., 2013).

Accordingly, this study scopes business transformation more broadly, focusing on firms' *engagement in transformation activities based on intent*, rather than on ex post judgments of success or failure. SMEs are included where there is explicit or implicit articulation of transformation intent—for example, through survey responses indicating substantial business upgrading, or through applications for public support schemes such as the Enterprise Development Grant, which is explicitly framed around deeper transformation in upgrading, innovation, and internationalisation. Within this scope, variation in business transformation activities is subsequently analysed in relation to their implications for talent, jobs, and skills.

Conceptual frames for talent, jobs and skills

The study focuses on talent strategies, job characteristics, and skills use as key workforce dimensions through which business transformation shapes economic and social outcomes. Conceptual framing for these dimensions draws on international research on skills utilisation, job quality, and talent management, anchored in the broader concern with the creation of good jobs in the economy (Brown et al., 2019; Green, 2006; Keep & Mayhew, 2014). Detailed conceptual definitions and analytical frameworks are provided in Chapter 2.

Structure of report

The report is structured as follows. Chapter 2 discusses the key literature. Chapter 3 presents the methodological approach used in this study. Chapter 4 presents the key findings from the qualitative investigation. Chapter 5 presents the key findings from the quantitative investigation. Chapter 6 discusses the implications of the study. Chapter 7 concludes the report.

2. Literature Review

From job creation to job quality in SMEs

As noted in Chapter 1, the focus of this study is not on SME business transformation per se, but on the implications of such transformation activities for talent, jobs, and skills. This emphasis reflects a central public policy concern in Singapore: while SMEs form the backbone of the economy, the sector has historically struggled to generate a sufficient number of good jobs for skilled local workers. Supporting SME transformation is therefore not only about improving firm productivity or competitiveness, but also about tipping the balance toward stronger employment outcomes within the SME sector.

Accordingly, business transformation in this study is not conceptualised as a set of completed, post-ante outcomes. Instead, the analytical focus is on firms' engagement in business transformation activities—that is, their intent and actions to change business models, processes, or capabilities. This approach allows the study to examine emerging patterns and trajectories in talent, job, and skills outcomes as SMEs undergo transformation, rather than limiting analysis to a narrow set of 'successful' cases.

Whereas earlier studies in both developed and developing economies emphasised SMEs' role in job creation, there is now growing recognition that employment growth alone is insufficient to deliver desired socio-economic outcomes. Consequently, recent research places greater emphasis on job quality, recognising that sustainable economic development and healthy labour markets depend not only on the number of jobs created, but also on wages, job security, skills utilisation, and working conditions (Croucher et al., 2013; De Kok et al., 2011, 2013; Hume et al., 2021; Kim, 2015).

Yet this shift towards job quality in SMEs requires an important analytical calibration in how job quality in SMEs should be understood. As argued by Kindström and Nord (2022), SMEs are not simply smaller versions of large firms; their constraints, organisational structures, and strategic options differ in fundamental ways. Consequently, practices that are effective in large firms do not always translate straightforwardly to SMEs and may, in some cases, produce contrarian outcomes. For example, although SMEs are often characterised as having weaker human resource (HR) capabilities, several studies have found that the formalisation of HR practices may have a negative association with employees' perceived work experiences in SMEs (García-Serrano, 2011; Storey et al., 2010). This may be because HR formalisation in smaller firms can unintentionally undermine the flexibility, autonomy, and informal work arrangements that support positive work experiences.

Indeed, empirical studies have consistently shown that employment in SMEs is associated with substantively different outcomes compared to larger firms (De Kok et al., 2011, 2013; Falco et al., 2011; Hume et al., 2021; Freebody et al., 2017). Across both developed and developing economies, jobs in the SME sector tend to be weaker on key dimensions including wages, job security, access to training and union protection. Smaller enterprises generally pay lower wages than larger firms, and employment relationships are often less stable (De Kok et al., 2013; Falco et al., 2011). In both developed and developing economies, SMEs are significantly less likely to provide formal training to their workers than large firms (De Kok et al., 2011; International Finance Corporation, 2013). Croucher et al. (2013) similarly highlights that SMEs tend to offer lower wages, weaker social protection, poorer occupational safety and health conditions, and less developed industrial relations compared to their larger counterparts.

Yet, a more nuanced picture emerges when job quality in SMEs is assessed in terms of job satisfaction. The same body of research finds that job satisfaction is often higher in SMEs than in large firms, despite weaker objective conditions (De Kok et al., 2011, 2013; García-Serrano, 2011; Storey et al., 2010). Studies

consistently report an inverse relationship between firm size and self-reported job satisfaction, with employees in small firms expressing higher levels of satisfaction than those in larger organisations (Falco et al., 2021). A commonly cited explanation is that SMEs are better able to offer non-wage job attributes that compensate for lower pay, such as greater task variety, stronger feelings of meaningfulness, closer social relationships, and more direct involvement in decision-making. These features—particularly meaning and job autonomy—have been identified as important drivers of performance in globally competitive SMEs, including the Mittelstand firms in Swiss-Germanic countries and Denmark's 'hidden champions' (Danish Technological Institute, 2014; Lehrer & Schmid, 2020; Pahnke & Welter, 2019).

Unfortunately, in Singapore, analysing job quality among SMEs using PIAAC data, Freebody et al. (2017) found that while SMEs in Singapore, as elsewhere, tend to pay less than non-SMEs, the wage differential between SMEs and non-SMEs in Singapore is substantially larger than the OECD average. More strikingly, unlike in many advanced economies where SME employees are often compensated for lower pay and job security through lower work intensity and higher levels of autonomy, employees in Singapore SMEs experience lower autonomy and job security alongside higher work intensity. The authors argue that this reflects deeper structural stratification between SMEs and non-SMEs in Singapore's economy, in contrast to the more integrated production systems found in many OECD countries. This is not unique to Singapore. Similar patterns are observed in South Korea, where the structural relationship between large conglomerates and SMEs is also associated with poorer job quality in SMEs (Kim, 2015).

More recent analysis using OECD's PIAAC 2022-23 data similarly highlight concerns about the underutilisation of human capital in Singapore SMEs. Chia et al. (forthcoming) show that SMEs in Singapore have increased their employment of professionals, managers, executives, and technicians (PMEs), yet the jobs created often involve lower job task requirements compared to similar roles in larger firms. Importantly, this pattern does not reflect differences in worker capabilities: PME employees in SMEs display comparable skills proficiency to those in non-SME firms based on standardised PIAAC's skills proficiency assessments in literacy, numeracy and problem-solving. This divergence between skills possessed and skills used indicates that organisational change in SMEs can increase occupational upgrading without corresponding job upgrading, resulting in systematic underutilisation of skills rather than skills-biased work redesign.

Echoing the above observed trends, Bhaskaran and Chiang (2020), in their analysis of Singapore's declining labour productivity and total factor productivity, identify the rapid and sustained inflow of low-cost foreign labour since the 2000s as a key factor depressing wages, business investment, and productivity growth. Although their analysis does not focus exclusively on SMEs, they observe that sub-par productivity growth has ultimately manifested in the under-performance of local firms. Relatedly, Cheang (2022) argues that Singapore's state-led industrial development model, while successful in driving growth, has tended to privilege multinational and state-linked firms, thereby limiting the scope for SME-led entrepreneurial discovery and upgrading. In sectors such as construction and manufacturing, SMEs have often been confined to low-cost supplier roles within global value chains, particularly as subcontractors to multinational corporations (Cheang, 2022; Chew & Chew, 2008). These positions offer limited scope for engaging in high value-added activities that demand workforce discretion, deep skills, or innovation-driven job redesign.

Indeed, business model challenges continue to hold SMEs back in Singapore from utilising the high skills of Singapore's workforce. Consistent with international literature like the German Mittlestand, Tan et al. (2025) found that it is the combination of high value-added business strategies and high-utilisation people strategies that predicts strong business performance in Singapore SMEs. Yet only 1 in 10 SMEs exhibit these characteristics with a substantial 7 in 10 SMEs held back by business model challenges. Specifically, SMEs' product strategies frequently lack the level of value addition required to support customisation, uniqueness, and premium positioning in the market.

In this context, the impact of business transformation on talent, jobs, and skills ultimately hinges on whether SMEs are able to strengthen skills utilisation, rather than simply increase the number of jobs they create. For Singapore SMEs facing structural constraints in wages and job security, improving skills utilisation—particularly through greater job autonomy—represents a critical non-wage lever for enhancing job quality. The capacity to organise work in ways that grant skilled workers discretion, responsibility, and meaningful involvement in business processes is therefore central to whether SMEs can develop a sustainable edge over the non-SME sector in attracting, retaining, and effectively deploying talent.

Skills utilisation, job autonomy, and talent strategies in SMEs

Skills utilisation refers to the extent to which employees' skills are effectively applied in their work. It encompasses not only the alignment between workers' capabilities and the tasks they perform, but also the degree of autonomy, discretion, and organisational resources available for exercising those skills (Buchanan et al., 2010; Green, 2013; Sung & Ashton, 2014; Warhurst et al., 2017; OECD, 2017; OECD, 2019b). The skills utilisation literature consistently emphasises that the underuse of skills is primarily a problem of work organisation and management, not the skills of the workforce.

A core insight from this literature is that skills utilisation is shaped by a set of interrelated organisational factors (Sung & Ashton, 2014). Firms' business strategies influence job structures and decision rights, with innovation- and quality-oriented strategies more likely to require discretion and judgement, while cost-based and efficiency-drive strategies tend to standardise tasks and constrain skill use. Job design and task complexity matter insofar as non-routine, problem-solving work provides greater scope for deploying skills (Adler, 2004). Task discretion and autonomy are critical enablers, as even highly skilled workers cannot utilise their capabilities when decision-making authority is tightly controlled. Management practices, including supervisory styles and opportunities for collaboration, further condition whether skills are activated or suppressed.

More recently, talent management has emerged as an important dimension of skills utilisation. Building on the sociology of professions, Evetts (2009, 2013) argues that contemporary organisations increasingly impose 'professionalism from above' whereby occupational discretion is displaced by managerial controls such as performance targets, metrics, and standardised procedures. Brown et al. (2019) show how corporate talent management systems stratify workforces by identifying and disproportionately investing in a small elite, while constraining opportunities for the remainder. This logic underpins the well-known 'war for talent' approach, in which organisations focus their development and rewards on a minority of workers deemed critical to value creation (Michaels et al., 2001; Becker et al., 2009). Professional discretion continues to be offered to the broad workforce, but organizational discretion is reserved for selected groups, ultimately limiting skills utilisation.

Evidence from Singapore suggests that SMEs often operate under an even more restrictive configuration. Sadik et al. (2025) find that SMEs in Singapore are more likely to offer neither professional nor organisational discretion. This amounts to a 'zero-talent' model, in which workers are afforded limited autonomy in their roles and minimal involvement in strategic or innovative activities. Crucially, Sadik et al. (2025) show that organisational discretion correlates strongly with who is included and benefits from business transformation and strategic change initiatives. In the absence of such discretion, skills are systematically underutilised, regardless of workers' formal qualifications or measured proficiency.

This finding has direct implications for how SMEs address capability needs. The 4Bs framework – build, buy, borrow and bot – are guiding HR decisions (Capron & Mitchel, 2012; Lenon, 2024). SMEs operating under a zero-talent model are structurally predisposed towards buy, borrow, or bot strategies—respectively as hiring skills from the external market (buy), relying on contractors or partners (borrow), or substituting

labour through automation (bot) —rather than build strategies that depend on developing and empowering existing workers. In contrast, higher-discretion organisational models are more conducive to build-oriented approaches that embed learning, autonomy, and sustained skill use within jobs. The choice among these talent strategies therefore reflects not only labour market conditions, but also deeper organisational decisions about who is valued and trusted.

Taken together, the skills utilisation literature underscores why job autonomy and organisational discretion are central to understanding the employment consequences of SME transformation. In contexts such as Singapore, where SMEs face structural constraints in wages and market positioning, the ability to organise work in ways that enable skills to be fully utilised—particularly by granting autonomy and inclusion in strategic activities—becomes a critical non-wage lever. Whether business transformation translates into better outcomes for talent, jobs, and skills therefore depends not only on the adoption of new technologies or the upgrading of business models, but on whether SMEs move away from zero-talent configurations towards organisational forms that actively deploy and develop the capabilities of their workforce.

Skills-biased organisational change / skills-biased technological change

A central assumption underpinning SME transformation policy is that organisational and technological change are inherently skills-biased. The prevailing policy logic is that as firms transform—by reorganising work, adopting new technologies, or upgrading business models—they will naturally raise demand for skilled labour and, in doing so, generate better jobs characterised by greater autonomy, learning, and progression. This assumption is particularly salient in the SME context, where wage growth is structurally constrained and job upgrading is expected to occur primarily through non-wage dimensions of job quality.

This logic draws heavily on two influential strands of literature: skills-biased organisational change (SBOC) and skills-biased technological change (SBTC). SBOC emphasises that changes in work organisation—such as delayering, decentralisation of authority, delegation of decision-making, multiskilling, and team-based work—reshape job content by increasing discretion, problem-solving, and coordination demands, thereby favouring more skilled and autonomous workers (Caroli & Van Reenen, 2001; Piva et al., 2005). SBTC complements this view by arguing that technology tends to be complementary to skilled labour, as higher-skilled workers are better positioned to deploy, adapt, and improve new technologies, while routine tasks are more vulnerable to automation (Goldin & Katz, 2008; Autor, 2015). Together, these frameworks provide a strong theoretical basis for the expectation that business transformation will translate into skills upgrading and better jobs.

However, both strands of the literature also caution—implicitly and explicitly—that skills bias is not automatic. As Acemoglu and Restrapo (2019) argues, the direction of technological change reflects organisational and strategic choices made by firms, rather than exogenous technological forces. They speak of ‘so-so technologies’ that are being pushed out that are productive enough to disrupt employment but not sufficient to lead to a substantial boost in productivity.

From an organisational perspective, restructuring can take divergent forms: it may expand autonomy and judgement, but it may also centralise control, standardise tasks, and intensify work. In firms operating under strong cost pressures—a common condition among SMEs—organisational and technological change may therefore be oriented less towards enriching jobs than towards extracting efficiency from existing labour. In such cases, transformation can raise skills demand on paper without improving skills utilisation or job quality in practice.

Further evidence points to the central role of business strategy in mediating whether organisational and technological change becomes skills-biased in practice. Tan et al. (2025) find that only around one in ten SMEs in Singapore exhibit the enabling conditions typically associated with SBOC and SBTC—namely, the combination of high value-added business strategies and high-utilisation people practices. For the majority of SMEs, weak or undifferentiated business strategies limit the extent to which transformation activities

translate into meaningful changes in job design, autonomy, and skills utilisation. This suggests that business transformation must involve substantive shifts in firms' strategic orientation, rather than incremental process improvements, if organisational and technological change is to result in job upgrading.

From this perspective, the policy assumption that SME transformation will naturally deliver better jobs through skills-biased change requires systematic investigation. Skills-biased organisational and technological change should be understood not only as conditional achievements, but as particularly demanding ones in the context of Singapore SMEs, where substantive efforts are required to overcome long-standing structural disadvantages relative to larger firms.

Summary

In summary, this chapter establishes the theoretical framing of the study around job quality, skills utilisation, and skills-biased organisational and technological change. The literature on job quality in SMEs highlights that, given their structural constraints, SMEs must compete with larger firms through non-wage attributes—most notably job autonomy—rather than wages alone. Skills utilisation provides a critical framework for understanding how such advantages can be realised, directing attention to a wide range of factors such as business strategy, job design and talent management. The chapter further shows that skills-biased organisational and technological change cannot be assumed to follow automatically from business transformation and, in the Singapore context, must be sufficiently substantive to overcome long-standing structural weaknesses in the SME sector.

3. Methodology

Mixed methods

A mixed-methods approach is adopted to study the relationship between SME business transformation activities in Singapore and their impact on talent, jobs, and skills.

The first rationale for using mixed methods is that different datasets offer complementary insights (Greene et al., 1989). As outlined in Chapter 2, existing literature suggests that transformation activities by Singapore SMEs do not automatically lead to better jobs or deeper skills. By leveraging multiple data sources, mixed methods allow us to generate and test a broader set of hypotheses about possible relationships between business transformation, workforce outcomes, and national socio-economic goals.

The second rationale for employing mixed methods is to enhance the robustness and credibility of findings through triangulation across multiple data sources (Kelle, 2001). This is especially important as this study is intended to inform policymaking. Triangulation strengthens confidence in the evidence base, making it more actionable for public agencies to test through pilots and targeted interventions.

The research design integrates three components:

- Phase 1 | Text analytics leveraging analysis of administrative data from the Enterprise Development Grant (EDG) administered by Enterprise Singapore. The findings from this dataset inform the selection of enterprises in the qualitative analysis.
- Phase 2 | Qualitative analysis leveraging 11 case studies of EDG grant recipients based on semi-structured interviews with 17 managers and 11 employees.
- Phase 3 | Quantitative analysis of 2,889 SMEs using Singapore's national survey of establishments—the Business Performance and Skills Survey 2 (BPSS2) conducted in 2021

Combined, the study allows us to capture both the depth and breadth of how SME transformation shapes job, skills, and talent strategies (Lin, 1998).

Due to confidentiality requirements associated with the EDG grant data, the methodology and detailed results of that component cannot be reported here. The main contribution of the text analytics was to guide a more purposive identification of the broader range of enterprise transformation types. Its influence on the eventual findings is modest; the core insights of the study are fundamentally shaped by the case studies and the quantitative analysis using the BPSS2 data. Consistent with the exploratory nature of the study, the research employs a sequential mixed-methods design in which qualitative insights inform the quantitative analysis, and both strands are given equal analytical weight (Leech and Onwuegbuzie, 2009).

Qualitative analysis

The qualitative component of the study involved interviewing SMEs that had applied for the EDG grant. Senior managers who led the firm's transformation efforts were interviewed alongside employees involved in or affected by these activities. The employee perspectives provided important triangulation, offering deeper insight into the processes and outcomes of business transformation activities on talent, job and skills.

In all, the study aimed to cover 12 SMEs, with one senior manager and two employees from each firm to enable corroboration of perspectives. A total of 130 firms were invited to participate, but recruitment proved challenging; ultimately, only 11 SMEs were secured before data collection had to be concluded.

Nonetheless, the interviews yielded sufficiently rich insights, particularly when triangulated with quantitative analysis.

Senior managers were first interviewed on the firm's business transformation activities, and their assessment on the impact on talent, job and skill strategies. In some interviews, the firms involved more than one senior manager. In one case, the research team had the opportunity to interview the SME consultant guiding the business transformation activities of the firm. In total, 17 personnel were interviewed in 11 firms related to business transformation activities.

Following the interviews, the senior managers were invited to nominate employees involved in these transformation activities for interviews. Not all senior managers were open to having their employees speak to us. Only 6 out of the 11 SMEs provided employees for interviews. In total, 11 employees were interviewed in these 6 companies.

All employees interviewed were contacted separately via email once the contact was provided by the senior managers. A series of steps was taken to ensure that employees give informed consent and that they felt safe to share their experience. Specifically, the study was explained to them, and they were informed that they need not take part in the study if they did not wish to, without their managers being notified. From the research team's assessment, participants generally appeared comfortable with the confidentiality assurances provided.

For both the employer and employee interviews, a semi-structured interview instrument was used based on "conversations with a purpose" (Burgess, 1988; p. 102). Semi-structured interviews provide a balance between the strictly worded questions used in surveys or questionnaires, and the lack of set questions used in unstructured interviews (Bryman and Bell, 2011a). This focused discussion gives flexibility to the researchers to ensure that relevant issues are discussed, with room for elaboration and explanations from interviewees.

Each firm is analysed as a case in relation to the interviews with the senior manager, employees and consultant. Each case is then compared together with other cases through a process of constant comparison (Glaser, 1965), leading to an assessment of which set of companies were more like one another and dissimilar to the rest. The findings from the qualitative analysis informed the interrogation of the quantitative data.

Quantitative analysis

The analysis conducted for this section uses the data from the Business, Performance and Skills Study II (BPSS2). The online self- administered BPSS2 questionnaire was completed by either the employer or senior manager from commercial establishments in Singapore with at least 10 staff (Tan et al., 2025). A total of 2,889 SMEs responses were used for the analysis.

An SME is defined by the Ministry of Trade and Industry as an enterprise with an annual sales turnover of under $100 million, or that employs less than 200 workers (Ministry of Trade and Industry, 2013). Given that BPSS did not have a complete set of revenue as establishments deem their revenue as sensitive information, SMEs are defined as enterprises with less than 200 workers (Tan et al., 2025).

Drawing on the qualitative findings of the crucial role of business models to transformation activities, a few conceptual approaches are taken:

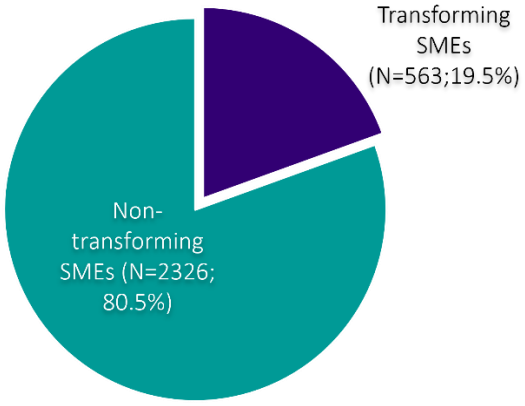
Who is a transforming SME?

Business transformation is a complex process that typically involves the management, employees, the operation processes, and technology. Due to the availability of measures in BPSS2, only two variables are considered in this analysis namely firms that:

- Invested in expansion (purchase assets, develop new or significantly improved goods, services or processes, entry into new markets); or
- Invested in new technology in the last 12 month (excludes replacing obsolete or depreciated technology)

Figure 2 show the distribution of transforming SMEs in the BPSS2 dataset.

Figure 2. Proportion of transforming SMEs



Value- added strategies

Due to findings from the qualitative analysis that showed variation in types of business transformation, high or low value-added strategies (VA) are considered in the analysis. High-VA strategies enable firms to stand out among their competitors through the production of highly differentiated, customizable, and premium quality products and services. The measure of VA strategy used in the analysis comprises a combination[1] of the following three questions in BPSS:

- Compared to others in your industry, there was a substantial amount of customisation depending on the requirements of customers or users of your services.
- You compete in a market for premium quality products or services.
- This establishment relies on developing unique products or services.

A VA score is derived by standardising the average values of the three questions. An arbitrary cut-off at '0' of the standardised score was set to distinguish establishments with low or high VA where high VA SMEs are allocated a value of "1" and "0" for low VA SMEs. Combined, SMEs in the BPSS dataset are grouped into four quadrants as shown in **Table 3**:

[1] Principal Factor Analysis was conducted with one factor explaining 58% of the variance and Cronbach's alpha of 0.63.

Table 3: Four archetypes of SMEs

	Low value- added SMEs	*High value- added SMEs*
Transforming SMEs	**Transforming & Low Value- Add** *TF=1, VA=0*	**Transforming & High Value- Add** *TF=1, VA=1*
Non- transforming SMEs	**Non- transforming & Low Value- add** *TF=0, VA=0*	**Non- transforming & High Value- add** *TF=0, VA=1*

Talent, job and skills variables

Talent, job and skills variables are used to study the correlation between SMEs' transformation activities and their skills and talent strategies. Because the BPSS2 dataset does not capture wages with sufficient granularity, direct analysis of wage gains is not possible. However, jobs embedded in firms with stronger skills strategies tend to be associated with higher wage outcomes, making skills strategy a credible basis for assessing and comparing job quality (Chia et al., forthcoming; Freebody et al., 2017). Two broad dimensions, namely skills strategy and talent development, are used as follows:

Skills strategy dimension

- *Job complexity*

First, we focus on job complexity through the lens of skills demanded by jobs. Mason (2011) found that an increase in product strategy is associated with an increase in skills demand. It is therefore expected that business transformation activities should lead to increases in skills demand. The job complexity measure in BPSS2 consists of jobs that require a bachelor's degree or higher and frequent learning.

- *Jobs that require a bachelor's degree or higher*

The education level required to do a job can be a proxy for job complexity given that it is more likely for a degree job to demand for more cognitive tasks like problem solving and literacy.

- *Frequent learning*

Learning is expected to be more frequent in jobs that are complex with more complicated production process (Nedelkoska & Patt, 2015).

- *Autonomy*

Autonomy refers to the employee's ability to work and make decisions over their work independently. It is a differentiator for SMEs as a non-wage attribute to make up for lower wages compared to larger firms (Freebody et al., 2017). BPSS2 asked employers four questions regarding the extent of discretion workers at their establishment had over how, when, where, and the standard to which they do their work.

Talent development dimension

- *Increased in skilled workers*

The increase in the proportion of jobs which demand for higher level of job complexity and should trigger an increase in the number of skilled workers within the firms. If the level of job complexity increases in transforming SMEs, we would expect the increase in number of skilled workers in transforming SMEs suggesting a sound hiring strategy. Skilled workers is represented as the increase in professionals, managers and executives (PMEs) hired in the firm.

- *Buy or build talent*

With the need to increase in skilled workers, it would be of interest to further investigate if the firms develop or "build" their employees from within, or to "buy" talent. Utilising the build strategy over the buy strategy shows strategic and competitive advantages that forms the core competencies within the organisation (Daneshgar et al., 2013). In the long run, it is posited that the build strategy is a more sustainable strategy for businesses to develop and retain talent.

- *Employee engagement*

Increasing skilled labour is not sufficient; firms need to provide a conducive environment to support employees to exhibit high level of discretionary effort to drive innovation and value creation. One key measure of employee engagement is d*iscretionary effort,* the level of effort employees put in above and beyond what is required of the job. Employee engagement is closely related to discretionary effort (Sharafizad & Redmond, 2019). BPSS measures employees' discretionary effort by asking employers the proportion of their workers that they frequently observe exhibiting behaviour consistent with high levels of engagement through the following questions:

No.	I observe the workers at this establishment…
1	going above and beyond the call of duty
2	taking up the duties of a colleague without being asked
3	making helpful suggestions for improving things
4	putting in more hours that you expect

Business performance

Finally, we investigate the correlation of transformation strategies on business performance. This is based on the responses employers give if their market share, profit, and revenue decreased, stayed the same or increased over the last 12 months.

Triangulation of findings

Divergence and convergence of qualitative and quantitative findings are analysed through holistic triangulation (Turner et al., 2017). Constant comparison of hypotheses and alternative explanations are used when there is divergence in the qualitative and quantitative results. This allows us to develop a best-case explanation in instances when there is divergence. Where there is convergence, qualitative and quantitative interpretations are used to strengthen the findings.

Summary

The impact of SMEs' business transformation activities on talent, jobs and skills is investigated using mixed methods, combining insights from 11 case studies of transforming SMEs with a quantitative investigation of 2,889 SMEs.

4. Results 1: Qualitative investigation of SMEs

Two contrasting pathways

This chapter traces two pathway archetypes linking business transformation activities to the impact on talent, job and skills as undertaken by Enterprise Development Grant recipients, based on qualitative interviews in 11 firms. Two patterns emerge; the high road and the low road.

In the high road, SMEs innovate to create new value by building more complex products and services to generating resilient and higher-quality revenue streams. In the low road, SMEs focus primarily on extracting more revenue from an existing business model—typically through process efficiencies, digitalisation of routines, and tighter managerial control—without shifting the core offering of their products and services.

These pathways do not only reflect different investment choices; they entail distinct trajectories for talent, jobs, and skills. High-road firms re-architect their business model around innovation and product/service differentiation. They expand hiring of skilled workers and redesign jobs to expand autonomy, problem-solving, and collaboration across levels. Low-road firms prioritise efficiency gains, add management layers or outsource/automate selected activities, keeping job content for the rest of the workforce tightly scoped. Over time, those choices compound—either into a flywheel of value creation, learning and capability building, or into a treadmill of incremental efficiency with limited scope for broad workforce development. The sections that follow first define the two strategies and their workforce implications and then present 4 out of the 11 case studies.

Defining the two strategies

High road: value-creating innovation (evident in 4 out of 11 case studies)

Business transformation strategy: High-road SMEs pursue new wealth creation. They move up the value chain—designing proprietary products, embedding sustainability, platformising services, or introducing analytics-rich solutions. In our sample, this included an e-health/infocomm firm developing patented AI-based products and a marine engineering firm moving from systems integration to be among the first-in-market in sustainable equipment. These companies often collaborate with universities or research partners and purposefully accumulate excess capability relative to current tasks, so they can pursue emergent opportunities rather than rely on today's pipeline.

Workforce implications: Demand for PMEs increase at scale. This makes it unfeasible to 'buy' experience through attracting qualified workers outside of the firm. Instead, high-road firms frequently build talent from fresh graduates, diploma holders, and mid-career switchers, giving them autonomy to experiment and fail safely. Job design expands across the board—more cognitive and social tasks, complex problem-solving, cross-functional teaming, and higher discretion even at junior levels. Training mixes standard programs with generative workplace learning (mentoring, joint problem-solving, boundary-crossing projects).

Low road: revenue-extracting innovation (evident in 7 out of 11 SMEs)

Business transformation strategy: Low-road SMEs prioritise exploiting current wealth. They 'innovate' to deliver existing products better: automating processes, tightening KPIs, or offshoring routine work to lower-cost labour markets. Where products are neither distinctive nor premium—a common challenge for Singapore SMEs—improvement focuses on doing more of the same, only cheaper/faster, rather than upgrading the products and services to be a differentiator. This extends into a 'borrow/buy' models for specific expertise (e.g., hiring a contractor to set up a tool) without building enduring in-house capability.

Workforce implications: Capability investments concentrate at the PME layer (planning, compliance, process design) while rank-and-file autonomy shrinks. Training is frequently standardised and narrow (compliance or basic technical), with limited access for non-PMEs. Organisationally, firms add control points and managerial layers; digital tools are used primarily for monitoring and throughput rather than to enable creativity.

Table 4 summarises the contrasting business transformation strategies of Singapore SMEs with contrasting implications for talent, job, skills and learning.

Table 4. Contrasting business transformation strategies of Singapore SMEs

Dimension	Value-Creating Innovation (High Road)	Revenue-Extracting Innovation (Low Road)
Innovation Strategy	• Innovate by creating more complex products and services that generate stronger, sustainable revenue streams	• Innovate by improving efficiency in existing activities to draw more from current revenue streams
Talent–Skills Strategy	**Broad talent development** • Hire widely, including many PMEs, to directly participate in innovation. • Build model, including hiring those without experience and training them • Open to non-traditional sources of talent.	**Narrow talent development** • Hire selectively, mainly to strengthen managerial capacity or provide specific expertise. • Buy model, hiring those with existing experience • Target specific talent sources
Job–Skills Impact	**Transformational** • High skills demand across the workforce • Greater discretion and autonomy for employees • Culture of collaboration and teamwork.	**Incremental or regressive** • High skills demand only at PME level • Reduced rank-and-file autonomy • Reinforce top-down culture
Training & Learning	**Broad-based development** • Standard and non-standard training, technical and soft skills • High levels of generative forms workplace learning	**Narrow development** • PMEs access technical and soft skills training • Rank-and-file workers is limited to standard technical training.
Future Labour Demand	**Sustained local PME demand** • Likely to sustain demand for local high-skilled workers due to the need for face-to-face innovative work • Space for growth of technical roles	**At-risk local PME Demand** • Likely to consider using remote PME workers to hedge costs and sustain price competition strategies while demand for low-skilled workers locally continue

What the high road looks like in practice

High-road firms recognise that innovation entails risk but view it as essential for long-term survival in Singapore's high-cost, advanced economy, where low-innovation, low-cost strategies are increasingly exposed to intense competition, particularly from Chinese firms. They counter the well-known SME talent attraction challenge by creating alternative value for talent—hiring for trajectory and crafting jobs with

meaningful autonomy, learning, and exposure, consistent with what is observed in international literature (De Kok, 2011, 2013).

Case 1: Infocomm SME — productising AI-enabled healthcare

Traditionally a provider of electronic record infrastructure and project-based e-health integration, the firm reaches the limits of a feast-and-famine delivery model after more than two decades in operation. Its senior management recognises that long-term sustainability requires a decisive shift away from bespoke services leveraging on intellectual property (IP) of other firms towards scalable, value-creating offerings that leverages the firm's IP. A new business unit is therefore launched to build recurring revenue from proprietary products, using artificial intelligence (AI) to move the firm up the value chain. The Senior Vice President (SVP), who leads this transformation, describes the pivot plainly:

> "We want to shift to something that is recurring and where there is actually able to show growth."

This strategic shift entails a fundamentally different risk profile. The new unit operates independently from the firm's core business, allowing it to experiment with AI, platformisation, and robotics without the constraints of established delivery routines. Although the unit remains a cost centre in its early stages, these short-term risks are understood as necessary investments in long-term value creation and competitive differentiation.

Talent constraints in emerging technology areas push the firm to rethink conventional hiring practices. Instead of relying on experienced specialists—who are both scarce and expensive—the unit deliberately opens its talent funnel. Fresh graduates, mid-careerists from unrelated industries, and even interns are recruited and entrusted with meaningful responsibilities in product development. These individuals are valued for their curiosity, passion, and ability to challenge established ways of thinking. To enable this, the unit adopts a deliberately flat organisational structure that encourages experimentation and open challenge:

> "We always tell them there's no hierarchy… try to throw ideas… There's no right and wrong answer."

This flat structure is not merely symbolic. Interns and junior employees work directly on core products, participate in brainstorming sessions, and are expected to contribute ideas alongside more senior staff. Learning is embedded in everyday work rather than formal training programmes. Juniors shadow seniors, engage directly with customers, and learn to frame technical problems from the client's perspective, gradually building both technical and commercial judgement through hands-on experience.

As the unit grows, the SVP takes an active role in protecting this environment from the wider corporate hierarchy. This is seen as especially critical for research and development activities, where speed, creativity, and collaboration are central to innovation outcomes:

> "Especially for R&D teams and new young dynamic teams, you need to be a team. You cannot have a hierarchy. Once you have a hierarchy, it stifles creativity."

The firm's approach to innovation also has direct implications for the future of labour demand. Unlike cost-driven transformation strategies that rely on modularised work or remote labour to reduce expenses, Firm 1's value-creating model depends on dense, ongoing collaboration among highly skilled workers. Innovation is understood as a collective process that requires frequent interaction and co-presence, particularly in research and development. As the SVP explains:

> "My team requires a lot of brainstorming… [working on the product] It's something that I need to bring my team together… the dynamic process of being able to develop new things – it has to have the people to come together. It is very difficult to actually have the people work from home and be able to deliver such, such products… And I think ideas come together better when we actually meet face-to-face."

Because the firm's core work is deeply interdependent and difficult to codify, the use of remote or offshore labour is not a viable substitute. Instead, the transformation anchors demand for high-skilled, co-located work. In this sense, the future of labour demand in Firm 1 is relatively secure: the same organisational and technological choices deepen skills use, reinforce collaboration, and embed high-quality jobs at the heart of the firm's long-term growth strategy.

The Enterprise Development Grant played an important role in moderating the risks associated with the firm's growth ambitions. While the firm would have proceeded with the investment regardless, the Senior Vice President noted that the grant helped de-risk what was a high-cost but necessary strategic pivot.

Case 2: Equipment Manufacturer — moving upstream to sustainable design

A 40-year-old manufacturing firm with a group employment size of around 70 launches a small subsidiary to pursue first-in-the-world sustainable solutions. Long positioned as a manufacturer and integrator, the firm deliberately moves upstream into high-end design for the first time, targeting proprietary, patentable intellectual property rather than replicable integration work. The team is now publishing research papers and applying for a patent, signalling a strategic shift from execution to knowledge creation. The General Manager (GM) captures the leap:

> "In Singapore – a lot was integration… not the core fundamental design. Basically if you give the design to anyone, anyone can build it… That is where we came in."

The move upstream introduces uncertainty and risk. Developing sustainable solutions entails original design work with little precedent, requiring emergent learning rather than the application of established routines. A small group of employees is entrusted to lead the initiative, starting with smaller projects that allow them to build system-level understanding before tackling more complex designs. Learning is intensive and generative: reading academic literature, consulting overseas experts, developing original designs, and running simulations to test and refine performance. Capability accumulates through iteration, not instruction.

Unable to 'buy' senior specialists at SME wage levels, the firm pivots to a deliberate build strategy. Fresh engineering graduates are recruited and given responsibility early, working across mechanical, electrical, and process domains rather than within narrow functional silos. Jobs are redesigned to emphasise autonomy, cross-functional problem-solving, and collective ownership of outcomes. Hierarchy is flattened to support this mode of working, with decisions driven by technical reasoning rather than positional authority. As the GM explains:

> "We are not going to tell you exactly [what to do]… If somebody has a better argument, then you cannot implement that. So, that flexibility of giving out their ideas…"

Trust is reinforced through a transparent reward structure in which new recruits are paid the same based on job role, regardless of prior background. Visitors frequently comment that the firm operates more like a start-up than a traditional manufacturer, reflecting its emphasis on experimentation and shared accountability.

As capabilities deepen, the firm expands its talent strategy to include diploma holders as a complementary source of expertise. These technicians are not deployed as support staff but as core contributors to the firm's installation and implementation capabilities, complementing the engineers' theoretical knowledge with hands-on skills. The firm plans to send these recruits to Europe to acquire installation expertise directly, reducing reliance on costly external specialists:

> "Once a design has been done… we want to train them… bring that knowledge in, so that when we do the actual installation [we no longer] have to get so-called 'expert' from Europe."

Taken together, Firm 2 exemplifies a high-road manufacturing transformation anchored in original design, internal capability-building, and expansive job redesign. The reliance on firm-specific engineering knowledge and collaborative problem-solving minimises the risk of professional, managerial, and executive roles being offshored. At the same time, by investing in internationally portable installation skills, the firm creates new pathways for technicians to become globally mobile, positioning both engineers and diploma holders as integral to its long-term, sustainability-driven growth strategy.

The Enterprise Development Grant similarly played an important role in moderating the risks associated with the firm's growth ambitions. The GM noted that the transformation was costly and required careful choices. In this case, the grant enabled the firm to invest in advanced software features that would otherwise have been unaffordable, but which significantly enhanced the quality of the final product.

High-road pattern, summarised:

- New revenue logic (productisation, bespoke, sustainability, analytics-rich services, intellectual property).
- Build-oriented talent strategy; broad autonomy at junior levels.
- Jobs redesigned to be richer, more cross-functional, more client- and problem-centred, co-location.
- Heavy reliance on mentoring and on-the-job learning; standard training used selectively to scaffold—not substitute—workplace learning.
- Strategic use of public grants to derisk costly investments that the firm were already undertaking

What the low road looks like in practice

Low-road firms focus on doing the current thing cheaper or more efficiently—through automation, offshore labour, or added managerial control. This can be rational in the short run, especially for price-sensitive markets, but risks locking the firm into low-margin competition while under-utilising Singapore's human capital base.

Case 3: Appliances Manufacturer — managerial layering and top-down KPIs

An 18-year-old firm with around 30 employees designs and manufactures a common household appliance, earning local SME awards for quality and entrepreneurship. Operating in a highly competitive market, the firm participates actively in government-supported initiatives such as the Singapore Quality Class, digitalisation, job redesign, and skills training. Yet internal customer analyses consistently highlight price competition as the dominant driver of its business model. While management recognises the potential to move into higher-end design, the firm's transformation strategy instead prioritises operational efficiency, tighter process control, and improved customer service.

At the centre of this strategy is a deliberate effort to strengthen the managerial layer. The Managing Director (MD) identifies people management as the firm's most pressing challenge and responds by formalising

leadership roles and introducing key performance indicators (KPIs) that cascade from top management downwards. As the MD explains:

> "The people is definitely one of my main challenges right now… I selected five leaders… Five of them will have monthly reporting back on their KPIs… Everything can cascade down from the top management down to the operation staff."

This approach reflects a belief that clearer reporting lines, stronger supervision, and data-driven monitoring will raise productivity and address long-standing operational gaps, such as inventory tracking and workflow coordination. To support this shift, the firm adopts a 'buy' model for capability development. Degree-holding managers are hired to fill newly defined roles in areas such as business development and project management, including positions that require prior experience in government tendering. These hires are expected to professionalise processes and pursue new business opportunities that existing staff are perceived to lack the skills to handle.

However, the strengthening of the managerial layer also reshapes workplace dynamics. Decision-making becomes increasingly centralised, with initiatives rolled out in a top-down manner. Non-managerial employees, many of whom have minimal formal qualifications, experience a reduction in autonomy and discretion at work. This is particularly evident in the adoption of new digital tools. Even when automation software is introduced to support frontline tasks, ground-level staff are largely excluded from the selection and design process. As one customer service executive observes:

> "They don't really ask for everyone's opinion… mainly they just get the feedback from the [newly] appointed leader."

Training for non-managerial staff continues, particularly in areas such as digital marketing, but the MD expresses frustration that these skills are not being applied in practice. Learning at the rank-and-file level remains informal and limited, with little scope for experimentation or skill deepening. In contrast, professional, managerial, and executive (PME) hires are sent for leadership and digital marketing courses, reinforcing a bifurcated skills strategy within the firm.

External consultancy services are purchased using the Enterprise Development Grants. Consultants endorse the firm's focus on leadership development, framing the managerial reforms as an investment in people. One consultant notes:

> "The [MD]… wants to develop more of his people into leaders… instead of calling them managers, he calls them leaders… So what is the meaning of a leader? So a leader is somebody who works with and through people to achieve results."

Yet despite such encouragement, the firm does not fundamentally revisit its underlying business model. Consultancy reports recommending product innovation as a pathway to future-proofing are acknowledged, but the firm chooses to double down on process discipline—appointing leaders with KPIs, introducing customer management systems, and tightening control over operations—rather than investing in new product capabilities.

Taken together, Firm 3 illustrates an efficiency-optimising transformation pathway built around a buy model for managerial capability. While this approach strengthens coordination and process control, it also narrows the scope for bottom-up innovation and marginalises non-managerial workers. In contrast to high-road

transformation cases, the firm's strategy improves efficiency without fundamentally reshaping jobs or addressing the structural constraints of price-based competition.

Case 4: Professional Services — labour arbitrage at scale

Firm 4 is an 18-year-old marketing services company with around 25 workers. Operating in a crowded and highly contestable market, the firm adopts price competition as a deliberate business strategy rather than a transitional phase. Securing high-end projects is viewed as risky, given the skill requirements and organisational changes such work would entail. Instead, the firm positions itself as a mass-market provider, prioritising volume over margin. As the founder explains:

> "Yeah, it's low but it's sustainable. Every month we're signing contracts… I'd rather have mass – a few three-thousand-dollar contracts than wait for one ten-thousand-dollar contract."

Moving into premium work is seen as structurally incompatible with the firm's existing operating model. Higher-value projects would require a different workforce, different skills, and a reconfiguration of internal processes—changes the firm is unwilling to undertake. As the founder notes, even if clients have higher budgets, "they don't think of us," because delivering premium work would require capabilities the firm does not build internally.

To sustain this low-price strategy, the firm relies heavily on labour arbitrage. Of its 25 workers, roughly half are based in Singapore, while the other half are contract staff working remotely from the Philippines, Pakistan, Indonesia, and Vietnam. These overseas workers contribute directly to core operations, performing sales, customer service, graphic design, and administrative tasks. The founder frames this as a rational response to globalised markets and digital platforms:

> "Clients are finding us online… They are like "Oh, it's only a thousand Sing dollars?" To them it's 600 USD…."Send me your invoice" and they pay and we start the work… I envision that in another few years I will end up having a 24-hour workforce from all over the world and then we can service clients from all over the world…I feel that Singaporeans are losing their edge…Even [if] the Filipino… only do[es] half of what the Singaporean does, if I [hire] three of them, they are still cheaper and more productive."

When higher-end skills are occasionally required, the firm adopts a 'borrow' model rather than building internal capability. External consultants are brought in on a project basis to meet specific client needs. The firm is reluctant to invest in developing such skills in-house, as it does not expect sufficient utilisation given the nature of the projects it typically attracts. This reinforces a shallow skills equilibrium, where advanced capabilities remain external and episodic.

Automation plays a complementary role in sustaining the firm's low-cost model. Using an Enterprise Development Grant, the firm procures marketing software to increase the output of its business development (BD) team. The objective is not job enrichment or skills upgrading, but to raise throughput without increasing headcount. As the founder explains, automated follow-ups allow the team to handle more clients simultaneously:

> "So they've doubled their output with the same number of people. So [we] don't have to hire extra people and waste money."

Rather than freeing up time for higher-value work, automation intensifies work by increasing the pace and volume of tasks performed by existing staff.

Finally, the firm leverages its remote workforce as part of a regional internationalisation strategy. With support from an EDG grant, it seeks to offer similarly low-cost marketing services in the home countries of its overseas contractors, replicating its price-competition model across borders.

Taken together, Firm 4 exemplifies a low-road transformation pathway anchored in price competition, labour arbitrage, and automation without skills upgrading. While the strategy enables cost control and short-term viability, it limits skill deepening, constrains job quality, and reinforces a business model in which local employment is increasingly marginal and easily substitutable.

Low-road pattern, summarised:

- Product and services remains largely unchanged; gains come from cost control and throughput.
- Buy/borrow/offshore model dominates; capability building is episodic.
- Autonomy shifts upward; rank-and-file jobs narrow and are more tightly monitored.
- Training is standardised and concentrated at PME level; little generative workplace learning.
- Opportunistic use of public grants to trigger activities that the firm would otherwise not fund

Summary

This chapter traces two contrasting business transformation pathways – an innovation, new wealth generation approach versus an efficiency-driven, revenue-generation approach, which has contrasting effects on talent job and skills in the current and future. The former leads to expansive jobs, more complex skills demand and ‘build’ strategies as these firms require high-skilled workers at scale. The latter is typically supported by ‘buy’ approaches, where selected expertise are brought into the firm without improving the fortunes of the broad workforce. Guided by the qualitative findings, the next chapter interrogates the quantitative data to assess whether similar patterns of divergence can be observed.

5. Results 2: Quantitative investigation using Business Performance and Skills Survey 2

Setting up the BPSS2 Investigation

In the previous chapter, two broad patterns are identified among recipients of the Enterprise Development Grant: a high road pathway, centred on value creation and marked by inclusive talent development, expansive jobs, and complex skills demand; and a low road pathway, centred on revenue extraction and marked by narrow, often regressive approaches to workforce development. This chapter extends those insights by moving beyond grant-supported firms to the wider SME landscape using the Business Performance and Skills Survey. The analysis confirms the presence of these divergent pathways in the wider economy, based on data from a total of 2,889 SMEs were used in the analysis.

As outlined in the methodology section in Chapter 3, the SME data in BPSS2 is sliced in two ways:

- SMEs pursuing a transforming strategy, defined as those that reported investing in expansion over the past 12 months through purchasing assets, developing new or significantly improved goods, services, or processes, entering new markets, or adopting new technology (excluding replacement of obsolete or depreciated technology).

- SMEs pursuing a high value-added (VA) strategy, defined as above-average levels of product strategy aimed at creating substantially customised, unique, and premium offerings.

The above gives rise to a typology of four types of firms as shown in **Table 5**:

1. Transforming SMEs pursuing high-VA strategies (13%)
2. Transforming SMEs pursuing low-VA strategies (7%)
3. Non-transforming SMEs pursuing high-VA strategies (42%)
4. Non-transforming SMEs pursuing low-VA strategies (39%)

Table 5. Typology of four types of firms in the Business Performance and Skills Survey

Transforming, High VA 13% (n=368)	Non-transforming, High VA 42% (n=1199)
Transforming, Low VA 7% (n=195)	Non-transforming, Low VA 39% (n=1127)

Source: Business Performance and Skills Survey 2

Regression results

Regression analyses were conducted across multiple dimensions of talent, jobs, skills, and business performance. The quantitative findings strongly triangulate with the qualitative evidence. They show that transformation activities in Singapore SMEs are skills-biased but only high-road transformations are associated with inclusive talent development and autonomy gains that are more sustainable for the SME sector, consistent with the qualitative evidence. Specifically, the following are observed:

- **Transformation activities in SMEs are skills-biased.** This is reflected in increases in jobs requiring a degree and frequent learning in both transforming low-VA and transforming high-VA SMEs, alongside increased hiring of PMEs. Gains are consistently stronger in transforming high-VA SMEs than in transforming low-VA SMEs.

- **Transformation activities in SMEs are not autonomy-biased.** Autonomy is driven by business strategy rather than transformation per se. Even so, autonomy is strongest among transforming high value-added SME, suggesting that transformation activities may have had an amplifying factor in high-VA SMEs.

- **Transformation activities in SMEs are not inclusion-biased.** 'Build' strategies are concentrated among high-VA SMEs—especially those that are transforming—while transforming low-VA SMEs are more likely to rely on 'buy' strategies.

- **Transformation activities in SMEs are associated with stronger business performance**. Both transforming low-VA and transforming high-VA SMEs are more likely to report increases in profits, revenue and market share, with stronger associations among high-VA transformers. This suggests that high-VA transformation does not come at the expense of commercial performance.

A summary of the findings is at **Table 6** while the regression results are provided in the next section.

Table 6. Summary of regression results with non-transforming low VA SMEs as reference group

Dimensions	Categories	Method	Transformation effects?	Observation
Job-skills strategy	% of jobs with degree requirements	Linear regression	Yes. Positively correlated and stronger in transforming high-VA SMEs.	• Transforming & High VA SMEs: **+5.2 pp** degree-level jobs ($p \leq 0.01$, **strong** association). • Transforming & Low VA SMEs: **+2.3 pp** degree-level jobs ($p \leq 0.1$, **weak** association). • Non-transforming & High VA SMEs: No significant difference.
	% of jobs requiring frequent learning	Linear regression	Yes. Positively correlated and stronger in transforming high-VA SMEs.	• Transforming & High VA SMEs: **+11.8 pp** jobs requiring frequent learning ($p \leq 0.01$, **strong** association). • Transforming & Low VA SMEs: **+3.8 pp** jobs requiring frequent learning ($p \leq 0.05$, **moderate** association). • Non-transforming & High VA SMEs: No significant difference.

Dimensions	Categories	Method	Transformation effects?	Observation
	% of job with high autonomy	Linear regression	Partial. Autonomy is driven by high-VA strategies, not transformation, though effects are amplified when high-VA firms transform.	• Transforming & High VA SMEs: **+0.65** autonomy index points (p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: No significant change. • Non-transforming & High VA SMEs: **+0.56** autonomy index points (p ≤ 0.01, **strong** association).
Talent strategy	Likelihood of increasing PMEs	Logistic regression	Yes. Positively correlated and stronger in transforming high-VA SMEs	• Transforming & High VA SMEs: **3.97×** more likely to hire PMEs (p ≤ 0.01, **strong association**). • Transforming & Low VA SMEs: **1.72×** more likely to hire PMEs (p = 0.020, **moderate** association). • Non-transforming & High VA SMEs: No significant difference.
	Likelihood of 'build' strategy	Logistic regression	Partial. Positively correlated with high-VA SMEs irrespective of transformation. Negatively correlated with transforming low-VA SMEs.	• Transforming & High VA SMEs: **3.42×** more likely to adopt a *build* talent strategy (p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: **0.63 x** likelihood to adopt a *build* strategy (p = 0.070, **weak** association). • Non-transforming & High VA SMEs: **3.13×** more likely to adopt a *build* talent strategy (p ≤ 0.01, **strong** association).
	% of workers exercising discretionary effort	Linear regression	Partial. Discretionary effort is driven by high-VA strategies, not transformation, though effects are amplified by high-VA transformation.	• Transforming & High VA SMEs: **+0.57** discretionary effort index points (p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: No significant change. • Non-transforming & High VA SMEs: **+0.26** discretionary effort index points (p ≤ 0.01, **strong** association).
Business performance	Increase in profits	Logistic regression	Yes. Positively correlated and stronger in high-transforming high VA SMEs.	• Transforming & High VA SMEs: **3.84×** more likely to report increased profit (p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: **2.20×** more likely to report increased profit (p ≤ 0.01, **strong** association). • Non-transforming & High VA SMEs: No significant difference.

Dimensions	Categories	Method	Transformation effects?	Observation
	Increase in revenue	Logistic regression	Yes. Positively correlated and stronger in high-transforming high VA SMEs.	• Transforming & High VA SMEs: **4.71×** more likely to report increased revenue (p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: **2.73×** more likely to report increased revenue (p ≤ 0.01, **strong** association). • Non-transforming & High VA SMEs: No significant difference.
	Increase in market share	Logistic regression	Yes. Positively correlated and stronger in high-transforming high VA SMEs.	• Transforming & High VA SMEs: **4.90×** more likely to report increased market share p ≤ 0.01, **strong** association). • Transforming & Low VA SMEs: **2.29×** more likely to report increased market share (p < 0.01, **strong** association). • Non-transforming & High VA SMEs: No significant difference.

Source: Business Performance and Skills Survey 2

Deep dives of each dimension

This section provides the regression results.

Existing jobs (not employees) that require a bachelor's degree or higher

Linear regression is used to test if business strategy significantly predicts the number of jobs in SMEs that require a bachelor's degree or higher (**Table 7**). The results show clear differences across types of SME transformation. SMEs that transform while pursuing high value-added strategies have, on average, about 5.2 percentage points more jobs requiring a bachelor's degree or higher compared to non-transforming, low value-added SMEs, and this result is strong and highly statistically significant ($p \leq 0.01$). SMEs that transform but remain in low value-added activities also show an increase in degree-level jobs—about 2.3 percentage points—but this effect is much smaller and only weakly statistically significant ($p \leq 0.1$). In contrast, non-transforming high value-added SMEs show no meaningful difference. Taken together, the findings indicate that while transformation is associated with increase in degree requirements, substantial and reliable skills upgrading occurs primarily when transformation is combined with high value-added strategies.

Table 7. Regression of type of business strategy vs require a bachelor's degree or higher

	Dependent Variable: % of existing jobs (not employees) that require a bachelor's degree or higher					
	Model 1			**Model 2**		
Variables	*Coef.*	*p-value*	*sig.*	*Coef.*	*p-value*	*sig.*
Type of Business Strategy (Transforming & Value-Add) *(Referenced group: Non-transforming & Low VA)*						
Non-transforming & High VA	-	-		-0.32	0.654	
Transforming & Low VA	-	-		2.28	0.078	*

Transforming & High VA	-	-		5.21	0.000	***

Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.

Constant	41.67	0.000	***	37.11	0.001	***
Adjusted Pseudo R^2	0.29				0.30	
N	2886				2886	

*p≤0.1; **p≤0.05; ***p≤0.01

Frequent learning

Linear regression is used to test if business strategy significantly predicted the level of frequent learning in SMEs. **Table 8** shows that on average, transforming SMEs with high VA are 11.77 points higher than non-transforming & low VA establishments to require frequent learning/development activities in their existing jobs (not employees). The result is strong and highly statistically significant (p≤0.01). Transforming SMEs with low VA strategies too reported requiring more frequent learning, but it is at a lower coefficient of 3.84 that suggest moderate levels of statistical significance (p≤0.05). In contrast, non-transforming high value-added SMEs show no meaningful difference. Corroborating the findings on increase in degree requirements, the findings indicate that while transformation is associated with more jobs that require frequent learning, substantial and reliable increases occur primarily when transformation is combined with high value-added strategies. Consistent findings on frequent learning indicate that rising degree requirements reflect genuine skills upgrading rather than credential inflation.

The inclusion of the variable, type of business strategy, in model 2 (**Table 8**) has improved the adjusted R square from 0.21 (model 1) to 0.24 (model 2), an increase of over 14%.

Table 8. Regression of type of business strategy vs frequent learning/development activities

	Dependent Variable: % of existing jobs (not employees) that require frequent learning/development activities					
	Model 1			Model 2		
Variables	Coef.	p-value	sig.	Coef.	p-value	sig.
Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)						
Non-transforming & High VA	-	-		-0.25	0.779	
Transforming & Low VA	-	-		3.84	0.015	**
Transforming & High VA	-	-		11.77	0.000	***

Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff,

permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.

Constant	15.60	0.263	5.50	0.691
Adjusted Pseudo R2	0.21		0.24	
N	2886		2886	

*p≤0.1; **p≤0.05; ***p≤0.01

Autonomy

Linear regression is used to test if business strategy significantly predicts autonomy in transforming SMEs. **Table 8** show that job autonomy increases only under high value-added strategies, not transformation alone. Compared to non-transforming, low value-added SMEs, firms that both transform and pursue high value-added strategies score about 0.65 points higher on the autonomy index, a strong and statistically significant effect ($p < 0.001$). Interestingly, even without transformation, high value-added SMEs already show higher autonomy, scoring about 0.56 points higher than the baseline group ($p < 0.001$). By contrast, SMEs that transform but remain in low value-added activities show no meaningful change in autonomy (–0.12, $p = 0.102$). This indicates that autonomy is fundamentally tied to business strategy rather than transformation per se. High value-added models create the conditions for discretion and decision-making at work, whereas low value-added transformation does not improve—and may even slightly reduce—autonomy.

The inclusion of the business strategy variable has improved the adjusted R square from 0.11 (model 1) to 0.18 (model 2) (see **Table 8**). This shows that business strategy has an effect on autonomy, given that it has improved the variance explained of the regression model by almost 64%.

Table 9. Regression of type of business strategy vs autonomy

	Dependent Variable: Autonomy (Index of 4 items)					
	Model 1			Model 2		
Variables	Coef.	p-value	sig.	Coef.	p-value	sig.
Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)						
Non-transforming & High VA	-	-		0.56	0.000	***
Transforming & Low VA	-	-		-0.12	0.102	
Transforming & High VA	-	-		0.65	0.000	***

Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered

as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.

Constant	0.80	0.239		0.02	0.975
Adjusted Pseudo R2	0.11			0.18	
N	2886			2886	

*p≤0.1; **p≤0.05; ***p≤0.01

Increase in skilled workers (PMEs)

With the increase in the level of job complexity in transforming SMEs, we would expect an increase of demand for skilled workers in transforming SMEs.

Logistic regression is used to test if transforming SMEs with high VA strategies are significantly more likely to increase skilled workers (PMEs) than the other firms. The results show that SME transformation on its own is associated with increased hiring of skilled workers (PMEs), but the strength of this effect depends strongly on the type of transformation. Compared to non-transforming, low value-added SMEs, firms that both transform and pursue high value-added strategies are almost four times more likely to hire more PMEs (odds ratio = 3.97, $p < 0.001$). SMEs that transform but remain in low value-added activities are also more likely to hire PMEs, but to a much smaller extent—about 1.7 times more likely (odds ratio = 1.72, $p = 0.020$). By contrast, non-transforming high value-added SMEs do not show a statistically significant difference from the baseline group. This indicates that while transformation increases demand for skilled workers, high value-added transformation generates a far stronger and more reliable expansion of PME employment.

It is also noted that the inclusion of the predictor variable, type of business strategy, has improved the adjusted R square from 0.14 (model 1) to 0.17 (model 2) in **Table 10**. This shows that type of business strategy indeed has an effect on increasing skilled workers.

Table 10. Logistic regression of type of business strategy vs increasing skilled workers (PMEs)

	Dependent Variable: Hiring PMEs					
	Model 1			Model 2		
Variables	Odds Ratio	p-value	sig.	Odds Ratio	p-value	sig.
Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)						
Non-transforming & High VA	-	-		1.23	0.189	
Transforming & Low VA	-	-		1.72	0.020	**
Transforming & High VA	-	-		3.97	0.000	***

Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered

as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.

Constant	0.22	0.446	0.07	0.184
Adjusted Pseudo R2	0.14		0.17	
N	2886		2886	

'Buy' or 'build' talent

Do SME increase the demand for skilled workers using 'buy' or 'build' strategies? Logistic regression results in **Table 11** shows that it is value-added strategies that predict 'build' or 'buy' strategies, rather than transformation activities. Firms that pursue high value-added strategies—whether or not they are transforming—are much more likely to adopt a 'build' strategy, developing skills internally rather than relying on buying expertise. Even so, transformation amplifies the likelihood of pursuing a 'build' strategy in transforming high-VA firms.

Specifically, non-transforming high value-added SMEs are about three times more likely to adopt a build strategy (odds ratio = 3.13, $p < 0.001$), while transforming high value-added SMEs are even more likely—about 3.4 times more likely—to build talent internally (odds ratio = 3.42, $p < 0.001$). By contrast, SMEs that transform but remain in low value-added activities are less likely to adopt a build strategy (odds ratio = 0.63, $p = 0.070$), indicating a continued reliance on 'buy' approaches such as external hiring or contracting consistent with the qualitative data.

It is also noted that the inclusion of the predictor variable, type of business strategy, has improved the adjusted R square from 0.15 (model 1) to 0.20 (model 2) in **Table 11**. This shows that type of business strategy indeed has an effect on firms' 'build' or 'buy' talent strategy.

Table 11. Logistic regression of type of business strategy vs buy or build strategy

	Dependent Variable: Buy vs Build Strategy					
	Model 1			Model 2		
Variables	Odds Ratio	p-value	sig.	Odds Ratio	p-value	sig.
Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)						
Non-transforming & High VA	-	-		3.13	0.000	***
Transforming & Low VA	-	-		0.63	0.070	*
Transforming & High VA	-	-		3.42	0.000	***

Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.

Constant	16.12	0.310		4.77	0.558
Adjusted Pseudo R2	0.15			0.20	
N	1953			1953	

*p≤0.1; **p≤0.05; ***p≤0.01

Discretionary effort

Linear regression is used to test if business strategy significantly predicted discretionary effort in SMEs defined as senior managers' observation of how workers voluntarily go beyond what is expected of them. **Table 12** indicate that discretionary effort is driven by business strategy rather than transformation per se. SMEs pursuing high value-added strategies exhibit significantly higher levels of discretionary effort, with strong statistical significance. Even among non-transforming firms, high value-added SMEs score 0.26 points higher on the discretionary effort index than non-transforming, low value-added SMEs, and this difference is strongly statistically significant ($p < 0.001$). This effect is even larger among transforming high value-added SMEs, which score 0.57 points higher, again with strong statistical significance ($p < 0.001$), indicating that transformation amplifies employee engagement only when it is aligned with a high value-added business model. By contrast, SMEs that transform while remaining in low value-added activities show no meaningful change in discretionary effort (–0.02, $p = 0.841$). This may indicate that employees are more willing to go 'above and beyond' when firms operate high value-added business models, whereas low value-added transformation does not generate similar engagement gains.

The inclusion of the variable, type of business strategy, in model 2 (**Table 12**) has improved the adjusted R square from 0.16 (model 1) to 0.19 (model 2), an increase of over 18%. This shows that business strategy indeed has an effect on discretionary effort.

Table 12. Regression of type of business strategy vs discretionary effort

	Dependent Variable: Discretionary Effort (Index of 4 items)					
	Model 1			Model 2		
Variables	Coef.	p-value	sig.	Coef.	p-value	sig.
Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)						
Non-transforming & High VA	-	-		0.26	0.000	***
Transforming & Low VA	-	-		-0.02	0.841	
Transforming & High VA	-	-		0.57	0.000	***
Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.						
Constant	1.19	0.073	*	0.61	0.354	

Adjusted Pseudo R2	0.16	0.19
N	2886	2886

*p≤0.1; **p≤0.05; ***p≤0.01

Business Performance

Increased Profit

Logistic regression is used to test if transforming SMEs with high VA strategies are significantly more likely to report an increase in profit than the other firms. It is found that holding all other controlled variables constant, transforming SMEs with high VA strategies are 3.84 times more likely to report an increase in profit than firms with low VA and not transforming as shown in **Table 13** below. Transforming SMEs with low VA strategies are 2.2 times more likely to report an increase in profits.

The inclusion of type of business strategy in the regression model has improved the adjusted R square by 25%, from 0.12 (model 1) to 0.15 (model 2).

Table 13. Logistic regression of type of business strategy vs increased profit

	Dependent Variable: Increased Profit (Logistic)					
	Model 1			**Model 2**		
Variables	*Odds Ratio*	*p-value*	*sig.*	*Odds Ratio*	*p-value*	*sig.*
Type of Business Strategy (Transforming & Value-Add) *(Referenced group: Non-transforming & Low VA)*						
Non-transforming & High VA	-	-		1.15	0.384	
Transforming & Low VA	-	-		2.20	0.001	***
Transforming & High VA	-	-		3.84	0.000	***
Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.						
Constant	0.18	0.455		0.04	0.186	
Adjusted Pseudo R^2	0.12			0.15		
N	2886			2886		

**p*≤0.1; ***p*≤0.05; ****p*≤0.01

Increased revenue

Logistic regression is used to test if transforming SMEs with high VA strategies are significantly more likely to report an increase in revenue than the other firms. It is found that holding all other controlled variables constant, transforming SMEs with high VA strategies are 4.7 times more likely to report an increase in revenue than firms with low VA and not transforming as shown in **Table 14** below. Transforming SMEs

with low VA strategies are 2.73 times more likely to report an increase. The inclusion of business strategy in the regression model has improved the adjusted R square by 25%, from 0.12 (model 1) to 0.15 (model 2).

Table 14. Logistic regression of type of business strategy vs increased revenue

	Dependent Variable: Increased Revenue (Logistic)					
	Model 1			**Model 2**		
Variables	*Odds Ratio*	*p-value*	*sig.*	*Odds Ratio*	*p-value*	*sig.*
Type of Business Strategy (Transforming & Value-Add) *(Referenced group: Non-transforming & Low VA)*						
Non-transforming & High VA	-	-		1.10	0.545	
Transforming & Low VA	-	-		2.73	0.000	***
Transforming & High VA	-	-		4.71	0.000	***
Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.						
Constant	1.52	0.836		0.35	0.618	
Adjusted Pseudo R^2	0.12			0.15		
N	2886			2886		

*$p \leq 0.1$; **$p \leq 0.05$; ***$p \leq 0.01$

Increased market share

Logistic regression is used to test if transforming SMEs with high VA strategies are significantly more likely to report an increase in market share than the other firms. It is found that holding all other controlled variables constant, transforming SMEs with high VA strategies 4.9 times more likely to report an increase in market share than firms with low VA and not transforming as shown in **Table 15** below. Transforming SMEs with low VA strategies are 2.29 times more likely to report an increase.

The inclusion of the predictor, type of business strategy, in the regression model has improved the adjusted R square by 21.4%, from 0.14 (model 1) to 0.17 (model 2), improving the variance explained of the outcome variable.

Table 15. Logistic regression of type of business strategy vs increased market share

	Dependent Variable: Increased Market Share (Logistic)					
	Model 1			Model 2		
Variables	Odds Ratio	p-value	sig.	Odds Ratio	p-value	sig.

Type of Business Strategy (Transforming & Value-Add) (Referenced group: Non-transforming & Low VA)					
Non-transforming & High VA	-	-	1.29	0.218	
Transforming & Low VA	-	-	2.29	0.004	***
Transforming & High VA	-	-	4.90	0.000	***
Regression model controlled for establishment size, establishment age, industry, trust, family-owned status, proportions of managers, professionals, technicians & associate professionals, other staff, permanent contract workers, workers paid less than $2000, workers paid at least $2000 but less than $7000, workers paid $700 and above, female workers, workers older than 45 years old, employment pass holders, special pass holders, foreign worker permit holders, workers who are adding significant value to your business, workers who are candidates for future promotion, workers who are considered as high potential, workers who will be difficult to replace within three months if they resigned, availability of talent management in company.					
Constant	0.08	0.394	0.02	0.197	
Adjusted Pseudo R2	0.14		0.17		
N	2886		2886		

*p≤0.1; **p≤0.05; ***p≤0.01

Transforming SMEs are more likely to report better business performance e.g., increased in market share, revenue, and profit. However, a larger proportion of transforming SMEs with high VA strategies reported better business performance compared to transforming SMEs with low VA strategies.

A note on the models

In this section, we investigate the effect of business strategy on the outcome variables mentioned above. From the regression models, it is observed that the adjusted R squares[2] ranged from 0.15 to 0.30. These values are comparable with existing literature on firm transformation, with adjusted R square generally ranging from 0.04 (Wang et al., 2021) to around 0.24 (Kozubikova & Kotaskova, 2019). The comparatively low R square may be attributable to factors that impact business transformation for which data was not available, such as knowledge management practices (Altarawneh & Al-Adaileh, 2023), whether the business is in a growing, maturing or declining phase (Xie et al., 2022), technological factors (Kozubikova & Kotaskova, 2019), organisational culture (Athambawa, 2020; Kumari & Saharan, 2020), and the macroeconomic environment, e.g., Covid-19 pandemic. Also, the main aim of the regression models in this section is to explain the relationship between type of business strategy and the outcome variables of interests and not predicting the outcome variables, therefore, the adjusted R square value is not deterministic (Moksony, 1999).

Summary

The quantitative findings strongly corroborate the qualitative evidence in identifying two distinct SME transformation pathways—low value-added and high value-added—with statistically significant differences across jobs, skills, talent strategies, and business performance. While SME transformation is generally skills-biased, substantial and reliable skills upgrading is concentrated in high value-added transformation pathways, where job complexity increases are larger and jobs are more likely to offer autonomy and

[2] The adjusted R square measures the extent to which the predictors explain the variance in the outcome variable.

discretionary effort—outcomes not observed in transforming low value-added firms. These differences extend to talent strategies, with transforming low-VA firms relying on ‘buy’ approaches, while transforming high-VA firms pursue ‘build’ strategies that support internal capability development. Importantly, high value-added transforming firms also report the strongest improvements in profits, revenue, and market share, indicating that high-road transformation does not come at the expense of commercial performance and offers. In all, high-road transformation offers more sustainable gains for the SME sector.

6. Integrated results and discussion

Integrated findings: high road vs low road SMEs

The findings in the previous chapters indicate that while there is evidence that business transformation activities in Singapore SMEs are skills-biased, the kind of change associated with supporting SMEs to overcome its structural weakness vis-à-vis the non SME sector can be achieved only a distinct type of business change – high value-added transformation.

Quantitative analysis shows that business transformation activities generally have increased the employment of skilled PMEs in Singapore's SMEs, with degree-level jobs serving as a proxy for increased in demand for cognitive skills and frequent learning suggesting higher levels of job complexity. Combined, they show that the increase in skills demand with SME transformation activities are genuine and not effects of credential inflation. This pattern is observable in both higher and lower value-added firms when they transform, but much more significantly in higher value-added firms.

However, when we shift to job quality—particularly autonomy gains—the distinction between the two transformation pathways becomes stark. Only firms pursuing high-road transformation strategies demonstrate evidence of providing more opportunities for their workforce to exercise autonomy, signalling richer forms of job design and more meaningful engagement. Earlier research by Freebody et al. (2017) show that unlike SMEs in economies such as Germany and Denmark, Singapore SMEs have not compensated for wage gaps with non-wage attributes such as job autonomy. The absence of such patterns in Singapore SMEs underlines the need for deeper structural change if a sustainable SME sector is to take root. Our findings show that only high value-added transformation supports this crucial gains in autonomy.

The evidence on talent strategies reinforces the sustainable gains high value-add transformations offer. Across the sample, low value-add transformation is correlated with 'buy' rather than 'build' talent strategies. The qualitative findings show that low value-added firms tend to rely on external hiring, as 'buy' strategies provide rapid access to expertise but often sideline existing employees. In contrast, firms that invest in 'build' strategies are typically pursuing high value-added transformations, where complex capabilities must be developed internally and at scale, making reliance on external hiring alone neither feasible nor sufficient.

The qualitative findings further sharpen the contrast in skills and learning trajectory across transforming SMEs. In low-road firms, workforce strategies centre on reinforcing managerial control and ensuring compliance across the workforce for efficiency-driven gains. By contrast, high-road firms deliberately enable discretion, initiative, and generative forms of learning for value-creation gains.

AI and digitalisation compound these challenges by widening the divergence between high-road and low-road transformation pathways. The qualitative evidence suggests that high-road transformation can act as a bulwark against digital skills offshoring, as it depends on skilled workers exercising judgement, coordination, and problem-solving in situ. By contrast, low-road transformation treats digital technologies primarily as substitutes for skill, expanding firms' ability to source high-skilled labour at lower cost through external, remote, or contingent labour pools. This pattern aligns with emerging evidence that AI poses significant risks to high-skilled work when firms pursue value-capture strategies, whereas value-creation strategies offer more sustainable pathways for retaining and upgrading high-skilled—and even non-professional—work (Brown & Sadik, 2025; Tay et al., 2025).

The qualitative evidence on the use of public funds highlights two distinct roles. In high-road firms, grants function primarily as a risk-sharing mechanism, de-risking high-cost that firms are already committed to

pursuing—consistent with economists' arguments that public subsidies should address risk and uncertainty linked to long investment horizons (Stiglitz, 1989; Mazzucato, 2021). In low-road firms, by contrast, grants operate more as behavioural inducements for immediate business activities. In these cases, public funds are less about correcting underinvestment in value creation and more about incentivising incremental or cost-focused adjustments.

These divergent transformation models underscore stark choices that policymaking must confront: providing undifferentiated support to SMEs risks blurring signals between fundamentally different modes of transformation that have contrasting socio-economic outcomes. Specifically, it risks over-investing in low-road transformation while under-investing in high-road strategies. Without doubt, public support should actively steer SMEs towards the high road, where transformation generates a stronger pipeline of high-skilled, sustainable jobs, supports inclusive talent development, and reduces the risks of AI-enabled offshoring of high-skilled work.

Steering markets towards high value-add transformation

The evidence presented in this study shows that SMEs too face a structural choice between low-road and high-road pathways of transformation. Low-road strategies may deliver short-term business survival but they do little to strengthen long-term competitiveness or create meaningful jobs that can help the SME sector attract talent. By contrast, the high road—anchored in innovation, capability building, and autonomy in work—offers the prospect of stronger firms, better jobs, and deeper skills. The challenge is that public incentives do not automatically reward this path. Steering mechanisms are therefore necessary to shift the balance.

Societal action, led by the public sector, has a crucial role in reshaping these incentives. As argued by Sadik & Chia (2025), SMEs in Singapore must do more to contribute to the creation of *middle jobs*—roles that combine stability, skill use, and career progression. This imperative is heightened by the disruption of AI and automation, which increasingly encroach on high-skilled cognitive jobs that were once seen as secure. If SMEs do not step up to offer more high-quality middle jobs, the risk is a polarised labour market where high-skilled cognitive jobs are squeezed out by AI use in large firms for efficiency gains while the other jobs remain trapped in low-wage, low-autonomy work. In strong SME economies such as Germany and Denmark, SMEs mitigate precisely this risk by underpinning inclusive labour markets. Yet Singapore's SMEs have not consistently compensated for lower wages with stronger non-wage attributes such as autonomy. Without deliberate steering, the SME sector cannot mitigate the amplified risks of technological unemployment.

Steering markets towards the high road requires three levers. First, **funding frameworks** must shift from neutrality to intentionality. As shown in our qualitative analysis, public grants currently support both high- and low-road strategies indiscriminately. This risks over-investing in activities that generate minimal workforce benefits while under-investing in transformations that carry higher barriers but yield deeper business and societal returns. In the dataset, 42% of high-value-add SMEs are not taking the step to transform themselves. Funding criteria should prioritise firms that demonstrate commitments to job autonomy, skill development, and middle-job creation.

Second, **labour market institutions** can be recalibrated to reward high-road practices. In economies such as Germany, sectoral wage agreements and apprenticeship systems reinforce the alignment between firm competitiveness and job quality. Singapore does not need to replicate these models wholesale, but stronger institutions—whether through industry partnerships, wage–skill compacts, or public procurement standards—can create baseline expectations that SMEs contribute to sustainable employment practices.

Third, **narratives of success** must be reshaped. Current discourse often celebrates SMEs that engage in digital transformation or support their workers in training. While these are important, they do not represent the full promise of SME transformation. The bigger aspect to celebrate is when SMEs engage in high-road transformations, taking the high-risk road of designing new, unique and premium products and services and empowering their workforce in the process. By celebrating such SMEs, policymakers and industry bodies can redefine what it means to succeed in Singapore's SME sector.

In short, steering markets towards high-road transformation is not about sustaining weak firms or propping up uncompetitive business models. Rather, it is about aligning public investment, institutional frameworks, and societal narratives with the types of SMEs that can thrive through innovation, build resilient capabilities, and create meaningful jobs. The goal is to make Singapore's SMEs exemplars of value creation, not survivalism.

Experimentation in the Adult Learning Collaboratory

The Adult Learning Collaboratory (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, 2025). It brings together firms, researchers, and ecosystem partners to co-design, prototype, and test new enterprise models.

Building on insights from this study and relevant others, the ALC has launched an initiative called *New-Age Business Transformation* to develop practical operating methods for high road enterprise–workforce transformation. A pilot approach is currently being designed for trial with 10 enterprises. Three key lessons emerge from these experiments that are reported below.

First, the power of data to inspire transformation. Many SMEs rely on independent consultants or small consultancy firms that lack the scale, datasets, or analytical tools to challenge firms' existing mental models of growth and competitiveness. The Enterprise Compass, developed from BPSS2 constructs, addresses this gap by translating complex research insights into structured, comparative data that enables CEO-level strategic conversations. It benchmarks SMEs against top-performing Singapore SMEs operating on high-road transformation pathways and provides the results to CEO leaders. In doing so, the tool shifts discussion away from incremental efficiency improvements towards more fundamental questions about business models, skills, and value creation. Early trials suggest that these data-driven conversations are catalytic: when leaders see clearly where their firm sits relative to top-performing peers, they begin to understand not only *that* change is needed, but *why* certain transformation pathways matter more than others. What grabs their attention is the evidence that such firms have been able to report stronger business performance in terms of increases in profits, revenue and market share, which is their very challenge as business leaders. For consultants, the learning curve is steeper. Many are unfamiliar with framing transformation through lenses such as value creation and autonomy. Yet this challenge underscores the importance of data: it allows firms and consultants to move beyond intuition-driven to evidence-based strategy. Importantly, data alone is insufficient. Peer narratives—stories of other Singapore SMEs that have successfully taken the high road—have been found to play a complementary role in countering the perception that such strategies are only viable in larger firms or other economies. Together, data and narratives help expand the strategic imagination of SME leaders.

Second, the high road is disruptive. While data and narratives can prompt reflection, high-road transformation ultimately requires business leaders to make difficult and often uncomfortable decisions. Our findings indicate that high-road strategies are disruptive not only because they challenge existing business models, but because they fundamentally reshape relationships at work. High-road transformation invites workers to participate differently—through greater autonomy, judgement, and responsibility—while

requiring leaders to step back from close control and established managerial routines. This mutual shift demands the rebuilding of trust on both sides. Leaders must be willing to cede authority, while workers are expected to step up, take on greater responsibility, and engage more deeply with problem-solving and customer value creation. Not all workers are immediately prepared for these expanded roles. Some are hesitant or resistant based on results of ongoing trials in the ALC, particularly in organisational contexts where trust has historically been limited. As a result, high-road transformation often entails difficult conversations, renegotiation of expectations, and uneven adjustment across the workforce. Where these relational and behavioural changes are not actively supported, high-road strategies risk stalling despite strong strategic intent.

Third, operating methods matter. The most persistent barrier to high-road transformation lies not in aspiration, but in safe execution. SMEs would have to attempt to transform without overly destabilising the business. This creates a fundamental tension: firms are expected to experiment with new value-added models while simultaneously sustaining existing revenue streams models built around price competition, tight margins, and operational control. Evidence from the ALC cases highlights the importance of concrete operating methods that allow firms to manage this tension. Practices such as staged pilots, prototyping, parallel business units, or ring-fenced innovation teams enable SMEs to test high-road strategies without destabilising core operations. These methods also create protected spaces for skills development, learning, and autonomy to emerge—conditions that are largely absent in low-road transformation. Strengthening these operating methods is critical if SMEs are to move beyond episodic transformation initiatives towards sustained, high-road change.

Taken together, the ALC experience suggests that experimentation is not simply about trial and error, but about equipping SME leaders and workforce with new ways of seeing, choosing, and doing—within a community that reinforces their efforts. Data provides the spark, strategic choice provides the direction, operating methods provide the means, and the community—supported by researchers and consultants—provides the ecosystem that makes sustained transformation possible. The ALC trials are still ongoing and will be reported in 2026.

The role of the public sector

The ALC experiments directly engage with the practice-based challenges of enterprise–workforce transformation, seeking to nudge SMEs towards high-road pathways that create meaningful and sustainable jobs. However, this study also points to an urgent review area: the role of public funding. The central challenge for public funding is not the scale of investment, but the degree of intentionality with which it is deployed. Enterprise Development Grants, SkillsFuture subsidies, and job design and technology schemes already channel substantial resources into SME transformation. Yet when applied in a neutral manner—supporting all forms of upgrading regardless of their strategic orientation—they risk diluting their impact and may inadvertently reinforce low-road models of change.

Intentionality requires recognising that not all transformation is equal. Public funds should not merely reduce the costs of incremental improvements but actively lower the barriers to high-road strategies that strengthen firms, improve job quality, and deepen skills. For example, EDG support could be made contingent on firms demonstrating how proposed initiatives expand value-creation, job autonomy, enhance skill use, or contribute to sustainable capability building. SkillsFuture funding too seeks to support such goals. Only when public funding is concerted in signalling the kind of SME transformations that are desirable could meaningful structural change take place. This is not an administrative exercise but require strategic capabilities in the public service. In focus group discussions that this research team conducted with high-road firms to discuss the study's findings, business leaders expressed strong willingness for public officers to engage more closely and to develop a deeper understanding of the business changes they were

undertaking. They perceived public engagement currently to be deliberately kept at arm's length, with interactions centred on procedural compliance rather than substantive discussion of transformation.

By aligning funding frameworks and strategic capabilities with the goals of stronger firms, better jobs, and deeper skills, the public sector can transform grants from generic subsidies into strategic levers that actively steer the SME sector towards high-road outcomes. In this way, public funding shapes a form of SME transformation where business performance and workforce development advance together for a stronger economy and a more resilient workforce.

Summary

While transformation across SMEs is generally skills-biased, reflected in higher demand for PMEs, degree-level jobs, and frequent learning, only high value-added transformation converts this into deep capability building, greater job autonomy, discretionary effort, and 'build' talent strategies that sustain skills utilisation at scale. Low-road transformation, by contrast, reinforces cost competition, external hiring and managerial control, limiting both value creation and job quality. These divergences are further amplified by AI, which enables low-road firms to offshore or externalise skilled work, while high-road firms remain anchored in in-situ judgement, coordination, and innovation. Public funding currently supports both pathways: in high-road firms it functions as a risk-sharing mechanism that de-risks strategic investment, whereas in low-road firms it tends to subsidise marginal or efficiency-driven activity. The chapter argues that more intentional public funding, stronger institutional leadership, and practice-based experimentation—such as that undertaken through the Adult Learning Collaboratory—are necessary to steer SME transformation towards high-road pathways that strengthen firms, create meaningful middle-quality jobs, and underpin long-term economic resilience.

7. Conclusion

This study provides evidence that SME transformation in Singapore does not follow a single or uniform trajectory. Instead, SMEs transform generally through two distinct pathways that generate fundamentally different outcomes for skills, jobs, and long-term competitiveness. This shifts the policy debate from whether SMEs are transforming to the more critical question of which transformation pathways should be encouraged—and how they can be made viable at scale.

The findings show clearly that SME transformation in Singapore is skills-biased. Across both high and low value-added firms, transformation is associated with increased demand for skilled professionals, managers, and executives (PMEs). This is reflected in rising degree-level job requirements and more frequent learning embedded in work, indicating genuine increases in job complexity rather than credential inflation. However, the nature and depth of skills upgrading depend decisively on the transformation pathway.

It is high-road transformations that make substantially larger and stronger upgrades in skills demand. In fact, only high-road transformation accompanies rising skills demand with genuine increase in job quality through autonomy gains and evidence of increase in discretionary effort. These firms redesign work around judgement, coordination, and problem-solving, creating non-wage job attributes—autonomy, learning, and engagement—that are essential for productivity growth and for making SME jobs credible and attractive career pathways for Singaporeans. Additionally, high-road firms anchor value creation in in-situ human judgement and acts as a bulwark against AI-enabled offshoring of high-skilled work. Crucially, these gains are achieved without sacrificing commercial performance: high-road transformers report the strongest improvements in profits, revenue, and market share.

By contrast, low-road transformation reinforces structural weaknesses. While it increases skills demand, it tends to do so through external hiring and tighter managerial control. Job autonomy does not improve and talent development is selective rather than inclusive. AI and digitalisation may further widen this divide, enabling low-road firms to offshore or externalise high-skilled work.

Current public funding frameworks support both pathways equally. Qualitative evidence indicates that in high-road firms, public grants function as risk-sharing mechanisms, de-risking strategic investments that firms are already committed to pursuing. In low-road firms, the same funds tend to subsidise incremental or cost-focused activities. Treating these pathways as equivalent risks misallocating public resources and slowing quality upgrading of the SME sector.

Equally important, the study shows that high-road transformation does not emerge automatically. It requires new ways of organising work, rebuilding trust between leaders and workers, and developing operating methods that allow firms to experiment without destabilising core business. The experimentations in the Adult Learning Collaboratory (ALC) play a critical role in addressing this challenge by testing practice-based approaches—combining data, strategic reflection, operating methods, and peer learning—to nudge firms towards high-road pathways.

Taken together, the findings illuminate a clear path forward. Intentional public funding, institutional leadership, and sustained experimentation through platforms such as the ALC are all necessary to shift SME transformation towards the high road. When aligned, these levers can enable SMEs to become engines of innovation, creators of good middle-quality jobs, and anchors of long-term economic resilience for Singapore.

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