SUSS | IAL INSTITUTE FOR ADULT LEARNING SINGAPORE

Skills-First: Are We There Yet?

CSFP Working Paper No. 1 (May 2025)

Publisher's note

The views and analyses presented in this document are those of the authors. The contents are intended for discussion and generating ideas, and are not necessarily the views or policy prescriptions of the Institute for Adult Learning (IAL) or the Singapore University of Social Sciences (SUSS).

Please cite this publication as:
Gog, S. J., Sung, J., & Sigelman, M. (2025). *Skills-First: Are We There Yet? (CSFP Working Paper No. 1)*. Institute for Adult Learning, Singapore University of Social Sciences.

ISBN: 978-981-94-3080-2 (digital)
CSFP Working Paper No. 1 (May 2025)

Contents

Preface

Globally advanced economies and developing economies are grappling with issues related to economic sustainability and competitiveness amidst externalities and domestic challenges. As a corollary, human capital development and future-skilling have come to the fore on the policy agenda. Often however, issues such as skills mismatch of the economically active and enterprises' inertia to transform their businesses pose challenges to advancing these policy objectives. For the most part, stakeholders have begun to realise that more needs to be done to close the nexus between the supply and demand of skills for the economy. This has resulted in numerous efforts across the globe focusing on skills-based and skills-first conceptions, practices and debates.

Singapore is one of the economies that is enthusiastic about building a skills-powered economy. We, from the Office for Skills-First Practices, at the Singapore University of Social Sciences-Institute for Adult Learning, decided to convene global and local experts to kickstart the Skills-First Working Paper Series. The aim is to evoke discussion and identify progressive organisations and individuals to lead change and forge enduring skills-first practices. In particular, the Skills-First Working Paper Series emphasise an ecosystem approach to tackle interconnected structural inefficiencies. The line-up of the series is as follows:

#1 Skills-First: Are We There Yet?

#2 Skills-First: What Does It Mean for Me as an Individual?

#3 Skills-First: What Does It Mean for My Organisation as an Employer?

#4 Skills-First: What Does It Mean for Policymakers?

#5 Skills-First: Who Are the Critical Intermediaries?

#6 Skills-First: A Framework for Action

This first paper, "Skills-First: Are We There Yet?" investigates the structural inefficiencies that hinder systemic change towards a skills-powered economy and attempts to identify the critical questions that key stakeholders, i.e. individuals, employers, policymakers, training providers, need to examine closely. The paper calls for deeper reflection and joint action to enable skills to function not as a peripheral consideration, but as a central organising principle for inclusive and responsive labour markets.

Each paper will be accompanied with a roundtable discussion to deliberate ideas and distil possible skills-first practices for prototyping.

We aim for the Skills-First Working Paper Series to serve as an important conversation starter to align thoughts on how to approach skills-first from an ecosystem perspective, as well as a springboard for experimentation of needle-moving solutions. We would like to express our gratitude to the co-authors who made time to pen the papers and the participants of the roundtable discussions for their generous sharing.

Edwin Tan
Director
Office for Skills-First Practices
Institute for Adult Learning

Gog Soon Joo
Fellow
Office for Skills-First Practices
Institute for Adult Learning

Click here to share your feedback or join us in driving the Skills-First initiative

Abstract

This paper investigates the persistent barriers impeding a skills-first approach in workforce development—a paradigm that positions recognisable skills and proficiency as the primary currency for employment, career progression, and organisational performance. Although many countries have made strides in integrating skills into education and training systems, the dominance of qualifications in labour market signalling remains largely intact. The analysis identifies five structural inefficiencies—signalling failures, coordination deficits, risk asymmetry, measurement gaps, and cultural resistance—that continue to undermine systemic change despite growing interest in skills-first practices.

Drawing on international case studies and Singapore's evolving skills policy landscape, the paper argues that these inefficiencies are not isolated technical flaws but interconnected elements of an entrenched system. Employers still rely on formal credentials in the absence of trusted, portable, and low-cost skills signals. Fragmentation among education, training, and employment actors weakens the development of shared operational frameworks. Individuals and firms face asymmetric risks in investing in skills, while policymakers struggle to quantify how specific capabilities contribute to economic and organisational outcomes, such as productivity and innovation. Cultural norms further reinforce credential-based signaling by employers and individuals, but this challenge is one component within a broader ecosystem of inertia.

Rather than offering prescriptive solutions, the paper adopts an ecosystem perspective, emphasising the mutual dependencies among key stakeholders—individuals, employers, training providers, and policymakers. Through this lens, it identifies critical questions for each group: What assumptions about value, merit, and capability must be re-examined? What incentives or structural adjustments are required to enable a shift towards recognising skills over credentials or making skills a currency for work? How can labour market actors co-create systems that balance flexibility, rigour, and equity?

The discussion argues that piecemeal reforms or technical fixes are insufficient. Realising a skills-first system requires sustained coordination, cultural adaptation, and the development of institutional capacities that support a new logic of workforce value. Singapore's experience illustrates both the opportunities and constraints of pursuing this vision. Ultimately, the paper calls for deeper reflection and joint action to enable skills to function not as a peripheral consideration, but as a central organising principle for inclusive and responsive labour markets.

Introduction

Introduction

1.1 The Policy Shift Towards a Skills-First Paradigm

The global labour market stands at an inflection point. Technological disruption, demographic shifts, evolving employment structures, and climate transitions are placing unprecedented demands on workforce agility. Yet, most workforce development systems remain anchored in 20th-century, qualification-centric practices. Since 2010, many industrialised countries have made only incremental moves towards hybrid “skills-based” models. The World Economic Forum (2024) warns that progress has been limited, with 100 million workers underemployed due to skills mismatches or lack of credential recognition.

Amid these pressures, the “skills-first” paradigm is emerging as a potentially transformative alternative—one that positions skills as the core currency for articulating, developing, and recognising capabilities across the labour market. In this approach, qualifications serve not as gatekeepers but as supplementary signals, supporting rather than substituting for recognisable skills and proficiency. The skills-first model seeks to tackle both the demand and supply sides of the skills equation through close collaboration among employers, educators, policymakers, and individuals.

The central question is whether skills can become a true currency in the labour market, rivalling or surpassing the value of formal qualifications—and whether employers can effectively leverage skills to improve organisational performance (Jesuthasan & Kapilashrami, 2024). Equally, can individuals leverage their skills to open opportunity and enhance career mobility and resilience throughout their working lives? This question underpins current policy efforts to build skills-powered economies that match the fast pace of technological and economic transformation.

1.2 Defining the Skills-First Paradigm Shift

While often used interchangeably with "skills-based", a skills-first approach represents a distinct orientation. It consciously prioritises the identification (or articulation), acquisition, demonstration, use of skills, and the recognition of skills as the central aims of workforce development—including recruitment, job design, learning and career advancement. Crucially, a skills-first approach requires systemic coordination. In contrast, skills-based models typically focus on recognising competencies within existing qualification structures, often through supply-side initiatives like recognition of prior learning or modular certification.

To clarify this distinction, this paper adopts the following typology:

Pre-2000s

Qualification-centric systems

Prioritise formal education and certification as primary markers of employability and capability (Hayward & Fernandez, 2004). Originating from the field of labour economics, these systems often categorise occupations according to the binary definition of "high-skill" (i.e., degree jobs) and "low-skill" (i.e., non-degree jobs).

2000s–present

Skills-based hybrids (2000s–present)

Integrate skills within existing qualification systems, often via competency-based education and recognition of prior learning, but maintain traditional qualifications as the dominant form of signalling capabilities. In this period, sector skills councils and sectoral skills frameworks became part of the structure to articulate skills (Vazirani, 2010).

Emerging

Skills-first models

Prioritise recognisable skills and proficiency, performance outcomes, and their application in the workplace. Qualifications play a supporting role rather than serving as prerequisites. System-level readiness is essential, implying the need to invest in coordination efforts (LinkedIn, 2023; World Economic Forum, 2023; Ministère du Travail, de la Santé, des Solidarités et des Familles, 2022).

While global interest in skills-first practices is on the rise, significant progress remains elusive[1]. Singapore, with its established commitment to skills policy, offers a valuable case study for examining how these paradigms play out in its ongoing prototyping practices. This paper argues that, despite growing momentum, movement towards skills-first remains slow and uneven—not due to lack of interest or evidence, but because of five structural inefficiencies that limit systemic change—barriers that require coordinated policy orchestration and collective efforts from all stakeholders rather than incremental reform.

While Section 1.2 defined the skills-first model conceptually, the following section identifies the five structural barriers that continue to limit its adoption in practice.

[1] It is also important to acknowledge that there may be sectoral differences and occupational requirements where skills-first approaches require adjustment. For example, certain sectors have stringent qualification requirements driven by legal, regulatory, or safety considerations. Thus, a skills-first framework should be contextualised across industries, with variable implementation strategies and timelines.

1.3. The Five Structural Barriers to Change

Despite increasing evidence—such as findings from the World Economic Forum (2024) and the Burning Glass Institute (2022) indicating that skills-based hiring practices can enhance productivity and workforce diversity—adoption remains limited. Only 12% of EU enterprises systematically use skills taxonomies, while 68% of workers distrust non-academic credentials (OECD, 2023). This inertia stems not from technological or pedagogical limitations but from five systemic barriers:

Signalling failures
Employers struggle to articulate and verify evolving skill needs, while workers lack consistent mechanisms to signal their capabilities.

Coordination deficits
Fragmentation among educators, employers, and policymakers hinders alignment of skills frameworks, job design, and training.

Risk asymmetry
Employers fear training investments will not yield returns—for example, because of employee poaching by competitors—while workers hesitate to upskill without guaranteed recognition or reward.

Measurement gaps
There are few robust tools to quantify the impact of skills on performance or productivity, leading stakeholders to fall back on familiar credentials—and more problematically to underinvest in talent development.

Cultural resistance
Formal education and qualification attainment remain deeply embedded as a status symbol and hiring proxy, reinforcing credential bias, and differential reward for job roles labelled as requiring less qualification. The reality is qualification is a poor signal for skills and competencies.

The remainder of this paper explores the argument that overcoming these structural inefficiencies requires coordinated, system-level interventions—rather than incremental adjustment. Section 2 traces the historical evolution of skills policy, situating the skills-first paradigm within a broader historical context. Section 3 introduces an analytical framework built around the five structural barriers. Section 4 surveys promising interventions for addressing these barriers. Section 5 provides a summary of key policy initiatives in Singapore in addressing the barriers, and Section 6 reflects on the roles of different stakeholders—individuals, policymakers, employers, and training providers—in building a more coherent skills-first ecosystem.

The Evolution of Skills Policy:

From Qualifications to Skills Ecosystems

2

The Evolution of Skills Policy:

From Qualifications to Skills Ecosystems

The evolution of skills policy over the last four decades reflects broader tensions between education systems, labour market needs, and the shifting valuation of human capital. In response to growing criticism of rigid credentialing regimes, the 1980s and 1990s saw the emergence of competency-based approaches aimed at aligning education more closely with rapidly evolving labour markets. This marked a pivotal shift in vocational education and training (VET), as traditional qualifications were increasingly viewed as poorly suited to the realities of modern employment. Outcome-oriented models gained traction during this period, emphasising demonstrable skills over time-served curricula. Yet despite these reforms, progress was uneven due to conceptual ambiguities, inconsistent implementation, and the enduring dominance of qualification-based signalling in employment decisions.

2.1 The Rise of Competency-Based Vocational Qualifications

In the United Kingdom, the introduction of the National Vocational Qualification (NVQ) framework in 1986 marked a key turning point, emerging in response to the fragmented "jungle" of technical and vocational courses that had proliferated in preceding decades (Gov.UK, 2024b). Designed to streamline training programmes, NVQs emphasised competence as measured by workplace performance rather than academic attainment. This model emphasised "learning by doing", with assessments conducted in real work environments to validate skills.

While this approach introduced valuable innovations such as work-integrated assessment, early NVQs were criticised for reducing occupations to discrete, observable tasks and overlooking more complex, higher-order capabilities like problem-solving and adaptability (Vickerstaff & Sheldrake, 1988). By the late 1980s, functional analysis replaced task-based frameworks, shifting the focus to holistic work roles. This approach aimed to capture not only task execution but also decision-making, contingency management, and collaboration (Gov.UK, 2024a). Yet despite these innovations, NVQs faced low employer uptake. By 1990, only 14% of UK firms had integrated them into recruitment, citing challenges in aligning NVQs with existing HR systems (Vickerstaff & Sheldrake, 1988).

Australia mirrored these reforms through its competency-based training (CBT) initiatives, leading to the introduction of the Australian Qualifications Framework (AQF). *Industry training in Australia: The need for change* (Dawkins, 1988) advocated for a national VET system prioritising industry-defined competencies, resulting in the absorption of technical schools into Technical and Further Education (TAFE) colleges. Unlike the UK's NVQs, Australia's competency frameworks incorporated generic skills—such as communication and teamwork—reflecting a broader ambition to cultivate a flexible, future-ready workforce. The emphasis was not only on task-specific ability but also on adaptability in the face of economic change.

However, tensions arose between policymakers and business leaders, who championed CBT for its labour market responsiveness, and educators, who expressed concern over its rigid implementation. Vocational instructors in particular criticised its prescriptive assessment criteria, warning that excessively rigid competency standards could stifle pedagogical creativity (Newton, 2018). The so-called "Grade Debate" of the 1990s exemplified this friction, as educators pushed back against binary competency assessments—such as pass/fail or competent/not competent—arguing instead for more nuanced performance evaluations that could recognise varying levels of proficiency and growth (Newton, 2018).

2.2 Conceptual Ambiguities and Terminological Divergence

Despite widespread adoption of competency-based training, the 1980s and 1990s surfaced enduring tensions over what "competence" truly meant. In the UK, NVQs defined competence narrowly—as the ability to perform specific workplace tasks to prescribed standards. Critics dismissed this formulation as overly reductionist, arguing it failed to capture the full range of skills needed in real-world settings (Wolf, 2001).

By contrast, management theorists such as Boyatzis (1982) conceptualised "competency" as an underlying behavioural characteristic linked to attributes like leadership or emotional intelligence. This divergence in definitions led to widespread terminological confusion. NVQs focused on "competence" as observable performance, while corporate frameworks emphasised "competencies" as more fundamental, internal traits and capacities (Arifin, 2021).

The lack of conceptual alignment hindered cross-sector collaboration. Educators and employers often struggled to reconcile vocational standards with organisational competency models, leading to inconsistent implementation and limited transferability. These definitional gaps would continue to pose challenges into the skills-first era, particularly as policymakers seek to integrate education, employment, and lifelong learning under a common framework.

2.3 Singapore's Early Experimentation: The National Skills Recognition System

Singapore's own experience with competency-based training reflects many of the global trends outlined above, as well as unique local dynamics and institutional responses. The country's first major foray into competency-based training came in 1999 with the launch of the National Skills Recognition System (NSRS), developed under the Productivity and Standards Board, which was later restructured into SPRING Singapore[2]. Drawing from lessons from the UK's NVQs and Australia's AQF, the NSRS was introduced as a pilot programme in three sectors—cleaning, hospitality, and marine—with the goal of addressing widespread gaps in skills recognition across industries.

[2] In 2018, SPRING Singapore was merged with International Enterprise Singapore to form Enterprise Singapore.

Despite its tripartite consensus and use of industry-defined standards, the NSRS faced significant implementation challenges. Employers expressed frustration with the administrative burdens of workplace assessments, while many workers viewed NSRS credentials as inferior to traditional academic qualifications. The system's rigid, government-devised assessment plans left training providers with limited room to adapt, which restricted innovation and responsiveness. As noted in a World Bank evaluation:

> [Under the NSRS system], it was found that standardized, government-devised assessment plans were not as effective as they might be, since [training] providers could not adapt them.
>
> (World Bank, 2012, p. 41)

By 2004, only 300,000 certifications had been issued under NSRS achieving half of the original target—with uptake concentrated in manufacturing rather than in the growing services sector (World Bank, 2012). In response to these limitations, the establishment of the Singapore Workforce Development Agency (WDA)[3] was to develop a more flexible, scalable training model. This led to the launch of the Workforce Skills Qualifications (WSQ) system in 2005. The WSQ emphasised sectoral competency frameworks, organised around work functions and job roles, a skills-based credentialling system, and a stringent quality assurance system.

WSQ has since evolved into a comprehensive workforce training system rooted in modular, stackable credentials and based upon technical skills and competencies (TSC) and generic skills and competencies (GSC)[4]. The system attempted to integrate both TSC and GSC into workplace performance outcomes. Additionally, employer engagement became a central feature of the WSQ, supported by generous training subsidies to encourage uptake. Sectoral Skills Councils were established and managed by WDA to articulate and update the sectoral skills requirement. The usage of sectoral competency frameworks was restricted to the WSQ system.

Recognising the need to have wider adoption and application of skills beyond the WSQ system, the establishment of the national skills framework was set up in 2016, further enhancing the national jobs-skills intelligent (NJSI) system. The NJSI comprises of jobs and skills taxonomies and sectoral skills framework that are continually updated through integrated data-led approach supplemented by expert input. The national skills framework supports sectoral- and enterprise-manpower and skills planning and development, while ensuring portability of skills through common set of jobs and skills taxonomies. The national skills framework is adopted by various credentialing systems.

[3] In 2016, the Singapore Workforce Development Agency (WDA) was restructured. It was renamed Workforce Singapore (WSG) and some of its functions were transferred to a new statutory board, SkillsFuture Singapore (SSG).

[4] In 2019, SSG reviewed the GSC that was first introduced in 2016, and developed the Critical Core Skills (CCS) comprising 16 competencies grouped into three essential areas for today's workplace.

2.4 Ongoing Challenges and Limitations for the Skills-Based Approach

While the reforms of the 1980s and 1990s laid the groundwork for skills-based ecosystems, several inter-related structural challenges have persisted:

a. Stakeholders scepticism: Firms—and to some extent workers and society—accustomed to credential proxies questioned the labour market validity of competency certificates. In the UK, NVQs were perceived as inferior to traditional qualifications, perpetuating class-based stratification (Cedefop, 2020; Keep, 2002).

b. Assessment rigidity: Binary performance models such as pass/fail criteria failed to reflect varying degrees of proficiency. This lack of granularity limited their utility for nuanced talent development and career progression.

c. Conceptual fragmentation: Competing definitions of competence—task-based (as in NVQs), behavioural (in corporate HR models), and pedagogical (e.g., Bloom's taxonomy)—created fragmentation across the education and employment sectors that stymied coherent policy design (Arifin, 2021). Similarly, there has been lack of consistency in whether assessments measure competency in a single skill or the full bundle of skills required for entry into an occupation.

d. Limited transferability and future-skilling: Early skills-based systems were designed primarily to meet the immediate needs of specific industries. They often fell short in supporting cross-sector mobility or preparing workers for emerging roles in a rapidly shifting economy.

e. Institutional resistance: Except for a small number of institutions of higher learning (IHLs), many universities and polytechnics have been slow to adopt skills-based frameworks. Concern about diluting academic rigour and the challenge of integrating competency-based credentials into existing degree structures remain significant.

Taken together, these challenges reflect deeper systemic issues: a tendency to frame reform primarily in supply-side terms, an overreliance on education-based solutions, and a lack of policy mechanisms to drive demand-side adoption.

Even as competency-based models gained recognition among employers, adult educators and policymakers, their practical impact was muted by entrenched institutional preferences and the absence of systemic coordination.

Structural Inefficiencies in Skills Ecosystems:

The Five Pillars

Structural Inefficiencies in Skills Ecosystems:

The Five Pillars

Despite decades of reform and experimentation, many of the foundational challenges identified in earlier systems continue to shape the present-day skills landscape. In particular, the persistence of skills-based models—despite their widely documented limitations—reflects deeper systemic failures embedded in the labour market and workforce development landscape. This section examines five interdependent structural inefficiencies—signalling failures, coordination deficits, risk asymmetry, measurement gaps, and cultural resistance—that collectively reinforce the primacy of credentials while obstructing transitions to a skills-first approach. Addressing these inefficiencies is essential to reducing skills mismatches, expanding talent pools, and lowering underemployment.

3.1 Signalling Failures: The Dominance of Qualifications

Labour markets operate under significant information asymmetries, where credentials serve as imperfect proxies for skills. Employers, facing screening costs equivalent to 14% of annual salaries in small and medium-sized enterprises (SMEs), often rely on qualifications as heuristic signals of competency—a rational response in contexts where skill verification mechanisms remain underdeveloped (Asia Pacific Economic Cooperation, 2012).

Signalling failures are particularly pronounced in youth employment. An experiment involving 1,200 SME job interviews found that candidates who provided certified soft skills data were 23% more likely to secure employment than those who relied solely on qualifications. Yet, only 12% of firms adopted such certifications post-trial, citing administrative burdens and entrenched credential biases (Bassi & Nansamba, 2022). Similarly, research by the Social Market Foundation indicates that 20% to 40% of the wage premium associated with education stems from signalling rather than human capital enhancement, incentivising credential accumulation over competency development (Bhattacharya & Percy, 2021).

Owing to these signalling barriers, progress in recognising skills as an alternative to qualifications in Singapore has been slow. A 2023 LinkedIn study found that six in ten professionals in Singapore believed a degree was less important for securing a job today than it was 20 years ago. However, employers and HR professionals continue to emphasise academic qualifications in hiring decisions (Lau, 2023). A 2024 Burning Glass Institute study found that, for every 100 jobs that dropped a degree requirement, not even 4 incremental candidates without a degree were hired (Sigelman et al., 2024).

A key barrier to greater adoption has been the need for a standardised signal of quality.

Non-degree credentials have proliferated across both online and traditional training providers—in the US, the Credential Engine project (2025) has catalogued over 1.1 million of them—but most lack third-party assessment. According to a forthcoming joint American Enterprise Institute-Burning Glass Institute report, only 1 in 8 non-degree credentials yield a wage gain that those who earn them would not have otherwise gotten. As a result, it has been difficult for firms to know which credentials qualify a candidate for a given role. In the absence of better alternatives, managers continue to rely on proxies, however inefficient they may be.

The demand-side perspective requires deeper examination, particularly regarding how enterprises can integrate skills into internal business processes. To what extent can skills drive recruitment and development planning to support business needs? A skills-first approach would require embedding skills into business processes, product/service development, and business transformation initiatives. However, few organisations have demonstrated the ability to translate business plans to the skills required to execute on them—let alone to identify workforce gaps that must be bridged. Put differently, even as most firms have highly evolved supply chains for each of their key factors of production, their talent supply chains are anaemic. A common taxonomy linking business activities, skills, and job roles could help employers make strategic choices in the design of work through the "Bot-Borrow-Build-Buy" model, enabling firms to optimise decisions across task, contracting, developing internal talent, and hiring external talent based on the availability and trainability of specific skills. Capturing changing workplace needs and coordinating responses across stakeholders is essential.

The traditional "build-buy-borrow-bot" framework refers to a talent acquisition and development strategy where organisations prioritise internal talent development first, followed by external hiring, contingent workers, and finally automation. While the 4B framework has been around for nearly a decade, today's talent landscape is experiencing "a fundamental shift away from automation" where organisations increasingly view technology as augmentation rather than replacement for human capabilities, reflecting human talent alone cannot scale effectively (Lennon, 2024).

From the individual's perspective, navigating a skills-first labour market necessitates developing career adaptability—a set of psychosocial-labour market resources that enables one to anticipate, respond to, and capitalise on changing work demands. In this environment, workers need to continuously engage in self-directed learning and identity construction, shifting from a qualification-centric mindset to one that emphasises the acquisition, demonstration, and articulation of transferable skills portfolios through conscious and continuous exploration of both the self and the environment. (Brown et al, 2012).

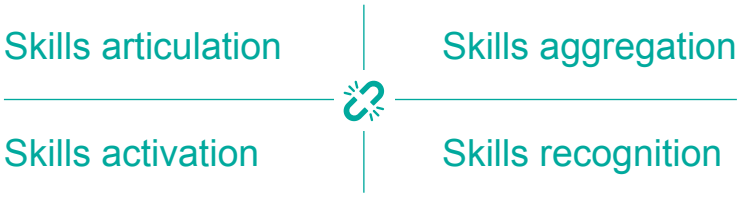
The shift towards a “Bot-Borrow-Build-Buy” paradigm requires workers to cultivate heightened career identity awareness, recognising when to develop new skills internally, when to leverage existing capabilities differently, and when to supplement their skills through strategic partnerships—ultimately becoming curators of their own human capital in response to the nonlinear career trajectories characteristic of contemporary labour markets (Brown et al., 2012; Savickas, 2013).

3.2 Coordination Deficits: The Silos of Stakeholder Interests

Skills ecosystems often suffer from misalignment between employers, educators, and policymakers. One of the key challenges is the lack of a shared language between industry and education. Educators frame skills in terms of learning objectives, employers focus on skills as the enablers of functional execution or as drivers of workplace performance, and policymakers often equate skills with earnings and career progression. The absence of a shared language between these perspectives exacerbates signalling problems, impedes stronger connections between learning, work and career outcomes. As a result, it becomes difficult to motivate learners or to position skills as meaningful labour market currency.

Sporadic efforts may seem impressive, but aligning stakeholder interests is often challenging. For example, IBM has developed its own credentials strategy, with its digital badge programme leading to increased employee engagement and improved employability among badge recipients (Surch, 2024). However, these credentials have yet to gain cross-industry recognition due to incompatible taxonomies between corporate and public credentialing systems (Leaser, 2019).

A fundamental question arises regarding who is best positioned to coordinate the various elements of the skills ecosystem:



The broken links along this skills value chain can present significantly hurdles to the implementation of skills-first policies.

This coordination challenge extends to the investment required to build sustainable capability for planning and coordinating a ‘skills-powered economy’, which requires tight collaboration among stakeholders who each hold only parts of the value-chain. Past efforts, such as sector skills councils in the UK and Australia, had some success but proved unsustainable. The lack of common skills currency across sectors, employers and job roles remains a core challenge.

A key driver of these systemic breakdowns in coordination is a lack of infrastructure or incentive for data sharing across stakeholders.

In many countries, data privacy concerns hinder the ability to connect records. Meanwhile, employers loathe to share training records with other companies and, even within government, records from TVET, higher education, and workforce development agencies are seldom unified. The result is a siloed patchwork of data that makes it difficult to develop a shared awareness of the current and emerging needs of critical sectors, of the skill inventory of the workforce, or of available education and training assets that could be brought to bear in closing gaps.

Supply-side stakeholders, including higher education institutions, TVET providers, and continuing education and training organisations, face their own set of challenges. While most institutions have industry engagement platforms, the lack of consistent labour market forecasting means curriculum and learning outcomes are likely to lag behind the pace of change. What incentives exist for these institutions to place skills at the centre of their services? How can they close the gap between what is taught and what is sought in the workplace?

Recognition of skills acquired through both formal, and informal and non-formal learning is essential for a functioning skills-first framework.

While most institutions have industry engagement platforms, the lack of consistent labour market forecasting means curriculum and learning outcomes are likely to lag behind the pace of change.

3.3 Risk Asymmetry: The Investment Disincentive Trap

Skills development is often hindered by risk aversion among both employers and employees. Employers worry about increased employee turnover after training, while employees are reluctant to invest in training due to uncertainties about its returns. For example, risk-averse managers are 30% less likely to fund general training (transferable skills) compared to firm-specific training (Caliendo et al., 2020). Similarly, line managers, who are often held to account for poor hires and in any case bear the operational cost, perceive replacing qualification-based strategies with skills-first strategies as risky (Fuller & Sigelman, 2024).

Risk-averse managers

30%

less likely to fund general training compared to firm-specific training

Line managers perceive replacing qualification-based strategies with skills-first strategies as

risky

Workers, particularly those with lower levels of education, often underinvest in training due to a lower willingness or propensity to participate in training. This reluctance is influenced by economic preferences such as future orientation and leisure preference, as well as personality traits including locus of control, examination anxiety, and openness to experience, despite clear economic returns to training (Fouarge et al., 2013). In other cases, financial constraints further complicate cost-benefit decisions related to training investment (Popov, 2014). Even where employers offer training reimbursement schemes, some low-wage workers may lack the liquidity in funding or in time availability to pursue training options that would be otherwise rational. Another reason may be the lack of timely, actionable labour market information.

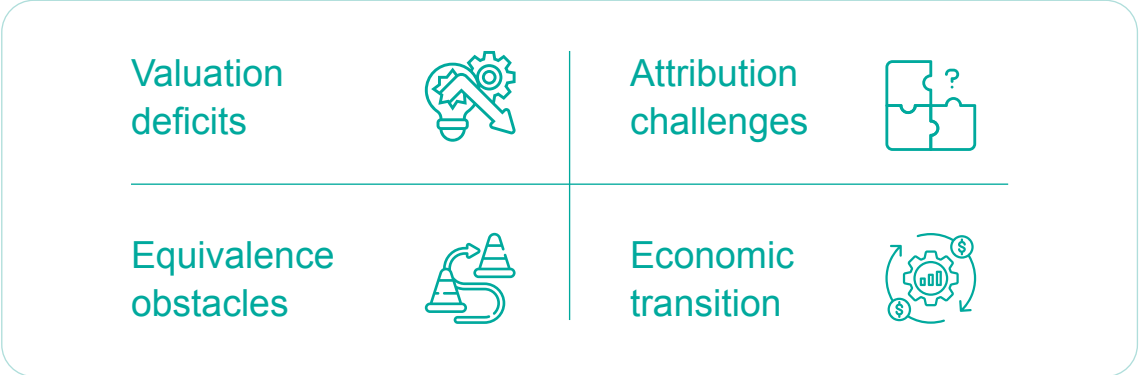
The erosion of job security can be mitigated by developing habits within individuals to regularly review their productive assets (e.g., skills, networks and learning-to-learn capability). How can policy frameworks encourage this self-directed behaviour in career management? Additionally, to what extent can employers become more effective in signalling skill needs to their employees and supporting individual career planning? What will motivate employers to play the role of active developers to enhance employees' career opportunities?

The impact of globalisation on skills-first strategies represents another critical dimension. For example, employers take advantage of offshoring to high-skilled but low-cost locations. Skills advantages in many advanced countries have been affected. Globalisation fundamentally influences how skills are valued, acquired, recognised, and utilised in the labour market, creating both challenges and opportunities for the adoption and implementation of skills-first approaches.

3.4 Measurement Gaps: The Productivity Black Box

The measurement challenge is arguably the most significant structural impediment to skills-first transitions. Despite decades of human capital theory development, contemporary labour markets rely on remarkably crude instruments to measure the relationship between skills and productivity.

This measurement gap manifests in four key areas:



a. Firstly, valuation deficits arise from the absence of standardised metrics for assessing the economic contribution of specific skills. The World Economic Forum's Human Capital Report (2023) notes that while 83% of surveyed employers acknowledge skills as critical productivity drivers, only 11% systematically measure skill-specific productivity contributions. This gap in measurement incentivises firms to rely on the usual proxy, formal qualifications.

b. Secondly, attribution challenges compound skills valuation deficits. Skills rarely operate in isolation. Instead, they function within complex ecosystems involving complementary competencies, organisational structures, leadership, organisational culture, and technological interfaces. Consequently, isolating the productive contribution of individual skills becomes methodologically fraught. For example, De Grip and Sauermann's (2013) longitudinal study of 1,800 service workers across six European countries reveals that conventional productivity metrics capture only 24% of skills-driven performance variation, with other complementary factors explaining substantially more variance.

c. Thirdly, the existence of different skills frameworks prevents efficient skill comparison across sectoral, organisational, and geographical boundaries. The proliferation of sector-specific competency frameworks—often using incompatible taxonomies and assessment standards—hinders the development of a universal "skills currency" that could enable seamless labour market transitions. As Autor (2011) observes, "without a common language for skills, labour markets inevitably default to the crude heuristics embedded in traditional credentialing systems".

d. Fourthly, as the valence of most developed markets has turned increasingly towards the knowledge economy, the drivers of productivity are poorly understood. In industrial systems, productivity measures are straightforward, essentially tallying the output of tasks: how many parts did a factory worker make, how many calls did a contact centre worker take, how many dollars did a salesperson bring in? The knowledge economy, by contrast, is driven by expertise, and expertise is difficult to measure. The better software developer is not necessarily the one who wrote more lines of code. As measures of productivity have themselves proven elusive, it is not surprising that firms struggle to evaluate the impact of skill on productivity improvement.

This measurement gap creates what might be termed as a 'productivity black box' wherein both employers and policymakers lack the instrumentation to adequately value skills-based contributions.

While it is possible to create highly valued job roles, e.g., AI engineers, most firms lack the tools to measure productivity gains from skill investments. As a result, they default to cost-optimisation, treating labour as an expense rather than an asset. It is therefore not a surprise that employee skills do not appear in a company's balance sheet, but their wages do. In fact, despite the popularity of the term 'human capital', Generally Accepted Accounting Principles (GAAP) do not permit recognition of the value of a firm's human assets and funds spent on training are treated as direct expenses. As such, there is no fixed way of tracking return on workforce investments. At the practical level, when skills are 'invisible', it inadvertently reinforces credential-based hiring practices, as degrees and diplomas serve as imperfect but familiar proxies for potential productivity. Without robust measurements, the skills-first approach may struggle to prove its advantages over credential-based systems—despite growing interest.

Without robust measurements, the skills-first approach may struggle to prove its advantages over credential-based systems—despite growing interest.

The question of what initial steps, e.g., the America Opportunity Index or ISO30414 for internal and external human capital reporting (HCR) in organisations, can be taken locally in Singapore, and perhaps globally, to address these measurement gaps becomes crucial. Without a recognised system to measure and validate skills, stakeholders tend to revert to qualifications as their default metric.

In order for skills to become a true 'currency' in the labour market, the development and validation of a 'skills bank' or repository may be seen as a fundamental necessity.

3.5 Cultural Resistance: The Persistence of Credentialism

Cultural resistance represents a subtle but deeply entrenched barrier to skills-first transformation. Unlike signalling or coordination inefficiencies that stem from institutional misalignments, this resistance is rooted in long-standing societal norms that equate academic credentials with merit, status, and employability. Across many industrialised countries, degrees have come to serve not only as technical qualifications but also as symbols of identity, aspiration, and legitimacy in professional settings (Ammerman et al., 2023; Bhattacharya & Percy, 2021).

This dynamic is particularly salient in managerial hiring behaviours (but also observed in other human resource practices, such as talent development, succession planning and so on). Research consistently finds that employers tend to recruit candidates who reflect their own educational background, reinforcing credential-based selection and limiting the adoption of alternative skill signals (The Burning Glass Institute, 2022).

Even in firms experimenting with skills-based hiring, evidence shows limited behavioural change. A 2024 study reported that " … during the past decade the number of job postings that once required college degrees but no longer do has jumped fourfold. For every 100 of these postings, however, fewer than four additional candidates without degrees were actually hired" (Fuller & Sigelman, 2024). This gap between policy intention and cultural practice highlights that the persistence of credentialism is not merely a structural legacy but an active social preference—sustained by elite norms, workplace conventions, and the symbolic capital of education. In such cases, credentials serve more as indicators of cognitive capacity or trainability than of job-specific skill, decoupling formal education from workplace relevance (Brown et al., 2010).

The persistence of credentialism is not merely a structural legacy but an active social preference—sustained by elite norms, workplace conventions, and the symbolic capital of education.

Credentials serve more as indicators of cognitive capacity or trainability than of job-specific skill, decoupling formal education from workplace relevance.

Yet cultural resistance is not confined to employers and institutions. Individuals themselves often perpetuate the credential-centric mindset, opting to pursue degrees to the exclusion of other routes to professional advancement—even when leveraging demonstrable skills or experiential learning as labour market signals offers better returns. In fact, many pursue levels of academic certification well beyond occupational requirements. This phenomenon has contributed to an observable escalation of qualification attainment across OECD countries, including the growing normalisation of master's degrees as a baseline for professional entry in fields that previously accepted bachelor-level qualifications (OECD, 2023). The result has been a growing crisis of unemployment or underemployment as a surfeit of graduates is mismatched to the contours of labour market demand; having invested considerable time and treasure in accruing degrees, graduates wind up accepting jobs they could have gotten without having bothered—or choose to sit on the sidelines rather than accept employment they consider beneath their level. In the US, over half of graduates find themselves underemployed, highlighting the perils of pursuing degrees over practical education, while one in five school leavers outearn their university-educated peers (Hanson et al., 2024; The Burning Glass Institute, 2024).

While platforms like LinkedIn have introduced mechanisms for users to showcase verified skills, uptake has been uneven—suggesting that even when tools for skills signalling exist, individuals may still perceive qualifications as the more socially recognised and competitive currency in the labour market (Linkedin, 2023).

This raises deeper questions about whether individuals are culturally conditioned to undervalue skills as a basis (or currency) for employability, or whether the pressures of competitive labour markets drive them towards safer signalling strategies. In either case, the continued preference for qualifications over demonstrable competencies complicates the shift towards a skills-first model.

Without broader social legitimisation of alternative pathways—and clear labour market rewards for pursuing them—individuals may be reluctant to stake their career progression on skill-based signals, even when such mechanisms are technically available and even when such choices offer a notionally superior return on investment.

Examples of

Skills-First Interventions

4

Examples of

Skills-First Interventions

Several interventions—at both national and organisational levels—have attempted to address these inefficiencies directly. This section categorises them according to which structural barrier they primarily target, whilst acknowledging that comprehensive approaches often address multiple barriers simultaneously.

4.1 Addressing Signalling Failures: Verification Mechanisms and Skills Currencies

Digital Credentials Consortium: Creating Verifiable Skills Infrastructure

The Digital Credentials Consortium (DCC), founded in 2019 by a collaboration of leading universities from North America and Europe, focuses on resolving signalling failures in education and employment through the adoption of open-standard verifiable credentials. The consortium implements the World Wide Web Consortium (W3C) Verifiable Credentials standard, which enables the creation of tamper-evident, privacy-preserving, and portable digital credentials, including digital badges, certificates, and micro-credentials (Lemoie et al., 2023; W3C, 2022).

DCC's approach extends beyond basic digital certification by incorporating cryptographic verification, embedded skill taxonomies, and evidence links within credential metadata, enhancing trust and transparency. This infrastructure directly tackles trust deficits associated with non-traditional credentials by providing three core verification elements (Grech et al., 2021):

i. Identity authentication: Verifies that the credential belongs to the claimant.
ii. Issuer validation: Confirms the institutional origin of the credential.
iii. Credential integrity: Ensures the credential has not been altered.

The DCC's infrastructure helps legitimise non-traditional credentials by addressing transparency and reliability. For policymakers exploring skills-first transitions, DCC's model highlights (Lemoie et al., 2023):

i. The need for open standards for broad ecosystem participation.
ii. Cryptographic verification to establish trust.
iii. Structured competency frameworks for precise skill representation.

This comprehensive approach demonstrates that signalling failures can be mitigated through system redesign—not merely digitising existing qualifications.

New Zealand's Micro-Credential Framework: Institutional Validation for Skills Signals

New Zealand's national micro-credential framework, introduced in 2018 by the New Zealand Qualifications Authority (NZQA), exemplifies how formal institutional validation can address signalling failures. Micro-credentials are integrated into the New Zealand Qualifications and Credentials Framework (NZQCF), ensuring the same quality assurance standards that apply to traditional qualifications (New Zealand Qualifications Authority, 2022).

To maintain trust and recognition, the framework retains a 'legacy' linkage with traditional qualifications through credit equivalency. The framework includes:

i. Credit equivalency: Micro-credentials range from 5 to 40 credits, with each credit representing 10 hours of learning.

ii. Quality assurance: Rigorous processes ensure consistency in assessment and moderation, similar to traditional qualifications.

iii. Stackable pathways: Learners can combine smaller micro-credentials into larger qualifications, facilitating lifelong learning and upskilling opportunities.

By ensuring quality and consistency, the NZQA aims to enhance the overall value and credibility of micro-credentials in the New Zealand education and employment system (Klinkum, 2020).

The framework's retention of qualification linkages highlights a crucial aspect of the 'skills-first' paradigm: While prioritising recognisable skills and performance outcomes, qualifications can still serve as a complementary signal. This aligns with the concept that 'skills-first' represents a continuous shift in favour of skills-based recognition as a primary currency in the labour market, without entirely displacing the value of formal qualifications (Fisher & and Leder, 2022).

4.2 Addressing Coordination Deficits: Harmonisation Initiatives and Shared Languages

The European Skills, Competences, Qualifications and Occupations (ESCO) Framework

The ESCO framework represents a significant cross-country effort to address coordination deficits through the establishment of a common skills language, advancing the principles of skills-first systems. Developed by the European Commission and fully launched in 2017, ESCO provides a multilingual classification system containing over 13,890 skills and 2,942 occupations, designed to enhance interoperability between education, employment, and mobility systems (European Commission, 2019).

The key features of ESCO's approach include (European Commission, 2019):

i. Semantic interoperability: Machine-readable links between skills, occupations, and qualifications allow automated translation of competencies across domains (e.g., matching educational outcomes to job requirements).

ii. Multilingual support: Available in 24 EU languages plus Icelandic, Norwegian, and Arabic, reducing language barriers in cross-border recruitment.

iii. Integration with national systems: By 2023, 23 EU member states had mapped occupations to ESCO, with five completing full skills alignment.

ESCO directly addresses the "language gap" between education and employment, a critical coordination barrier. This facilitates the ability to prioritise and signal skills in the labour market, supporting job-matching and qualifications transparency. As of October 2023, 23 EU member states had completed occupation mapping, and five had fully mapped their skills frameworks (European Commission, 2022).

Singapore has a similar tool in the Skills Framework (SkillsFuture Singapore, 2025) supporting skill transparency across sectors and career development pathways. It offers a potential foundation for skills-first transitions by targeting coordination deficits. However, as in the case of ESCO, a key challenge remains employer adoption within operational functions. This is vital to fully realising a skills-centric economy where skills are the primary currency.

Skills Framework for the Information Age (SFIA): Industry-Led Skills Harmonisation

The Skills Framework for the Information Age (SFIA), launched in 2000 and now in its 9th version (SFIA 9), represents a significant industry-led effort to address coordination deficits through the establishment of a common skills language in the digital technology domain. Unlike government-initiated frameworks, SFIA emerged from collaborative efforts by industry practitioners and employers, providing a globally recognised common reference model for identifying, developing, and managing digital skills (SFIA Foundation, 2025).

Key features of SFIA include:

i. Comprehensive skills architecture: SFIA maps 121 professional skills across six categories (Strategy and Architecture, Change and Transformation, Development and Implementation, Delivery and Operation, Skills and Quality, and Relationships and Engagement) and seven levels of responsibility, creating a standardised vocabulary for digital competencies (SFIA, 2024). This consistent nomenclature facilitates clearer communication between employers, education providers, and practitioners.

ii. Global adoption and translation: Available in 12 languages and used in over 180 countries, SFIA transcends national boundaries and sectoral silos, providing a truly international skills taxonomy that enables cross-border skills recognition (SFIA, 2024).

iii. Industry-education alignment: The framework actively bridges the communication gap between industry and education, with universities in the US and other countries using SFIA to benchmark curriculum outcomes against industry requirements (Bowers & Sabin, 2024). This connection addresses one of the fundamental coordination deficits identified in our analysis—the misalignment between learning objectives and workplace performance expectations.

Despite these successes, SFIA faces adoption challenges similar to other harmonisation initiatives. SMEs often lack resources to implement comprehensive skills frameworks, while larger organisations may resist abandoning previously adopted competency models. These implementation barriers mirror the coordination challenges identified in our structural inefficiency analysis, highlighting that even well-designed skills languages require supportive ecosystems to achieve widespread adoption.

4.3 Addressing Risk Asymmetry: Cost-Sharing Models and Transition Support

Sweden's Job Security Councils (Trygghetsråden)

The Swedish example represents an interesting approach to addressing risk asymmetry through collective risk-pooling mechanisms. Established through collective agreements between employer organisations and trade unions, these privately administered bodies provide comprehensive transition services for redundant workers: skills assessment, career counselling, targeted training, and placement support (Swedish Agency for Economic and Regional Growth, 2021).

The councils' distinctive feature is their financing mechanism. Participating employers contribute approximately 0.3% of payroll to sectoral funds, functioning as a form of unemployment insurance focused on skills transition. This arrangement distributes adaptation costs across employers and time periods—addressing the "investment disincentive trap" identified in our structural inefficiency discussions. By collectivising risk, individual employers can support substantial reskilling investments without absorbing their full cost, while workers gain enhanced security during transitions (Trade Union Advisory Committee to the OECD, 2018).

For the skills-first transitions, Sweden's model offers valuable insights regarding risk-sharing mechanisms that could facilitate training or re-training needs. The councils demonstrate that risk asymmetry can be systematically addressed through well-designed institutional arrangements that align stakeholder incentives.

By collectivising risk, individual employers can support substantial reskilling investments without absorbing their full cost, while workers gain enhanced security during transitions.

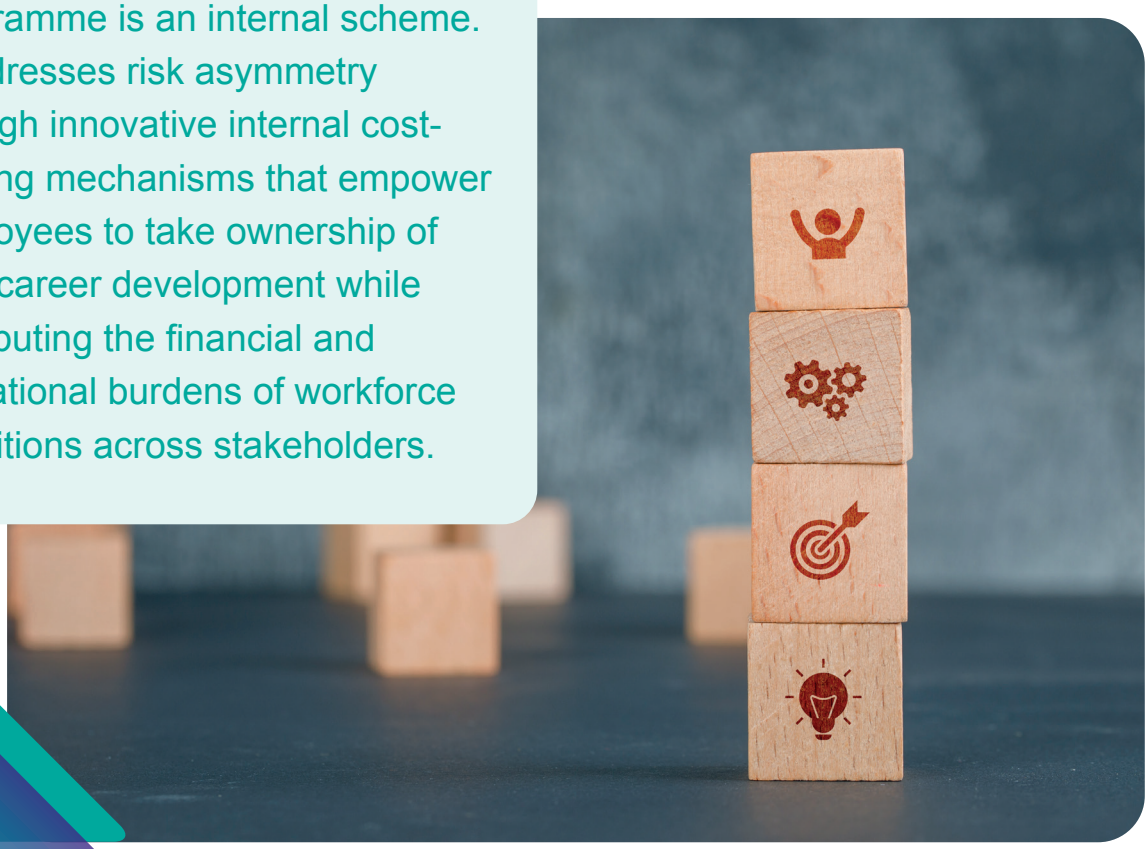
Zurich Insurance Group's MyJourney and My70Percent Programmes

Unlike Sweden's sector-wide collective approach, Zurich Insurance's My70Percent Programme is an internal scheme. It addresses risk asymmetry through innovative internal cost-sharing mechanisms that empower employees to take ownership of their career development while distributing the financial and operational burdens of workforce transitions across stakeholders (iVentiv, 2024).

The programme is based on the insight that most employees use only about 70% of their full skill potential in their current roles. By identifying underutilised capabilities and aligning them with future business needs, Zurich promotes both workforce agility and individual growth. Employees are encouraged to pursue training, cross-functional projects, and short-term assignments, supported through structured organisational backing.

Paired with the MyJourney initiative—a personalised platform for skills development and career planning—these programmes exemplify how firms can move beyond compliance-based training to adopt proactive, skills-first strategies. Zurich's approach demonstrates that, even without a national framework, companies can structurally address risk asymmetry through internal policies that align incentives and reduce investment barriers.

Zurich Insurance's My70Percent Programme is an internal scheme. It addresses risk asymmetry through innovative internal cost-sharing mechanisms that empower employees to take ownership of their career development while distributing the financial and operational burdens of workforce transitions across stakeholders.



Key features of My70Percent and MyJourney programmes include[5]:

i. On-the-job learning opportunities:

- Employees are encouraged to take on short-term assignments, part-time projects, or cross-departmental roles to develop new skills and gain exposure to different areas of the business.
- These opportunities are voluntary and open to all employees, democratising access to experiential learning.

ii. Employee empowerment:

- Integrated into Zurich's "MyJourney" platform[6], employees can assess their current skills, identify gaps, and match themselves with available internal opportunities.
- Participation is employee-driven—staff are encouraged to "put their hand up" for projects that align with their career aspirations or skill-building goals.

iii. Internal cost-sharing model:

- Zurich funds the programme's infrastructure and operations (e.g., platform maintenance and coordination), while employees contribute by time and effort to these additional responsibilities.
- Host departments share operational costs by temporarily reallocating resources (e.g., providing mentorship or project oversight).
- By 2020, Zurich Insurance had invested £1 million in this cost-sharing reskilling initiative within its UK operations. This funding enabled two-thirds of employees to gain practical experience in new roles without the need for extensive formal training, significantly reducing direct training expenditures (Pearson, 2025).

iv. Public-private collaboration:

- In some locations (e.g., Switzerland), Zurich partners with public agencies to deliver reskilling programmes targeting underrepresented groups (e.g., individuals returning from long-term illness or with disabilities), leveraging public funding to reduce corporate costs.

[5] The '70Percent' label refers to the 70-20-10 framework for learning and development, which mostly consists of 70% of learning comes from experiential opportunities, 20% from coaching or mentoring, and 10% from formal instruction.

[6] The tools are available at https://www.qorusglobal.com/innovations/27159-myjourney

4.4 Addressing Measurement Gaps: Productivity Frameworks and Skills Valuation

A critical structural inefficiency in skills-first transitions is the absence of reliable frameworks to quantify how specific skills contribute to productivity, innovation, or profitability. Traditional approaches, such as using educational qualifications or years of schooling as proxies for human capital, fail to capture the returns of discrete skills, competencies and cognitive abilities. These measurement gaps undermine efforts to prioritise skills in policy design, as stakeholders lack empirical evidence to justify investments in skills development over credential-focused systems. To address this, novel approaches are emerging to directly link skill acquisition and application to economic outcomes at organisational, sectoral, and national levels.

OECD's Programme for the International Assessment of Adult Competencies

The OECD's PIAAC study, launched in 2013, represents a pioneering effort to overcome measurement gaps by directly assessing adult skills—specifically, literacy, numeracy, and problem-solving—and correlating them with labour market outcomes. Unlike qualification-based proxies, PIAAC uses comparable competence tests to measure skill proficiency, enabling policymakers to analyse how skills affect productivity and wages at a national level.

Key mechanisms in PIAAC measures:

i. Skill proficiency scores: Adults in 39 countries are tested on real-world tasks (e.g., interpreting graphs, using digital tools), generating granular data on competence-based skill distributions.

ii. Policy benchmarking: Countries like Germany and Finland use PIAAC data to review their vocational training programmes, targeting the skill gaps that most hinder economic performance (Martin et al, 2022; Finnish Ministry of Economic Affairs and Employment, 2024).

iii. Linking skills proficiency to labour market outcomes and wages: Assuming wages roughly reflect productivity, the OECD reported:

> … an increase of one standard deviation in an individual's literacy proficiency (48 score points) is associated with a 0.8 percentage-point increase in the probability of being employed. An increase of one standard deviation in literacy proficiency is also associated with a 6% increase in hourly wages in these countries.
>
> (OECD, 2019, p. 111)

These findings have been corroborated by additional studies (Hanushek et al., 2015; Vignoles, 2016), reinforcing the idea that skills—when measured directly—have demonstrable economic value.

PwC's Skills-First Workforce Strategy: Organisational-Level Measurement of Skills Impact

Unlike national-level efforts such as PIAAC, PwC's approach illustrates how skills valuation can occur within firms by embedding skill taxonomies, workforce analytics, and internal mobility systems. A key innovation was the deployment of a skills-first hiring strategy in PwC UK, which replaced credential-based filtering with skill-matching algorithms and domain-specific skills assessments. The pilot reduced average hiring time by 45%, demonstrating not only operational efficiency but also enhanced responsiveness to emerging talent needs (World Economic Forum, 2024, p. 16).

PwC has attempted to measure outcomes traditionally linked to productivity through proxy indicators such as:

i. Internal mobility rates, which rose by over 9.25%, reflecting improved skills-role alignment.

ii. Training participation and intensity, which increased by 35% in France, indicating greater uptake of continuous learning opportunities.

iii. Return-on-skills-deployment, illustrated by the firm's internal "gig marketplace", which unlocked an estimated $6.1 million in productivity gains (World Economic Forum, 2024, pp. 16–17).

Though these indicators do not represent direct productivity measures in the classical economic sense (e.g., output per hour worked), they offer plausible organisational proxies for evaluating skills impact. More importantly, these metrics are now being institutionalised within PwC's workforce analytics systems, enabling ongoing refinement and predictive modelling. This aligns with De Grip and Sauermann's (2013) observation that skills tend to influence productivity indirectly through organisational processes, necessitating composite measurement strategies rather than singular causal metrics.

Moreover, PwC's shift to skills-based hiring has also broadened access to roles within the firm. After removing formal qualifications as primary screening criterion and adopting demonstrable skills assessments, the company recorded a 20% increase in the hiring of women and a 17% rise in the recruitment of candidates without traditional finance or STEM backgrounds into financial services positions—demonstrating that skills-first models can democratise access and contribute to more equitable workforce outcomes (World Economic Forum, 2024, p. 16).

PwC's approach illustrates how skills valuation can occur within firms by embedding skill taxonomies, workforce analytics, and internal mobility systems.

A key innovation was the deployment of a skills-first hiring strategy in PwC UK, which replaced credential-based filtering with skill-matching algorithms and domain-specific skills assessments.

4.5 Addressing Cultural Resistance: Embracing Skills Signaling and Skills Pathways

Cultural resistance to skills-first transitions stems from the entrenched role of educational credentials in defining merit, status, and employability in modern labour markets. This barrier is reinforced by hiring norms—particularly among highly-educated managers—who often replicate their own credential pathways in recruitment decisions, perpetuating bias and limiting the uptake of alternative skill signals. However, some organisations are challenging this dynamic by building internal cultures that recognise talent based on demonstrable potential rather than formal qualifications.

The American Opportunity Index: Institutional Culture and Upward Mobility

The American Opportunity Index (AOI), developed by the Burning Glass Institute, Harvard Business School, and the Schultz Family Foundation, benchmarks major US companies on how effectively they promote economic mobility through skills-focused employment practices. Based on real-world data of over 3 million workers, the AOI evaluates firms across metrics such as culture, pay, advancement, parity, and hiring without degrees (Sigelman et al., 2022).

Companies ranked highly demonstrate an institutional commitment to skills-first principles by removing unnecessary degree requirements, investing in internal career ladders, and recognising experiential learning. This index directly challenges cultural resistance by showing that firms can achieve better workforce outcomes through inclusive hiring practices and talent development strategies that de-emphasise the credential inertia.

IBM's "New Collar" Hiring and SkillsBuild Initiative

IBM has played a leading role in dismantling credential bias by promoting the concept of "New Collar" jobs—roles that prioritise skills over degrees. The company reports that over 50% of its US jobs no longer require a four-year degree (Ammerman et al., 2023). This cultural shift is reinforced through its SkillsBuild platform, a free learning and credentialing system co-developed with non-governmental organisations and public agencies to provide underserved populations with job-relevant skills and digital badges.

By investing in verifiable skills pathways and actively recruiting from non-traditional talent pools—including community college graduates, veterans, and career changers—IBM operationalises a skills-first ethos across its global workforce. The model not only demonstrates economic value through diversified hiring pipelines but also contributes to reducing systemic inequality in access to career advancement.

Together, these examples illustrate how organisational culture change—when embedded through measurement, incentives, and open hiring norms—can help overcome deep-rooted resistance to skills-first approaches.

Singapore's Attempts Towards a

Skills-Powered Economy

5

Singapore's Attempts Towards a

Skills-Powered Economy

Since the launch of SkillsFuture Movement (Shanmugaratnam, 2015) in 2015, there have been numerous efforts to strengthening the coordination and addressing gaps within the skills ecosystem in Singapore. The most significant policy shifts include updating the mandate of institutions of higher learning to serve continual learning; providing demand-side incentive to empower individuals and enterprises to take charge of reskilling and upskilling; deepening engagement with employers to drive skills-first practices; and providing online and offline resources to support future-skilling planning and implementation (SkillsFuture Singapore, 2020). Additionally, programmes and schemes continue to be rolled out to address the five structural gaps identified in this paper.

Table 1: *Skills Initiatives Relevant to Building a Skills-Powered Economy in Singapore*

	Supporting Skills Requirement Signalling	Enhancing Coordination Efficiency	De-Risking Initiatives for Learners and Employers	Enhancing the Impact of Skills to Performance or Productivity	Shaping Cultural Acceptance of Skills-First
a. Establish national jobs-skills taxonomies and resources to support decision-making, e.g., common national jobs-skills taxonomies, Jobs-Skills Portal, Careers & Skills Passport, Skills Profiling Tools	✓	✓	✓	✓	✓
b. Develop sustained capability among stakeholder groups to be active participants and contributors, e.g., Skills Development Partners, Jobs-Skills Integrator, SkillsFuture QueenBees	✓	✓	✓		✓
c. Engage employers and workplaces to be active developers and users of skills, e.g., National Centres of Excellence for Workplace Learning, SkillsFuture QueenBees, Work-Study Programme	✓	✓	✓	✓	✓
d. Overcome financial barrier, informational barrier, situational barrier in accessing future-skilling, e.g., curation of relevant and quality training programmes, course fee subsidy, SkillsFuture Credit at ages 25 and 40, SkillsFuture Enterprise Credit, Jobs-Skills Portal, annual and thematic Jobs-Skills Insights; online and offline career-future skilling coaching and advisory	✓		✓	✓	✓
e. Targeted outreach initiatives, e.g., outreach and roadshows, key events with intermediaries, social media outreach and promotion	✓	✓			✓
f. Build a responsive and quality training and solution partners, e.g., IHLs as anchor providers, engage talent solution partners	✓	✓	✓	✓	✓

Singapore does not have the silver bullet to attain the visioned skills-powered economy. The various initiatives are continually fine-tuned and adjusted to enhance its effectiveness. There is more work to be done in the five structural gaps in order to achieve a skills-first society.

Towards a Skills-First Ecosystem:

An Integrated Approach

6

Towards a Skills-First Ecosystem:

An Integrated Approach

As outlined in Section 1.2, making the leap from skills-based hybrids to a truly skills-first ecosystem requires more than programmatic adjustments. It calls for structural realignment and cultural transformation. This section synthesises the paper's conceptual, historical, and policy insights to prompt reflection on what it would take to shift Singapore's skills ecosystem towards a skills-first model. Rather than assigning fixed roles to stakeholders, the focus is on surfacing interconnected challenges that individuals, employers, training providers, and policymakers must confront if skills are to function as a true currency in the labour market—and if enterprises are to become genuinely skills-powered.

A skills-first ecosystem is not simply an assemblage of programmes, tools, or frameworks; it is a coherent system in which recognisable skills and proficiency guide labour market signalling, mobility, productivity, and broader societal value. Building such a system requires questioning deep-seated assumptions, realigning incentives, and forging new modes of collaboration.

The five structural inefficiencies explored earlier—signalling failures, coordination deficits, risk asymmetry, measurement gaps and cultural resistance—are not isolated problems but mutually reinforcing dynamics. Addressing them therefore demands a shared sense of responsibility across all stakeholder groups.

Individuals

For individuals, the transition to a skills-first ecosystem raises foundational questions about identity, aspiration, and career planning. If labour markets increasingly value demonstrable skills over formal qualifications, how should individuals approach their learning journeys? Are they equipped to identify, develop, and communicate their skillsets in ways that employers and society recognise? Moreover, how can policy and institutional frameworks empower individuals to take ownership of their skills narratives, particularly in a context where existing social norms equate success with formal credentials?

Singapore has introduced the SkillsFuture Credit to support individual agency in skills development. Yet questions persist: Is this support sufficient, especially for mid-career workers or those without degrees, for whom a skills-first model may present both new opportunities and heightened risks?

Employers

For employers, a central challenge lies in overcoming entrenched reliance on qualifications as the most readily available hiring tool. While many firms acknowledge the potential of skills-first strategies to expand talent pools and improve job-matching and internal mobility, few have restructured their systems to make skills the organising principle. What would it take for firms to move beyond skills-based methods to embed skill-first practices throughout hiring, performance evaluation, promotion, and workforce planning?

Moreover, businesses—particularly SMEs—need to develop internal capabilities to execute strategic changes that leverage skills and talents to drive tangible business outcomes such as innovation, productivity, and market adaptability, rather than implementing skills frameworks as merely procedural exercises. The capacity to translate skills identification into competitive advantage requires deliberate alignment between workforce competencies and specific business objectives, supported by leadership that can articulate how skills investments address concrete operational challenges and growth opportunities. Are employers ready to invest in skills visibility tools, such as validated digital credentials, that can support better workforce planning and talent identification? What forms of institutional support or incentive structures might encourage firms, particularly SMEs, to invest in the development of general and transferable skills?

Training Providers

Training providers, particularly in higher education and continuing education sectors, must confront their own dual role as knowledge institutions and labour market intermediaries. If the skills-first approach is to be realised, how can training providers better align their programme design, assessment models, and learner support systems with demonstrable competencies rather than curriculum completion?

In Singapore, training providers also operate in a competency-based system in which skills are assessed as 'competent or not competent'. Should providers aim to cultivate excellence in their assessment methods, rather than the minimum thresholds of adequacy captured in the pass/fail binary? What accountability frameworks are appropriate for ensuring that micro-credentials and modular pathways deliver both rigour and relevance? Furthermore, might training providers play a central role in shaping trusted skills taxonomies and recognition mechanisms, even as they seek to preserve pedagogical autonomy and sectoral diversity?

Policymakers

Policymakers must navigate the challenge of aligning stakeholders who differ not only in their interests, but also in their mandates, norms, and operational capacities. A skills-first transition is not just a technical reform but a broader political-economic shift. It demands strategic statecraft: investing in connective skills infrastructure (e.g., interoperable skills data platforms, digital credentials systems), embedding measurement systems that can link skills to productivity, and building institutional mechanisms for cross-stakeholder coordination.

Beyond technical interventions, what symbolic actions—such as taking the lead in changing recruitment practices in the public sector—might be necessary to shift societal perceptions of value away from paper qualifications? After all, one of the objectives of Singapore's SkillsFuture policy is to reduce the social emphasis on academic credentials and encourage upskilling for all. Still, qualifications will always have a role to play. The question is whether governments can foster a public narrative that legitimises alternative pathways without undermining the value of academic ones.

6.1 Making Change Stick: Collaboration and Commitment

Each of these stakeholder domains intersects with the others. Individuals' willingness to pursue non-traditional learning pathways depends on whether employers recognise those skills. Employer uptake is shaped by the credibility of training providers. Training providers, in turn, respond to regulatory and funding incentives influenced by policymakers. And policymakers, meanwhile, play a catalytic role by shaping the incentive structures, accountability frameworks, and public narratives that influence all other actors. This interdependence suggests that Singapore's skills-first transition must be understood—and governed—as a ecosystem, rather than as a set of isolated or piecemeal reforms.

Finally, a critical reflection is warranted on the temporal dimension of change. Shifting to a skills-first system will not happen overnight. It demands long-term commitment, iterative experimentation, and collective learning. In the near term, hybrid models that combine qualification frameworks with skill validation may offer a pragmatic bridge. However, without clarity of vision and sustained multi-level engagement, the promise of a skills-powered economy will remain out of reach.

6.2. Critical Questions for a Skills-First Transition

If a skills-first ecosystem is to succeed, stakeholders must not only act, but also reflect. The following questions are offered as provocations for each stakeholder group, intended to support that reflection and prompt deeper inquiry:

a. What assumptions and practices must be re-evaluated in your domain to make skills-first practices viable?

b. What interdependencies with other actors must be understood and addressed?

c. What risks are you willing to take—and what forms of institutional support do you require—to turn aspiration into action?

These are the questions with which stakeholders in Singapore and globally must collectively grapple in order to co-create a skills-first ecosystem that is credible, inclusive, and responsive to a dynamic labour market. This transition is not simply a technical fix for mismatched jobs and skills—it is a deeper test of whether institutions can evolve alongside changing ideas of merit, capability, and opportunity. Meeting that challenge requires more than coordination; it calls for a collective rethink of who learns, who certifies, and who defines value. If skills are to become the currency of opportunity, then the system that recognises them must operate not as a set of siloed reforms, but as an ecosystem where trust, legitimacy, and adaptability are shared responsibilities.

References

Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. *Handbook of Labor Economics, 4*(PART B), 1043–1171. https://doi.org/10.1016/S0169-7218(11)02410-5

Ammerman, C., Groysberg, B., & Rometty, G. (2023). The new-collar workforce. *Harvard Business Review, 101*(3–4), 96–103. https://hbr.org/2023/03/the-new-collar-workforce

Arifin, M. A. (2021). Competence, competency, and competencies: A misunderstanding in theory and practice for future reference. *International Journal of Academic Research in Business and Social Sciences, 11*(9), 755–764. http://dx.doi.org/10.6007/IJARBSS/v11-i9/11064

Asia Pacific Economic Cooperation. (2012). *Effective labor market signaling: A strategy addressing unemployment and talent mismatch*. Asia Pacific Economic Cooperation Secretariat. https://www.apec.org/publications/2012/10/effective-labor-market-signaling-a-strategy-addressing-unemployment-and-talent-mismatch

Bassi, V., & Nansamba, A. (2022). Screening and signalling non-cognitive skills: Experimental evidence from Uganda. *The Economic Journal, 132*(642), 471–511. https://doi.org/10.1093/ej/ueab071

Bhattacharya, A., & Percy, C. (2021). *Signal failure: How can we get more value and less waste from our education system?* The Social Market Foundation. https://www.smf.co.uk/publications/signal-failure/

Bowers, D. S., & Sabin, M. (2024). Demonstrating the use of a professional skills framework to support the assessment of dispositions in IT education. *Education and Information Technologies, 29*(6), 7595–7632. https://doi.org/10.1007/s10639-023-11933-z

Boyatzis, R. (1982). *The competent manager: A model for effective performance*. John Wiley & Sons.

Brown, P., Lauder, H., & Ashton, D. (2010). *The global auction: The broken promises of education, jobs and incomes.* Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199731688.001.0001

Brown, A., Bimrose, J., Barnes, S. A., & Hughes, D. (2012). The role of career adapt-abilities for mid-career changers. *Journal of Vocational Behavior, 80*(3), 754–761. https://doi.org/10.1016/j.jvb.2012.01.003

Caliendo, M., Cobb-Clark, D. A., Obst, C., Seitz, H., & Uhlendorff, A. (2020). Locus of control and investment in training. *Journal of Human Resources*, 0318-9377R2. https://doi.org/10.3368/jhr.57.4.0318-9377R2

Cedefop. (2020). *Vocational education and training in Europe, 1995-2035: Scenarios for European vocational education and training in the 21st century*. European Union. http://data.europa.eu/doi/10.2801/794471

Credential Engine. (2025). *Credential Engine*. https://credentialengine.org

Dawkins, J. (1988). *Industry training in Australia: The need for change*. Australian Government Publishing Service.

De Grip, A., & Sauermann, J. (2013). The effect of training on productivity: The transfer of on-the-job training from the perspective of economics. *Educational Research Review, 8*, 28–36 https://doi.org/10.1016/J.EDUREV.2012.05.005

European Commission. (2019). *European skills, competences, qualifications and occupations*. https://esco.ec.europa.eu/system/files/2021-07/Handbook.pdf

Fisher, R. M., & and Leder, H. (2022). An assessment of micro-credentials in New Zealand vocational education. *International Journal of Training Research, 20*(3), 232–247. https://doi.org/10.1080/14480220.2021.2018018

Fouarge, D., Trudie, S., & and de Grip, A. (2013). Why do low-educated workers invest less in further training? *Applied Economics, 45*(18), 2587–2601. https://doi.org/10.1080/00036846.2012.671926

Fuller, J., & Sigelman, M. (2024). *What companies get wrong about skills-based hiring*. Harvard Business Review. https://hbr.org/2024/05/what-companies-get-wrong-about-skills-based-hiring

Gov.UK. (2024a). *Origins and evolution of the CASLO approach in England: Chapter 3 – Genesis*. https://www.gov.uk/government/publications/origins-and-evolution-of-the-caslo-approach-in-england/origins-and-evolution-of-the-caslo-approach-in-england-chapter-3-genesis

Gov.UK. (2024b). *Origins and evolution of the CASLO approach in England-Chapter 2: Pre-history*. https://www.gov.uk/government/publications/origins-and-evolution-of-the-caslo-approach-in-england/origins-and-evolution-of-the-caslo-approach-in-england-chapter-2-pre-history

Grech, A., Sood, I., & Ariño, L. (2021). Blockchain, self-sovereign identity and digital credentials: Promise versus praxis in education. *Frontiers in Blockchain, Volume 4-2021*. https://www.frontiersin.org/journals/blockchain/articles/10.3389/fbloc.2021.616779

Hanson, A., Salerno, C., Sigelman, M., Zeeuw, de, M., & Moret, S. (2024). *Talent disrupted: College graduates, underemployment, and the way forward*. The Burning Glass Institute. https://www.burningglassinstitute.org/research/underemployment

Hanushek, E. A., Schwerdt, G., Wiederhold, S., & Woessmann, L. (2015). Returns to skills around the world: Evidence from PIAAC. *European Economic Review, 73*, 103–130. https://doi.org/10.1016/J.EUROECOREV.2014.10.006

Hayward, G., & Fernandez, R. M. (2004). From core skills to key skills: Fast forward or back to the future? *Oxford Review of Education, 30*(1), 117–145. http://www.jstor.org/stable/4127155

iVentiv. (2024). *Building a skills-based organisation: Insights from Zurich Insurance*. https://iventiv.com/insights/building-a-skills-based-organisation-insights-from-zurich-insurance

Jesuthasan, R., & Kapilashrami, T. (2024). *The skills-powered organization: The journey to the next-generation enterprise*. The MIT Press.

Keep, E. (2002). The English vocational education and training debate – A case study in 'complexity' and 'failure'. J*ournal of Education and Work, 15*(3), 347–365.

Klinkum, G. (2020). *How to build a successful micro-credentials System: Best practises from New Zealand*. TeachOnline.CA. https://teachonline.ca/webinar/how-build-successful-micro-credentials-system-best-practises-new-zealand

Lau, D. (2023). Employers and HR experts say academic qualifications shouldn't be totally done away with, as survey shows changing attitudes. *Today*. https://www.todayonline.com/singapore/skills-qualifications-degree-jobs-hiring-2173161

Leaser, D. (2019). *Do digital badges really provide value to businesses?* IBM Training and Skills Blog. https://www.d2l.com/wp-content/uploads/2023/05/Do-digital-badges-really-provide-value-to-businesses_-IBM-Training-and-Skills-Blog.pdf

Lemoie, K., Schmidt, P., & Muramatsu, B. (2023). *Making sense of the key data standards for verifiable LERs*. Digital Credentials Consortium. https://digitalcredentials.mit.edu/docs/DCC-Making-Sense-of-Key-Data-Standards-for-Verifiable-LERs.pdf

Lennon, T. (2024). *Five trends that are reshaping the four Bs*. Institute for Management Development. https://www.imd.org/ibyimd/talent/five-trends-that-are-reshaping-the-four-bs

LinkedIn. (2023). *Skills-First: Reimagining the labor market and breaking down barriers*. LinkedIn Economic Graph. https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/PDF/skills-first-report-2023.pdf

Ministère du Travail, de la Santé, des Solidarités et des Familles. (2022). *Le plan d'investissement des compétences en quelques mots*. https://travail-emploi.gouv.fr/le-plan-dinvestissement-des-competences-en-quelques-mots

Newton, P. (2018). *Competence-based assessment in vocational education: A UK perspective*. Ofqual.

OECD. (2019). *Skills matter: Additional results from the survey of adult skills*. https://www.oecd.org/en/publications/skills-matter_1f029d8f-en.html

OECD. (2023). *OECD skills outlook 2023*. https://www.oecd.org/en/publications/2023/11/oecd-skills-outlook-2023_df859811.html

Pearson. (2025). *Zurich Insurance*. https://learn.credly.com/pearson-wfs-case-study/zurich-insurance

Popov, A. (2014). Credit constraints and investment in human capital: Training evidence from transition economies. *Journal of Financial Intermediation, 23*(1), 76–100. https://doi.org/https://doi.org/10.1016/j.jfi.2013.11.003

Savickas, M. L. (2013). Career construction theory and practice. In R. W. Lent & S. D. Brown (Eds.), *Career development and counseling: Putting theory and research to work* (2nd ed., pp. 147–183). John Wiley & Sons.

SFIA. (2024). *SFIA version 9*. SFIA Foundation. https://sfia-online.org/en/sfia-9

SFIA Foundation. (2025). *About SFIA and the SFIA Foundation*. https://sfia-online.org/en/forum/supplementary-pages/about-sfia

Shanmugaratnam, T. (2015). *Budget speech 2015 - Section C: Developing our people*. SkillsFuture Singapore. https://www.skillsfuture.gov.sg/newsroom/budget-speech-2015---section-c-developing-our-people

Sigelman, M., Fuller, J., Dawson, N., & Levanon, G. (2022). *The american opportunity index*. Burning Glass Institute, Harvard Business School Project on Managing the Future of Work and Schultz Family Foundation. https://americanopportunityindex.com/AOI_2022_Final_Report.pdf

Sigelman, M., Fuller, J., & Martin, A. (2024). *Skills-based hiring: The long road from pronouncements to practice*. The Burning Glass Institute. https://www.burningglassinstitute.org/research/skills-based-hiring-2024

SkillsFuture Singapore. (2020). *Next bound of skillsfuture*. https://www.skillsfuture.gov.sg/ aboutskillsfuture/nextbound

SkillsFuture Singapore. (2025). *Skills frameworks*. https://jobsandskills.skillsfuture.gov.sg/frameworks/skills-frameworks

Surch, D. (2024). *The importance of digital credentialing in today's technical workforce training programs*. IBM TechXchange. https://community.ibm.com/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=f56dafef-5e55-42e5-8b4d-01934555ba8e&forceDialog=0

Swedish Agency for Economic and Regional Growth. (2021). *Job security councils: Institutional arrangements and economic effects*.

The Burning Glass Institute. (2022). *The emerging degree reset*. https://www.burningglassinstitute.org/research/the-emerging-degree-reset

The Burning Glass Institute. (2024). *Launchpad jobs*. https://www.burningglassinstitute.org/research/launchpad-jobs

Trade Union Advisory Committee to the OECD. (2018). *The Swedish Job Security Councils – A case study on social partners' led transitions*. https://tuac.org/news/the-swedish-job-security-councils-a-case-study-on-social-partners-led-transitions/

Vazirani, N. (2010). Competencies and competency model—A brief overview of its development and application. *Journal of Management, 7*(1), 121–131.

Vickerstaff, S., & Sheldrake, J. (1988). The history of industrial training policy and the limits of corporatism in Britain. *Management Research News, 11*(1/2), 18–19. https://doi.org/10.1108/eb027935

Vignoles, A. (2016, January). *What is the economic value of literacy and numeracy?* IZA World of Labor. https://wol.iza.org/articles/what-is-economic-value-of-literacy-and-numeracy/v1

W3C. (2022). V*erifiable credentials data model v1.1*. https://www.w3.org/TR/vc-data-model/

Wolf, A. (2001). Chapter 25: Competence-Based Assessment. *Counterpoints, 166*, 453–466. http://www.jstor.org/stable/42977808

World Bank. (2012). *SABER workforce development country report: Singapore 2012*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/101071468299971244/saber-workforce-development-country-report-singapore-2012

World Economic Forum. (2023). *The future of jobs report 2023*. https://www.weforum.org/publications/the-future-of-jobs-report-2023/

World Economic Forum. (2024). *Putting skills first: Opportunities for building efficient and equitable labour markets.* https://www.weforum.org/publications/putting-skills-first-opportunities-for-building-efficient-and-equitable-labour-markets/

Authors

Gog Soon Joo
Fellow, Office for Skills-First Practices, Institute for Adult Learning

Dr Gog Soon Joo is a Fellow at the Singapore University of Social Sciences-Institute for Adult Learning, where she leads the Skills-First projects. Her research interests include skills ecosystem, skills policy, and workforce development. She is a highly sought after thought leader in skills development and lifelong learning.

Johnny Sung
Visiting Research Fellow, Institute for Adult Learning
Honorary Fellow, Centre for Skills, Knowledge, and Organisational Performance, Department of Education, University of Oxford

Professor Sung currently serves as a thematic expert on skills policy, supporting the European Commission's Council Recommendation on implementing Individual Learning Accounts across member states. He is an Honorary Fellow at the Centre for Skills, Knowledge, and Organisational Performance at the University of Oxford, and a Visiting Research Fellow at the Institute for Adult Learning. He also conducts collaborative research with the ILO and OECD.

Matt Sigelman
President, Burning Glass Institute

Matt Sigelman is President of the Burning Glass Institute, a Fellow at the Stanford Center on Longevity, and Senior Advisor at the Harvard Project on the Workforce. Named by Forbes to its Future of Work 50, Matt has dedicated his career to unlocking new avenues for mobility, opportunity, and equity through skills.

Editors

Silin Yang
Deputy Director, Office for Skills-First Practices, Institute for Adult Learning

Albert Kienfie Liau
Head Analyst, Office for Skills-First Practices, Institute for Adult Learning

Institute for Adult Learning Singapore

11 Eunos Road 8
#07-04 Lifelong Learning Institute
Singapore 408601

(65) 6579 0300 CSP@ial.edu.sg www.ial.edu.sg