



RESEARCH AND DEVELOPMENT FOR SINGAPORE'S SKILLS-FIRST FUTURE:

AN INTELLIGENCE AND LEARNING AGENDA FOR SKILLS VALUE REALISATION

Sets out a Research and Development agenda for Singapore's Skills-First future. The agenda uses an Observatory, a feedback loop and prototyping to track whether Skills-First practices change, understand what works and why, and test new approaches to improve adoption and outcomes.

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GOG SOON JOO

SILIN YANG

JOHNNY SUNG

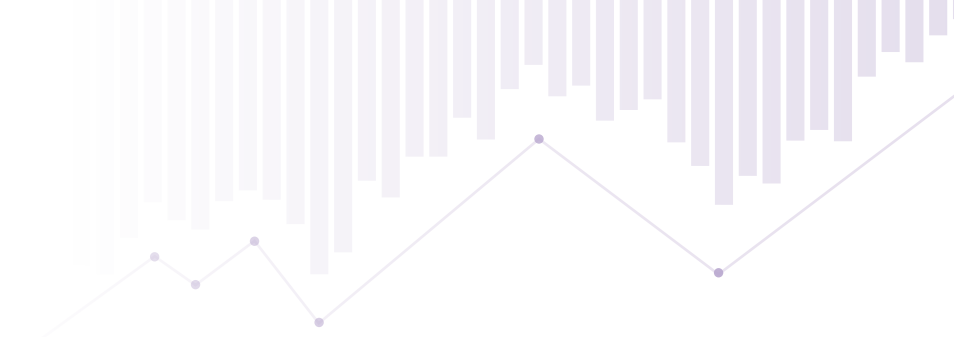
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EXECUTIVE SUMMARY

A Skills-First approach puts skills at the centre of workforce development. It prioritises the identification, acquisition, demonstration, use and recognition of skills. It relies less on qualifications, job titles or traditional career pathways (Gog et al., 2025).

Singapore has built one of the most comprehensive Skills-First infrastructures in the world. It includes detailed Skills Frameworks, comprehensive training subsidies, a Training and Adult Education sector with a broad suite of courses, a national digital skills credential in the Careers & Skills Passport, integrated jobs-skills intelligence, and a well-developed network of career services. The Skills-First Readiness and Adoption Index (SFRAI), co-developed by the OECD and the Singapore University of Social Sciences-Institute for Adult Learning (SUSS-IAL), places Singapore in the upper-middle tier globally (OECD & SUSS-IAL, 2025).

The infrastructure is in place. Practice has not yet caught up. Skills-First practices become meaningful only when they show in observable behaviour. When people adopt and reinforce these behaviours over time, the behaviours become routine. Skills-First then shapes the everyday decisions of employers, intermediaries, workplaces and individuals in hiring, matching, training, career choices and enterprise transformation.

This document sets out the Research and Development (R&D) agenda that supports the **Skills-First: Framework for Action** (Lee et al., 2026) published by the Centre for Skills-First Practices (CSFP) at IAL. The agenda serves as the **learning function** of the Framework. It is a continuous learning loop. It observes whether Skills-First practices change, diagnoses why they do or do not, tests what shifts them, and informs funding and policy.

The learning loop is **deliberately action-oriented**. Every area is organised around questions that address policy and practice priorities, generating findings that agencies, employers, intermediaries and individuals can act on. Studies are co-designed with practitioners from the outset to ensure their relevance to real-world challenges and opportunities. Findings are released progressively throughout the research process, enabling timely application to policy development and practice. Success is measured by the decisions the agenda improves and the practices it shifts.

The agenda is organised around **Skills Value Realisation**. This is the condition in which skills are activated, recognised, developed, used and rewarded across the labour market, at the individual, enterprise and system levels. The agenda has three connected research areas.



Area 1: Skills-First Observatory

Tracks the adoption, routinisation and outcomes of Skills-First practices at national, sectoral, enterprise and individual levels, and in emerging initiatives.



Area 2: Feedback Loop

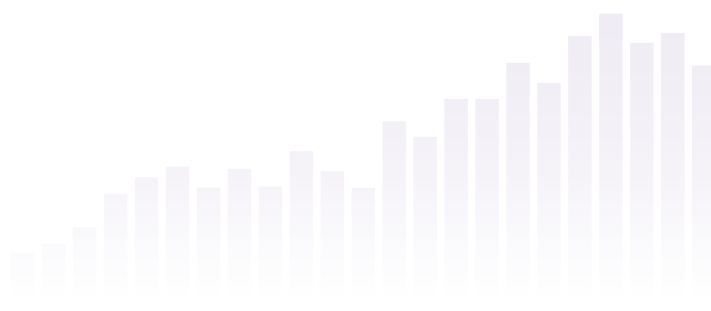
Works with Skills and Workforce Development Agency (SWDA), other relevant government agencies and industry partners to test the theories of change behind existing mechanisms, grouped into five clusters. Findings feed back into the Observatory and into policy refinement.



Area 3: Prototyping

A sandbox to design, test and evaluate new mechanisms that can shift Skills-First practices where existing mechanisms have not.

Advancing this agenda requires researchers and practitioners across disciplines, in Singapore and abroad. Chapter 6 outlines how interested partners can contribute to this collective endeavour.



CHAPTER 1

FROM INFRASTRUCTURE TO PRACTICE

Infrastructure alone has not shifted practice, in Singapore or elsewhere. The Burning Glass Institute and Harvard Business School analysed 11,300 roles in large firms. Removing degree requirements shifted hiring by only a few percentage points (Sigelman et al., 2024). The OECD Skills Outlook 2025 documents persistent under-use of skills across advanced economies (OECD, 2025a). The World Economic Forum estimates that about 39% of workers' core skills will change by 2030. Sixty-three per cent of employers cite the skills gap as the main barrier to business transformation (World Economic Forum, 2025).

Infrastructure is necessary but not sufficient. The missing element is **practice logic**: the routine habits and decision rules of institutions and individuals. These have not yet taken hold at scale.

The ***Skills-First: Framework for Action*** (SF-FfA) is a collective commitment. It asks government, employers, individuals, unions, education providers and ecosystem partners to change together, largely on a voluntary basis. Collective action of this kind needs shared evidence about who is moving and who is not. Without that evidence, the action cannot be coordinated, held to account or corrected over time.

The Competitiveness Case

This agenda serves a competitiveness mandate. Its ultimate outcome is the performance of firms, workers and the economy. The SF-FfA names these outcomes: productivity, workforce mobility, skills deployment and transformation readiness. Skills-First practice is the **mechanism**. Competitiveness is the **outcome**.

Each research area serves this outcome. The Skills-First Observatory carries the outcomes through to a visible, publicly accountable scorecard. The feedback loop confirms whether existing mechanisms produce them. The prototyping function tests which new mechanisms can deliver them more effectively.

Technological change makes this work urgent. Artificial intelligence is changing how work is organised and which skills are in demand. In that environment, the cost of unrealised skills value compounds. A workforce whose capabilities are not visible, mobile and rewarded cannot be redeployed at the speed that transformation requires. Built well, this agenda can deliver measurable shifts in adoption, effectiveness and capability. It can also position Singapore to lead internationally on the question every mature skills system now faces: how to turn infrastructure into impact.



CHAPTER 2

THE THREE RESEARCH AREAS

The R&D agenda has three areas that reinforce each other by design. **Area 1** establishes the measurement foundation for tracking Skills-First practices and outcomes. **Area 2** examines the effectiveness of existing mechanisms in driving these practices. **Area 3** designs, tests and refines new mechanisms to address gaps and emerging needs. Evidence generated in each area informs and strengthens the others, creating a continuous learning loop that supports the Framework for Action.

Each area sets out **Research** priorities and **Develop** priorities. Research priorities define the key questions to be investigated and the knowledge gaps to be addressed. Develop priorities state the indicators, instruments, data and tools needed to generate evidence, support analysis and translate research findings into actionable insights.

AREA 1: SKILLS-FIRST OBSERVATORY

Why This Area Matters

Singapore has no integrated, continuous system to track Skills-First adoption at the national level. Individual programmes monitor participation and completion. There is no system-level view of whether skills are becoming the operating currency of hiring, training, deployment and progression.

The SFRAI provides international benchmarks across 30 economies. Its standardised approach gives limited domestic detail on why practices change or stay the same. Like the PIAAC datasets it draws on, it runs at about ten-year intervals (OECD & SUSS-IAL, 2025). This limits its use for funding and programme decisions within current planning cycles. Singapore needs a domestic monitoring instrument with higher frequency and finer detail.

The proposed national instrument has a different purpose from benchmarking. It tests a domestic hypothesis: that Skills-First practice makes a real difference to individual careers and to enterprise performance. Singapore can verify this directly in its own labour market. Two developments make this test timely.

First, **Career Health** has become a national priority. Career Health is an individual's capacity to navigate a working life of many decades with agency, resilience and continued relevance. Skills-First practice is the mechanism that sustains Career Health. Second, **responsible workforce**

transformation, driven by AI and other change, needs visibility of whether firms redeploy and develop people based on their skills, independent of title or tenure. Both need monitoring that is domestic, frequent and detailed enough to inform decisions.

The key distinction for the Observatory is between **declared intent** and **revealed behaviour**. The OECD now treats this distinction as central to mature skills systems (OECD, 2025a). Most monitoring, in Singapore and elsewhere, measures declared intent: what employers say they will do, and what individuals say they have learned. A system that measures whether hiring, deployment and mobility decisions actually take place tests the Skills Value Realisation hypothesis on its own terms, with Singapore's own data. It can also become an exportable reference case for how mature skills systems verify behaviour change.

Area 1 covers both sides of the Skills-First system. On the individual side, it tracks whether people identify, develop, signal and renew their skills across a working life, and whether this produces measurable career outcomes. On the enterprise side, it tracks whether firms hire, design work, deploy and reward by skills, and whether these practices produce firm-level returns. Career Health is an explicit dimension of the individual side, consistent with the evidence on lifelong career sustainability (Hooley, 2014; OECD, 2025b).

What It Measures

The Skills-First Observatory has two layers. The **Core Monitoring Layer** tracks established practices. The **Innovation Layer** tracks emerging approaches. Together, the two layers cover four components.

Core Monitoring Layer

- 1 Adoption and Routinisation of Skills-First Practices (Individuals).** The extent to which individuals adopt and consistently apply Skills-First practices in their career, learning and skills decisions.
- 2 Adoption and Routinisation of Skills-First Practices (Employers).** The extent to which employers adopt Skills-First practices and embed them in regular workforce and talent decisions.
- 3 Workforce and Enterprise Outcomes.** The outcomes associated with Skills-First practices for individuals and employers.

Innovation Layer

- 4 Emerging Initiatives and Pilots.** Selected ground-up, community-based and pilot initiatives that provide insight into emerging approaches to Skills-First implementation. The Observatory tracks their implementation, progress and effectiveness.

Proposed Priorities for Research and Development

The Observatory works at five levels: national, sectoral, enterprise, individual, and emerging initiatives and pilots. Each level has a Research priority and a Develop priority. Researchers, data owners, sector bodies and practitioners can contribute their expertise and collaborate across these levels.

National level

Research: Are skills becoming the basis of hiring, deployment and progression across the labour market? Is this shift sustained over time?

Develop: A national indicator set based on revealed behaviour, such as job postings, hires and internal moves. The set will have a 2027 baseline and an annual refresh as a minimum.

Sectoral level

Research: Do Skills-First practices routinise more easily in some sectors? What roles do firm size, sector structure, occupational licensing and regulation play?

Develop: Sector indicators of Skills-First hiring penetration, linked to the Skills Frameworks and Jobs Transformation Maps. Sector bodies can use these indicators to track their own progress.

Enterprise level

Research: What moves a firm from one-off Skills-First pilots to routine practice in hiring, work design, deployment and reward? Which practices are associated with returns in productivity, retention and internal mobility?

Develop: An enterprise routinisation scale, from first adoption to embedded practice. The scale will be validated against HR and administrative data.

Individual level

Research: How do individuals identify, develop, signal and use their skills across a working life? How does this relate to Career Health across life stages and workforce segments?

Develop: A Career Health measure that detects change within one to two years. A linked panel that tracks skills use at work in addition to training participation.

Emerging initiatives and pilots

Research: Which ground-up and community-based initiatives shift Skills-First practices? Through what mechanisms, and in which contexts? What signals that an initiative is ready for evaluation in Area 2 or scale-up in Area 3?

Develop: A light-touch reporting protocol that enables grassroots initiatives to report their outcomes using indicators consistent with those adopted across the Observatory.

Across all levels

Research: How can federated data from public agencies, employers, platforms and surveys be combined without loss of privacy or trust?

Develop: A data linkage protocol for the federated Observatory. It will cover access, privacy, interoperability and common definitions. This will enable evidence from different studies and data sources to be integrated and analysed coherently, rather than remaining fragmented across separate research efforts.

Methodological approach

Measurement is deliberately federated. It draws on multiple complementary data sources and does not rely on a single data owner. The Observatory integrates employer and individual survey data, administrative datasets, online labour market information and digital platform analytics. These sources are triangulated with national administrative indicators where appropriate, such as the Ministry of Manpower's Singapore Opportunity Index (Burning Glass Institute et al., 2025), and with other relevant labour market datasets. At the national level, the Observatory describes whether and where practice is changing. Questions of cause and programme effect sit in Area 2. CSFP serves as the methodological hub. It is responsible for synthesis, the integrated Observatory, and interoperability with other data sources such as LinkedIn and platform analytics.



AREA 2: FEEDBACK LOOP ON EXISTING MECHANISMS

Why This Area Matters

Singapore invests substantially in skills development mechanisms and programmes each year. Each mechanism is underpinned by a theory of change that explains how an intervention is expected to influence behaviour, strengthen capabilities and improve labour market outcomes. There is an opportunity to build on these investments by systematically examining and validating these theories of change, both at the programme and ecosystem levels. Doing so would strengthen the evidence base for understanding how different mechanisms work, individually and collectively, and inform the continuous refinement of policies and programmes to maximise their effectiveness and impact.

Area 2 proposes a **feedback loop** to close this gap. The loop uses evidence from the Skills-First Observatory (Area 1) to test whether existing mechanisms work as intended, for whom, and under what conditions. The scope covers stated theories of change and, where useful, implementation, design and policy settings. The central test is whether mechanisms help to routinise Skills-First practices, in addition to their effect on labour market outcomes. Monitoring can describe change. A feedback loop allows the system to correct itself.

The initial focus will be on mechanisms and programmes overseen by SWDA, with CSFP envisaging close partnership with SWDA to jointly develop the research questions, priorities and data arrangements for Area 2. This will serve as a starting point for progressively extending the feedback loop to other relevant agencies and ecosystem partners, recognising that Skills-First adoption and outcomes are shaped by multiple mechanisms operating across the wider ecosystem.

Clusters of Existing Mechanisms

This agenda groups existing mechanisms into five clusters. Each cluster shares a theory of change, based on the main lever that its mechanisms use. The programmes named are examples. The list is not exhaustive. Research on each cluster can draw on international evidence about the same type of lever, and the clusters can take in new programmes over time.

Table 1: Clusters of Existing Mechanisms and their Theories of Change (illustrative)

Cluster	Shared theory of change	Examples	Key questions for the feedback loop
Skills signals and intelligence	A shared skills language and credible skills signals reduce information gaps, enabling individuals and employers to make more informed, skills-based decisions about hiring, learning and career development.	Skills Frameworks Jobs Transformation Maps Careers & Skills Passport	• Are skills signals used in actual hiring, role design and workforce planning decisions, or mainly consulted as reference? • Which signals do employers trust most, and in which sectors? • Does active use relate to later Skills-First practices, such as skills-based role briefs and self-directed learning choices?
Individual learning investment	Lower cost barriers lead individuals to invest in learning that they choose for their own careers.	SkillsFuture Credit SkillsFuture Level-Up Programme	• Do funded learning choices align with skills that bring labour market returns? • What share of funded training converts into applied workplace performance and career progression? • Does use differ by life stage, income band and workforce segment in ways that suggest inclusion gaps?

Cluster	Shared theory of change	Examples	Key questions for the feedback loop
Career transition and placement	Structured reskilling, career guidance and placement support help workers move into new roles and sectors based on their skills.	Career Conversion Programmes SkillsFuture Career Transition Programme Career services	• Do participants show sustained wage and role progression three to five years after the programme? • Which workforce segments experience the greatest improvements in career outcomes, including career mobility, progression and resilience? • To what extent do employers adopt Skills-First practices in hiring, deployment, development and progression of programme participants?
Work-integrated learning	Learning in real work contexts speeds up skills transfer and shortens the gap between training and applied performance.	Work-Study Programmes	• Does work-integrated delivery produce stronger conversion from training to performance than classroom delivery? • Which workplace conditions, such as supervisor support, work design and performance systems, sustain the gains? • Do host employers go on to routinise skills-based deployment?
Enterprise transformation support	Support for firm-level workforce planning helps firms turn transformation plans into skills-based hiring, deployment and development.	Enterprise Workforce Transformation Programme	• Do participating firms change hiring, deployment or development practices, compared with similar firms that do not take part? • Which forms of support, such as advisory, funding or tools, are associated with sustained change? • Does the effect vary by firm size and sector?



How The Feedback Loop Operates

Area 2 is a standing function with three recurring operations.

- **Theory of change validation.** For each cluster, the assumed causal pathway is made explicit. It is then tested against longitudinal data from the Observatory.
- **Diagnosis of gaps.** Where mechanisms do not produce their intended effects, research identifies the cause. The cause can be implementation fidelity, the causal mechanism, targeting, or a shortfall in enabling conditions.
- **Adaptive refinement.** Findings feed into programme design, funding criteria, policy settings and outreach. This happens within review cycles agreed with SWDA, so that evaluation leads to policy learning.

Proposed Priorities for Research and Development

Area 2 has five themes. The three operations above form the first, second and fifth themes. Combined effects and equity cut across all clusters.

Theory of change validation

Research: Do the mechanisms in each cluster shift Skills-First decisions by individuals and employers, in addition to labour market outcomes? Which causal links in each theory of change hold, and which break?

Develop: A register of theories of change for each cluster. The register states the causal links, indicators and evaluation status. This will be supported by standardised outcome indicators aligned with the Observatory in Area 1 to ensure consistency and comparability across research areas.

Diagnosis of gaps

Research: Where effects are weak or uneven, what is the cause: implementation, targeting, missing enabling conditions, or design?

Develop: A common diagnostic protocol and measures of implementation fidelity that apply across clusters.

Combined effects

Research: How do mechanisms from different clusters combine along the journey of an individual or a firm? For example, how does the combined effect of SkillsFuture Credit, the Careers & Skills Passport and career guidance differ from the sum of their separate effects?

Develop: A linked administrative dataset that allows analysis of journeys across mechanisms, developed with SWDA and subject to data governance agreements.

Equity

Research: Do gaps in reach and effect persist across life stage, income band, sector and employment type? Which design changes close them?

Develop: Equity indicators as a standard part of every evaluation in Area 2.

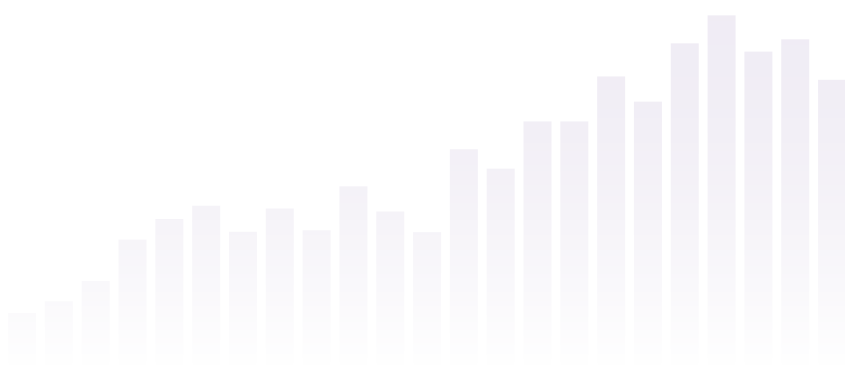
Adaptive refinement

Research: How are evaluation findings used in programme design and funding decisions? What helps or blocks their use?

Develop: A refinement protocol, agreed with SWDA. It sets review cycles, a joint review forum and rules for the release of findings.

Methodological approach

The feedback loop requires causal rigour. Studies use experimental designs where these are feasible and ethical. Otherwise, they use rigorous quasi-experimental methods, such as difference-in-differences, regression discontinuity and instrumental variables. This is consistent with established practice in the evaluation of active labour market programmes (Card et al., 2018; OECD, 2025c). Every study meets the common standards in Chapter 3. Access to administrative data and the timing of evaluations follow agreements with SWDA.



AREA 3: PROTOTYPING NEW MECHANISMS

Why This Area Matters

Areas 1 and 2 show what is adopted, whether it works, and why. They also show where practice does not move, even after existing mechanisms are refined. Area 3 designs, pilots and evaluates new mechanisms for these gaps. It tests whether mechanisms that are not yet in the policy portfolio can shift Skills-First practices. Prototypes that succeed are then considered for scale.

Three Types of Prototype

International evidence shows that gaps in Skills-First adoption occur at two levels: in behaviour within existing structures, and in the structures themselves (Thaler & Sunstein, 2008; OECD, 2017). Area 3 works with three types of prototype.

- **Behavioural nudges.** Low-cost changes to decision environments. They make Skills-First the easiest option at key choice points for individuals, employers and intermediaries.
- **Structural pilots.** New institutional arrangements or market mechanisms. They remove barriers in job structures, pay systems and contracts.
- **Solutions prototypes.** Turn data and evidence into targeted interventions that address barriers to Skills-First adoption.

The three types work together. Nudges shift behaviour within existing structures. Structural pilots change the structures. Solutions prototypes translate evidence into targeted interventions.

Selection of Prototypes

Each prototype is selected against five criteria.

- **Evidence of a gap.** Area 1 or Area 2 shows a practice gap that existing mechanisms do not close.
- **Leverage.** Singapore has the institutions, data or market position to test the mechanism at meaningful scale.
- **A host partner.** An employer, sector body, intermediary or platform is willing to host the pilot.
- **Measurable change.** Effects on behaviour can be measured within two years.

- **A route to scale.** There is a credible path from pilot to sector or national adoption.

CSFP invites researchers, employers, intermediaries and platform operators to propose prototypes that meet these criteria.

Proposed Priorities for Research and Development

Each prototype type has a Research priority and a Develop priority. Scaling applies to all three types.

Behavioural nudges

Research: Which changes at specific choice points shift decisions toward skills? Do the shifts last after the trial ends? Choice points include job advertisement templates, shortlisting screens, prompts in the Careers & Skills Passport, and course recommendations.

Develop: A set of choice-point interventions ready for trial. They are co-designed with employers, platforms and career services, and come with a randomised trial protocol.

Structural pilots

Research: Which new arrangements in job structures, pay systems and contracts remove barriers that nudges cannot reach?

Develop: Pilot sites with host employers, sector bodies and intermediaries, starting with the two illustrative priorities below.

Solutions prototypes

Research: What types of interventions are effective in encouraging individuals and enterprises to adopt and sustain Skills-First practices, and under what conditions?

Develop: Prototype and test solutions that address identified barriers and enable individuals and enterprises to embed Skills-First practices in everyday decisions.

Scaling

Research: Under what conditions can a successful prototype be scaled within and across organisations, or to sector or national levels, while sustaining its effectiveness?

Develop: Stage-gate criteria for decisions to scale, adapt or stop a prototype. A route for validated prototypes to enter the evaluation cycle in Area 2.

Illustrative Priorities

Two illustrative priorities meet the selection criteria: fractionalisation of work for senior workers, and skills-based compensation. They are early bets. The portfolio will change as the Observatory and the feedback loop show where the largest gaps lie.

Illustrative Priority 1: Fractionalisation of Work for Senior Workers

Consider a 63-year-old maintenance technician with 30 years of experience in diagnosing and resolving building system faults. As he approaches re-employment, his employer offers him reduced working hours in his existing role. However, his experience and skills could potentially benefit other companies that need similar expertise but may not require a full-time technician.

With a clearer understanding of his skills and a way to match them to opportunities, he could take on specialised fault-diagnosis assignments across two or three companies. This would allow him to continue contributing his expertise while enjoying more flexible work arrangements.

The example illustrates how a Skills-First approach could create new opportunities for senior workers by recognising and deploying their skills beyond conventional job roles and organisational boundaries.

Fractionalisation divides work into discrete tasks or projects. Workers are matched to them by demonstrated skills, independent of job title or employment contract. It operates internally, where a firm deploys workers across projects and roles through a skills inventory. It also operates externally, where intermediaries allocate project-based work across firms and platforms.

The initial focus is workers aged 55 and above. Singapore's workforce is ageing (Ministry of Manpower, 2025). Senior workers hold tacit knowledge that systems based on credentials and titles often under-value. They also face structural disadvantages: age-related hiring bias, and a mismatch between full-time role structures and the working arrangements they prefer (OECD, 2025b). International models, such as encore-career and phased-retirement schemes and silver-economy platform pilots in Japan, deploy senior workers on demonstrated skills (Cabinet Office Japan, 2022; OECD, 2025b). This prototype extends the intent of Singapore's Senior Worker Support Package and Senior Employment Credit into a Skills-First mechanism.

Research

- Under what conditions does internal fractionalisation improve skills use and firm performance, and sustain the engagement and wellbeing of senior workers?
- How do external platform and intermediary models affect match quality, income and career outcomes for senior workers, compared with conventional employment?
- Which employer incentives drive uptake, especially among SMEs?

Develop

- Contractual, regulatory and CPF arrangements that let fractional work create skills-based opportunity without reproducing age-based disadvantage.
- Skills inventories and matching tools for internal and external deployment, tested with host employers and intermediaries.

Illustrative Priority 2: Skills-Based Compensation

Skills-based compensation links pay, recognition and progression to the demonstration and application of skills. Job title, seniority and credentials carry less weight. It covers monetary reward, such as pay-for-skills and skills-linked progression bands. It also covers non-monetary recognition, such as skills-based promotion, peer endorsement and visibility. Rewarding skills development and application strengthens individual incentives to invest in skills. It also strengthens firm-level demand for Skills-First practice (Lawler, 2000; Mercer, 2023).

International evidence is growing but uneven. Pay-for-skills models improve retention and flexibility. Their effects on productivity are mixed and depend on context (Aguinis et al., 2013; Murray & Gerhart, 1998; Shaw et al., 2005). The design of non-monetary recognition is under-studied in Asian labour markets where SMEs dominate. Singapore's Careers & Skills Passport and Skills Frameworks provide a foundation for prototypes at the sectoral level.

CSFP's ongoing study on skills-based compensation provides a foundation for advancing this research priority. Building on the first phase, which reviewed international evidence, the planned second phase offers opportunities for partners to contribute to the design and evaluation of approaches suited to Singapore's workforce and enterprise needs.



Research

- Under what organisational conditions does skills-based compensation improve workforce capability, productivity and business value?
- How do workers value non-monetary recognition against monetary reward? Does this vary by life stage or occupational group?
- How do different approaches to compensation and recognition affect the adoption and routinisation of Skills-First practices?

Develop

- Validation infrastructure that employees and managers see as fair and credible, building on the Careers & Skills Passport and Skills Frameworks.
- Pay and recognition structures adapted for SMEs, ready for sector-level pilots.

Design Principles for Prototyping

All Area 3 prototypes share four design principles.

- **Co-designed with practitioners.** HR professionals, sector specialists, career coaches and platform operators shape each prototype from the start, to ensure that prototypes address real-world needs, draw on practical expertise and are feasible for implementation.
- **Staged with decision points.** Each prototype starts small and passes set stage gates. At each stage, evidence is assessed against agreed criteria to determine whether the prototype should be scaled, refined or discontinued. Lessons from all prototypes, including those discontinued, contribute to the broader evidence base.
- **Connected to the Observatory.** Prototype outcomes are tracked using indicators aligned with Area 1. Learning extends beyond individual projects and contributes to system-wide understanding.
- **Underpinned by common standards.** Each prototype meets the standards of method, mechanism and equity outlined in Chapter 3, ensuring rigour, consistency and fairness in their design, implementation and evaluation.

CHAPTER 3

HOW THE THREE AREAS WORK TOGETHER

The three areas run in parallel, with each contributing to and drawing on evidence generated by the others. Areas 1 and 2 establish the evidence base: what is adopted, whether it works, and why. This includes identifying opportunities for new approaches where existing mechanisms and policy settings, even after refinement, have yet to achieve the desired shifts in practice.

Area 3 acts on that evidence to design what comes next. It works as a **sandbox** to design, pilot and evaluate mechanisms that are not yet in the policy portfolio. It tests whether they can move the adoption “**delta**”: the gap between current and desired Skills-First practices that existing mechanisms have not closed. While Area 2 evaluates and informs the refinement of existing mechanisms and policy settings, Area 3 explores and tests new approaches to establish their potential effectiveness and scalability.

The strength of the R&D agenda lies in the continuous exchange of evidence and insights across all three areas, supported by shared data, common measurement protocols and regular convening across areas. Together, the three areas turn the Framework from a statement of intent into a self-correcting system.

Table 2: *How the Three Research Areas Connect*

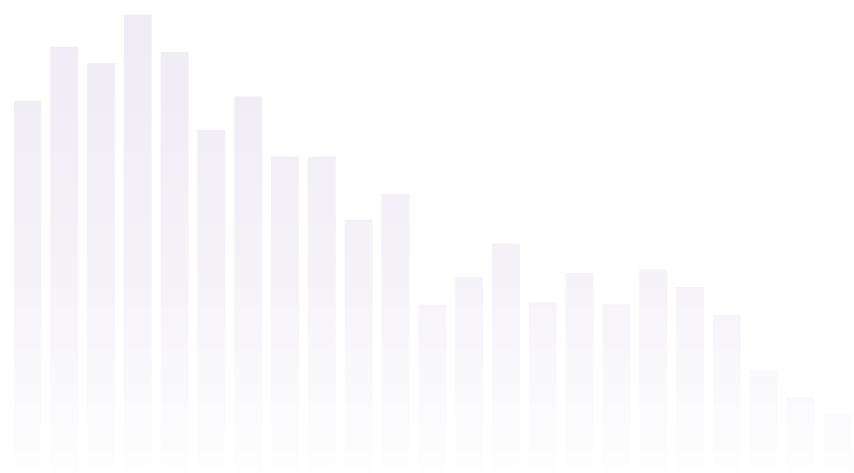
Research Area	Primary function	Key output	Connects to
Area 1: Skills-First Observatory	Observe and measure	Integrated Observatory of adoption, routinisation and outcomes at national, sectoral, enterprise and individual levels, and in emerging initiatives	Supplies baselines and tracking data to Areas 2 and 3; informs policy and funding allocation
Area 2: Feedback Loop	Evaluate and explain	Confirmed or revised theories of change for clusters of existing mechanisms; diagnosis of implementation gaps and equity shortfalls	Draws on Observatory data from Area 1; feeds programme refinements back into policy with SWDA; identifies gaps for Area 3 to prototype

Research Area	Primary function	Key output	Connects to
Area 3: Prototyping	Innovate and test	Evaluated prototypes of new mechanisms, ready to scale, adapt or stop; evidence on what works under what conditions	Uses Area 1 indicators to track prototype outcomes; addresses gaps identified by Area 2; successful prototypes enter the Area 2 evaluation cycle

Common Standards

All three areas apply three common standards.

- **Method.** Each study uses an experimental design where this is feasible and ethical. Otherwise, it uses a rigorous quasi-experimental method. The study must show how it knows that an effect is causal.
- **Mechanism.** Each study explains why a practice occurs or shifts. This includes the trust, risk and identity dynamics that shape how individuals signal skills and how employers decide.
- **Equity.** Each study states for whom the finding holds and who is at risk of being left out. It gives explicit attention to occupation type, workforce segment, sector and firm size.



CHAPTER 4

SEQUENCING AND PRIORITY BETS

The agenda will be implemented progressively, focusing on a targeted set of strategic priorities while establishing the foundational capabilities needed to support subsequent phases. The phased approach is guided by two key principles. First, the Skills-First Observatory (Area 1) establishes the evidence base needed to support the Feedback Loop (Area 2). Second, insights generated through the Feedback Loop will inform the design and prioritisation of prototyping initiatives (Area 3), ensuring that new mechanisms respond to identified needs and opportunities.

Table 3: *Proposed Sequencing of the R&D Rollout, 2026–2030*

Phase	Focus	Why first	Horizon
Foundation	Area 1: Federated Observatory and data backbone (individual and enterprise); national baseline; data linkage protocol Area 2: Scope, priorities and data arrangements agreed with SWDA	Supplies evidence to every other area; sets baselines against which change can be measured; enables the feedback loop and prototyping to be directed by evidence	2026–2027
Priority Bets	Area 2: Theory of change validation for three priority clusters: skills signals and intelligence, individual learning investment, and career transition and placement Area 3: Fractionalisation pilots for senior workers (internal and external); skills-based compensation prototypes	Highest leverage and least studied; carries the competitiveness case; generates the causal evidence the system most needs	2027–2028

Phase	Focus	Why first	Horizon
System Building	Area 2: Feedback loop extended to all five clusters; equity analysis and analysis of combined effects across clusters Area 3: Expanded prototype portfolio based on diagnostic evidence from the Observatory	Builds out the connected system; deepens the action loop; includes equity design from the outset	2027–2029
Depth and Scale	Area 2: Longitudinal outcome tracking (three to five years) for the priority clusters Area 3: Scaling of validated prototypes; sector-level structural pilots	Behavioural and norm change takes place over a longer horizon; longitudinal evidence confirms sustained impact beyond short-term response	2028–2030

CAPABILITIES FOR THE AGENDA

The agenda needs multi-disciplinary capability, integrated across the three areas. Five disciplines form the core.

- **Labour economics** for demand and supply dynamics, wage effects and causal inference.
- **Organisational psychology** for individual and employer decision-making and training transfer.
- **Sociology for credentialism**, signalling and norm change.
- **Statistics and quantitative methods**, which underpin every area.
- **Public policy and political economy** for governance, implementation and coordination.

Supporting disciplines include business and management, adult learning, behavioural economics, data science, information systems, ethnography, communication studies, and law and regulation.

Practitioner expertise is equally essential. Practitioners take part as co-investigators. They include HR practitioners, sector specialists, career guidance professionals, training designers, and employment agency and platform professionals who understand how matching works. Researchers and practitioners co-design studies and prototype new practices together. This joint work turns research that describes decisions into research that informs them.



CHAPTER 6

CALL FOR COLLABORATION

Singapore has built Skills-First foundations that compare well with any system in the world. The **Skills-First: Framework for Action** commits to turning that infrastructure into routine practice. International evidence shows that this change does not happen by itself.

This agenda sets out how research and development can drive that change. The Skills-First Observatory (Area 1) tracks whether practice changes at national, sectoral, enterprise and individual levels, and in emerging initiatives. The feedback loop (Area 2) tests whether existing mechanisms work as intended, for whom and why. Prototyping (Area 3) designs and tests new mechanisms where practice does not move. Each area has Research priorities, which state what we need to understand, and Develop priorities, which state what we need to build. Success is measured by the decisions the agenda improves and the practices it shifts.

Advancing this agenda requires collaboration across institutions, disciplines and borders. Researchers and practitioners bring complementary expertise and perspectives to strengthen the evidence base and translate insights into action. International partnerships also provide opportunities to test, compare and extend findings across different skills systems, contributing to a broader understanding of what works, for whom and under what conditions.

Realising the ambitions of this agenda will also require funding and resources to support research, development and experimentation. CSFP welcomes funding and co-investment partnerships from public agencies, industry, foundations and other organisations that share a commitment to advancing Skills-First practices and outcomes.

Ways to Join

- **Co-investigators** lead or co-lead studies on the priority questions in any area.
- **Data partners** contribute or link data to the federated Observatory.
- **Prototype hosts** pilot new mechanisms. They include employers, sector bodies, intermediaries and platforms.
- **Practitioner co-designers** shape studies and prototypes from the start.
- **International partners** run parallel or comparative studies in their own systems.
- **Funding and resource partners** support research, data infrastructure and prototyping through funding, co-investment or in-kind contributions.

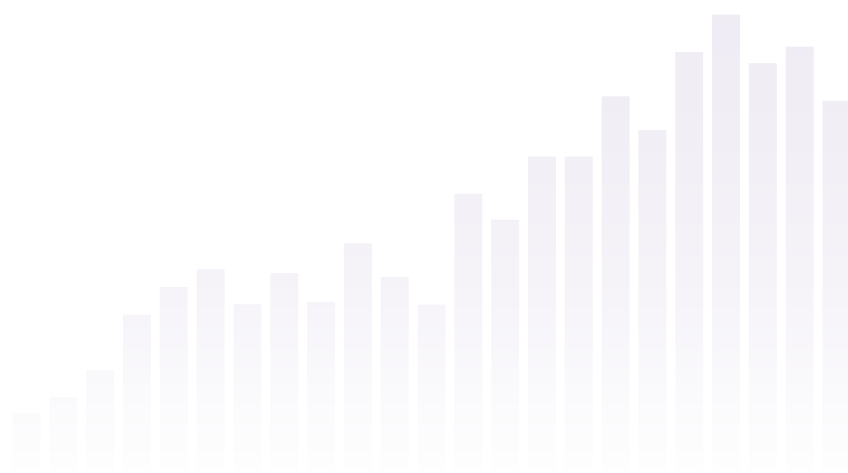
What Partners Receive

- Access to shared indicators and Observatory data, under agreed terms.
- Co-authorship and joint publication.
- Early access to findings, which the agenda releases progressively.
- A testbed for their own research and business questions.
- A place in a regular convening of researchers and practitioners across all three areas.

An Open Invitation

Skills Value Realisation has a human aim. A person's skills should decide the work they can do, the reward they earn and the future they can build. Reaching that aim is a shared task. We invite you to take it on with us.

CSFP invites researchers and partners to contribute to this R&D agenda. Please send proposals or expressions of interest to CSFP@ial.edu.sg by 30 June 2027.



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ANNABEL CHEN

Director, Centre of Research and Development in Learning (CRADLE),
Nanyang Technological University

CHEONG WEI YANG

Vice Provost (Strategic Research Partnerships), Singapore Management University

MAY LIM

Associate Vice President (Lifelong Learning), Singapore Institute of Technology

NICHOLAS SIM

Assistant Provost, Singapore University of Social Sciences

RENEE TAN

Assistant Executive Director and Director (Research Division), Institute for Adult Learning,
Singapore University of Social Sciences

TREVOR YU

Co-Director, Centre of Research and Development in Learning (CRADLE),
Nanyang Technological University

SKILLS AND WORKFORCE DEVELOPMENT AGENCY (SWDA) RESEARCH AND ANALYTICS DIVISION

AUTHORS



GOG SOON JOO

Senior Director (Special Project),
Institute for Adult Learning

Dr Gog Soon Joo is Senior Director (Special Projects) at the Singapore University of Social Sciences-Institute for Adult Learning, where she leads the Skills-First projects. Her research interests include skills ecosystems, skills policy and workforce development.



SILIN YANG

Deputy Director (Centre for Skills-First Practices),
Institute for Adult Learning

Dr Silin Yang is Deputy Director (Centre for Skills-First Practices) at the Institute for Adult Learning, Singapore University of Social Sciences, where she leads the centre's research and analytics. A strategist in workforce and skills development, Dr Yang drives Skills-First initiatives. She specialises in turning data on skills demand and supply into actionable insights for enterprise and workforce transformation.



JOHNNY SUNG

Honorary Fellow,
Centre for Skills, Knowledge, and Organisational Performance,
Department of Education, University of Oxford

Professor Sung is a thematic expert on skills policy. He supports 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 Singapore University of Social Sciences-Institute for Adult Learning. He also conducts collaborative research with the ILO and OECD.

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Institute for Adult Learning Singapore

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

 (65) 6579 0300

 CSFP@ial.edu.sg

 www.ial.edu.sg