



Review

Advancing Lifelong Learning in the Digital Age: A Narrative Review of Singapore's SkillsFuture Programme

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Abstract: Amidst the fourth industrial revolution, marked by swift technological advancements and changing economic environments, lifelong learning has risen as an essential cornerstone for developing people and society. Adult education, with a particular focus on skills learning, is vital in equipping individuals with the necessary competencies to navigate the dynamic demands of the modern workforce. This paper provides a qualitative analysis and commentary on the case study of Singapore's SkillsFuture movement, an exemplary national initiative to promote skills learning among adults. Intending to reach a wide audience in educational science, we investigate the effectiveness and impact of this comprehensive programme and its implications for other countries. This article contributes to educational science and policy development by illustrating the importance of investing in adult education and skills development. By comprehensively studying the SkillsFuture experience, we offer valuable insights into establishing effective and inclusive lifelong learning ecosystems to foster a culture of continuous learning, equipping individuals to adapt and thrive in a volatile, uncertain, complex, and ambiguous global landscape.

Keywords: lifelong learning; adult education; SkillsFuture; educational science; workforce development; continuing education and training; public policy



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1. Introduction

In today's world, the unyielding speed of technological progress, the spread of global interconnectedness, and shifts in economic structures have created significant changes in the characteristics of employment and education. The necessity for ongoing education throughout one's life has become critical as the rapid obsolescence of knowledge and certain abilities accelerates (Allen and van der Velden 2002). Consequently, individuals must continually update their skills to remain competitive in the job market. The value of education is no longer confined to the formative years of childhood and adolescence; instead, it transcends age boundaries, emphasizing the importance of learning throughout adulthood. Lifelong learning, defined as pursuing knowledge and skills throughout one's life, has become a key driver for personal development, career advancement, and economic prosperity. This shift in educational need has paved the way for adult learning to take centre stage, as individuals recognize the need to acquire new competencies and adapt to the changing demands of the modern workforce.

One country that has distinguished itself as an innovator and promoter of lifelong learning and adult skills development is Singapore. Recognizing the critical role of education in driving economic growth and social cohesion, the Singaporean government initiated the SkillsFuture Programme. The SkillsFuture Programme represents a comprehensive and innovative approach to equipping its workforce with the skills necessary to navigate the dynamic challenges of the 21st-century economy. SkillsFuture is a nationwide initiative that started in 2015 for adult education as a response to the fourth industrial revolution, to ensure the continued employability of Singaporeans and to prepare its workers for the changes brought by technological disruption and globalization (Gleason 2018; Tan 2016).

This is all the more important considering the island nation's lack of natural resources that elevates the importance of its workforce and the need for constant skills upgrading (Kumar 2004) in line with the broader understanding of the evolving nature of the job market. While numerous comprehensive overviews of SkillsFuture's history and challenges exist (Kumar 2017; Sung and Freebody 2017; Tan 2016), we aim to provide a balanced commentary on its implementation and propose potential pathways that could inform future policy and approaches that may drive similar efforts globally. Against this backdrop, this article examines the effectiveness and impact of Singapore's SkillsFuture Programme as an exemplar of a nationwide push for adult skills learning. Moreover, it seeks to provide insights and lessons that can be adapted by other countries striving to foster a culture of lifelong learning and upskilling among their adult populations.

SkillsFuture's reach extends beyond Singapore and is commonly used as a case study for international research into lifelong learning policy. For example, Nguyen (2019) recognized SkillsFuture as an example of a structured programme for lifelong learning courses in Vietnam and integration with small-to-medium enterprises to produce a resilient workforce. The recognition of SkillsFuture as a format for lifelong learning is further enhanced by quantifying unemployment rates for various groups of participants and recommending less emphasis on paper qualifications (Loke and Gopinathan 2016). SkillsFuture is also an example of lifelong learning in the post-COVID-19 world (Dikhtyar et al. 2021; James 2020). This is also evidenced in its partnership with Generation, a global nonprofit organization that supports training and improves the employability of the workforce (SkillsFuture Singapore 2023d). These attest to SkillsFuture's use as a case study to advance local and international lifelong learning policies.

This research sheds light on the effectiveness and challenges of implementing nationwide adult skills learning initiatives. As lifelong learning becomes imperative for personal fulfilment and societal progress, the insights derived from the case of SkillsFuture hold significant implications for educational science and policy development worldwide. Understanding how a nation can successfully integrate adult skills learning into its social fabric can lay the groundwork for nurturing a skilled, adaptable, and resilient workforce prepared to thrive in an increasingly volatile, uncertain, complex, and ambiguous (VUCA) global landscape. The following sections will delve into the literature on lifelong learning and the importance of upskilling in the modern world. Building on this foundation, we will explore the key components of Singapore's SkillsFuture framework in Section 2, investigating its objectives, implementation strategies, and collaborative efforts among stakeholders. Sections 3 and 4 outline the barriers that the SkillsFuture programme had to navigate, the potential opportunities that have since surfaced that require attention, and how it can leverage changing skills demand and the workforce landscape to succeed. Lastly, Section 5 concludes by providing direction for policy and practice for similar implementation in other countries.

Navigating the VUCA World through Lifelong Learning

In developing this commentary, we input key phrases into academic databases like Google Scholar, JSTOR, and ERIC to retrieve research articles on lifelong learning and career progression. Phrases include "VUCA world and lifelong learning", "impact of technology on job roles", "importance of upskilling and reskilling", and "continuous learning in

workplaces". As topics on SkillsFuture are not thoroughly studied, we also obtained news publications focusing on SkillsFuture.

In many developing-to-developed countries, lifelong learning is a concept that has gained significance in the 21st century, shaped by the shift towards a knowledge-based economy. It transcends the traditional notion of education confined to early adolescence and first degree. Lifelong learning is characterized by continuously pursuing knowledge, skills, and competencies beyond the first job. In this fast-paced, technological era, facilitated by globalization and the rise of the knowledge economy, governments, employers, and employees assign significant value to lifelong learning. In keeping with the VUCA world, the definition of lifelong learning has also evolved. It is no longer limited to formal education systems or certification programmes, but extends to other modes of learning, including self-directed learning, blended learning, online courses, workshops, and even vocational training at the workplace for specific requirement skills (Burns 2020; Fischer 2000; UNESCO Institute for Lifelong Learning 2022).

The 21st century has witnessed an unprecedented technological revolution that has fundamentally transformed industries and job roles. Automation (Teo et al. 2022), artificial intelligence (Cheong et al. 2019, 2021; Lai et al. 2021; Tang et al. 2021; Zhao et al. 2021, 2022) data analytics (Ho et al. 2019), and other emerging technologies have disrupted traditional work processes, rendering some skills obsolete while creating a demand for new ones. To address the challenges of a VUCA world, lifelong learning should emphasize flexibility and adaptability in design while fostering an environment to learn from diverse experiences. Lifelong learning is essential to keep up with these technological shifts, as individuals must continually acquire new skills and knowledge to remain relevant and competitive in the evolving job market (Raab 2021). The labour market has evolved significantly, with an increasing emphasis on knowledge-intensive and specialized jobs. Many traditional job roles have been replaced or augmented by technology, leading to a shift in the types of skills and competencies that employers seek. Being proactive in lifelong learning catalyses career advancement and professional growth, ensuring that employees possess the necessary skills to secure employment and thrive in the dynamic labour market (Bierwolf et al. 2017). As industries and job requirements change rapidly, individuals who invest in upgrading their skills are better positioned to take on new challenges, assume leadership roles, and progress in their careers. Thus, a country that emphasizes the importance of adult learning also fosters a growth mindset, enabling individuals to embrace change, learn from failures, and pursue new opportunities. For example, in times of economic uncertainty, individuals with diverse skill sets and the ability to adapt are more likely to emerge with greater resilience. At the personal level, lifelong learning enriches personal growth and empowers individuals to pursue their passions and interests. Consequently, lifelong learning has become an essential life skill for individuals to thrive. It facilitates adaptation to technological advancements, prepares individuals for changes in the labour market, fosters career advancement, bolsters economic resilience, and promotes personal development (Bierwolf et al. 2017; Raab 2021; Seevaratnam et al. 2023).

Rapid technological advancements and industry changes have widened the disparity between the skills possessed by the current workforce and the skills demanded by employers, making it challenging for employers to find workers with the appropriate expertise (Goos et al. 2011; Savino 2009). Skill gaps can lead to decreased productivity, reduced competitiveness, and difficulty attracting foreign investment. The widening skill gaps further create an urgent demand for upskilling and reskilling. Upskilling involves enhancing existing skills to meet the changing needs of a job or industry. For instance, employees may undergo training in digital literacy, data analysis, or project management to better align with technological advancements. Upskilling allows individuals to remain competitive and increase their value within their current roles. Reskilling involves acquiring entirely new skills to transition into different job roles or industries. For workers whose jobs are at risk of automation, reskilling offers an opportunity to pivot their careers and explore emerging fields with higher demand for human skills.

As such, continuous learning, a subset of lifelong learning that applies to the upskilling of working adults, is critical to bridging skill gaps effectively. Individuals and organizations must engage in ongoing education and training as industries evolve to keep pace with changing requirements. Continuous learning fosters a workplace learning culture, promoting adaptability, innovation, and resilience. It also encourages employees to embrace lifelong learning for career development and personal growth. Consequently, to facilitate bridging skill gaps, governments, educational and private institutions, and employers must collaborate to design effective upskilling and reskilling programmes that address skill gaps and support the evolving workforce (Morandini et al. 2023).

However, with an ambition to promote lifelong learning, multiple barriers may emerge that can stifle its progress and reach. Time constraints due to busy schedules, balancing work, family responsibilities, and other commitments leave one with limited time for formal education or training programmes. Financial limitations due to the high costs of education and training programmes, learning materials, and commuting may deter individuals with limited financial resources from pursuing further learning. The lack of awareness of the availability and benefits of lifelong learning and upskilling opportunities, the limited access to educational institutions, and the absence of flexible learning options can hinder adult learners from pursuing lifelong learning and upskilling. These are commonly cited barriers to continuing and lifelong education (Falasca 2011; Giurge et al. 2020; Hovdhaugen and Opheim 2018).

Singapore has placed itself in a prime position to address the barriers to lifelong learning with its collaborative partnership between the government, the workforce (represented by employers and employees), and the institutes of higher learning. This tripartite partnership is a crucial aspect of Singapore's SkillsFuture initiative, which aims to promote lifelong learning and enhance the skills and employability of its workforce. In the remainder of this article, we focus on Singapore's SkillsFuture movement. We want to examine how it was conceived, the route it took to reach its current position, the challenges it faced and will be facing, and potential areas of development for it to become more robust.

2. From Lifelong Learning to SkillsFuture

The first local milestone towards lifelong learning was initiated through the Skills Development Fund in 1997, which provided money to companies to train their employees. This fund was acknowledged as a supply-side policy as early as 1997 (Pan 1997). This supply-side policy did not see much uptake, which was part of the impetus for a lifelong learning policy driven by the individual. The second milestone came in 2001, which saw the passing of the Lifelong Learning Endowment Fund (LLEF) Act. This initiative incentivized Singaporeans to take up training, either locally or overseas. The definition of training under this act was purposefully broad, promoting and acquiring skills and expertise to enhance workers' employability (Attorney-General's Chambers of Singapore 2021).

Two significant events took place in the late 2000s to further drive the Singaporean government's intent of promoting lifelong learning, with the LLEF given an SGD 800 million budget and the Continuing Education and Training (CET) Masterplan being launched. The CET Masterplan is a strategic blueprint developed by the government to enhance Singapore's lifelong learning ecosystem and skills development landscape. The plan was first introduced in 2010 and has undergone periodic updates to address changing economic and workforce needs. The CET Masterplan is integral to Singapore's efforts to build a skilled and adaptable workforce that can meet the challenges of a rapidly evolving economy.

The idea to consolidate efforts to promote lifelong learning while making it accessible to Singaporeans eventually led to the ideation of the SkillsFuture initiative, administered by the SkillsFuture Singapore Agency (SSG), a statutory board under the Ministry of Education Singapore. SkillsFuture was launched in 2015 as part of the government's efforts to enhance the capabilities of its workforce and promote lifelong learning, the result of the SkillsFuture Council chaired by then Deputy Prime Minister Tharman Shanmugaratnam (Tay 2014). It emphasized the importance of skills development and continuous education to remain

employable and adaptable in a rapidly evolving economic landscape. Currently, SSG operates with four key thrusts ([SkillsFuture Singapore n.d.](#)):

1. Helping individuals make well-informed choices in education, training, and careers.
2. Developing an integrated, high-quality system of education and training that responds to constantly evolving industry needs.
3. Promoting employer recognition and career development based on skills and mastery.
4. Fostering a culture that supports and celebrates lifelong learning.

Since its inception, SSG has launched several key initiatives that remain hallmarks of the initiative:

1. **SkillsFuture Credit.** The SkillsFuture Credit provides all Singaporean citizens aged 25 and above with an initial credit amount (SGD 500 as of August 2023) that they can use to offset the costs of a wide range of approved courses. The credit is periodically topped up, allowing individuals to pursue learning opportunities continuously throughout their working lives.
2. **SkillsFuture Earn and Learn Programmes.** Targeted towards individuals with diploma and technical certificates as their highest qualification, the SkillsFuture Earn and Learn Programme was launched to provide fresh technical institute graduates, diploma graduates, and mid-career individuals with an alternative pathway to gain industry-relevant skills and work experience. Participants in the programme undergo structured on-the-job training with partner employers while completing a part-time diploma or post-diploma courses.
3. **SkillsFuture Work–study and Work–study Degree Programmes.** Initially conceived as a work–study arrangement, which expanded to work–study degrees in 2020, this programme was originally a joint effort between SSG, the National University of Singapore, and Sea Limited, allowing working adults to pursue further degrees while remaining in their jobs. This has evolved into the Work–study Degree Programme, facilitating a smoother transition for students as they enter the workforce after graduation. These initiatives entail a collaborative effort between companies and universities to design and implement curricula that seamlessly integrate theoretical knowledge with practical experience. Additionally, both entities assess students’ performance jointly, incorporating classroom learning alongside structured on-the-job training.

With this, the messages that the Singapore government sends to Singaporeans are shaped accordingly to drive across the importance of adult education as a support for individual careers and national economic progression. The first message is the need to have parallel paths to career development by providing a complement to educational qualifications; the second is to provide an alternative to the supply-driven adult education market by empowering the individual; and the third is to transform Singapore from an industrial economy to a knowledge economy by training locals to fill up in-demand job postings.

2.1. Creating Parallel Paths to Career Development

In Singapore’s educational context, most people view success as more academic than vocational; this is even acknowledged by the government ([Tan 2016](#)). One way SkillsFuture offers alternative routes to career development is through industry-relevant skills. SkillsFuture’s course offerings range among skills in data analytics, finance, cybersecurity, and languages, amongst others ([Kim et al. 2021](#)). The intentional choice of these “skills” as part of the initiative decouples the idea of skills from its previous association with trades and crafts. This contextualization signals to Singaporeans that skills are as essential as, if not more important than, paper qualifications if one wants to improve their employability.

One can view this de-emphasis on grades and degrees as a way of managing Singaporeans’ expectations of the importance of academic success. However, one question that arises is why Singapore would want to do this de-emphasizing at all ([Chong 2014](#)). Waring et al. provide a good discussion of the factors that could have driven this deci-

sion (Waring et al. 2018). Citing data provided by Singapore's Ministry of Manpower, they note that the decade after 2006 saw unemployment among degree holders rise from 18% to 35%. Waring et al. partly attribute this rise to the fact that degree holders accounted for a third of the labour force compared to one-fifth in 2006. In other words, there was an increase in the number of degree holders but fewer of these degree holders were employed. This increase in the number of unemployed degree holders is unwelcome for three reasons. First, compared to previous years where degree holders enjoyed near-full employment, the current reduction in graduate employment is a negative change that may affect Singaporeans' views of government effectiveness. Second, this increase may also lead to the usually unspoken concern of population disenfranchisement. Finally, there is the economic concern that unemployed degree holders could be better channelled to vocational employment, reducing the under-utilization of human resources. SkillsFuture was thus initiated as one of the potential solutions for this.

SkillsFuture tackles these challenges in various ways. Upskilling through SkillsFuture Programmes allows people without degrees to take courses to enter industries or be promoted in their current industry. This could reduce population disenfranchisement because it seemingly gives everyone equal access and opportunity through skills. Consequently, by allowing universities to provide their own SkillsFuture courses, the government allows the universities to work closely with the workforce, meaning that such universities remain competitive and relevant by adapting their programmes to offer and teach the relevant skills required by the workforce.

2.2. *Providing an Alternative to Supply-Driven Adult Education*

The adult education sector was supply-driven before 2003 (Pan 1997). This means the government and employers were responsible for their employees' training. The Singapore government attempted to accomplish this through rebates given to employers, though it was unsuccessful (Sung 2011). Compared to this old system, where employers were given the resources to train potential and current employees, SkillsFuture encourages potential and current employees to train themselves to become more attractive to employers. This places the burden of training on the individual, away from the employers. This is not to downplay the importance of providing subsidies, as a study from Lim et al. has shown that one of the primary motivators for people taking up CETs is still the amount of available subsidies provided either by their company or the government (Lim et al. 2023). However, this poses specific challenges for certain marginalized groups, as will be discussed in Section 3.

One potential consequence of this shift in training is worth discussing, inspired by Chua (2019) in a sociological paper. By shifting the training burden to the individual, the government can offer Singaporeans a subtle shift in the national political narrative. The previous system of supply-driven adult education was compatible with the Singapore government asking individuals to put aside personal interests for the greater good of the economy. In contrast, by shifting the training burden to individuals, citizens have more incentives to look out for their personal economic interests and there is less room for the narrative of sacrificing one's interests for the greater good. Indeed, an argument can be made that one should pursue one's interests for the sake of the greater good of the economy, as the economy will benefit from better efficiencies. This shift is admittedly a slight one, but it could have political and economic ramifications in the future.

2.3. *Moving from an Industrial to a Knowledge Economy*

Finally, SkillsFuture plays a vital role in the Singapore Government's goal of transitioning from a capital-intensive economy to a knowledge-intensive one. The coupling between education and labour markets started growing stronger around the end of the 1990s. The historical importance of policies during the ensuing decade on SkillsFuture's creation can be traced across several papers (Han 2001, 2007; Kumar 2004). In recent years, SSG identified various key skills for Industry 4.0, which uses technology and automation

to support the industry (SkillsFuture Singapore 2023b). These skills, such as additive manufacturing, AI, and cloud computing, require more advanced skills and knowledge.

Han explored the relationship between lifelong learning and the global move from an industrial, capital-based economy to a knowledge-based one as early as the start of the millennium (Han 2001). Using data from the World Bank, Han noted that Singapore's and other Asian countries' governments emphasized lifelong learning just as their education spending was being reduced from 1970 to 1998. Governments emphasized lifelong learning to combat economic shrinkage, coupling the labour and education markets together (Han 2007).

Kumar (2004) gives a good overview of the landscape of lifelong learning in 2004, acknowledging the importance of lifelong learning policy for governments in building human capital. Kumar explores how the Singapore government can utilize the potential of its limited human capital for a knowledge-based economy. He studied the question through the lenses of government, organizations, and individuals. Kumar noted that the government had been active in fine-tuning its lifelong learning policies and attempts to improve critical thinking skills. Turning to organizations, he pointed out that private organizations are not giving as much attention to lifelong learning policies and that this was an area that the government could focus on. Finally, he suggests that individual employee workplace engagement was a challenge that had room for improvement and that individuals needed to answer the call for leadership development (Kumar 2004).

Finally, SkillsFuture's wide variety of courses allows individuals to shape their careers in a way that engages them, providing options for an individual to move away from a dissatisfying career. One of the potential problems that Kumar foresees for the government is the challenge of measuring the success of lifelong learning programmes. This challenge is tackled by SkillsFuture's breaking down of jobs into discrete, measurable skills that, presumably, can be taught and learned. Interestingly, while Kumar's paper was published in 2004, SkillsFuture was developed in 2015, reflecting the continuing commitment by the Singapore government to lifelong learning.

3. From Barriers to Opportunities

3.1. Developing Skills Taxonomy for a Common Skills Language

While SkillsFuture was set up for various reasons discussed in Section 1, some barriers could hinder it from achieving its purpose. At the ontological level, articles by Ng (2017) and Kumar (2017), and a public commentary Poon and Kuah (2019) illustrate the nebulous definitions of "skills" versus other educational terms like "learning". Ng (2017) gives the example of building a computer system, where it is not just a matter of technical know-how but finding solutions to complex computing problems faced by the worker's company. This contrasts with Poon and Kuah (2019), who opined that we should not overlook know-how in pursuit of skills training. This definition of skill suggests that it is the ability to act in a way to resolve a problem. By comparison, know-how, as defined in Poon and Kuah (2019), is a form of capacity for workers to do things they are not fully aware of, while skills can be catalogued and codified. This definition of skill refers to the tangible ability that can be broken down into parts.

SkillsFuture proactively addresses this by embracing a broad definition of skills, encompassing "knowledge, application, and experience" de Roock and Baidon (2019), promoting a more comprehensive understanding of skill development. SkillsFuture also divides skills into hard technical skills, such as knowing how to use a computer, and soft skills, such as communicating across cultures. SkillsFuture's Enterprise Portal is a website for employers to explore ways of upskilling employees according to the skills taxonomy defined by the requirements of Singapore's workforce (SkillsFuture Singapore 2023c). This broad definition of skills has the advantage of being understandable by everyone, specialists and laypeople alike. It caters to a broad range of "skills" that are necessarily different in each industry sector. At the ontological level, every job is associated with a set of skills through SSG's continuing development of its skills framework. Individuals can

thus compare their current skills and skills required for their desired job to make informed decisions on upskilling or reskilling.

3.2. Empowering Individuals in Tearing down Barriers

Further addressed in Section 2, the shift from supply-side adult education, through rebates to companies, to demand-side lifelong learning through SkillsFuture has shifted the onus to individuals. Lifelong learning is also seen as a way to achieve higher earnings and provides opportunities for everybody to learn, as we have explored in Section 2.1. However, some academics argue that SkillsFuture, in its current state, does not benefit the unskilled to its fullest potential.

Lee and Morris (2016) explore inequality in depth and use OECD data to support their argument that inequality has increased in Singapore over time. They also explore the effect of the shift of learning burden onto individuals. They note several points: first, those with disability or family responsibilities are excluded from the official narrative of lifelong learning; second, while there is a differentiation between higher-skilled and lower-skilled individuals, with lower-skilled workers being low-waged, there are more courses that cater to higher-skilled workers than to lower-skilled ones. They note that, out of 12 programmes, seven catered to Professionals, Managers, and Executives (PMEs), three catered towards the low-skilled, and only two catered to both audiences. Chia (2020) and Gog (2019) add to Lee and Morris, showing that low-waged security personnel do not have as many opportunities to upskill themselves owing to an unwillingness by their superiors to send them for training. More information on the inequality in Singapore can be found in Smith et al. (2015).

Various studies have explored the reasons and motivations behind people choosing to take CET courses or not. Given the shift to online education accelerated by the COVID-19 pandemic disrupting education (Kaiser and McKenna 2021), certain groups of people will be disproportionately left out. For example, older adults find e-learning time-consuming and troublesome (Khatri 2010). Furthermore, even though there are tangible benefits to older adults joining these CETs, there are also some pushbacks related to time, health conditions, and cost (Thang et al. 2019). There have been programmes rolled out by the Infocomm Media Development Authority (IMDA) for seniors and persons with disabilities since 2020 (Infocomm Media Development Authority, Singapore 2023), and these recent developments and their efficacy need to be explored further.

Continued exploration in this area is essential, as will be underscored in our subsequent points, to enhance accessibility for underserved groups. Recent government initiatives to bolster digital literacy are commendable and show great potential, but their offerings are limited. Augmenting participation rates could be achieved by fostering community engagement and establishing peer mentoring groups, facilitating mutual support in skill acquisition.

3.3. Lifelong Learning for Advancing Humanistic Aspects of Education

SkillsFuture's framework admirably provides extensive opportunities for vocational education. While the emphasis is currently on practical skills, it is noteworthy that discussions are underway to enhance the programme by integrating more humanistic aspects of education, such as fostering a stronger sense of national identity. Humanistic education emphasizes education's social and individual elements instead of the "content" or economic aspect of education. For example, humanistic education would emphasize ways to live together in a society, or teach and discuss forms of human self-actualization. In contrast, a vocational or economic focus would emphasize education for career development (Sung and Freebody 2017).

Singapore has taken a very pragmatic approach to education since its birth as a nation-state (Tan 2012). This ideology manifests as an emphasis on exams, perceived importance of STEM education, and less emphasis on subjects in the Arts and Humanities (Tan 2005, 2016). Pragmatism has manifested differently across Singapore's time as a nation, firstly

“survival”, then “efficiency”, before moving towards “knowledge” and “abilities” (Kitagawa 2011). In 2005, Tan (2005) wrote about issues with Singapore’s move from an efficiency-driven education to an ability-driven education. The former focuses on producing skilled workers for the economy, and the latter focuses on developing every student’s talents and abilities. While Tan was writing for the school context, she devoted a section to exploring the tensions between Singapore’s pragmatism and the ideology behind Ability-Driven Education.

The emphasis on education for economic purposes, with less focus on the individual’s potential for growth, would carry over to the 2010s and, eventually, to SkillsFuture. Exploring the rhetoric of lifelong learning in Singapore, Ng finds a noticeable lack of rhetoric on informal learning, while the rhetoric of lifelong learning for economic purposes was strong (Ng 2013). Sung and Freebody (2017) use OECD data and Delore’s four pillars to explore the strengths and weaknesses of Singapore’s SkillsFuture policy. They argue that, while Singapore placed strongly on “learning to know” and “learning to do”, it was weak in “learning to live together” and “learning to be”. This means that, while Singapore was strong in learning under formal education and for vocational purposes, it was weak in learning for social cohesion and personal growth, respectively, which needs to be evaluated and translated to policy (Abu Bakar et al. 2020). While it must also be noted that Singapore’s education system is moving more towards a “values-driven” education (Ministry of Education, Singapore 2023), it remains to be seen whether this can and will be translated into a lifelong learning context.

4. From Existence to Flourishing

Having been in operation for several years at the time of writing this article, SkillsFuture offers a rich tapestry of research avenues, beckoning scholars to unearth fresh perspectives and understandings, particularly in the realm of adult education and lifelong learning. In the subsequent sections, we suggest three promising areas for future research, which could ultimately translate to the application of lifelong learning beyond SkillsFuture and Singapore. First, there is room to explore the impact of blended learning, especially in an adult education context, to transcend the physical barriers of lifelong learning. Second, SkillsFuture allows researchers to understand the factors affecting individuals taking lifelong learning courses. This further implies that recently created models that incorporate micro, meso, and macro factors can have their robustness tested for different contexts. With Singapore’s ageing population, as with many developing-to-developed communities, there has been increasing attention on possible research that explores lifelong learning among elderly adults.

4.1. Expediting Measurable Implementations of Blended Learning

This push to improve the quality of online and blended learning offerings is crucial in a post-COVID world (Cheong and Jones 2020), where technology plays an increasing role in workforce upskilling. However, care needs to be taken in this technology adoption process so that certain sections of people will not be left out, as we shall discuss in this section. In 2022, SSG and the Institute of Adult Learning (IAL) launched iN.LEARN 2.0 to promote blended learning and the use of online tools in CET (SkillsFuture Singapore 2022). It focuses on four areas: to raise the takeup rate of online and blended learning, to increase the adoption of technologies by businesses, to develop remote assessment solutions, and to improve the matching of individuals to courses.

Chen et al. (2020) explore the use of blended learning in Singapore’s training and adult education sector in iN.LEARN 2.0’s predecessor. Their paper examines the status of blended learning as of 2021 and how it can be conducted well for adult learners, and explores ways to promote innovative learning cultures in the workplace. Among their reported results was a survey that showed that about a quarter of training providers use blended learning. They also found that adults were less proficient in blended learning than in traditional classroom settings.

There have been studies into the attitudes of various groups towards online and blended learning in Singapore. [Billett et al. \(2022\)](#) performed surveys and interviews in multiple phases before and after the onset of the COVID-19 pandemic to understand how working-age adults view lifelong learning. They found that more than 50% of recent graduates from CETs found blended learning to be the most effective mode of delivery, with a rising trend across the years. However, the efficacy of the course depends on the type of skills taught. They conclude the importance of course design in improving the suitability of a blended learning delivery and the familiarity of the instructor to online tools as the key areas of improvement.

With iN.LEARN 2.0 in its second year of implementation, the effectiveness of such innovation is being analysed; it is likely that, as time passes and methodologies for adopting blended learning appear, more training providers will adopt blended learning practices, thus leading to more research in this field in a positive feedback loop. This will provide more data for researchers to better understand blended learning and its benefits, or lack thereof, and translate these findings to other countries for implementation.

4.2. Understanding Factors Affecting Participation

Research into barriers that prevent individuals from participating in lifelong learning has recently moved beyond looking at individual variables. [Boeren \(2016, 2017b\)](#); [Boeren et al. \(2010\)](#) created a model called the “Comprehensive Lifelong Learning Participation Model” that includes both meso and macro factors alongside individual factors that prevent participation. Meso factors look at learning providers, meaning that they consider workplaces or organizations that provide training for individuals. Macro factors are country-scale factors, including the labour market, economy, and education and training.

Singapore’s closely knitted interactions between the government, training organizations, and individuals create a good laboratory to test theoretical models, like Boeren’s model. This is especially true in a small country like Singapore, where such an integration is possible, thus attracting more researchers from abroad to analyse the outcomes of this field. Tracking SkillsFuture’s success and failures will also generate quantitative data as time passes. These quantitative data will complement the mass of qualitative data and research that has characterized the field of lifelong learning ([Boeren 2017a](#)).

At a more individual level, there have been various studies on individual perspectives and attitudes towards lifelong learning. Leow et al. conducted interviews with 176 working-age Singaporeans to find out their views on participating in CETs ([Leow et al. 2022](#)). They found that the top three reasons for participation were to (i) gain personal development, (ii) acquire extra skills for their next job, and (iii) try for a better career. This is also related at a macro level to Leow et al.’s findings from interviewing 40 companies willing to provide full financial support and time off for their employees to participate in CETs ([Leow et al. 2023](#)). The main reasons these companies joined the Work Study Programme were to train new employees with relevant qualifications and upskill their current employees to get a promotion. These serve as a starting point for exploration into the motivations of both individuals and employees in lifelong learning courses.

A recent paper by [Lim et al. \(2023\)](#) performed statistical analysis and modelling of the opinions regarding SkillsFuture offerings, and identified factors affecting peoples’ interests in lifelong learning. A survey of more than 5000 participants was conducted to understand which factors affected Singaporeans’ perceptions of lifelong learning programmes—personal motivation to learn or awareness of course offerings. Using physics-informed opinion dynamics modelling, they identified personal motivation as the key factor affecting the take-up rate of SkillsFuture courses. In addition, they found that lower salary and education levels are correlated with a lower motivation to learn but have the most significant increase in reception to lifelong learning when exposed to lifelong learning courses. A key recommendation of the paper includes creating roadshows for past participants to discuss the benefits of such courses, which would increase awareness of course offerings and enrollment.

[Kim et al. \(2021\)](#) also discuss preliminary findings that can help improve SkillsFuture's outreach. They argue that the increase in uptake, from 126,000 in 2016 to 500,000 individuals in 2019, fills economic needs. More research could be conducted on understanding citizens' motivations for taking such courses and exploring alternatives to the current model of subsidies. For example, the government could differentiate people further when giving out credits by counting the number of courses they pursue in a given period or paying a dollar for every dollar provided by the individual. These provide examples in the research direction for barriers to participation in lifelong learning programmes.

4.3. Advancing Research into Adult Education for Older Citizens

With Singapore's population ageing rapidly ([National Population and Talent Division, Singapore n.d.](#)), there has been increasing interest in healthy ageing, which includes longer employability. Singapore is responding to the older proportion of workers through the National Silver Academy (NSA). In this initiative, lifelong learning for seniors is supported through a broader range of learning options. For example, in addition to the courses available on SkillsFuture, those eligible for NSA courses can take short or exam-free courses that focus on life skills or work skills. Such courses can be found on the SkillsFuture website ([National Silver Academy n.d.](#)).

[Billett \(2011\)](#) predates SkillsFuture or the NSA but is a good starting point for adult education for older citizens in Singapore. The key finding is that older workers' greater working knowledge and more effective work procedures were an asset to the economy, concluding that efforts to sustain older citizens' employability were worthwhile even if such enduring knowledge is less practical in specific industries like advertising or information technology. Billett also conducts interviews and finds that, contrary to the idea that older workers are reluctant or slow to learn, these workers had engaged in significant new learning, but few of these learning accounts were secured through training programmes. For many of these older workers, learning happened in the workplace before the advent of SkillsFuture. Many asked for workplaces to provide more learning opportunities.

[Thang et al. \(2019\)](#) supports what was discussed in Section 3 by suggesting expanding the discussion around lifelong learning to include informal learning. They point out that the emphasis on the economic benefits of learning sends the message that productive ageing only matters for employability, discouraging learning beyond what is needed for paid work. Informal learning activities like watching free and accessible online videos should be encouraged. The authors discuss the need for a paradigm shift in society's educational system to understand learning beyond academic and work qualifications.

In 2020, multiple studies on lifelong learning for senior citizens in Singapore appeared. We can begin our exploration with [Maulod and Lu \(2020\)](#), who investigated the topic of barriers to learning and key aspects of successful learning in a classroom context. They found that course affordability, variety, accessibility, low barriers to entry, and lack of exams made courses very attractive for seniors. Instructors in these classes must be skilful, empathetic, and engaging to impact the older workers positively. Maulod and Lu complement Ko's study on teaching older adults in Singapore ([H. Ko 2020](#); [P.-C. Ko 2020](#)) study on the social networks of older Singaporean learners. In line with Maulod and Lu's findings, [H. Ko \(2020\)](#) also found that the instructor played a decisive role in one's decision to take up the course. [P.-C. Ko \(2020\)](#) further found that intergenerational ties, support of their partner, and support from friends all play an important role in encouraging the elderly to take up learning. The importance of each of these aspects differs based on the elderly in question's marriage status and gender.

Whether this recent spate of studies will affect how courses for senior citizens are envisioned remains to be seen. Still, given the increasingly ageing population in Singapore and many developing-to-developed countries, it is likely that more research will be directed to this area in the near future.

5. Concluding Remarks

This study has covered much ground on the development of SkillsFuture Singapore and the ideological shifts in lifelong learning. Sung has attempted to measure SkillsFuture success through data from the Organisation for Economic Co-operation and Development (OECD) (Sung and Freebody 2017), which ranks Singapore as 11th on the PIAAC¹ score (Faure et al. 2013). SkillsFuture Singapore also highlights its successes and roadmap in its annual reports. In the previous year, SkillsFuture has extended its partnership with the manufacturing and sustainability sectors, working with five polytechnics in Singapore for adult education, and launched four more work–study programmes in aerospace engineering, customer experience, agriculture and aquaculture technology, and facilities management (SkillsFuture Singapore 2023a). Nevertheless, there are opportunities for potential enhancements in policy improvement and practical application.

Our findings indicate a need for policy adjustments for inclusivity. Much attention has been placed on skilled workers and increasing attention has been given to upskilling older workers for today's workforce requirements. The next step is to increase access to groups most vulnerable to the effects of globalization. Ng argues that SkillsFuture has shown signs of how vulnerable groups can benefit by specifying the unique example of how prison inmates are given skills training to rehabilitate and prepare them for reintegration into society (Ng 2017). This effort should be continued and extended to other vulnerable groups.

In practice, effective methods for engaging adult learners are the strength of SkillsFuture's approaches to flexible learning through technology and industry relevance, providing a practical blueprint for emerging workforce sectors or industry sectors yet to adopt a lifelong learning approach to remain relevant. For practitioners in other countries, this study offers insights into how elements of SkillsFuture can be adapted to suit their specific national and cultural contexts. While SkillsFuture is uniquely tailored to Singapore's context, aspects such as the tripartite agreements between the workforce, government, and educational institutions can be adapted. A united effort to equip individuals to deal with the VUCA world can provide practitioners with targeted strategies to prepare learners for similar challenges. Fundamentally, one of the key drivers for lifelong learning is the culture of lifelong learning. Singapore had to undergo several iterations and initiatives to find a model that fits the current worker generation. While this study highlights the progress made, countries can draw on the lessons learnt to find one that can achieve similar outcomes in their own contexts.

Exploring diverse implementations of lifelong learning and pedagogical improvements is crucial for its applicability to global contexts. The case of SkillsFuture in Singapore exemplifies this, highlighting the significant role of government initiatives in adult education, the challenges they face, and the potential research avenues they open up. This study underscores the need for continuous innovation and inclusivity in lifelong learning policies to effectively equip the workforce for a rapidly evolving global context. The present study analyzes SkillsFuture's development and challenges while identifying potential research opportunities arising from its implementation. As a case study, SkillsFuture's route is informative in educating its workforce in a global context while addressing local issues. We have identified three strengths of SkillsFuture, namely its provision of parallel paths to career development instead of a singular focus on grades, an alternative to supply-side education, and paving the way to a knowledge economy. Opportunities exist to enhance its course offerings and expand accessibility to lower-income and less-educated groups.

Beyond SkillsFuture, this article illustrates how lifelong learning can be implemented, recognizing that different countries, cultures, and messaging may yield diverse responses to lifelong learning. Irrefutably, the lessons learned from Singapore and subsequent research can inform the implementation of lifelong learning programmes beyond the city-state to establish a healthy and self-sustaining lifelong learning ecosystem elsewhere. Our study here could complement work conducted in policy research (Kim et al. 2021) and pedagogy (Chia and Sheng 2022) by suggesting research directions to improve lifelong learning to encompass more segments of society and improve its utility to industry. The

areas of future research identified, i.e., the adaptation and implementation of blended learning, understanding the motivations and barriers affecting the adaptation of CETs, and creating courses for older citizens, can be applied internationally.

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Note

- ¹ Programme for the International Assessment of Adult Competencies.

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