
INNOVATION APPETITE AND READINESS OF ENTERPRISES IN SINGAPORE

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Abstract

For its pivotal role in economic growth and the subsequent ripple effect on the development of all corners of society, innovation is widely hailed as the key to the future. Nations around the world actively take measures to cultivate innovation as a means to remain competitive in the global economy and improve standards of living. Singapore is no exception, heavily investing in business innovation through the RIE2025 (National Research Foundation, 2020) and learning innovation through iN.LEARN 2020 (Ministry of Trade and Industry, 2017b). However, several shortcomings exist in Singapore's innovation landscape. For one, innovation by locally owned enterprises is limited, trailing behind the public sector, government-linked companies (GLCs), and multinational corporations (MNCs) (Lim, 2016; Wang, 2018). The country as a whole also receives a lower level of return on their innovation investments compared to other countries (Cornell University et al., 2020).

To address the gaps identified, this study presents the context surrounding innovation in Singapore and proposes that the two factors of innovation appetite and innovation readiness are critical in understanding the aforementioned issues. To investigate, 210 top-level management executives were surveyed and 13 semi-structured interviews were conducted to provide insights into the innovation decision-making process of different business entities in the country. Findings revealed that although the rates of innovation-related knowledge, perception, and investment decisions are encouraging, appetite and readiness presented room for improvement and should be given greater emphasis in the innovation process. Specifically, tackling the willingness for medium to large-scale learning innovations and developing the organization and collaboration processes within an enterprise are pivotal to increasing learning innovation investment and output. Implications are discussed.

This publication is the first in a series of papers by inlab ultimately focused on learning innovation in Singapore. It aims to capture the bigger picture of the innovation decision-making process while also comparing the differences in perception, priorities, and practices between different types of innovation. Findings will be used to inform strategies in raising the adoption and scaling up of learning innovation, shape learning innovation interventions, as well as guide future measures of learning innovation promotion in the country.

1. Introduction

Innovation is the word of the decade. East to west, across economies of all levels of development, innovation is seen as the key to unlocking long-term and sustainable economic growth and social development. Nations like the United Kingdom, Chile, Ghana, and Honduras have government entities specifically dedicated to innovation (Global Trade and Innovation Policy Alliance, 2019) and the European Union named innovation “the heart of the Europe 2020 strategy” (European Commission, 2011). Countries are fervently innovating and Singapore is no exception.

In a recurring bid to become the “Global-Asia node of technology, innovation, and enterprise” (Ministry of Finance, 2020), innovation has been among the top of Singapore’s priorities for the past decade. The National Research Foundation, a department within the Prime Minister’s Office, lauds innovation as an essential pillar in the foundation of the country’s “Future Economy” (National Research Foundation, 2016). Recent years have seen the topic of innovation consistently and extensively spoken about in the annual Budget speech given by the country’s Finance Minister to inform citizens about government expenditure projections (Ministry of Finance, 2020).

But first and foremost, what exactly *is* innovation? Such a sensational word is crucial to define. Throughout humanity - for some would argue that innovation is as old as mankind itself - there have been many attempts to uncover this complex and multi-dimensional concept. However, a common thread found throughout all its definitions unanimously point towards, in some way or another, a new change. To innovate is “to use a new idea or method” (Cambridge Dictionary, n.d.) – very simple in essence, but it is this simplicity that allows space for a wealth of ideas to grow and flourish without limitations.

Because of its buzzword or trendy reputation, one may think of innovation as a practice that radically and creatively improves items or processes that already exist, resulting in products or services that are novel and transformative. Smartphones, for example, are an oft-mentioned example of innovation that was undeniably transformative to the market. This new product was a clear change from when a phone, a calculator, a camera, a computer, and many other tools were all separate items. E-readers. Robot vacuums. And those are all just

examples of product innovation - there is also process innovation (changes in the way products are made and distributed), position or marketing innovation (changes in the context in which the products are introduced), and paradigm or organizational innovation (changes in the organizational processes or underlying mental models framing the organization) (OECD, n.d.; Tidd et al., 1998). However, it is important to note at the onset that innovation need not be disruptive to the market or even completely novel each time to make an impact. New change can be small, and most of the time innovation does take place incrementally, by gradually adding to an existing product or optimizing an existing process.

Innovation in an enterprise can also go beyond the realm of its processes, products, and services to change and transform the learning and development (L&D) activities of its employees. Learning innovation, or changes in the way learning is designed, developed, and delivered (SkillsFuture Singapore, n.d.), enhances the quality and accessibility of skills and knowledge acquisition and is an important contributor to business viability and growth. New and innovative ways of learning in the workplace can save time and cost and improve business performance when employees apply skills learned directly at work. Learning innovation can therefore optimize efficiency and productivity, and expand opportunities that drive performance (Lutin, 2020). The evolution of the global workforce in terms of competitiveness and complexity has placed a premium on reskilling and upskilling (van Dam, 2018). As companies move to innovate internal business processes, innovation in learning will inevitably follow suit. Similarly, given that intellectual capital and ideas are rising in value, learning and transformed learning can give enterprises a competitive edge (Wright, 2000). Furthermore, not only have new technologies changed how people do business, the technologies themselves too are in constant flux, as are the norms surrounding the use of those technologies. This highlights the importance of examining learning innovation as well.

In this study, then, our scope of innovation encapsulates all the aforementioned forms: innovation in area of goods and services (product innovation, process innovation, position innovation, and paradigm innovation), as well as innovation in the area of internal learning and development (learning innovation). Ultimately, if carried out successfully, innovation can offer innumerable benefits to an enterprise such as through an increase in productivity, efficiency, profit margins, and market presence, which can in turn benefit the enterprise's base country through an increase in GDP, the ability to capitalize on new growth areas, and the creation of new jobs. The potential is enormous. So much so that in the knowledge

economy of today, where the economy is built around new and newer skills and ideas (Green & Costello, 2001), innovating appears to be less of a beneficial option and more of a necessity. When competitive advantage comes from successfully turning ideas into economic value and upskilling employees to greater heights amidst rapid technological and scientific advancements, and everyone is constantly on the lookout for the bigger and the better, innovation becomes crucial to relevancy and economic growth.

Recognizing this, Singapore places a large emphasis on innovation, with investments that began modestly but have grown exponentially. In 1995 the government pledged \$2 billion towards structural investments in R&D (a key pillar in innovation), which tripled to \$6 billion ten years later in 2005, and almost tripled again to \$16 billion another ten years later in 2015. At its latest, the RIE2025, a Research, Innovation, and Enterprise plan from 2021 to 2025, commits \$25 billion to be spent on research, innovation, and enterprise activities (National Research Foundation, 2020) such as the Scale-up SG programme, the Innovation Agents programme, and the SME Co-Investment Fund. An additional \$27 million is dedicated to learning innovation through iN.LEARN 2020, a learning innovation initiative led by the statutory board SkillsFuture Singapore (Ministry of Trade and Industry, 2017b) that aims to drive blended learning and foster closer collaboration within the Continuing Education and Training (CET) ecosystem. In terms of guidance, there are 23 Industry Transformation Maps (ITMs) acting as growth and competitiveness plans for 23 industries supported by the government (Ministry of Trade and Industry, 2017a). The government's stance is clear: businesses should innovate to remain competitive.

If economic growth is a major indicator of successful innovation efforts, these investments appear to be bearing fruit over the years according to Deputy Prime Minister and Finance Minister Heng Swee Keat (Ministry of Finance, 2020). The Budget Speech 2020 cited an increase in overall productivity and median income over 2017 to 2019 as a result of economic transformation, and previously shared many success stories as anecdotal evidence of innovation, even in 'old economy' sectors like construction and food production (Ministry of Finance, 2019). Mr Heng also mentioned that the rankings and regard for educational institutions in Singapore, as the best in Asia and among the top in the world, attested to the success of R&D investments.

Furthermore, in 2017 Singapore topped the list for start-up talent in the world, ahead of even Silicon Valley (Startup Genome, 2017). Technology unicorns Grab and Garena, worth US\$10 and \$3.7 billion respectively (Forbes, 2019), are headquartered locally. Internationally renowned companies like Dyson are moving their headquarters to Singapore (Tovey et al., 2019) and over 4,000 firms too choose to house their Asia-Pacific regional headquarters in Singapore, including companies like Rolls-Royce, LinkedIn, Microsoft, and Bayer Pharmaceuticals (Economic Development Board, 2017).

Despite such achievements, the innovation landscape in Singapore has room for improvement. One shortcoming is in the low levels of innovation input by local enterprises. While the country clinched the top spot on The Global Competitiveness Report 2019 by the World Economic Forum, much of the evaluating framework was directly related to governmental policies and systems such as institutions, infrastructure, labour market, and market size. Similarly, the Global Innovation Index 2020 too placed Singapore at the top of the Innovation Input Sub-index list as the country with the highest innovation efforts in the world (Cornell University et al., 2020), but most assessed elements directly related to the larger national ecosystem and included variables such as political environment, education, general infrastructure, and trade and market. Only a handful were in some way influenced by enterprises, such as R&D performed and financed by businesses.

In reality, beyond governmental factors, investments in innovation by local enterprises are limited and local innovation players in the private sector are few, with the field largely dominated by the public sector, government-linked companies (GLCs), and multinational corporations (MNCs) (Lim, 2016; Wang, 2018). Singapore presents a rare case in which the public sector is clearly leading the innovation wave over the private sector instead of the other way around. This phenomenon does not bode well for the future of the innovation ecosystem given that local enterprises make up a significant portion of the economy - according to the Singapore Department of Statistics (2018), local enterprises (enterprises with at least 50% local equity) account for 81% of enterprises in Singapore, 69% of employment, and contribute over \$175 billion, or 38%, to the economy. Small and medium-sized enterprise (SMEs, defined as “enterprises with operating receipts not more than \$100 million or employment not more than 200 workers”), majority locally owned, make up an overwhelming 99% of the economy.

Several business surveys have divulged valuable insights into the innovation perceptions of local enterprises. Firstly, a survey by the Singapore Chinese Chamber of Commerce & Industry revealed that out of 972 respondents across the services, manufacturing, and construction industries, 95% of whom were SMEs, less than half (45.1%) said that innovation was part of their business priorities (Singapore Chinese Chamber of Commerce & Industry, 2019). This is echoed by HSBC in their Navigator: Made for the Future report (2019) consisting of 2,500 global businesses. Out of 200 Singaporean companies, only 44% of Singaporean companies were found to agree that innovation is a “pre-requisite for survival”. Aon Inpoint’s 2019 SME Insurance Survey, which compiled data from over 300 SMEs in Singapore, reported that factors such as increasing competition proved more concerning than failure to innovate when asked to predict the impact of risks in two years (Aon Inpoint, 2019).

The suggestion that less than half of Singaporean enterprises sees innovation as a matter of importance implies correspondingly low levels of innovation appetite, or how much or aggressively a company is willing to innovate. This could be influenced by the generally risk-averse culture that persists in Singapore, where safety and security are favoured over wagers and chance. In 2016 then-Minister for Industry S Iswaran noted that there was a fundamental need for the Singaporean society to have “a greater tolerance of risk and acceptance of failure, because - as all of us know - innovation and enterprise cannot always succeed” (Soon, 2016). Mr Brandon Lam, a Managing Director and Country Head from DBS Bank, commented in an interview that Singaporeans aged 22-37 were “quite practical people” who were “surprisingly risk-averse” (sgsme.sg, 2018). An international study by the Organisation for Economic Co-operation and Development found that over 70% of Singaporean students surveyed expressed fear of failure, well above the world average of around 50%, which results in a tendency to avoid challenging situations in fear of making mistakes as they may be regarded as shameful or a sign of a lack of ability (OECD, 2019). There have even been active attempts to tackle the root of the risk-aversion culture and “dial back” on the over-emphasis on academic success, in part to encourage more positive learning orientations such as curiosity and collaboration (Chia, 2018; Ministry of Education, 2019).

Another factor affecting how aggressively a company is willing to innovate would be, of course, resource availability. For SMEs in Singapore, contending with the accelerating speed of change could be difficult alongside managing the challenges of day to day business -

capital scarcity was found to be a major challenge for enterprises in trying to adapt and innovate (Aon Inpoint, 2019). The HSBC Navigator: Made for the Future report mentioned that 36% of Singaporean businesses pinpointed skills shortage as a key barrier to innovation, which was higher compared to the global average of 28% (HSBC, 2019). Similarly, the Singapore Business Federation's National Business Survey 2018/19 added that the biggest innovation challenge faced by the businesses they surveyed was the cost of technology, followed by availability (or lack) of manpower with technological expertise, as well as retraining workers to develop their digital capabilities (Singapore Business Federation, 2019).

And still, investments in innovation may not bear fruit even among those who do value and engage in innovation on whatever scale, the investments may not bear fruit. Singapore as a whole receives a lower level of return on their innovation investments compared to other countries (Cornell University et al., 2020). To illustrate, while Singapore ranks first place in the world on input (with a score of 70.20 out of 100), she only ranks 15th on output (with a score of 43.02 out of 100). Meanwhile, Switzerland topped the innovation output rank, almost 20 points above Singapore, with lesser input. Likewise, the Czech Republic also achieved about the same level of innovation output as Singapore with far lesser input. These comparisons therefore suggest that fruitful innovation goes beyond the extent of investment and perhaps even investment itself.

A hidden factor behind this discrepancy could be a lack of innovation readiness, which refers to the internal capabilities within the organization itself to put innovation into practice (INSEAD & Logica, 2009; Shum, 2015). A study of 200 business leaders across Europe by INSEAD & Logica (2009) showed that even with the investment of resources into innovation, 80% of enterprises faced a gap between their innovation goals and achieving them, meaning that the investment was “effectively wasted” due to a lack of innovation readiness. Simply saying innovation is important or allocating money to R&D spending does not create innovation – an organisation has to ensure that its internal innovation process is supported and managed effectively, with the appropriate processes and incentives in place, to be innovation-ready.

For example, according to Zerfass (2005), consistent stakeholder orientation facilitated by innovation-related leadership communication is a key factor of innovation readiness. A

model by Shum (2015) based on Australian enterprises captures a set of 15 competencies contributing to innovation readiness such as teamwork, diversity, and idea management. Mahmud, Rosnan, & Hazman-Fitri (2013) found that organizational policy, culture, and training improved the ability of an organization to adopt change and innovate in Malaysian SMEs. These are some critical factors that could facilitate or impede innovation between the initial input and the output, and yet are underrated or underrepresented in many innovation studies when it comes to innovation capability.

In short, recognizing the importance of innovation, implementing it at a certain scale, and implementing it *successfully* (meeting its objectives and actually leading to an improvement in business processes or profit margins for example) are all separate affairs with their own specific challenges. Where would innovation appetite and innovation readiness then fit into an organization's existing innovation decision-making process?

As a baseline, Rogers (1962) puts forth a five-part innovation decision-making process of a unit (such as an individual or an organization): knowledge, persuasion, decision, implementation and confirmation (Figure 1). He suggests that the innovation process is manifested through a series of actions and choices over time in the evaluation of a new alternative to those previously in existence – and it is this inherent 'newness' of innovation, and the uncertainty that lies with it, that differentiates innovation decision-making with other types in a business.



Figure 1 Rogers' innovation decision-making process (1962)

According to Rogers (1962), 'knowledge' occurs when a decision-making unit is exposed to the existence of innovation and gains some understanding of it; 'persuasion' occurs when

forming a favourable or unfavourable attitude towards it; ‘decision’ occurs when adopting or rejecting it; ‘implementation’ occurs when it is being put to use; and ‘confirmation’ occurs when the unit seeks reinforcement of its decision.

As innovation appetite regards the scale to which the innovation would occur, it would come into play after persuasion and close to or parallel to decision and implementation. Innovation readiness would be relevant after implementation of the innovation but before the confirmation of its output (Figure 2).

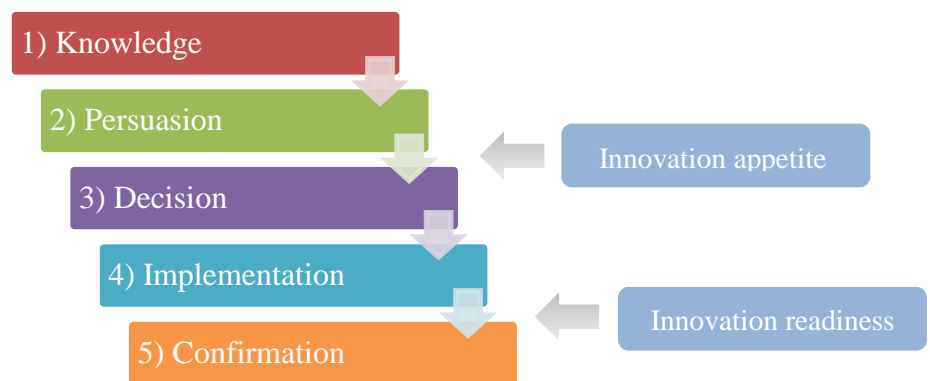


Figure 2 Rogers’ innovation decision-making process (1962), including where additional factors of innovation appetite and innovation readiness would come into play

Where do we then begin in studying the innovation process? Widely agreed is the role that leaders play in an enterprise’s innovation activities - there is no shortage of literature related to the impact of top-level management on innovation, from large companies to SMEs (Gumusluoğlu & Ilsev, 2009). A study by de Jong and Den Hartog (2007) revealed as many as 13 ways leaders can enhance employees’ innovative behaviour, such as through providing vision, recognition for innovation activities, and stimulating knowledge diffusion. Leaders can also encourage innovation by implementing supervisory and reward system support for innovation or granting their employees freedom and autonomy (Chandler et al., 2000; Krause, 2004). Indirect links between leadership styles and innovation have been established as well, such as through organizational learning (Aragón-Correa et al., 2007) and workplace culture (Gil et al., 2018). The role of leadership in innovation as a whole is paramount and goes far beyond allocating financial resources.

Thus, in a nutshell, this study explores the levels of innovation appetite and innovation readiness in Singaporean enterprises within the larger decision-making process framework, through the perspective of business leaders.

To the best of our knowledge, there has yet to be systematic inquiry done on either innovation appetite or innovation readiness in the country. And for Singapore's wishes for her enterprises to be "the incubators of innovation, the crucibles for skills upgrading, and the creators of good jobs for our people" (Ministry of Finance, 2020) to come true, it is crucial to break down the innovation process and study each fragment closely to understand the overall enablers and constraints of successful innovation in order to make informed decisions about the appropriate approaches in its promotion.

2. Methodology

Morse (1998) suggests that when characteristics in a phenomenon are mostly unknown and unidentified, researchers should begin with participants who can best represent the phenomenon of interest. Thus, as mentioned, our sample consists of business leaders – C-suite executives, managing directors, or equivalent senior-level management representatives – who have the most individual influence and are best able to contribute to the engineering and implementation of innovation activities in a particular enterprise. The study also utilizes a mixed-methods approach, where a researcher “collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry” (Tashakkori & Creswell, 2007). This approach developed with the earliest social research projects but is now widely used in a variety of different research disciplines (Hesse-Biber, 2010). Part of its appeal to researchers has to do with offsetting the weaknesses of a method with a strength of another, leading to a greater degree of understanding through mutual “elaboration, enhancement, illustration, and clarification” (Greene et al., 1989). Taking into consideration the wide scope we are studying, qualitative responses can be useful in supplementing or explaining complex or contradictory survey responses (Driscoll et al., 2007).

Data was collected in two parts. Firstly, 210 top-level management representatives in Singapore completed an online survey questionnaire. Secondly, 13 participants from the same sample who fulfilled additional sampling criteria (eg. consented to a follow-up interview, have held their position for at least 2 years, are sole or key decision makers in the company) were interviewed through the online conferencing platform Zoom.

The survey questionnaire ran from June 2020 to August 2020 and focused on measuring levels of innovation appetite and innovation readiness as well as capturing information on the other stages of the innovation decision-making process framework. Measures of innovation appetite are scarce given that the plethora of different business goals and outcomes in the field would require individual consultations for each enterprise to draw out useful and personalized innovation agendas. Therefore, since this study is interested in overall levels of innovation appetite of the landscape instead of any specific companies, general-level items that would broadly capture levels of innovation appetite in the enterprise

were added and collocated with items capturing general risk appetite and learning innovation appetite.

As for innovation readiness, the questionnaire included items created with reference to the Innovation Readiness Model (showcased in Figure 1.2) pioneered by INSEAD in collaboration with Logica (2009) that rests upon four critical areas for identifying the overall innovation readiness of an enterprise:

1. Leadership and ambition – the overall vision and mission of the organization and how it is reflected in leadership and strategy
2. Organization and collaboration – the internal organization and how it is set up to contribute to an innovative climate, as well as the involvement of external partners
3. People and culture – the combination of talents, incentives, and opportunities for innovation to take place
4. Implementation and measurement – the actual innovation process, including integration of innovation into day-to-day activities and its measures and metrics.

Then, semi-structured interviews were conducted in the month of September 2020 with an average duration of 27 minutes each. Questions covered participants' perceptions and views of external (eg. sector-wide tendency or space to innovate, government support) as well as internal factors affecting innovation (eg. personal motivations, enterprise structure and processes) to gain deeper insights into the innovation decision-making process.

Analysis was performed on the quantitative survey data with the IBM statistical analysis program Statistical Package for the Social Sciences (SPSS), using descriptive statistics and correlation analysis to lay out and explore a ground-level look of the landscape. The qualitative data from interviews were then guided by Boyatzis' hybrid-driven approach for thematic analysis, which blends a data-driven and inductive approach to identify key patterns and themes (Boyatzis, 1998). Each transcript was reviewed to generate a preliminary list of codes which was then refined, clarified, and rewritten to form a final coding scheme. This was applied to the data once again and resulted in descriptive thematic codes supplemented with quotes as qualitative data analysis.

3. Findings and Discussion

It must be noted at the onset that data for this study was collected in the midst of a temporally sensitive context – the COVID-19 pandemic no doubt shapes the findings immensely. Through the months of 2020, pandemic-related difficulties for Singaporean enterprises such as the Circuit Breaker measures, limited gathering capacities, lower purchasing intent, and weak external demands led the country into a deep recession and triggered a strong push for businesses to move online or risk folding. One study found that almost 75% of Singapore firms were accelerating the pace of digitalization in 2020 as a result of the pandemic (Microsoft, 2020). Government support for innovation was also highly boosted, with commitments such as \$20 billion towards research in “high impact” areas like health and biomedical sciences and digital technologies (Chew, 2020) and up to \$150 million to help start-ups with their innovative business ideas (Choo, 2020).

Still, it is important to note that while disruption caused by COVID-19 should not be taken lightly, it may be inaccurate or remiss to attribute causal mechanisms of the pandemic on the innovation activities of an enterprise. In fact, when respondents did explicitly mention COVID-19, experiences included both increased and decreased levels of innovation, in both mindset-related matters and tangible implementation. For instance, in terms of mindset:

“I think now with the pandemic, I would say **more people are more open** now. [...] It’s driven some receptiveness to change and innovation.”

“(About no change in mindset) Because the way that they think is not really thinking out of the box. What has been provided is only from the small group of people who shared their ideas. So it’s **not really a real transformation.**”

In terms of implementation:

“**Changing from retail to social media selling**, which we did much more during COVID-19.”

“Due to CB (Circuit Breaker), **new processes were explored** which involves digitalization.”

“Due to COVID-19, **we did not invest** in innovation recently.”

“(About a manufacturing innovation) This is still under R&D but due to COVID-19, has been **put to a temporary stop.**”

With this in mind – that COVID-19 does not necessarily lead to more or less innovation – as much and as sensitively as possible, findings and discussion will be presented with the current circumstances taken into consideration.

Findings were organized along Rogers’ (1962) overarching framework set forth by Figure 2. As the findings also reference the different types of innovation set forth in the beginning, a brief recap is as follows (these definitions were also provided to respondents in the questionnaire):

- **Product innovation:** A new or significantly improved good or service. This includes changes in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics.
- **Process innovation:** A new or significantly improved production or delivery method. This includes changes in techniques, equipment and/or software.
- **Position innovation:** A new or significantly improved marketing method. This includes changes in product packaging, placement, or promotion.
- **Paradigm innovation:** A new or significantly improved mental model to frame the organization. This includes changes in business slogans or strategies.
- **Learning innovation:** A new or significantly improved learning and development method. This includes changes in design, development, or delivery of classroom learning, e-learning and/or workplace and work-based learning.

The pool of respondents (n = 210) consisted of business leaders mostly from SMEs (93.8%, n = 197) with a small proportion coming from MNCs (5.2%, n = 11) and large local enterprises (LLEs) (1%, n = 2). They were part of a wide variety of sectors, namely:

- Banking and Finance
- Building and Construction
- Consulting
- Design and Architectural Services
- Education and Childcare
- Education Technology (EdTech)

- Electronics
- Engineering
- Events Management, MICE, Hospitality
- Financial Technology (FinTech)
- Healthcare and Wellness
- Information and Communication Technology (ICT)
- Manufacturing
- Recruitment
- Retail and F&B
- Security
- Training and Adult Education (TAE)
- Transportation, Storage and Logistics
- Wholesale trade
- Others

An important sampling criteria was that the businesses should provide some form of in-house training for their employees, which would allow potential for learning innovation while also differentiating L&D activities and avoiding overlap of outsourced training. Most (88.6%) conducted this through on-the-job training such as supervised work and mentoring or coaching. Other forms of in-house training included face-to-face training at a fixed time and location such as in a classroom setting (52.9%) and asynchronous e-learning at the learners' convenience such as through learning management systems (26.7%).

3.1 Innovation knowledge

First and foremost, how do enterprises define and describe innovation? This question was left open-ended to avoid influencing answers which were later thematically coded. The majority of respondents (44.8%) responded that innovation was about improving or creating new ideas and processes (Table 1) – despite heavy emphasis on digitalization and moving online in innovation discourse, most business leaders understand that technology is only a facet of innovation, and that innovation as a whole could go beyond the digital. Other answers mentioned improving productivity, including through technology, or simply doing

things differently. About 6.2% did not clearly articulate what innovation meant to them, with responses such as "to solve" or "efficient and user friendly".

Table 1 Proportion of responses on innovation knowledge

Responses	n	Percentage
Improving or creating new ideas and processes	94	44.8%
Improving productivity including through technology	47	22.4%
Doing things differently	22	10.5%
Adapting to landscape and competition	20	9.5%
Applying new perspectives	9	4.3%
Using digital means for customer-facing processes	3	1.4%
Applying acquired knowledge into solutions	2	1%
Others	13	6.2%

3.2 Innovation persuasion

Persuasion, or the formation of a favourable or unfavourable attitude, was first discerned through perceptions on the importance of innovation as a whole and as specified by the different types. In response to the question “In general, how important is innovation to your company?”, 90% of respondents answered at least “Somewhat Important” with exactly half of the participants answering “Very Important” (Figure 3).

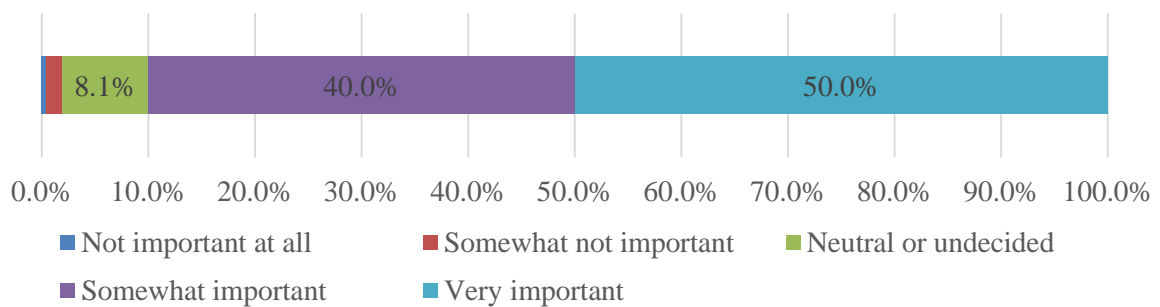


Figure 3 Proportion of responses on innovation importance

Out of the different innovation types, process innovation was deemed most important, with 91.4% of respondents answering “Somewhat Important” and “Very Important” (Figure 4). Product innovation proved to be the second most important (88.6%), and the remaining business types rated a little lower: 76.6% for paradigm innovation and 73.3% for position

innovation. Learning innovation in particular scored lowest (tied with position innovation) in “Very Important” and second highest in at least “Somewhat Not Important”, but by itself maintained an encouraging level of 81.4% in at least “Somewhat Important”.

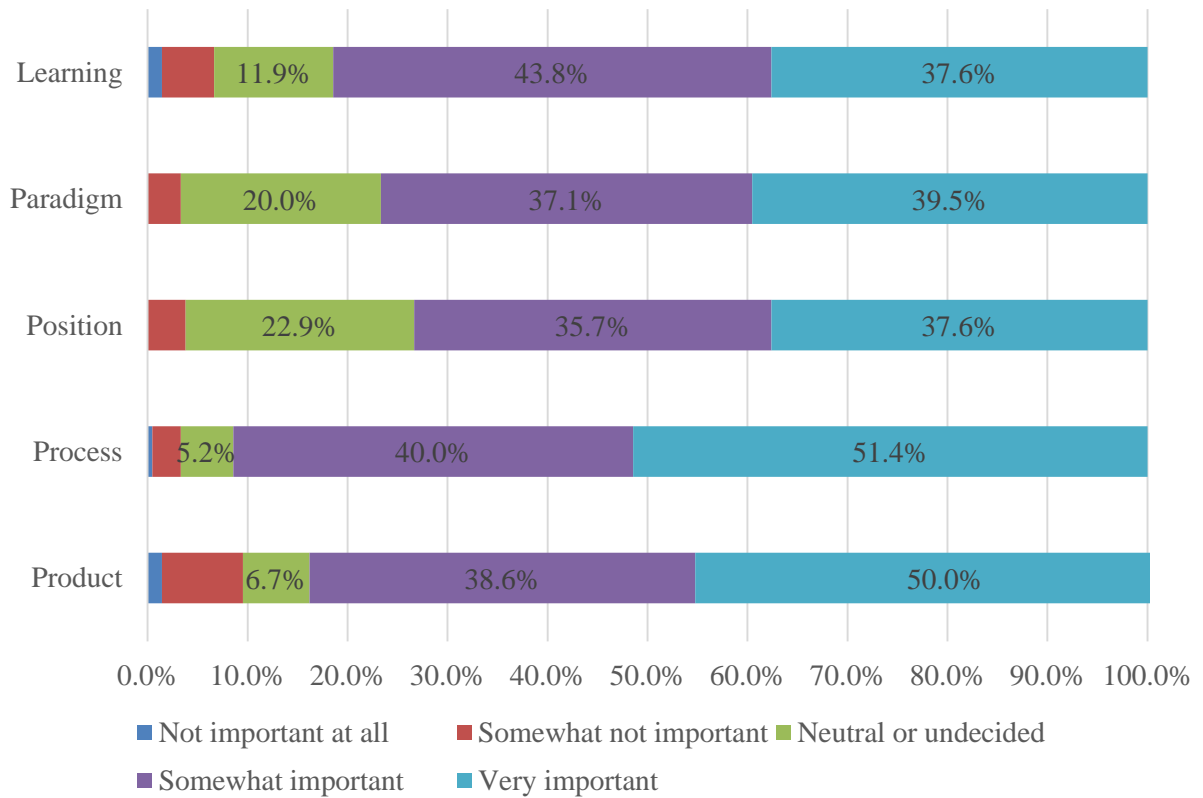


Figure 4 Proportion of responses on innovation importance, broken down by type

Similarly, to the question “How does your company feel about engaging or investing in innovation in general?”, 85.3% were at least willing to consider with 52.4% of respondents answering “My company is open and enthusiastic” (52.4%) (Figure 5).

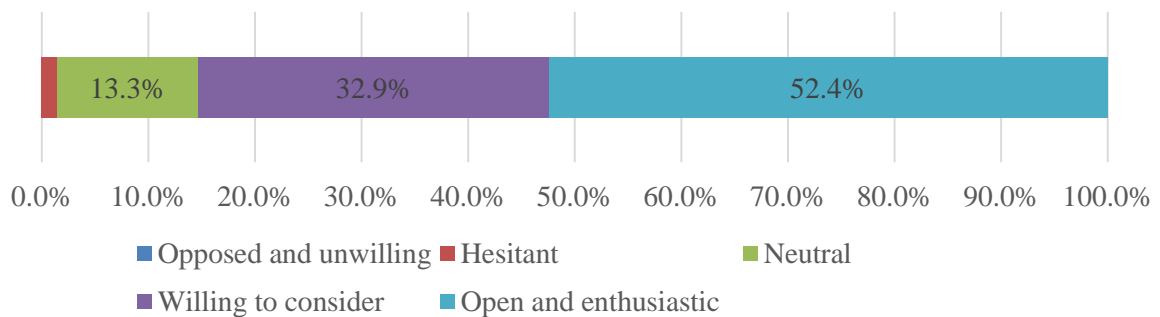


Figure 5 Proportion of responses on innovation consideration

This proportion is only slightly higher than previous business surveys which reported innovation prioritization rates of 45.1% and 44% (HSBC, 2019; Singapore Chinese Chamber of Commerce & Industry, 2019). This suggests that while COVID-19 may have led to an increase in actual digitization by enterprises, the forced push did not necessarily lead to a transformed mindset to embrace innovation, and that there is still room for improvement in the general importance of innovation as perceived by business leaders.

What, then, about the other half of the sample who did not think innovation was very important – why might they think so? Respondents suggested factors such as the low cost-benefit or return of investment of innovation, as well as Singapore’s steady economy and its general mindset and culture.

“The time and resources spent to create this particular new product or this new innovation, and then reaching a small market... **the cost-benefit is not fantastic.**”

“I feel like in the overseas market where the markets are bigger [...] you are forced to innovate, because there’s so many more companies. But **in Singapore [...] the market is quite sheltered.** So is like you are quite protected. And the mindset of Singaporeans are also like quite cushy.”

“It’s probably all down to education [...] **everybody run through the same system.** [...] The way they are taught or guided how to learn, acquire new skills.”

3.3 Innovation appetite

While half of business owners may rate innovation as “Very Important” and consider themselves “open and enthusiastic” to the matter, the issue of risk played a big role in moderating that zealotry. About the same proportion of respondents answered that their company was only “Somewhat willing to accept risk” (48.1%) in general (Figure 6), which certainly feeds into innovation and learning innovation appetite, where most companies were “Willing to adopt small to medium-scale innovation” (45.2%) and “Willing to adopt small to medium-scale learning innovation” (41.4%) (see Figure 7). Less than 5% of enterprises were willing to adopt large-scale innovation or learning innovation.

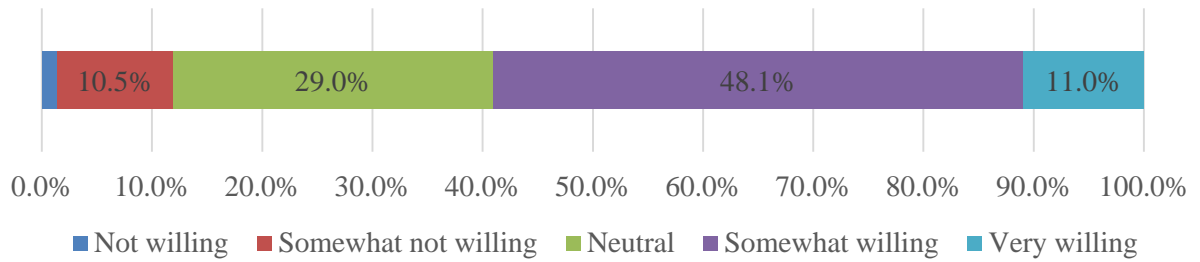


Figure 6 Proportion of responses on risk appetite

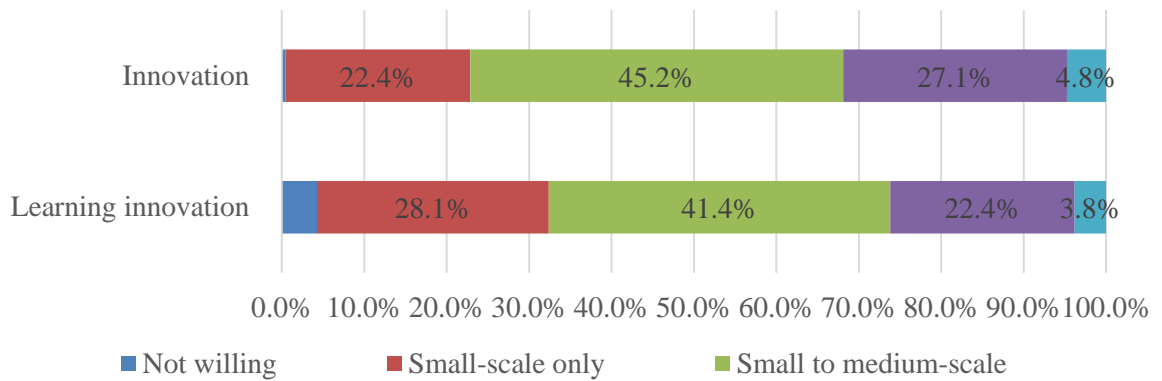


Figure 7 Proportion of responses on innovation and learning innovation appetite

Table 2 below puts a score to the level of innovation appetite in comparison with innovation importance (as part of persuasion), risk appetite, and learning innovation appetite. While innovation importance is high, the averages drop when appetite is concerned.

Table 2 Descriptive statistics of innovation importance, risk appetite, innovation appetite, and learning innovation appetite

Item	N	Mean	SD
Innovation importance	210	4.38	.736
Risk appetite	210	3.57	.874
Innovation appetite	210	3.13	.831
Learning innovation appetite	210	2.93	.910

The variables are also significantly positively correlated, suggesting that the relationship between these variables were similarly experienced by the respondents (Table 3).

Table 3 Correlation matrix between importance, risk appetite, innovation appetite, and learning innovation appetite

	Importance	Risk appetite	Innovation appetite	Learning innovation appetite
Importance	1	.463**	.4504**	.359**
Risk appetite	.463**	1	.548**	.409**
Innovation appetite	.504**	.548**	1	.638**
Learning innovation appetite	.359**	.409**	.638**	1

** . Correlation is significant at the 0.01 level (1-tailed).

These numbers allow a peek into the average Singaporean’s mindset when it comes to innovation: half of companies may be open and enthusiastic about innovation and think that it is very important, but even within this half, the scale of implementation is restrained by appetite and limited to only small or medium-scale innovation that tend to be ‘safer’ investments. This is not to downplay the importance of small-scale innovations or imply that they are irrelevant or less impactful – in fact, some studies have even suggested that small gains in efficiency, taken cumulatively, can be more impactful than improvements that come from radical changes (Tidd et al., 1998). Rather, it hints at a cautious and risk-averse outlook on innovation in general, in which medium-scale innovations would not even be a point of consideration for majority of the respondents.

What then affects innovation appetite? Once a company understands the importance of innovation, what are the factors that play into how much or aggressively (the extent and the scale) a company is willing to invest in it? Literature and surveys (reviewed above) suggested that constraints would include low resource availability as well as a risk-averse culture brought on by fear of failure, and interviewees shared similar thoughts. Responses included factors of cost, prioritization of survival, lack of demand from customers and

stakeholders, lack of possibilities for integration in high-touch industries, lack of knowledge, and a fear of failure.

“**High cost.** High cost for sure. It hits the profit margin for the first few years definitely.”

“**Survival is the top most priority,** so not enough attention is being paid to upskilling and learning and innovation.”

“Customers who are not tech-savvy such as mine, some of them **might not see the objective** or they might not see the reason or the justification to implement this.”

“We are not like banking and perhaps manufacturing where they use a lot of robotics and software, all those. [...] For us, **we require a lot of manpower, physical.**”

“**They don’t know how to change.** [...] When there’s options, some business leaders tend to get confused.”

“The biggest hindrance unfortunately is, I would say, the culture. [...] **The general fear of failure,** unfortunately.”

“In our environment here [...] that **failure is about losing face,** it’s very embarrassing, it can be quite disgraceful.”

On the other hand, it is also of interest to understand the motivations behind why some business leaders choose to innovate, or the enablers behind their innovation appetite. Which factors convince business leaders to take the risk and invest in the new or unknown? Respondents cited factors such as customer satisfaction, desire to expand, increase in productivity, their own personal character, need to keep up with trends, necessity of innovation, and a sense of fulfilment and recognition.

“Reaching my learners and giving them **a positive experience.**”

“We also at the same time looking for overseas expansion. So only through innovation and like developing processes then we are able to have the **enough tools to go overseas.**”

“It’s worthwhile consideration if it helps to **reduce time of my people.** So that end of the day if everybody gets to spend less time on work and more time doing other things, then that creates a work life balance.”

“Maybe it’s my **personal character.** [...] I prefer to do things on my own. I prefer to do things that’s out of blue.”

“Singaporeans are an incredibly jealous bunch. [...] (Gives example of noticing innovation by Japanese, Thai, Korean companies) So in terms of innovation, a lot of it is coming from **external factors and external experiences.**”

“For me, it is **the only way to survive.** [...] To us, innovation must happen.”

“I think for innovation, personally [...] to get the **sense of fulfilment.** [...] It’s not quantifiable but at least to have it out in the market and seeing it being done and working.”

“For a small company like ours [...] having such **recognition** would be good.”

3.4 Innovation decision and implementation

Findings so far have looked at knowledge, persuasion, and appetite – what business owners think of innovation in a theoretical and abstract sense. Innovation decision and implementation then moves into tangibility. In the survey, participants were asked to indicate whether their company had engaged or invested in innovation in the last 12 months, as well as a brief description of those innovations, if any. This provided a general idea on the actual innovation rate and most commonly innovated areas in an enterprise (Figure 8).

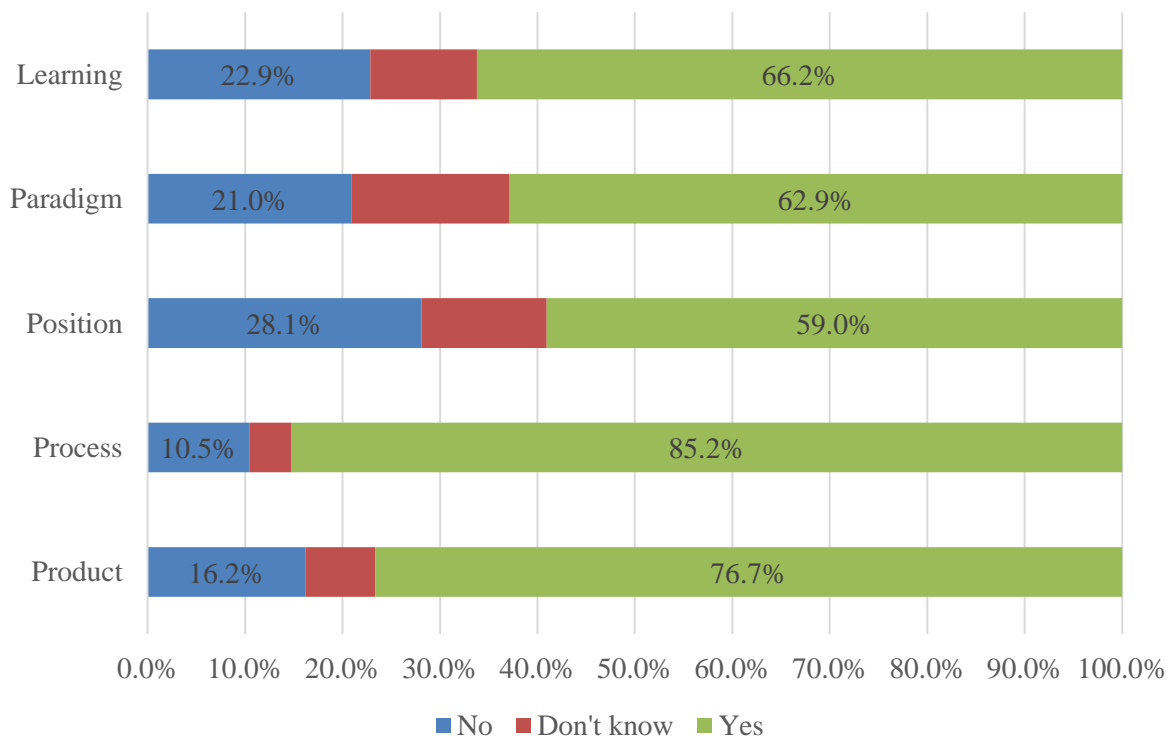


Figure 8 Proportion of responses on innovation implementation, broken down by type

The majority of the sampled enterprises executed at least one type of innovation. The most frequent type was process innovation (85.2%), where many reported general improvements or automation in business processes, production or delivery methods such as through digitization and enhancing software. This was followed by product innovation (76.7%) including changes or improvements to products, new products, and product diversification. About 66.2% of enterprises conducted some form of learning innovation. As a point of comparison, this is a substantial jump from the results of a 2018 study which found that only 48% of training providers invested in and 47% adopted blended learning (Chen et al., 2020). This may be in line with the expected effects of COVID-19, where many businesses were forced to adapt to physical limitations by moving, adding, or increasing online presence.

Interviewees were also asked about their innovation wish lists – for those who were innovating, what were some of their desires in the innovation landscape? Responses included increased government guidance, increased pilots with SMEs, and increased support for small industries.

“Rather than by business owner, it’s governed by the government. [...] Singapore is like a big company [...] They have guideline and the rule and the regulation, then the staff and the management will follow. Similarly **if the government give a clear guideline**, and give the good incentive to the business owner to move towards innovation, then definitely, the business will follow; then staff will follow, then overall, business environment will change.”

“Perhaps the **government can be more involved in terms of recommending products.**”

“(About Productivity Solutions Grant) They are all pre-approved so-called solutions but [...] a lot of these solutions are being tested by bigger firms. So it **may not be that relevant to small companies.**”

“I think the most lacking one would be [...] government to do a lot of **pilot projects with start-ups.** [...] So although the ecosystem is there, although the funding efforts are there, but sometimes may not have enough government opportunity.”

“I think in terms of grant wise, it’s available to many companies. **It’s just not to my industry.** [...] Little focus is on my industry because of the size of the industry, I don’t blame it, but at the same time I think it’s not very fair.”

“My company [...] fall(s) into a specific **niche that is not supported by MTI or STB.**”

3.5 Innovation readiness

The survey then explored the internal capabilities within an organization, beyond conventional measures of capital and manpower count, that could bring innovation implementation to the intended outcomes. Responses provided insights into the overall level of innovation readiness as well as the scores for each pillar to identify areas of improvement (Table 4).

Table 4 Descriptive statistics of the different pillars of innovation readiness and as a whole

Pillar	Min	Max	Mean	SD
Leadership and ambition	2	5	3.72	.598
Organization and collaboration	1	5	3.11	.748
People and culture	2.20	5	3.98	.608
Implementation and measurement	1	5	3.23	.838
Overall			3.51	.546

People and culture came out as the strongest pillar, with organization and collaboration being the weakest. A deeper look into the responses corroborates this observation. From Figures 9, 10, and 11, the proportion of agreement to the statements regarding ‘understanding’, ‘well-communicated’, and ‘process’ of innovation decreases respectively.

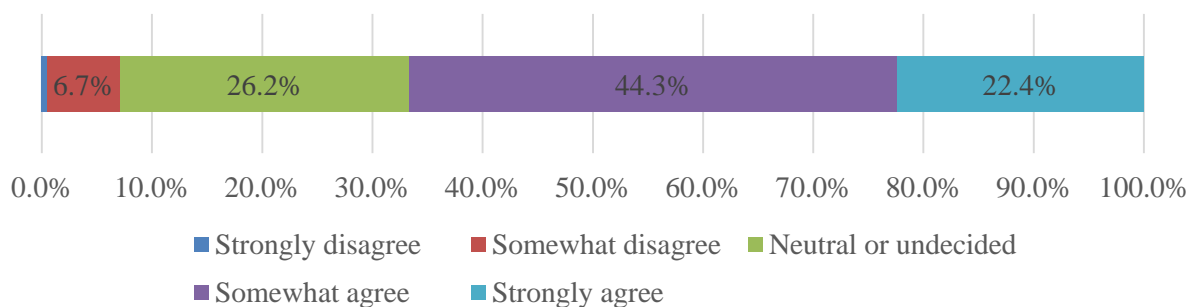


Figure 9 Proportion of responses to the statement: "All employees understand the importance of innovation as well as their roles and responsibilities in becoming more innovative."

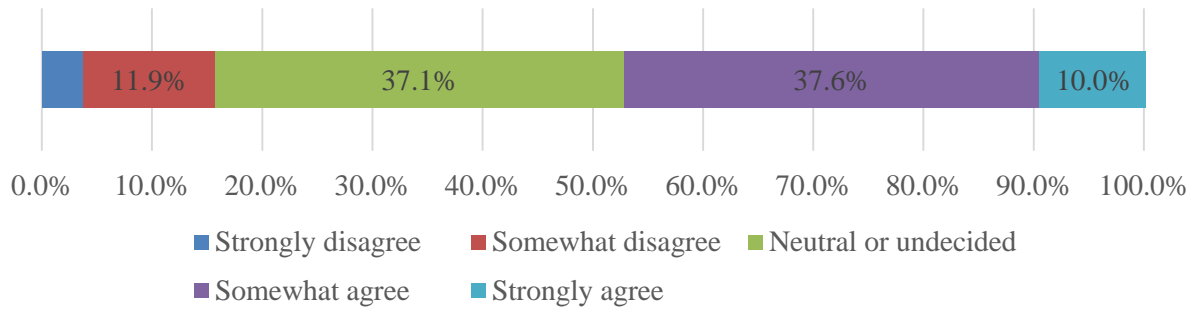


Figure 10 Proportion of responses to the statement: "My company has clear innovation strategies, objectives, and expectations that are well-communicated within the company."

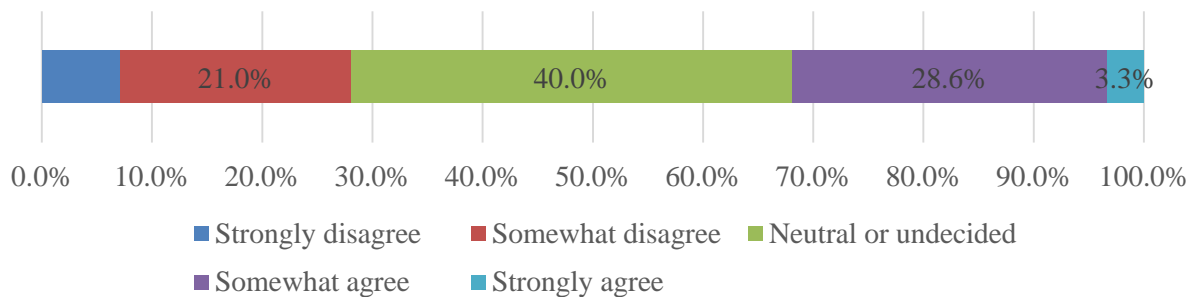


Figure 11 Proportion of responses to the statement: "My company has a well-described and functioning innovation management process."

While 66.7% of business leaders at least somewhat agreed that their employees understood the *importance* of innovation, they were less sure that those expectations were *well-communicated* (42.6%), and even less sure that the companies had a well-described and functioning innovation management *process* (31.9%). These statements together reflect the larger pillar-level finding – that while companies seem to emphasize creative problem solving, learning from failure, and the importance of innovation to their employees, these values may have only been expressed at a verbal or informal level if there also appears to be a lower level of internal organization and formalized processes for innovation set up within the enterprise.

From the leaders' perspective then, what internal capabilities have been hindering the input-output process? Almost all respondents mentioned a top-down disconnect and hesitance, inconsistency, or lack of understanding in implementation by the employees. A number alluded to situations in which the bosses or top-level management were innovative, but that the process would be "jammed" as the innovation moves to the employees.

“**To push it downwards, to the rest of the people**, it’s a challenge. [...] You spend more time trying to bridge the gap than connecting the dots.”

“The boss maybe are very outright and clear, thoughtful what they want. **But the people below them are not very clear.** They start to disconnect with what their bosses want. So then the whole implementation of innovation stuck. [...] Just find a lot of time, **it’s jamming the whole thing.** And then after a while, it doesn’t happen. Because the top is clear, the bottom is not clear, over time the whole thing will just be dragged down and being died off.”

“Sometimes I think, we are educated people, and to us, we understand [...] big picture stuff, but the proof of the pudding is always in the execution. [...] Maybe (the team) have not reached that level of maturity, they **don’t understand, cannot understand.**”

“I (had) lunch with a group of very traditional business owners. [...] They themselves are innovative and always thinking about digitisation. [...] But they also face challenge. **Their staff are not seeing it** also, as much as what they are seeing it. So yup, I would say most Singaporean owners, enterprise, know they need to innovate. But like I said, it comes down to the next few levels, it gets a bit hard to move.”

“I think that’s the main struggle with like the older companies. People with history. So when your team is older and you have staff who are like the mature age, **they find it difficult to accept changes or adapt to changes** so people will leave.”

Aside from the constraints, respondents also shared the enablers in their internal innovation journey, in terms of capabilities and organization. Suggestions included having a specific account manager to manage innovation, allowing employees to experiment with innovation, orientating all levels of staff on the importance and usefulness of automation, and performing consistent checks and measures.

“I believe any innovation journey taken by a company, it has to be led by **an account manager.** [...] Imagine if they are firefighting daily. They may not have the right mindset to start this journey without proper account manager.”

“**Sending them to the workshops,** then they hear from the expertise and people from other sectors. So they build up the knowledge. They also build up the skills.”

“At least you have open to people putting up ideas and then, maybe small budgets for, for at least **trying and experiment.**”

“So all our members, **even our lowest tier can actually be orientated** [...] what is the usefulness of automation and why we are in the journey of industry 4.0, why digitalization is required for the future.”

“**Closed loop checks** after investment.”

“**Checking and balance** to make sure that you’re not off track.”

4. Conclusion

The first few steps of the innovation decision-making process are encouraging: knowledge was at 93.8%, persuasion at 90%, and investment at 85.2%. This is a positive sign that the landscape is aware and not static despite numerous challenges to innovation. However, a significant constraint affecting the output can be attributed to a low appetite, which is currently still concentrated on small-scale to medium-scale innovations even in this new normal post-COVID-19. As previously mentioned, noting a lack of appetite is not to downplay the importance of small-scale innovations or imply that they are irrelevant or less impactful. Rather, it hints at a guarded take on innovation, and a nascence in the imagination of its potential that could be further expanded, in order to catch up with the global economy and break new barriers.

How may this be done? From the variety of different constraints and enablers uncovered, innovation can be seen as a complicated cognitive and practical web of different factors, so there is no singular initiative that can achieve the objectives – instead, a variety of approaches will be needed to move enterprises to the ideal square on the bottom-right (see Table 5 below) and push the landscape to dream big and act big. Of course, while it may be overly ambitious and even unrealistic to expect that every business and enterprise out there can or will move to large-scale innovations, the ideal square presents the best-case scenario and end goal for a radical transformation of the landscape.

Table 5 Appetite and readiness matrix

		Innovation appetite	
		Not willing to medium-scale	Medium-scale to large-scale
Innovation readiness	Strongly disagree to neutral	127 (60.5%)	43 (20.5%)
	Somewhat agree to Strongly agree	16 (7.6%)	24 (11.4%)

Additionally, although enterprises scored decently on the measures for innovation readiness, innovation readiness should not be overlooked – organization and collaboration requires greater emphasis in order to avoid innovation leakage. Enterprises and leaders who do invest in innovation should be aware that investing capital is only the first step. Bringing the innovation to fruition requires understanding and communication of the objectives among all levels of the enterprise, as well as formalized processes including consistent check-and-balances to see it through.

Overall, these findings serve to capture the state of play in the area of enterprise innovation and learning innovation perceptions and practices. They will first be used to inform the strategies of inlab, the core of the Innovation Centre at the Institute for Adult Learning, in catalyzing learning innovation in Singapore. The different initiatives of the centre such as its trademark innovSeries may serve as platforms to address the pain points within each step of the innovation decision-making process flow as discovered from the study, from a cognitive and mindset-related viewpoint as well as within the internal organization of an enterprise. Findings also suggest the need for external support towards the smaller players that together actually make up a significant portion in the larger ecosystem; for instance, as uncovered in the findings, there is a demand for more case studies, tools that have been tried-and-tested, or pilots with SMEs in a minimum risk environment.

The completion of this study paves the way for future projects in the series focused on learning innovation in Singapore. Past the peak of the COVID-19 pandemic, Singapore is at a critical point in its learning innovation journey. For one, the TAE sector has struggled through the worst of the pandemic with all its closures and social distancing measures, and is now adapting and adjusting to the new normal on the other side. For another, governmental policies targeted at raising adoption and scaling up learning innovation in the sector remain heavily emphasized in the form of funded initiatives, industry transformation maps, and industry digitalization plans. In all its complexities – the roles of technology and pedagogy in design, development, delivery, and all its varied efficacies; the initiatives, events, and efforts to encourage adoption; the different stakeholders from enterprises, stat boards, learning institutes, educational technology companies, government – there would be value in continuing to explore all the pillars and systems that make up learning innovation, in order to ensure that interventions and policies can be accurately positioned for the best learning outcomes.

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