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Centre for Work & Learning

INNOVATIVE LEARNING CULTURES IN SMES

A Cross-case Analysis

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EXECUTIVE SUMMARY

This study provides insights into the nature of innovation and learning, and the factors that shape innovation and learning in Singaporean Small Medium Enterprises (SMEs). Given the importance of developing an innovative learning culture in SMEs in the Singaporean context, and that innovative activity in small firms remains poorly understood in terms of its learning requirements, this study seeks to examine how organisational factors such as firm size, business model, management or leadership style and technology, as well as structure and flow of the work, constitute an innovative learning culture, and/or a "learning architecture" that comprises "the organizational mechanism(s), artifacts, and human assets that the organization has constructed over time and which contribute to the type and level of learning within the organisation" (Bishop, 2012, p. 516).

This study also addresses the incorrect perception that SMEs are somehow or somewhat "deficient", and/or that SME workers "lack" the ability or willingness to innovate and learn. We hope to provide a more contextualised and better understanding of SMEs through the stories of those participating in this study and their issues, challenges and particular practices. The focus on innovation and an innovative learning culture draws attention to both the strengths and challenges of SMEs.

Using a qualitative research method, the study investigates innovation and learning in seven SMEs in Singapore. It draws on data consisting of semi-structured interviews with employers, middle management and workers in the participating organisations; work shadowing with workers; document analysis; and discussions with various industry bodies and government agencies.

In this report, we develop a framework for an innovative learning culture. This helps to facilitate an understanding of how learning and innovations are initiated, and to identify the opportunities and support for learning and innovation in the seven organisations straddling the healthcare and advanced manufacturing sectors. We identify and analyse the various factors of an innovative learning culture which include:

- Conversations about workers' engagement and participation;
- Understanding the interconnections between the processes and activities of innovation and learning, and what organisations can do to support or enable their staff to innovate and learn; and
- A holistic and integrated approach to enable an innovative learning culture.

1. INNOVATIVE LEARNING CULTURES IN SMES: THE STUDY

1.1 Framing the project: putting workers back into the innovation story

In light of the strong government focus on innovation and learning, this study examines how Singaporean Small Medium Enterprises (SMEs) can create learning opportunities for innovation, and the kinds of organisational processes, conditions and cultures that enable innovation and learning to flourish. This study also seeks to inform stakeholders, particularly employers, managers, and business leaders, on how innovation and learning can be better supported within an enterprise.

Singapore has approximately 215,600 local SMEs which account for 99% of its business establishments, employ 70% of its workforce, and generate almost half its GDP (SPRING Singapore, 2015). SMEs thus play an important role in creating jobs and producing economic growth.

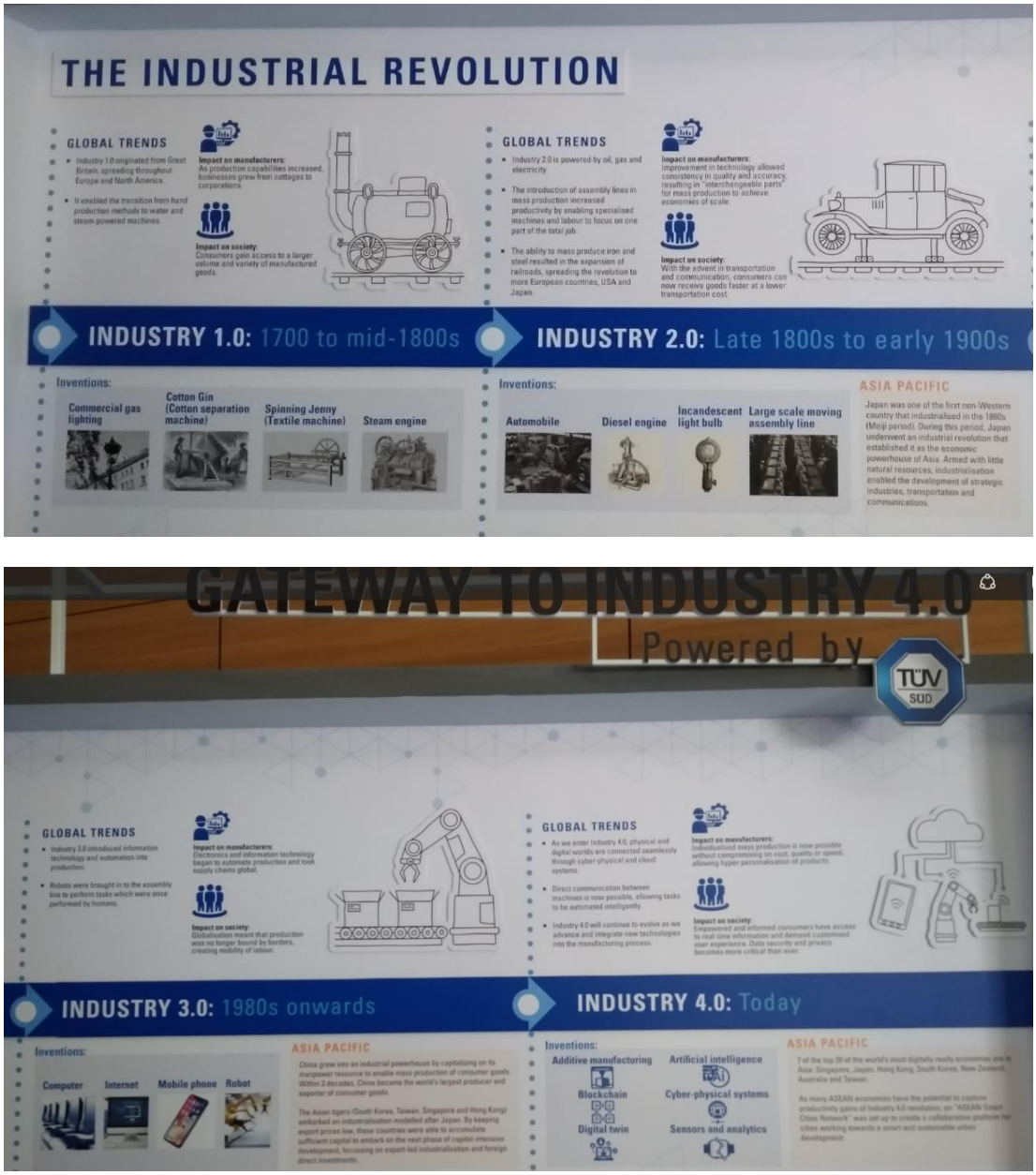
Operating in an era of economic and technological change, Singaporean SMEs continue to face deep challenges as a result of tight labour markets, rising costs of operation, and business uncertainties (DP SME Survey, 2009-2017). In order to "survive", SMEs are encouraged to innovate by collaborating with partners, including SIMTech, SPRING, polytechnics and universities, to transform their businesses, tap into public resources, and expand overseas. Former Manpower Minister, Mr Lim Swee Say, stated that Singapore will have to make "better and faster use of innovation to stay ahead of the competition" (Today, 2017). Innovation here typically refers to digitalisation and automation processes that create a competitive advantage by enhancing and/or exploiting connectivity, mobility and novelty.

> "It's not just about faster or cheaper, it's about being able to do things that were previously not doable." (Prof. Chua Chee Kai, Head, Centre for 3DPrinting, NTU. "Disruption: What lies ahead", 2016, pg. 41).

In these narratives and exhortations, innovation is manifested through a trajectory of experimentation, discovery and implementation. The stories of ingenuity, grit, perseverance, chance, etc., which tend to elevate charismatic technopreneurs and imaginative scientists into heroes who solve the world's perplexing problems, may perhaps overstate individual efforts and talents, and overlook organisational and societal factors and labour market dynamics.

Historians of science and technology have pointed out that the application of technologies directed by engineers, entrepreneurs and scientists who are informed by calculations of productivity and profitability, tend to downplay the social, economic and political implications of their decisions. Yuvaal Harari (2018) suggests that AI, robots and algorithms have replaced and/or displaced the worker from the centre of stories of economic success, and even social and political revolutions. In these stories or narratives, humans and communities have become marginal or irrelevant to the prowess and prominence of technology. Public exhibitions about innovation (Fig. 1) have emphasised inventions and production processes as “drivers” of the industrial “revolution”, leaving workers, humans and societies out of the bigger picture.

Fig. 1: Standees at Lifelong Learning Institute (16 Jan 2019 – March 2019)



On the other hand, former civil servant Adrian Kuah (currently Director, Futures Office, NUS) made the observation on his Facebook page (dated 13-Jan-2019) that government and public discourses of innovation have "so far zeroed in on second-order issues such as the drive towards a cashless society and smart lamp-posts with a fixation on devices, hardware, apps etc., in which "know-how" is king and the trade-off is that first-order "why" questions have not been asked". Kuah implies that technocratic public agencies and/or institutions, concerned primarily with efficiency, effectiveness and usefulness of certain technologies, usually do not critically question or reflect on the purposes and public good as far as what or who these innovative technologies really serve.

The impacts of digital innovation on employment, jobs and occupation, driven by technological and other interrelated infrastructural and industrial developments, are the subject of much debate and contestation. Past trends are not a good indicator of what is to come in terms of job creation, changes in the nature of work, and employment conditions (Brown, 2019). Innovation, which is situated in these debates, narratives and discourses, presents a new and different struggle for workers in general:

> "Perhaps in the twenty-first century, populist revolts will be staged not against an economic elite that exploits people, but against an economic elite that *does not need them* anymore. This may well be a losing battle. It is much harder to struggle against *irrelevance* than against exploitation." (Harari, 2018, p. 9).

In this study, we put workers (back) in the story of innovation. Stephen Billett (2018), a scholar of workplace learning and advisor to this study, suggests that much innovation at work also arises through workers' everyday activities and interactions in response to occupational tasks and challenges. This both necessitates and promotes learning. Billett argues that innovation and learning "co-occur" at work, and that for this co-occurrence to be effective there needs to be processes to support and align with the workplace goals. These processes are centred in work practices and settings such as organisational cultures, professional standards and industry requirements. Against the backdrop of issues discussed above, the study asks the following (research) questions:

1. How do SMEs develop innovative learning cultures?
2. What are the factors of an innovative learning culture?
3. What are the implications of the findings (from Qn. 1 and Qn. 2) for government and industry level efforts to support innovation and learning in SMEs?

These questions are addressed through seven case studies from within the advanced manufacturing and healthcare sectors (see Annex. A for sampling frame). The Training Partners Group of SkillsFuture Singapore has identified the advanced manufacturing and healthcare sectors to be of particular interest for the following reasons:

1. The sectors fall within the Industry Transformation Map, which has been developed for 23 industries under six clusters to help organisations drive innovation and productivity in a rapidly-changing economic climate;
2. The sectors have high value-add or potential high value-add to Singapore in terms of their contribution to national GDP and value-add per worker;
3. The sectors provide the potential for innovation and learning as a result of technological development and/or disruption through automation, the use of adaptive or assistive technologies (that help workers accomplish or perform specific tasks), and/or the development of new businesses in technological green fields such as additive manufacturing.

This study draws on interviews with employers, middle management and workers in the participating organisations (see Annex. B for profiles of participating organisations); observations of the work in participating organisations; and consultations with industry bodies, government agencies and institutions of higher learning. The data from this study consists of more than fifty interviews with employees and employers, more than twenty work observations, and forty consultations with industry experts and inputs from our academic advisor.

To address the three research questions, the report does the following:

1. Provides a brief overview of the shifting discourses of innovation in modern Singapore's economic history, in section 1.2 of Chapter 1.
2. Develops a framework to conceptualise the relationship between innovation, learning and organisation or work culture in Chapter 2, and designs a robust research methodology in Chapter 3.
3. Describes the processes and mechanisms of an innovative learning culture in Chapter 4.
4. Identifies and analyses the factors of an innovative learning culture in Chapter 5.

1.2 Discourses of innovation: the co-productionist and co-occurrence perspectives

Innovation as an economic strategy

Prior to Singapore's first post-independence recession in 1985, the economy worked towards ensuring and enhancing productivity to support industrialisation and economic growth (Woon & Loo, 2018). It was not until ten years later, in 1995, that innovation became the focus of attention for the Singapore Productivity and Standards Board (PSB). At the 1995/6 Productivity Campaign Launch, then Deputy Prime Minister (DPM) Lee Hsien Loong reasoned that it was no longer sufficient to match the world's best standards. "To keep abreast of others," he posited, "we need to couple quality with innovation" (as cited in Woon and Loo, 2018, p. 224). His sentiments were echoed in the then National Productivity Board's (NPB) publication, *Singapore's Productivity Movement: 1995-2000, Innovation & Quality*, asserting innovation as "a commitment to change and the need to challenge frontiers and seek breakthrough ideas rather than incremental changes" (ibid.).

At the 1997 National Day Rally, then Prime Minister (PM) Goh Chok Tong (1997) addressed a key "problem" among government ministries and agencies, referring to an Economic Development Board (EDB) officer who identified the structure as antithetical to the "Learning Nation" which Singapore aspired to become. Following the 1999 National Day Rally (Goh, 1999), in which PM Goh touched on innovation as a strategy to "[build] a first-world economy," the government and its agencies began to seriously prioritise innovation. In January 2000, the EDB Society presented a talk to 13 other organisations, including the Ministry of Trade and Industry (MTI), the Ministry of Manpower (MOM), EDB and PSB, entitled "Competing for the Future – Innovation as Revolution" (EDB Society, 2000). Notably, PM Goh's National Day Rally speech (2000) that year underscored the manifold nature of innovation:

> "Innovation does not only mean making new scientific discoveries or new inventions. It is also about insights into how to use other people's discoveries, knowledge and inventions to produce new wealth, or how to do things in a radically different but better way. Some innovations ride on technology, many others do not."

Innovation as a culture change

During 2001, government agencies organised training programmes and seminars related to innovation for public civil servants (Woon & Loo, 2018). In August of the same year, Goh (2001), at the National Day Rally, underscored the importance of "foster[ing] a culture of innovation". He furthered:

> "Innovation and imagination give an economy or a company that extra edge. Today, wealth is generated by new ideas, more than by improving the ideas of others. … The innovative spirit must permeate our whole society. The question is how to create an *environment* that encourages many of us to become innovators. … By innovators, I mean a people whose minds are always looking for new ideas and new ways of doing things, not simply copying what others have invented. For this, we need non-conformist thinking."

Research & Development as a key driver of innovation

The spirited and rallying call for innovation translated into the development of a strong local research and development (R&D) movement and community (ibid.; Low et al., 2016; Lim, 2016). Prime Minister (PM) Lee Hsien Loong's 2005 and 2010 National Day Rally speeches - the only two other rally speeches from 1997 to 2017 that addressed innovation - conveyed the necessity of R&D for innovation. Since 1995 the government has been investing exponentially in R&D, as shown in the table below:

Table 1: National Research Foundation plans, 1995-2020

Plan	National Technology Plan 1995	National Science & Technology Plan 2000	Science & Technology 2005 Plan	Science & Technology 2010 Plan	Research, Innovation and Enterprise 2015 Plan	Research, Innovation and Enterprise 2020 Plan
Budget	$2 billion	$4 billion	$6 billion	$13.5 billion	$16 billion	$19 billion

Source: Research Innovation Enterprise 2020 Plan (NRF, 2016)

Innovation as a model of economic growth and productivity

In his 1997 National Day Rally speech, PM Lee highlighted two organisations which were deemed to be innovative: Samsung and Phillips. PM Lee's conclusion was that "we have to adopt a strategy like [them]." Likewise, Patel and Chakarian's (2008) study of Singaporean organisations presents similar notions about innovation. According to their study, the Chief Executive Officers of the studied organisations sought after "business models and policies achieved elsewhere" rather than setting goals based on their own organisations' desired outcomes and/or ambitions (p. 15).

A study of the Singapore Budget speeches from the six years from 2013 to 2018 reveals the government's keen focus on innovation. However, it was not until 2015 that innovation took precedence when discussing economic productivity and growth, and not until 2016 that it became a key subject of the annual Budgets

(Ministry of Finance, 2013-2018). In these speeches (Ministry of Finance, 2016-2018), organisational "transformation" through innovation was not limited to new products (goods and/or services) and technology, but extended to include "new processes, or new business or organisation models".

Three key government agencies have been tasked with innovation. They are the National Research Foundation (NRF), EDB and SPRING Singapore. Set up in 2006 as a department within the Prime Minister's Office, NRF sets the direction for R&D by developing policies, plans and strategies for research, innovation and enterprise, funds strategic initiatives and builds R&D capabilities by nurturing research talents[1]. The industries targeted by NRF include advanced manufacturing and engineering, health and biomedical sciences, and urban sustainability[2]. In EDB's envisioning of Singapore as an "innovation hub" in which multi-national companies could base such operations as R&D and advanced manufacturing, innovation is deemed to be place- or site-specific. Marketed as "an ideal place to grow innovation", these companies are encouraged to take advantage of Singapore's facilities, infrastructure, talents, universities and industry leaders, and a business environment that supports firms to start up, experiment and trial new businesses, products and ideas for the region and beyond[3].

In order to help SMEs grow their businesses, develop capabilities and adapt to changing business conditions, SPRING Singapore offers several programmes, as well as funding and assistance schemes, to enhance business operations, finance the purchase of equipment, develop new systems and train staff. Here, innovation is about the government's "commitment to supporting (local) businesses for long-term growth"[4].

From a historical "co-productionist perspective" (Pfotenhauer & Jasanoff, 2017, p. 786), we can see that innovation has multi-faceted economic, social and political implications. In conjunction with this perspective, the study takes a "co-occurrence perspective" (Billett, 2018) of innovation to gain a more granular view of workers' everyday activities and interactions in response to occupational tasks and challenges, and the organisational processes and conditions that enable workers to adapt and make changes to their work, which exemplify the co-occurrence between work culture, learning and innovation.

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1 NRF. "Corporate Profile": https://www.nrf.gov.sg/about-nrf/national-research-foundation-singapore/corporate-profile

2 NRF. (2016). "Research Innovation Enterprise 2020 Plan: Winning through Science and Technology"

3 EDB. "Innovation in Singapore": https://www.edb.gov.sg/en/our-industries/industries-and-key-activities/innovation.html

4 SPRING Singapore. (2016). "Moving SMEs up the productivity and innovation ladder for growth" in Business Times: https://www.businesstimes.com.sg/hub/singapore-1000/moving-smes-up-the-productivity-and-innovation-ladder-for-growth

The co-occurrence perspective also approaches innovation in processual, incremental and continuous terms. It explores more deeply and moves beyond facilities, infrastructure, talents, universities, industry leaders and business environments to understand some of the interrelationships between these phenomena. It means that we ask questions about how and why innovations emerge and develop over time, and we view the process of innovation as a whole indivisible movement that is inherent in everyday work practices which contribute to social and economic outcomes.

The co-productionist and co-occurrence perspectives challenge the dominant 21st century discourse of innovation as being driven by technology - a "panacea" that cures socio-economic and organisational ills (Pfotenhauer & Jasanoff, 2017). These two perspectives allow us to see how innovation can be realised through and be comprised of learning, when enabled by the continuous engagement and participation of workers that strengthen the social fabric of the workplace. Innovation is as much about bold visions, novelty, and breakthrough ideas and products as it is about workers generating workarounds to make things work, stretching resources when they do not have the required resources, and making (incremental) changes to their work and transforming their work practices.

The co-productionist and co-occurrence perspectives also extend the parameters and variables of innovation, and expand the Singapore conversation about innovation *beyond* technological determinism and idealism, by situating innovation within its national socio-economic and organisational contexts. By focusing on the socio-personal and organisational dynamics of innovation, the co-occurrence perspective challenges second-order thinking which is merely concerned with "fitting" workers into a technologically-driven economic plan.

2. A FRAMEWORK FOR AN INNOVATIVE LEARNING CULTURE

2.1 Re-defining “innovation” in terms of learning and work

The OECD adopts a firm level perspective of innovation that focuses on the development of products and processes as well as organisational structures that promote the sharing and use of knowledge within the firm and with other organisations. Thus, innovation is defined as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD, 2005, p. 46). For the purposes of tracking, measuring, collecting and interpreting data on innovation activities and their economic impact, innovation has been categorised by OECD in terms of “product, process, marketing method or organisational method that must be new (or significantly improved) to the firm. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations.” (OECD, 2005, p. 46).

In this project, we explore more deeply and provide insights into the OECD definition by examining the ways in which SME organisations and workers innovate. This includes the everyday improvisations and problem-solving of workers in the workplace, and the ways in which they make incremental changes to their work (Hoyrup et al., 2012; Fagerberg et al., 2006; Billett, 2012) that improve the quality of work and performance, and contribute to the company’s production processes and products/services. Therefore, we expand the notion of innovation to cover the following:

1. The generation and implementation of new processes, products or ideas in the organisation;
2. The remaking of everyday work practices, job enactment and social processes in the organisation;
3. The everyday work-related thinking and acting leading to the remaking of practices, and the tendency to think about new and better ways of doing things and to try them out in practice in the organisation; and

4. The environment or conditions that encourage and promote innovation and learning.

From an organisational perspective, innovation can also be categorised as either “top-down” or management-led innovation, or as “bottom-up” or employee-driven innovation, as shown in Table 2. In this table, we highlight the types of activities typically associated with top-down and/or bottom-up innovations, the various characteristics of such innovations and the processes that generate them, as well as the different opportunities that are created or presented for learning.

Table 2: Typology of innovation and opportunities for learning

Types of innovation activities	**Direction of innovation**	**Characteristics of innovation**	**Processes that generate innovation**	**Opportunities for learning**
New products, services & processes	Top-down	Creativity & novelty	Ideate; create, develop & build	Feedback from customers; lessons from failures
Improvisation to existing products, services & processes	Top-down	Increase in quality of the product or service; gains in work productivity &/or efficiency	Reduce &/or optimise; amend or remove rules & guidelines (change structure)	Review of system; changes to work processes & staff perspectives
Solves problems; inventive solutions that emerge in practice	Top-down & Bottom-up	Convergence: reaching set goals; making decisions; limiting possibilities; controlling results	Coordinate; organise & enforce (create structure)	Everyday work problems & obstacles
Challenges status quo	Bottom-up	Asking “why” questions	Probe; question & evaluate (question structure)	Tensions & conflicts

Alternative ways of doing things & of thinking	Bottom-up	Divergence: exploring; finding out; discovering new possibilities	Experiment, search	Ambiguities

As shown in Table 2, we suggest that innovation is far more than “de novo”, i.e., the absolutely new and/or technology-based (Billett, 2018). As much as it is about adaptation and improvisation, solving problems, workarounds, and/or incremental changes required to make things work, innovation is also about workers asking questions which probe and challenge the status quo, and finding new or different ways of doing things that foster exploration, experimentation and discovery. All these activities and possibilities suggest that innovation is a result of “both deliberate and unforeseen or improvised processes according to a ‘fuzzy’ logic, following numerous routes, generating a multitude of ideas and establishing numerous connections-in-action during a constantly changing process.” (Gherardi, 2012, p. 228). They are only *visible* from a co-occurrence perspective, which examines the activities of innovation and processes that create the environment, conditions and systems for the interaction, relationship and habitus of both planned and unplanned improvising, the generation of ideas, and the creation of new connections.

Innovations create opportunities for learning (see Table 2), as does their adaptation to practice, and are therefore a socio-personal process (Billett, 2012). This means that innovations are shaped by the interplay between the individual and collective over time, leading to practices that are enduring and applicable from one context to another, but that also adapt according to contexts and evolve over time. Innovations are not fixed or permanent, but rather malleable under different and unexpected situations or over a long period of time.

Innovations as a form of change occur as a result of workers’ learning as well as their adaptations, which create new or refined work routines, practices and culture. Many learning concepts are analogous to this expanded notion of innovation and include: learning something new; non-routine problem-solving or advancing a novel response to a complex problem; the application of skills and knowledge from one context to another or to a novel situation; and adaptability, i.e., being able to adapt what one knows and can do in new circumstances and/or application (Billett, 2018).

Innovation as a continuous process of refining and making improvements to work can only be realised through learning practices that involve workers, their work and their performance, and those who enable and support them. Learning creates the “intellectual, passionate, ethical and aesthetic attachment” (Gherardi, 2012, p. 225) that binds workers to their work, the workplace and their colleagues. Thus, the learning that is implicitly required in the innovation process considers factors such as participation in work, spaces like “community of practice” (Lave & Wenger, 1991),

and activities like building communities (Block, 2008) when “radical innovations require new communities”, which call for new organisational forms and tools like dialogues, stories and tangible mechanisms (Gherardi, 2012, pp. 220-225). These tools ameliorate tensions, conflicting interests and interactions, and encourage the continuous process of refining and making improvements (to work) as well as assimilating new ideas and processes into the organisation that lead not only to organisational stability built upon shared understanding and alignment (of interests, goals, etc.), but also to diversity premised on ambiguity, openness and spontaneity[5].

Innovations as opportunities for learning, as a result or outcome of workers’ learning and adaptation, and as a process of refining and improving work, require not only managerial support and organisational resources, but more importantly a framework that maps out the processes and conditions for innovations and their connections with learning and work. This would allow for the value and meaning of innovations which occur in the contexts and circumstances of work and workplaces to be unpacked and analysed.

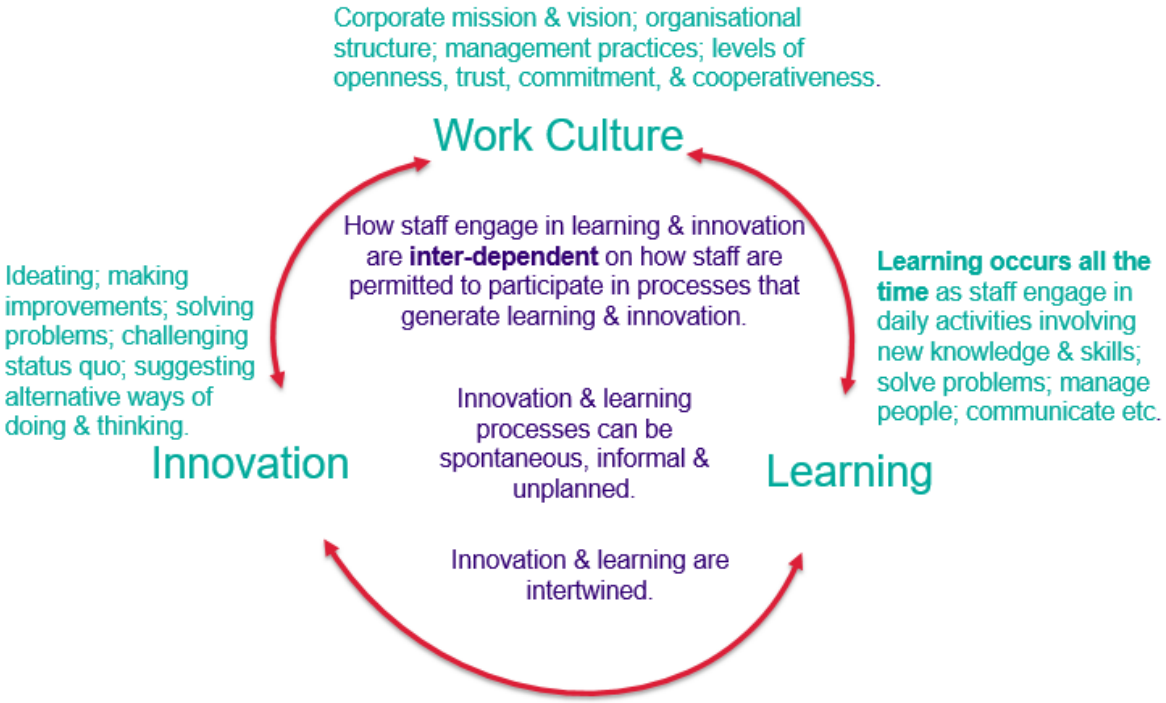
In the following section 2.1, we develop a framework that showcases the interconnections between innovation, learning and work. It provides a socio-cultural framing which supports concepts, such as workplace affordances and job crafting, that provide an understanding of workers’ actions and the relationship between workers and workplaces. These concepts may emphasise certain factors as enabling innovation and learning, such as the “agentic dimension” (Fuller & Unwin, 2017, p. 308) of workers, and/or workplace conditions which highlight work flow, tasks, job design, etc., as objects of study and targets of work improvement or transformation. The framework demonstrates how some of these factors and concepts are interconnected, and draws attention to the opportunities for innovation and learning in everyday work activities and circumstances, and the participation of workers.

2.2 A framework: innovation, learning and work culture

By exploring the interconnections between innovation, learning and work culture, we can then make suggestions as to how organisations could be better organised and could provide better support for innovation and learning. Fig. 2 illustrates the relationships between innovation, learning and work culture.

[5] Other scholars like Price et al. (2012) see this as a paradox “of continuing to enact practices while also choosing to change those enactments” (Price et al., 2012, p. 234). They show that work practices reproduce the organisational purposes, cultural values and predictable outcomes but “through emergent and interactional understandings, these practices are also enacted in variable and sometimes unanticipated ways” (ibid) which produce innovations which are same-same but different.

Fig. 2: Interconnections between innovation, learning and work culture



In Fig. 2, we suggest that the way in which staff engages in innovation depends on how they are encouraged and enabled to make changes to their work, to experiment, and to ask questions. Innovation is enabled and reinforced by learning. Learning is also dependent on innovation in terms of the affordances to generate ideas, the opportunities for improvement, encouragement to question or challenge the status quo, and the permission to try, fail, and try again.

Those opportunities, affordances, and conditions for learning and innovation are situated in and shaped by work culture, i.e., corporate mission, organisational structure, management practices, etc. As indicated in the previous chapter, we take an approach as informed by scholars and researchers of learning who see learning and innovation as closely intertwined. What this means is that learning and innovation share the same characteristics, for example, of creativity, solving problems and asking questions; and learning is a response to innovation and also an enabler of innovation, hence both mutually affect each other and are preconditions for the other. We view innovation and learning as organisational and interpersonal processes, i.e., socio-personal processes which may be spontaneous, informal and unplanned.

Work is inherently pedagogical because it is organised and enacted as a sustained practice (Billett, 2001); therefore, work provides strong learning dimensions. In this way, learning through work can be conceptualised broadly as “the product of participation in social practice through engagement in the activities

and access to support and guidance" (Billett, 2001, p. 2). However, what constitutes learning continues to be contested amongst theories of workplace learning. From an organisational perspective, what counts or matters as learning includes contribution to competitive advantage, knowledge and workers' competency (Price et al., 2012, p. 238). All these factors are embodied and evidenced in the worker's ability to innovate, i.e., to make changes to their work, to do things differently, and to find new ways to do their work and to solve problems. Learning and innovation arise when workers are able to examine and question others about what they do, as well as how and why they do it. It is by interacting with others (both human and non-human agents), that feedback is generated in order for workers to be able to enact changes and/or reinforce the status quo. Within each enactment, workers are also constantly applying their skills, knowledge and experiences, or re-contextualising and reforming their practices and knowledge, which shapes their understanding about what they do, and how and why they do it. As such, it is culture, or the conditions of work, which provides the opportunities and affordances for workers to *participate* through interaction, ask questions, and make decisions about their work that have a direct impact on innovation and learning. Furthermore, it is the responsibility of managers, supervisors and trainers to solicit workers' understanding, scaffold their learning, and help to integrate them into the work culture.

Yet culture – as understood by sociologists and anthropologists, is more than just the engineered conditions created and sustained by an organisation or a set of attitudes embodied by workers. Culture is emergent and indeterminate as "an indissoluble dialectic of system and practice, (and) as both the product and context of social action" (Silbey, 2009, p. 341). This understanding of culture, rather than the simplistic view (of culture) as "a commonly shared, stable set of practices in which all members of an organization learn from…in the performance of organizational tasks and the achievement of production goals" (ibid., p. 343), directs our attention to the *changing* industry contexts, *dynamic* structural relationships, *evolving* practices of work and learning, and their *interconnections* that are essential to innovation. The impacts of learning and innovation on organisational and work culture are affective and consequential, especially for the long term, as they reform or change pre-existing organisational structures and practices.

This dialectic understanding of culture is reflected in the framework presented in Fig. 2, which illustrates how "cultures in organisations are intricate, self-referential, socially constructed and difficult to manage" (Bishop et al., 2006, p. 12). It builds upon the idea that culture, while distinct from organisational structure, processes and strategies, is in a complex and mutually constitutive relationship with organisational development. The framework highlights the relationship between (work) culture, learning and innovation.

2.3 Conclusion

Work culture is expressed in various ways, and it is created, challenged and transformed but also embodied by individuals, work practices, and the structure of the organisation. This embodiment of culture means individual ontologies (i.e., personal values and beliefs, practices, goals, etc.), shape and are shaped by a complex web of meanings, interactions and social relationships. The nature and extent of connections between learning, innovation and culture are influenced by *workplace affordances*: the possibilities for action, shaped by the rules and imperatives imposed, and the roles, structures, activities, interactions, language, and degrees of support, or otherwise, in the organisation. That is, anything that affects the degree to which individuals participate and engage in learning and innovation.

What this means is that innovation and learning cannot rely solely on programmes and initiatives that invoke knowledge production and skills development which have been frequently operationalised in terms of "knowledge, skills, and attitudes", "performance criteria/ statements", and "underpinning knowledge"[6] with reference to individual actors. These imply *static* contexts and relationships, and mechanistic practices, often targeting the lowest-level actors with the least authority in the social hierarchy and imploring them to "fit in", "upgrade" and change.

The typical professional/vocational competency-based training and learning approach which is dominated by this agenda only "recognises change as (individualistic) development, a phenomenon that occurs over time…evident in the stages of competence framework" (Price et al., 2012, p. 238) rather than viewing the interconnections between the individual, collective and work culture. Such approaches have failed to consider the implications of work contexts, workplace conditions and opportunities, organisational structures and managerial practices. As indicated previously, we instead offer a critical understanding of the concepts of innovation, learning and culture to think about how individuals, organisations and practices are interconnected and situated within particular political and socio-economic milieus, as an alternative of not just enabling but sustaining innovation and learning in the long term.

Studies on innovation typically focus on examining models, strategies and stages of innovation, often relying on the diagnosis of societal, organisational and/or individual deficiencies, the use of benchmarking, and taking a "best practice" approach to putting forth policies, plans and programmes. At the same time, relatively little attention has been paid to the conditions that support or enable

[6] Singapore Workforce Skills Qualification: Interpretation of WSQ competency standards for training and assessment. IAL. Undated.

innovation, and to understanding the innovation that occurs in everyday work, or to explaining how workers initiate, sustain and perpetuate innovation. The conditions that support and enable innovation, paying particular attention to workers' roles in innovation, are, as indicated in Chapter 1 and earlier in this chapter, necessary to achieving the desired social and economic outcomes that have been positioned as vital for Singapore's innovative success.

By shifting the focus away from diagnosis, benchmarking and implementing best practices which presume that there is some "secret sauce" in innovation, a universal pathway to innovation "success", and/or even a role model (Silicon Valley, German, Nordic, etc.) of innovation, we develop a framework that demonstrates the relationship between innovation, learning and work culture. In Chapter 3, we describe the method and sampling frame for the study that enables the analysis of how workers initiate innovation, identify the opportunities for innovation, and explore how innovation can be supported. This introduces the interconnection between innovation, learning and work culture which is further elaborated in Chapter 4.

3. METHOD AND SAMPLING FRAME

The research questions of this project are addressed through a study of seven organisations from the healthcare (n=4) and advanced manufacturing (n=3) sectors in Singapore. The data consists of:

- semi-structured interviews with employers, middle management and workers in the participating organisations;
- work shadowing with workers in the participating organisations;
- document analysis of participating organisations, industry bodies and relevant government agencies; and
- discussions with various industry bodies and government agencies.

Fig. 3. Break-down of data

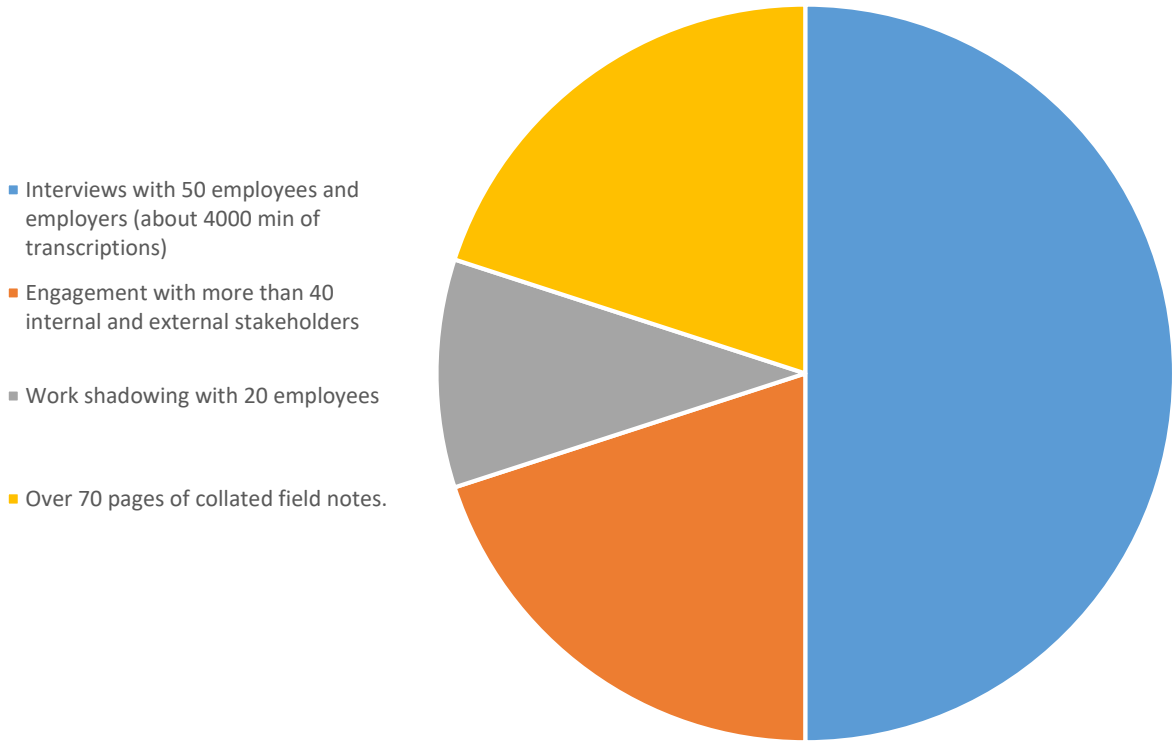


Table 3: Sampling frame

Criteria	Reasons for selection
Identified as an SME (organisation size of fewer than 200 employees or annual sales turnover of not more than S$100 million)	This study is specifically examining an innovative learning culture in SMEs in Singapore.
At least half of the SMEs to have more	SME Development Survey (in

Criteria	Reasons for selection
than 10 years of operation	Singapore) reflects that 93% of the SMEs in Singapore have operated for more than 10 years. This will help us understand the organisations' existing practices in developing longevity and its possible relations to innovative learning cultures, in addition to any relationship between sustainable practices and practices which support innovation.
Two industry sectors (advanced manufacturing and healthcare)	• high value-add/potential of high value-add to Singapore in terms of contribution to national GDP and value added per worker; and • high potential for innovative learning due to high operation risk and/or cost, as well as a critical need to provide high learning relevancy.
Willingness to participate in project	Commitment by the organisations to be involved in the project is necessary in order to collect the data required.

Seven SMEs from two industries, which fulfil the sampling criteria in Table 3, have been identified for the study. The research questions required a detailed investigation into the organisational dynamics, the nature of the business, and the staff experiences of their work; thus, a qualitative approach was used. Studying three to four organisations in each sector would allow the research team to explore key issues and challenges in greater depth. Given the range of business models and forms of production, this is considered to be very important. Using a qualitative approach is particularly suitable and appropriate where little is known about a phenomenon or where current perspectives are confusing (Dagnino & Cinici, 2016).

Table 4: Profile of participating organisations

Name of organisation[7]	Years in industry
Advanced Manufacturing sector	
Gan's Engineering (GE)	More than 30 years
3D Tech (3D)	6 years
ELens Manufacturing (EM)	More than 20 years
Healthcare sector	
Grace Care Services (GC)	5 years
Ming Liang Home (ML)	More than 30 years
Lee Hup Man Home (LHM)	More than 100 years
Sunrise Home (SR)	More than 10 years

Participants, including business owners, managers and workers, completed a form which provided demographic information. Staff from different job functions across the hierarchy were identified by their organisation's management and invited to be interviewed. The semi-structured interviews were conducted by the members of the research team.

An important part of the research consisted of work shadowing with staff from the participating organisations. The research team implemented a practice-oriented theory-method approach (Nicolini, 2012) in which work practices were recorded and analysed through observation, interaction and note-taking with the aim of "following the work practice". The data was comprised of field notes which documented the details of work activities, practices, events, key dialogues and phrases or vocabulary as well as the researchers' reflections, which link with the research questions and/or other broader issues.

In addition, the research team conducted semi-structured interviews with industry bodies, including SME associations, chambers of commerce, industry practitioners and relevant government agencies such as A*STAR, to understand their relationships with SMEs and the roles these entities play in enabling and supporting SME businesses and workers to develop and thrive, and to gain a better understanding of the ecosystem in which the SMEs are situated.

[7] Pseudonyms have been used to protect confidentiality of participating organisations and their staff.

4. HOW DO WORKERS IN SMES MAKE CHANGES AND SOLVE PROBLEMS, AND HOW DO ORGANISATIONS SUPPORT OR ENABLE THEM TO DO SO?

Our findings on the four healthcare (GC, ML, LHM, SR) and three advanced manufacturing (GE, 3D, EM) organisations demonstrate a range of innovation and learning practices which will be discussed broadly in terms of initiating innovation, opportunities for innovation, and support for innovation.

The findings not only describe how workers respond to challenges at work and find new ways of doing things that not only solve problems and create new processes and products, but also demonstrate how workers make an impact, instantiate, (re)produce and/or transform their work, depending on the nature and conditions of their work and other organisational factors. They show that workers are key in initiating innovation, and highlight the importance of proximal and situational factors that create opportunities and support for innovation.

Analysing the qualitative data, we find patterns regarding the initiation of innovation, opportunities for innovation, and support for innovation:

- Workers themselves are reported as being the most salient actors for initiating innovation in all seven SMEs.
- Bosses and managers are the second most important actors reported as supporting innovation.
- The next most frequently reported actors are supervisors, followed by co-workers and customers.
- Workers who are able to initiate change, generate new ideas, and/or do things differently, tend to be more involved in and committed to their work.
- The nature of work and type of industry it is embedded within strongly mediates affordances for innovation.
- An individual's life history and experiences play a significant role in extending and enabling innovation.
- Collaborative relationships between organisations, initiated and guided by their leaders and sustained by their workers, is key to innovation that results in new products and services.

4.1 Initiating innovation

It is important to understand from the SME perspective how workplace innovations are initiated. This section discusses the ways in which workers have initiated changes to their work in order to solve problems and/or create good outcomes, generate new ideas, and do things differently. It also identifies factors that mediate the extent to which workers are able to initiate such changes. From three different organisations, we offer four examples of workers initiating innovations.

Examples #1 and #2 from 3D Tech Pte Ltd

3D Tech is a relatively small high-technology company, founded in 2012, that offers a range of 3D printing products, systems and services. It is an authorised reseller of several advanced 3D printing systems which are used for rapid prototyping, and for design and modelling applications in the biomedical, architecture and manufacturing sectors. 3D Tech has a small workforce of fewer than 20 staff members, most of whom are young, motivated, curious, and keen to learn more about the 3D printing technology.

Debbie (pseudonym) is a biomedical engineer at 3D Tech, working at the interstices of science and engineering. Her work entails knowledge of biology, computing and engineering to render CT and MRI data of human organs and other anatomical features, e.g., tumours, into 3D models, which are then printed. Being a “hands-on person” (as described by herself), Debbie has initiated a new workflow which safeguards and keeps track of the data in the company's work. The new workflow has enabled the organisation to improve on overall productivity and the quality of their products. Debbie’s manager has recognised her efforts in documenting and systematising the company's processes.

Derek (pseudonym) is a service engineer at the same company. He works as part of a team of two to three people who go on site to diagnose, service and/or repair clients’ 3D systems which have been bought or leased from the company. A few years ago, Derek initiated a “user conference” to showcase the company’s services and 3D printing technologies to potential customers and gather feedback from them. The conference was deemed a success and has since become an annual event for the company.

Both Debbie and Derek have initiated innovative new practices. These are just two of several examples of innovation which may be considered as “local”, i.e., addressing the staff’s immediate area of work, but that are continuous and self-initiated. These innovations are ways in which workers create and/or enhance value to their work; however, they tend to be taken for granted or overlooked. Innovations such as these present opportunities for recognition of individual efforts, as well as a more expansive understanding of what constitutes innovation and of what the

company requires, i.e., a system to improve company processes and a business development function.

Examples #3 and #4 from Grace Care Pte Ltd and Sunrise Home

In the healthcare sector, the work undertaken by nursing aides and therapists, for example, is highly personal and personalised. Innovation, such as new practices and effective solutions, emerges from workers initiating engagements and building collaborative relationships with their patients and/or clients. Understanding the nature of work is key to recognising and enabling innovation in this sector.

Grace Care is a healthcare SME which provides care services for clients in their own homes. Staff members often work on their own when they visit clients in their homes. Much of their work practice is not directly supervised and staff members are required to generate responses to challenges encountered in working with their clients in their homes.

Jane (pseudonym) is a Home Care Assistant (HCA) for Grace Care. She visits her clients at their homes and helps them with the activities of daily life including eating, cleaning, washing and exercising. Her work is conducted in relative isolation from her colleagues and managers. Under such circumstances, Jane becomes central to the initiation of innovation.

On her own initiative, Jane has designed customised games that combine physical with psychological therapy. She takes a proactive approach to her work as she sees her job as enabling her clients to enjoy a better quality of life, and she is deeply committed to improving the quality of their health and well-being.

During a work observation at a client's home, Jane encouraged her client, an elderly person with early onset dementia, to talk to her. She later explained that this allows the client to speak openly about his/her feelings, and it also enables Jane to encourage, reassure, and explain things to the client. Through talking with the client, Jane helps to allay her client's fear, depression and/or anxiety as memory loss worsens and communication and reasoning abilities deteriorate. Talking also wards off loneliness for many of her elderly clients. Jane initiates talking as a kind of therapy, and this is as a result of her compassion for and experiences of working with elderly people.

Jane's crafting of her work (Fuller & Unwin, 2011) to address the individual needs of her clients, and her deeply empathetic approach, are in contrast to the mechanistic understanding about and the cavalier attitude that her managers have towards the (nature of) the work. This means that opportunities are lost to better support and improve the quality of work, and to recognise innovations that are evolving on the ground in everyday situations.

Like Jane, Tiong Soon is a physiotherapist at Sunrise Home who approaches his work as a kind of "craft work". He combines his experiences in massage therapy

and physiotherapy with his knowledge of Traditional Chinese Medicine to diagnose residents' conditions, and develops customised therapy routines for Sunrise Home's residents. He treats each resident on a case-by-case basis, and *invents* unique rehabilitative treatments for each resident.

The recoveries made by residents under his charge speak for themselves. For example, "Uncle Ding", who is in his 80s, came to Sunrise Home a few years ago after being abandoned by his family. According to Tiong Soon, Uncle Ding's body at that time was "all soft, limp and lifeless". He was downcast and unresponsive to people around him. Tiong Soon explained that he had to constantly encourage Uncle Ding in order to improve his spirit and "train his mind to (connect with) the body". Today, Uncle Ding is a totally different person – he is jolly and can move around by himself in a wheelchair as well as sit and stand without anybody's assistance.

Successes like the case of Uncle Ding depend on workers' engagement in their work to elicit a joint commitment with and collaboration from residents. These commitments and collaborations sustain and enable new practices and/or innovations. Managers at Sunrise Home recognise the importance of commitment and collaboration from staff and residents; therefore, they give workers like Tiong Soon the autonomy to make key decisions about how they want to do their work, and provide support for them to do their work.

The four examples provided in this section demonstrate that workers are the most salient actors for initiating innovations at work. This is deeply mediated, however, by the nature of their work, the type of industry they are embedded within, and management's level of understanding and support of their work. In the four examples, workers have to figure many things out by themselves when new problems or unknown and complex situations arise. Their capacity to initiate innovation which leads to or results in new solutions, ways of working, and/or changes in established practices, depends on the support and environment for questioning, reflection and improvisation.

4.2 Opportunities for innovation

The previous section 4.1 highlights the importance of workers initiating innovation. Opportunities for innovation that lead to sustained practices may also be top-down driven. In this section, we offer two examples that highlight efforts and/or changes which are initiated by management, and examine how they present opportunities for innovation. The first example showcases collaboration between an SME and its technology partner, and the second example illustrates a company undergoing a SMART factory conversion. Both activities create opportunities for innovation within their respective organisations.

Example #5 from ELens Manufacturing: inter-organisational collaboration

Chris (pseudonym) is an innovator-entrepreneur who founded ELens Manufacturing to design, manufacture and sell systems and equipment for the semiconductor back-end sector[8]. Incorporated in 1989 as a company that traded in equipment and machinery for the semiconductor industry, ELens Manufacturing has evolved to become an industry leader in the design and manufacture of automated wafer inspection systems. The company survived the economic crisis of 2008 and turned a profit by building collaborations with various industry and government stakeholders, which created opportunities for innovation.

One of ELens Manufacturing's key collaborators is SIMTech, a government-owned R&D agency. SIMTech has helped the company with its technology development and has provided technical expertise as well as support for the development of its first product. Such a collaborative relationship requires constant efforts to continue to build and sustain. Understanding each other's priorities and interests, and the ability to openly address differences and tensions, are major contributors to innovation. Chris' leadership has been crucial in helping and guiding his workers to build and sustain this relationship:

> "Some of my staff feel that SIMTech is not realistic. But when the technology comes over you still have to do work on it yourself, right? So if my staff say, '*SIMTech just throws everything to me; I cannot work, or I still have to spend a lot of effort'* but let's face it, okay? Without SIMTech, I would not have launched a new product. So whatever SIMTech is able to provide and support we have to be appreciative. And the Executive Director (of SIMTech) is actually quite supportive, and the researchers are actually quite positive."

A collaborative relationship between organisations, initiated and guided by their leaders and sustained by their workers, is key to innovation that results in new products and services. A collaborative relationship is characterised by an equality of work and a perception of fairness, or a fair deal for the people and organisations involved. Collaboration shifts business conditions from competition to cooperation, and creates opportunities for innovation. However, collaboration, or the building of strong ongoing relationships between people, making a concerted effort to achieve a sense of fairness for all parties and cooperating with rather than competing against each other, requires effort, commitment and resources to develop and sustain.

Example #6 from Gan's Engineering: SMART factory conversion

Opportunities for innovation also arise from organisational change or restructuring, factory automation and/or digitalisation. In the case of Gan's Engineering, the SMART factory project presents a major change to the

[8] CT's product line-up includes wafer inspection and measurement systems and die bonder machines. The company has received accolades for their in-house technology which helps to improve the speed and quality of the inspection process in wafer production.

organisation's operation. Gan's Engineering was incorporated in 1982 as a machining company, beginning as a sub-contractor for various MNCs and later becoming a medical equipment manufacturer with 135 employees and an R&D department. At the time of this research, the company is in the process of converting its production line into a SMART factory:

> "When we say SMART basically it is not just automation but we are looking at unmanned factories that could run 24-hour operations. We can turn-off the lights and still do manufacturing. We will introduce new technologies such as intelligent vehicles or AGVs (Automatic Ground Vehicles) to move things around." (Mr Seng, Director Operations)

Changes such as the SMART factory conversion are typically led by senior managers such as Mr Seng, who has been hired for his MNC experience and expertise and his familiarity with US Food and Drug Administration (FDA) regulations. For Mr Seng, developing workers' knowledge, skills and experience, and keeping them up to date and aligned with regulations, are priorities. Mr Seng expects his engineers to be able to interpret and navigate the FDA requirements, make decisions at various points in the production process, and understand process relationships. Apart from establishing or writing and implementing standard procedures for the company, Mr Seng suggests that coaching and (work) culture are the more important aspects of workers' learning, which is developed from an accumulation of practice and diverse experiences. Here, effective training and cultivating a culture of learning which can be organically sustained by the workers themselves are critical.

Mr Seng approaches the SMART factory conversion as not just an automation project but as one that will change the learning culture. Workers are now required to carry out different tasks, work with different people and technologies, and *understand* the implications of their actions, i.e., they need to understand why, and not just how, the various tasks are carried out. In this example, opportunities are presented for learning in which coaching, scaffolding of new work requirements, and managerial leadership will help workers to adapt and grow into their new jobs and roles. Mr Seng says:

> "The SMART factory model is a concept. All these MES, controlled interface, robotics, software, computer programming all come into the picture already. Can you imagine a production line that operates around the clock without anybody? It is not just an (IT) investment but requires people skills, knowledge production and learning. All very different. So it is not just automation."

The above two examples showcase top-down innovation (see Table 2) enabled by collaboration and technology, in which changes were initiated by management leaders but sustained by internal and external processes. The collaborative efforts that helped ELens to build a new product, and the SMART factory conversion by

Gan's Engineering, have presented opportunities for innovation through changes to work processes, and situations in which differences, tensions, conflicts and uncertainties need to be addressed and resolved. Management leaders like Gan's Engineering's Mr Seng recognise the importance of (developing an) organisational culture in which workers are empowered and engaged to innovate and are sustained by learning.

4.3 Support for innovation (from within the organisation)

Support from management is crucial in order for innovations to occur in the workplace. Our findings demonstrate that local actors, including employers, managers, supervisors and co-workers, play important roles in supporting innovation. None of this is surprising but it emphasises the point that support for innovation is grounded in the circumstances of practice, work conditions, and meeting the particular kinds of imperatives that arise in these settings which are relevant to its continuity and advancement. With the exception of Grace Care, employers, managers and supervisors are seen to be essential for setting the tone, creating the conditions, and providing guidance to workers, which allows innovation to flourish in the workplace.

Management support is essential during times of organisational change such as Gan's Engineering SMART factory conversion, and also in collaboration or partnership with other organisations as in the case of ELens Manufacturing, as discussed in the previous section 4.2. This may take the form of a new kind of leadership whereby leaders are able to create a different context, change the rules, and guide new practices and/or processes. Leaders or managers who understand that innovation is carried out in teams rather than as a matter of "individual genius", and is an integral part of everyday work activities rather than an exception, like an R&D function, strive to build a work environment of openness and trust, which involves people at all levels.

The actions of the management leaders of Gan's Engineering and ELens Manufacturing show that they view their workers as not merely a "resource" to be used, but as people to be trusted and relied upon for the success of new work requirements. This was most evident for innovations in the care and high-technology sectors in which people are core to the work.

<u>Example #7 from Sunrise Home: quality care</u>

Sunrise Home is an example of an organisation with a new kind of leadership in the healthcare sector. It has shed the trappings of clinical care institutions and created a more home-like environment for its residents. As a charity-run non-profit organisation, or Voluntary Welfare Organisation (VWO) for the socially and/or economically marginalised, Sunrise Home has been able to provide care services that are arguably superior to some privately-run or commercial nursing homes which

charge thousands of dollars per month. This success is largely due to its Executive Director, Nee Choo's (pseudonym), energetic hands-on leadership and to her approach which focuses on the quality of care rather than on the sector's "obsession" with safety and efficiency which often results, for example, in the use of restraints and diapers.

Nee Choo encourages her staff to not rush in their work but to instead focus on providing a good quality of care, which has resulted in a highly personal and personalised type of care. This is evidenced in initiatives such as "Gym Tonic" – a computerised exercise system that helps residents to keep track of their own exercise regime - and the "Tutti Bath", which is an automated showering system that reduces the frequency and need for workers to physically lift the residents on and off commodes.

Nee Choo also shows understanding and support for staff who wish to start a family and/or care for their families abroad. She personally leads process and quality improvement projects, and guides workers in the adoption of new practices and/or learning about new technologies. She is supportive of her staff, and does not hesitate to step in to cover nursing duties and shifts when required.

These factors have enabled Sunrise staff to be engaged in their work and to innovate. For example, by seeing their role as "housemates" who live and work alongside the residents, this change in language has enabled Sunrise staff to re-think and re-design their roles and identities. Thus, activities such as meals and showering are structured not as strict routines, but are customised to the residents' needs so that they are able to make decisions about when they want to eat, bath and exercise, how much they want to eat, and what sort of exercises they want to do, etc. Nursing Manager, Rose, says: "We allow our residents some kind of freedom, and give them independence to do whatever they want."

Staff members do not appear to be "rushing" as they work to help residents take responsibility of their own hygiene, health and well-being. Thus, care becomes a shared commitment and responsibility between Sunrise staff and residents. This is an innovation which has emerged as a result of Nee Choo's leadership in demonstrating what good quality care entails through initiatives such as "Gym Tonic" and "Tutti Bath", and extending it to her concern for staff members whose work embodies and communicates respect, autonomy and compassion.

Sunrise Home was in stark contrast to our other case studies within the aged care sector in which institutionalised forms of care around daily activities like meals, showers, and exercises, are tightly scheduled, measured and organised to maximise efficiency. In other nursing home cases, work is designed as a series of tasks to be optimised; for example, to reduce the showering time for residents from eight minutes to only six minutes. Such practices deplete the dignity of the residents as it is not unusual for them to be left naked in their wheelchairs in the open ward for

short periods, or as they wake to the stench of urine and faeces-filled diapers. Workers are constantly “rushing” to complete their tasks: to feed, bathe, clean and medicate residents. Sometimes, the well-being of the residents is compromised when they are put in restrainers and confined to their wheelchairs and beds for long periods to minimise fall rates, which are monitored and reported to the Ministry of Health. Staff and managers talk about their work in terms of strategy, efficiency, funding, pay and promotion, rather than in terms of the residents under their care. They are more proud of their achievements as productive and efficient workers than as carers who provide comfort to the residents under their care.

Example #8 from 3D Tech

People rather than technology are key to innovation in the high-technology sector. This is exemplified in the case of 3D Tech - an SME that offers a range of products, systems and services for industrial 3D printing in various sectors (see pg. 25 for a brief background of the company).

3D Tech founder-director Tim and his deputy Trina (both are pseudonyms) seek to create a flexible environment and flat structure in which workers are given the discretion to decide when and how to do their work. They expect their staff to work independently and to be able to solve problems on their own, both individually and as a team. Tim actively guides some of the more junior staff in their work, and he has also been key in initiating several projects which he oversees and leads in addition to managing the whole business.

Workers attest to the support for their work by describing how they are able to explore different things, make decisions about their work, and seek help or guidance from management whenever needed. Workers emphasise the “freedom” that they have in their work, which they contrast to a larger organisation such as an MNC. Desmond, a service engineer, says: “Because of the culture in MNC, I don’t have ‘freedom’ to do a lot of things. As MNCs are big corporations, so [I understand the insistence that] everything [has a set of] rules and regulations, and you always have to seek approval. Yah, so I don’t have the freedom to change things or do things in a different way in a larger organisation.”

3D Tech’s flat organisational hierarchy has created a sense of openness and camaraderie amongst the workers, who appreciate the “straight-forward” ways of doing things, their access to managers, and the opportunities to bond with each other both at and outside of work. Friendship is an important element of their work. It helps to build trust and commitment to each other, which are key ingredients for non-coercive forms of cooperation and teamwork that preserve a worker’s autonomy but at the same time create mutual accountability.

The high degree of workplace discretion or autonomy instituted means that workers are expected to work independently, exercise discretion and, in Tim's words, "try novel or innovative solutions, as long as the problem gets resolved". Hence, innovations are generally bottom-up (see Table 1) and tend to be bold, exploratory and experimental, with a high degree of uncertainty.

The examples from Sunrise Home and 3D Tech as provided in this section suggest that management leaders need to set the tone, create the conditions, and provide guidance in order for workers to innovate. It is important that leadership creates the right environment for mutual trust and interdependency, preserves and respects workers' autonomy, and understands that innovation is about enabling their own staff to better do their work.

4.4 Conclusion

Our findings in studying these seven organisations have highlighted the combination of proximal and situational factors, on the one hand, and the importance of workers taking the initiative on the other, which illustrates an interdependence that is central to learning and innovation.

Workers are key in initiating innovation, as demonstrated in several of our case studies which have shown how innovations emerge in the course of everyday work. These innovations arise from workers' attempts to initiate something new or solve problems and, in the process, offer highly inventive solutions and alternative ways of doing things.

Innovations also arise as the circumstances present themselves as opportunities, as in the example of the SMART factory conversion. They are mediated by proximal factors such as co-workers and supervisors, and management that set the tone for trust, openness and cooperativeness in relationships, both within and outside of the organisation. Managers help workers to frame their work in the right context, and articulate the purposes and direction in order for workers to learn.

Managers play a key role in innovation by providing crucial support for workers to innovate. This may be in terms of (re)organising the work and the organisational structure, creating an environment for cooperation, and recognising or rewarding different aspects of innovation such as teamwork. The approach by the workers to their work and innovations is deeply shaped and influenced by the managers, e.g., Nee Choo's leadership as the Executive Director of Sunrise Home has enabled the staff to see themselves as "housemates" of the residents, meaning they do not rush in their work and are more aligned with the organisation's goals.

Proximal, situational and circumstantial factors on the ground present opportunities and support for innovation, and workers who are able to initiate change, generate new ideas, and/or do things differently tend to be more involved in their work and more committed to innovation. Workplace affordances, or the invitational quality of conditions for innovation, are shaped by organisational structure and managerial practices, by the nature of the work, and by the industry.

The findings discussed in this chapter showcase the various factors that shape, enable and create innovation and learning. All these factors – the proximal and situational, circumstantial and agentic actions of workers - need to be *understood* in terms of their interconnectedness and interdependency, which is explained and illustrated in Chapter 2, Fig. 2. “Interconnections between innovation, learning and work culture”, p. 16.

In the following chapter, we focus on how organisations can support and create the conditions that lead to innovation and learning. We develop a heuristic called the “Seven Enablers” of innovation and learning, which is structured by a sense of trust, workers’ engagement, community, and state of emergence or, as George Herbert Mead (2002) explains, “a sense of continuous movement, and evolution into new states”. It is forward-looking, and aims to open up the possibility of “expansive transformation”, which is “accomplished when the object and motive of the activity are reconceptualised to embrace a radically wider horizon of possibilities than in the previous mode of activity” (Engestrom, 1987, p. 137). When mapped onto Engestrom’s “Expansive Learning Cycle”, the Seven Enablers illustrate the objects and purposes of innovation, and reframe these objects and purposes in a new and different light in order to enable more fundamental and radical change.

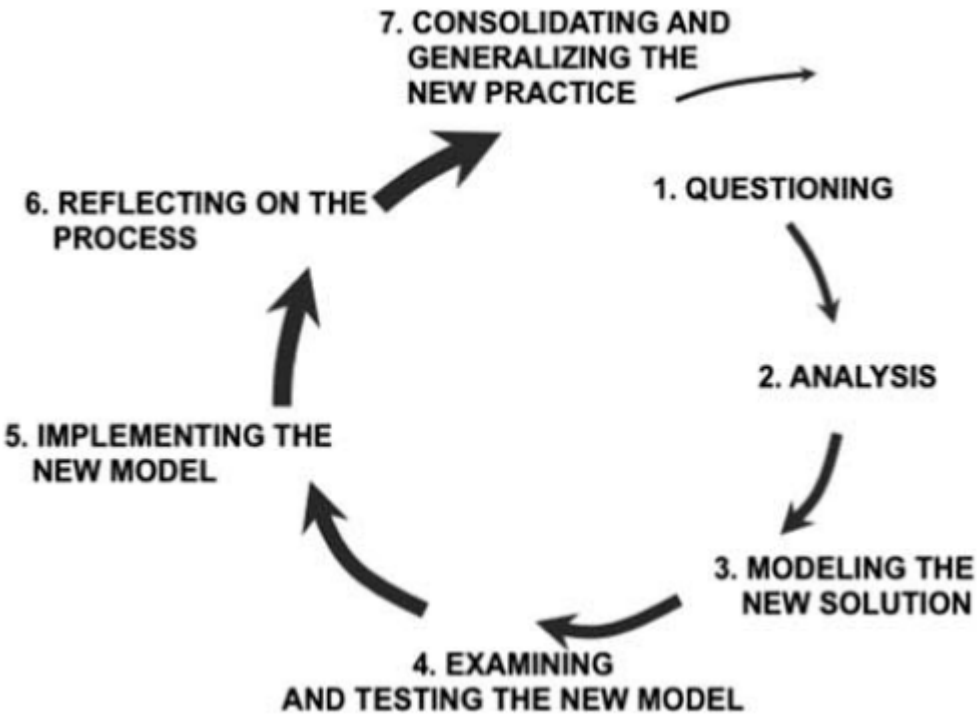
5. FACTORS OF AN INNOVATIVE LEARNING CULTURE

This chapter address the third research question which focuses on the efforts of the government and industry to support innovation and learning in SMEs. As indicated in Chapter 3, in thinking about enabling and developing an innovative learning culture, this chapter provides a brief explanation of the factors of an innovative learning culture which is identified through analysing our data and moving iteratively between the literature and data. In explaining these factors, we make reference to some of the examples discussed in Chapter 3. Through a discussion of the factors of an innovative learning culture, we hope to move organisational and policy thinking in the following directions:

From	To
an innovation agenda dominated by technological determinism	an idea of an innovative learning culture informed by and situated in the context of workplace learning
conversations about deficits and shortcomings of workers	conversations about facilitating worker learning to generate innovation possibilities through engagement, participation and opportunities
a perspective of innovation and learning as disaggregated	a dynamic understanding that focuses on the interconnections and interdependencies of factors, and evolving and/or emergent practices
seeing leaders as main actors of innovation	seeing work and learning practices, and workers and supervisors, as key

This shift in thinking, doing and talking about innovation and learning is the basis of Gregory Bateson's '*Learning III*', “where a person or a group begins to radically question the sense and meaning of the context and to construct a wider alternative context. Learning III is essentially a collective endeavour.” (Engestrom, 2001, p. 136). It helps us to see innovations as “culturally new patterns of activity” (ibid.), which assists us to understand more critically the roles people take in learning, how they learn, what they learn and the reasons for learning which are dynamic, situated and multi-voiced. It results in workers asking questions and analysing situations to find and define problems so as to resolve contradictions, seek solutions and develop new forms of work activity.

Fig. 4 Ideal-typical sequence of learning actions in an expansive learning cycle



Source: Nummijoki, Engestrom & Sannino, 2018, p. 5[9]

The Seven Enablers support the concept that learning enables collective transformation through changes initiated by workers within the organisation. Developing an innovative learning culture requires no more than what is already present and/or available within organisations. An innovative learning culture requires an understanding of innovation, learning and work as interconnected, interdependent and dynamic. Therefore, the core tasks are to expand the notion of innovation which accommodates/encompasses the different and diverse contexts, conditions and nature of work; and to focus on creating the conditions for workers' engagement, developing opportunities for workers to do different things and/or do things differently, and cultivating an environment that is open to the possibilities of ambiguity, the unexpected and the unpredictable.

[9] Engestrom's expansive learning cycle (Fig. 3) presents a model of "learning what is not yet there" (Nummijoki et al., 2018, p. 4). The model helps to frame up situations and encounters that reveal the rich texture and dynamism of learning actions within specific circumstances and context. Some of these complex dynamics include "tensions and conflicts but also negotiations and joint innovations" (ibid, p. 4) as diverse interests, backgrounds, experiences, and competencies become intertwined in the learning process.

5.1 Empowerment & Questioning

Worker empowerment refers to the discretion, trust and resources given to employees to make decisions on how best to do their work. It has two dimensions: the first is organisational, which refers to workplace affordances or the means in which workers are supported to make those decisions about their work; and the second is the personal, which refers to individual engagements or how workers choose to participate in their work. Billett (2012) suggests that the interplay between these two dimensions enables but could also hinder innovation by workers.

Empowerment enables workers to respond to situations arising in the course of everyday work, and to engage in and learn through activities and circumstances that are new to them. As organisations transform, leading to continual changes in products and business operations, workers increasingly need to be empowered to be able to question, i.e., to challenge or defend standard practices and ways, in order to meet new and unpredictable challenges.

Empowerment is dependent on workers' engagement and capabilities, and workplace affordances. Unfettered or unbounded "empowerment" may lead to negative outcomes for the organisation and possibly the workers. Constraints which seek to prevent or minimise these negative outcomes may have a role in innovation, but (empowered) workers sometimes challenge these constraints, which may lead to changes and transformation of work practices.

Empowerment also concerns the organisation itself. An empowered organisation is able to participate meaningfully in driving industry transformation. SME bosses often complain that they are at the receiving end of policies rather than being part of the discussion or play a meaningful role in the policy-making process. Incorporating a bottom-up perspective may not necessarily compromise the top-down approach of Singapore's policy-making ethos, but may perhaps improve the quality and take-up rates such that policies will be fit for purpose and find greater traction amongst SMEs.

5.2 Alignment & Reflection

On one hand, alignment implies a shared understanding of goals, intentions and motivations among stakeholders, including employees, employers and government agencies. It involves discussion and negotiation to reach an understanding of each other's interests, expectations and practices. Our data shows that strong alignment between staff and their employers, indicated by a shared understanding of their organisation's broad mission, tends to lead to greater engagement by the workers and a greater commitment to their work.

On the other hand, alignment refers to the process in which an organisation's strategy can be made more responsive to external conditions. This is reflected in the organisation's operations and the way workers do their work. There are variations of alignment evident across the organisations in this study because, in their structural and cultural aspects, organisations are much more complex than their official mission/vision statements, and "misalignments", or the variations between operations and the organisation's mission/vision, suggest that they never operate in the way originally intended.

Where variations are seen, it is with regard to how "mechanistic", i.e., top-down direct control and task-oriented or "organic" the organisational forms are; in other words, their level of empowerment, decentralisation and flexibility. Such variations are influenced by the way SME bosses and managers interpret and take into account various contingencies which affect their organisations. Whether top-down or bottom-up approaches are adopted to resolve differences or variations in goals, interests and purposes, alignment is a continuous process and key to developing an innovative learning culture.

5.3 Communication and Collaboration & Examining and Testing the New Model

Communication and collaboration focus on the nature and quality of interaction between people and organisations. Interaction, engagement and flexibility are important mechanisms of an innovative learning culture. Central to communication and collaboration is an idea or understanding of organisations as dynamic and evolving coalitions of people with different and varied interests and purposes who are willing to do things that meet the organisation's needs and requirements (Watson, 2009).

Communication and collaboration enable workers to negotiate and work out those differences and perspectives, and then to test or put into practice proposed solutions with the possibility of changing or enhancing the status quo in terms of the collective interests, purposes and objectives. Examining and trialling new solutions, practices and ideas which challenge the status quo inevitably results in conflicts and tensions. Here, the role of human agency and the meanings, interpretations and understandings which are inherent in organisational activities are important in communication and collaboration. Communication and collaborative processes recognise all these as a matter of social fact, and seek to enable or facilitate the interplay of a variety of interests, understandings, initiatives and reactions of individuals and groups within and outside of the organisation, which managers navigate, coordinate and shape, such as in examples #5 (pp. 27-28) and #8 (p. 32).

Organisational rules and procedures are not simply followed because they are rules or because they are requirements of the organisation, but because people recognise what is expected of them and comply in degrees of willingness and, as far as possible, whenever it suits their own purposes, interests and/or projects. Therefore, the ways in which organisation leaders and managers communicate and engage with their staff impact how workers negotiate and test new things or new ways of doing things that result in solutions, new practices and/or changes.

In Example #6 (pp. 28-29), at the company's annual party, the CEO of Gan's Engineering shared with workers his plan to convert the manufacturing operations into a SMART factory. Workers were excited about the transformation at the workplace but also apprehensive about what it meant for their work:

> "We need to see what sort of functions can the robot do or add to the line, and we need to operate the robot. If the robot won't do the work we still have to do it, correct or not? If the robot gets stuck, you need to go and cure "him" correct? We need to know more", says Chin Chin, a production line supervisor.

Similarly, innovation is made possible through partnerships with external stakeholders. In example #5 (pp. 27-28), ELens Manufacturing's collaborative relationship with SIMTech has enabled the company to develop proprietary technology and to manufacture their own products. Collaboration takes time and is built on a relationship of trust, accommodation and mutual understanding. A collaborative relationship is also characterised by a perception of fairness, or a fair deal (which is constantly negotiated) for the company, rather than simply the formality of contracts, rules and regulations.

5.4 Nature of Work & Implementing a New Model

The nature of work in the healthcare and advanced manufacturing sectors is different. Care work is "heart work", or what scholars refer to as "emotional labour" (Watson, 2009, p. 19), which requires workers to invest themselves emotionally in order to do a good job. This is especially true for workers in the care-giving sector, as illustrated in example #7 (pp. 30-31) where workers establish friendship and intimacy with those for whom they care over a long period of time, and are affected when their elderly clients or residents fall ill or die. The ways in which healthcare organisations manage or deal with emotional labour comprise and extend from the *philanthropic,* where the work is given as a gift, to the *prescriptive,* where the work occurs according to organisational and/or professional rules of conduct, and to the *pecuniary,* where the work is merely a commercial transaction.

The nature of work in the advanced manufacturing sector involves high levels of learning, problem-solving and autonomy in organisations like 3D Tech. For more traditional mass production organisations, the strategic use of technology such as

Industry 4.0 creates structural and cultural changes within the organisation. Workers in advanced manufacturing, whether in new sectors like 3D printing or those impacted by technology, can expect to take increasing responsibility for their own learning, development and careers, and ownership for work not (yet) defined by their organisations or job roles/descriptions. These changes and shifts create opportunities and challenges for workers to be self-directed and creative in initiating innovation that results in making changes, new solutions, and/or new ways of doing things.

Whether in healthcare, where care workers have to anticipate and respond to the changing needs of their clients and dynamic situations at work, or in advanced manufacturing, where the use and introduction of new technology is shaping work and workplaces in ways that could not be anticipated, workers are required to implement solutions and seek feedback from the workplace, the clients and their business partners, which results in new practices and work activities.

Nature of work also refers to the workplace environment that either enables or constrains learning and innovation at work. It includes work complexity, variety, and exposure to new knowledge, ideas, practices and perspectives. Work complexity and variety are shaped not only by roles and expectations, but also by the perceptions of staff and their managers. Crucially, how managers and leaders perceive their staff and their work significantly influences an individual's self-perception and inclination towards learning and innovation. As such, an organisation's leadership is closely related to the learning opportunities provided for the worker.

5.5 Knowledge Flows & Analysis

"High" knowledge flow, which is characterised by intense exchanges and a high degree of co-production of knowledge, tends to enhance the learning and performance of organisations and employees. The exchange and co-production of knowledge occur between multiple parties and across different organisational levels, involving internal and external stakeholders. Knowledge *flows* when alignment, communication and collaboration are enabled and supported, which reflects integration, facilitates ownership when knowledge production can be claimed by different people and in diverse ways, and affirms the value and spirit of cooperation. In other words, alignment, communication and collaboration facilitate "high" flow and form the basis of knowledge production. All these functions rest on workers thinking about why they do what they do, their discussions about making improvements or changes to the work, and their ability to explain themselves. All these are analytical functions which facilitate in the flow of knowledge.

From an organisational perspective, the production of knowledge is managed structurally in the hierarchy and organisation of work. Cross-team projects organised

by Gan's Engineering, for example, involve individuals from different departments and with different skills and knowledge. Discussions and interactions between a diverse group of people have led to refinements in work processes and practices. Meetings held across departments in ELens Manufacturing to discuss clients' needs have similarly involved knowledge flows across the organisation. Such communication and knowledge flows facilitate and enable learning and innovation.

Knowledge flows between organisations and external stakeholders are also crucial in innovation. The close-working relations of ELens Manufacturing and SIMTech and of Gan's Engineering and their collaborators, which are initiated and guided by the leaders, have created opportunities to develop new technologies and products.

Jane, a Health Care Assistant with Grace Care which provides home care services to clients at their homes in example #3 (p. 26), has successfully established a holistic practice that focuses on rehabilitation through games and talking. Her innovative practice has led to remarkable improvements in her clients' physical and emotional well-being. However, her experiences, innovations and practices have not been shared or institutionalised. Because the organisation's profit-oriented goals, structure of reward and managerial practices are not aligned with the altruistic purposes which inform Jane's professional practice, much of her work has gone unrecognised, and knowledge production and flow are impeded.

5.6 Recognition & Consolidating the New Process

Recognition refers to the act of acknowledging and rewarding employees' and organisations' efforts in applying their learning so that there is a sense of appreciation and gratitude in their workplace and industry. Managers need to express the importance of workers applying their learning to improve their work and, where appropriate, indicate that it is achieved in collaboration with their co-workers, clients and other stakeholders in order to consolidate or bring people together to sustain new practices and work activities.

Staff of ELens Manufacturing in example #5 (pp. 27-28) and of 3D Tech in example #7 (pp. 7, 32) emphasise that feeling appreciated and being recognised by their managers and bosses for their innovations is important, especially when their efforts, work ethics and initiatives are well rewarded. An employee of 3D Tech shared "I innovated different ways of repairing the machines, I don't follow strictly to the manual, which can't solve all problems. All machines are different, hence there is no one size fits all. The company recognises my effort and has promoted me to applications engineer recently."

Recognition theories in the social sciences which consider the forms, functions and implications of recognition, highlight the interpersonal characteristics

and logic of recognition (refs). Recognition is a vital human need. It underscores relationships and a failure to recognise the other is a cause for disrespect, misunderstanding and tensions. Recognition is an affirmation (of self)[10] and an alignment with what is valued by colleagues and managers. It helps to explain why people express good feelings when they are recognised and respected by their peers and managers. Recognition and respect also enable two-way communication between managers and staff, and two-way communication creates an opportunity for a bottom-up approach and suggestions for innovation.

5.7 Tolerance for Failure & Modelling New Solutions

Tolerance of failure refers to how employees or organisations deal with failure and risk. It is a precondition to encourage workers to propose suggestions and make changes to the work and this enables learning through trying new things and gaining experience from failures.

ELens Manufacturing in example #5 (pp. 27-28) faced many failures before finally developing a product that has achieved success in the semiconductor business. Chris, the CEO of ELens Manufacturing, shares openly about his failures in several public speeches and publications. He says, “Your original product isn’t good enough, so you have to come up with another machine. You come up with another, but that’s still not good enough. So you come up with another. You have to try to break new ideas. You learn from all your failures. We try and we try. You will still fail, but you will learn.” He highlighted in the interview that failures and errors are part and parcel of learning. Tolerating and learning from failures has enabled Chris and his team to change the way they develop new products. Previously, he relied on scientists from Japan for new technology but this business model did not work; however, since his company took ownership of the research and development work, and started collaborating with SIMTech, ELens Manufacturing has gained a reputation as a technology leader in the semiconductor business.

Tolerance for failure is reflected in how SME bosses and managers have significantly encouraged and supported their staff to problem-solve and experiment, and provided them with the discretion and resources to innovate. However, workers themselves may have a different attitude towards failure, which can be influenced by

[10] Hence, recognition is also a fundamental human right as much as a social process that enables communication, alignment and knowledge flows. It creates the inter-connections between people as well as organisational processes. Organisations will disintegrate when people fail to recognise their interconnections and interdependencies of each other, and systems will fail without feedback, which cannot be generated without the premise of recognition. The structuring of recognition coincides with Kerry Howell’s work on “gratitude” (https://www.youtube.com/watch?v=gzfhPB_NtVc) which examines the two-way process of giving and receiving, of acknowledgment and the giving back out of acknowledgement, in the context of education. The practice of gratitude (for educators) is reflective and introspective, and as a framework for practice enables engagement and commitment.

experiences such as being punished by their bosses or management for trying and failing.

Alternatively, workers could be encouraged to identify the actual problems, be given the support and resources to trial possible solutions, engage in real discussions, and participate meaningfully in the decision-making that affects their work. All these activities enhance the capacity for innovative learning, which comes from experiencing mistakes and failures, coping with unanticipated problems, and understanding how their work impacts and is impacted by others.

5.8 Conclusion

An innovative learning culture is engendered by empowering workers to initiate innovation, creating alignment, fostering authentic communication and collaboration, giving recognition, and tolerating failures when workers initiate and/or make changes to and transform their work practices. All of this enables innovative learning by tapping into the willingness of workers to creatively participate in solving problems, learning from making mistakes, and handling new and unexpected challenges.

The project shows that workers themselves (not just technology) – their engagement, i.e., participation in work, agency and voice - are key to innovation and learning. Workers initiate innovation but their actions are mediated by workplace affordances or what is provided, offered and made available to the workers. Workplace affordances are dependent on the nature of work and industry, organisational structure and managerial practices, and the invitational qualities of the social setting, situation and circumstance in which innovations can occur. The opportunities to interact with co-workers, the guidance of supervisors and support from managers and bosses also shape how workers innovate and learn. All these factors highlight the dynamic and emergent character of innovation and learning, the structural, agentic and situational forces at work, and the interplay between workers' engagement and workplace affordances.

One of the greatest myths about innovation is its equivalence with technology. This myth continues to be perpetuated as it often serves the interests of its loudest advocates – technology developers and providers. The truth is that innovation is never so much about the lack of technology or its adoption and application, but about how it emerges from what may now be called the social and organisational determinants of innovation embedded in an innovative learning culture.

6. CONCLUSION

Our analysis is grounded in the complex realities of learning and innovation. It is concerned with innovation as a new form of activity, and the creation and sustaining of innovation through learning. We broaden the definition of innovation beyond its conventional notion, e.g., that of OECD (see pg.12), to recognise that there may not be any measurable or singular innovation activity or work that could be the focus of coordination, as shown in the case study examples discussed in this report. It is more about the proximal, situational and circumstantial factors and the agentic action of workers, and the interplay of these factors, that shape and give rise to various forms of innovation.

Standard theories of learning focus on processes, build upon an acquisition model of some identifiable knowledge and skills, and presume a stability of the knowledge system and structure. An innovative learning culture, however, emphasises human agency, the learning and adaptive capacity of workers, and the social and organisational determinants of innovation.

Rather than accept these standard theories and models, we inquire critically into the practices, relationships and dynamics of innovation and learning as they really occur in the workplace. We conceptualise an innovative learning culture by developing a framework in which innovation and learning activities, and the factors and conditions that enable innovation and learning, are presented, so that new understandings and possibilities can arise. Our concerns and initial premises echo Engestrom, who argues:

> "The problem is that much of the most intriguing kinds of learning in work organisations violates this presupposition (of standard learning theories and models of innovation). People and organisations are all the time learning something that is not stable, not even defined or understood ahead of time. In important transformations of our personal lives and organisational practices, we must learn new forms of activity which are not yet there. They are literally learned as they are being created." (Engestrom, 2001, pp.137-138).

There are temporal and historical dimensions (of an innovative learning culture) which are discussed in Chapters 1 and 2. In Chapter 3, we describe the methodology and approach to the project. This is followed by Chapter 4 which provides case study examples of the ways in which workers in SME organisations initiate innovations, how opportunities for innovation arise, and the ways in which workers receive support for initiating innovation. From these case study examples, in Chapter 5 we then synthesise and analyse the factors of an innovative learning culture.

In this project, we regard an innovative learning culture as being deeply situated in and entwined with the workplace. Hence, we focus on the nature and conditions of work, take into account the various stakeholders' perspectives, including those of the workers, managers and employers, and inquire into the levels of support that enable innovation. The case study examples discussed in this report show an interdependence between proximal and situational factors (like co-workers

and supervisors), and workers taking the initiative to do something different or find their own ways to solve problems and to be key to innovation and learning. Workplace affordances constituted by the nature of work and industry, organisational structure and managerial practices, and work culture – mediate an innovative learning culture.

Certain organisational processes and mechanisms are crucial for an innovative learning culture. These may be about coaching and facilitating, (re)organising work and the organisational structure, creating an environment for cooperation, recognising or rewarding, and enabling collaboration across the organisation. Helping workers to frame their work in the right context and understand what is really going on, and to articulate the purposes and direction for workers to learn in times of change, such as what Mr Seng has done with Gan's Engineering SMART factory conversion, are important in that coaching and facilitating role. Leaders like Nee Choo, the Executive Director of Sunrise Home, set the tone for an innovative learning culture which is sustained by the workers themselves.

The notion of interdependence suggests that relationships are crucial to innovation. Rather than competition, collaborative partnerships may be more important for innovation and learning. The case study example of ELens Manufacturing highlights the constant work needed to build and sustain a collaborative relationship (with another institution or organisation). Here, understanding each other's priorities and interests, and the ability to openly address differences and tensions, are important in developing an innovative learning culture. While this relationship tends to be initiated by the organisation's leaders and managers, workers are required to sustain it. Furthermore, this type of relationship can only be propagated by an equality of work and a perception of fairness, or a fair deal for the people and organisations involved. Collaboration shifts business conditions from competition to cooperation, and creates opportunities for innovation.

Interdependence also suggests that an innovative learning culture is the result of collective successes in technical, marketing and organisational coordination rather than of "individual genius". Hence, organisations should strive to build an environment of openness and trust, which involves people at all levels. Empowering workers to do their work has enabled staff at Sunrise Home to organically change their roles and identities from those of "hospital wardens" to "housemates" of the residents, which has expanded the vista of possibilities that lend themselves towards a high quality of service and care.

Factors such as communication, collaboration and recognition, etc., highlight the human and social qualities of an innovative learning culture which are constituted by the processes of interpretation, understanding, meanings, and interplay of passions and interests. Hence, an innovative learning culture as an idea is situated in the complex human and social realities. As a strategy, an innovative learning culture directs a workplace to have an oriented, worker-centric, and community-focused approach to innovation and learning. As a form of management practice, it

keeps people and organisations open to the ambiguous, unexpected and unpredictable, which enhances capacities to learn and adapt.

Collectively, the case study examples in this report illustrate a diverse and dynamic innovative learning culture. They also illustrate that the key to an innovative learning culture is to focus on improving work conditions and quality of work, and enhancing work experiences for innovation and learning. An innovative learning culture embodies the qualities of engagement and participation, interconnectedness and dynamism that contribute to the sustainability of the organisation as a whole. Organisations all have the capacity, expertise and resources for innovation and learning - the point is to shift our conversations away from “SME problems” and/or “workers’ problems” to talking about the potentials and possibilities based on an understanding of the interconnections, interdependencies, and dynamism of work, learning and innovation.

6.1 Recommendations

More than just “getting incentives right”, such as the various levels of funding support available for SMEs for technology acquisition, more effort could be directed towards building, enhancing and maintaining sustainable working relationships with various partner institutions and organisations in and beyond Singapore.

This raises a fundamental question about the role of the government: whether it should take an “activist” role to drive innovation and learning, or let the market decide, or both. It highlights an opportunity to consider alternative models of work, innovation and learning, including “collaborative partnership” and/or other institutional forms (see also Bound, Chia & Karmel, 2016, p. 24).

Recently, we have seen iN.LAB providing funding support for innovation and learning projects, which also contributes to the development of an innovative learning culture. One of these projects is the Tan Tock Seng Hospital-VSM prototype development of a community tool that leverages on sophisticated technology like AI and interactive multi-media to create social archetypes, curate shared experiences, and develop as well as disseminate best practices on subject matters such as patient relationships, and interactions. As an organisational tool for building a culture and community of “kampong spiritedness”, and a platform for resolving non-clinical issues like upset and emotional patients and their families, it aims to help staff learn how they can cope better and deal more appropriately with the dynamic challenges of hospital life.

Generally, IAL recognises the importance of workplace affordances, and affirms its support for learning and innovation developments (and projects) which directly address the process of work. This study supports the planned strategy of sectoral development for innovative learning (through the sector Centres of

Innovation), and the continued involvement of SMEs to enable innovation and learning at work. At its core, an innovative learning culture focuses on improving work conditions and the quality of work, and enhancing work experiences for innovation and learning, which could be worked into the next bound of the iN.LEARN initiative. The study could also be used to help to identify innovative and learning practices, especially if they are embedded within the workplace.

Whether it is iN.LAB providing funding support, and/or IAL initiatives that focus on workplace implementation and work level intervention, capability development of workplace specialists, or strategic partnerships with public and private enterprises in Singapore, this study provides the framework, approach and ideas for thinking about, carrying out and talking about innovation and learning - in new and different ways.

For a discussion of more specific industry and organisational issues and recommendations, please refer to the two separate Industry Reports. For more specific applications of an innovative learning culture, please refer to the Research Note on the “Seven Enablers”.

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