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Innovation culture assessment: An exploratory diagnosis of a Taiwanese manufacturing company

Yong Keong TAY
Singapore Management University

INNOVATION CULTURE ASSESSMENT: AN EXPLORATORY DIAGNOSIS OF A TAIWANESE MANUFACTURING COMPANY

TAY YONG KEONG

SINGAPORE MANAGEMENT UNIVERSITY

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INNOVATION CULTURE ASSESSMENT: AN EXPLORATORY DIAGNOSIS OF A TAIWANESE MANUFACTURING COMPANY

By

Tay Yong Keong

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Thesis Committee

Thomas Menkhoff (Supervisor/Chair)

Professor in Organisational Behaviour and Human Resources (Education)

Singapore Management University

Jochen Reb

Professor in Organisational Behaviour and Human Resources

Singapore Management University

Benjamin Gan

Associate Professor of Information Systems (Education)

Singapore Management University

I hereby declare that this

Doctor of Business Administration dissertation

is my original work, and it has been written by me in its entirety.

I have duly acknowledged all the sources of information

that have been used in this dissertation.

This Doctor of Business Administration dissertation

has also not been submitted for any

degree in any university previously.

Tay Yong Keong

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ABSTRACT

INNOVATION CULTURE ASSESSMENT: AN EXPLORATORY DIAGNOSIS OF A TAIWANESE MANUFACTURING COMPANY

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The purpose of this research study is to better understand how manufacturing firms in Asia are trying to make innovation work and the challenges they are facing in creating and capturing new value. Based on a real-life case study of a medium-sized OEM lock manufacturer in Taiwan ("3ST"), the study sheds light on key building blocks of a robust corporate innovation culture with focus on 'Values', 'Behaviours', 'Climate', 'Resources', 'Processes', and 'Success', using a valid and reliable diagnostic innovation culture framework developed by Rao & Weintraub (2013).

Besides the identification of critical gaps in 3ST's innovation culture based on Rao and Weintraub's Innovation Quotient instrument (2013) and a thematic analysis of interviews, this mixed method study reveals how the various corporate status groups within the manufacturing firm (managers, supervisors, etc.) as well as the different business functions view 3ST's innovation challenges and strengths. There are conflicting views between and within the various groups and functions with regards to the urgency of innovation which makes it difficult for management and staff to work together and innovate.

Relative innovation weaknesses of 3ST include (i) the lack of innovation champions as a 'resource' as indicated by insufficient innovation activities

and dedication to promoting change within the firm; (ii) a rather poor understanding of how to make innovation work and to avail suitable training resources on innovation; (iii) insufficient innovation 'processes' such as stage-gate systems for reviewing and prioritizing projects as well as (iv) an insufficient ROI of innovation efforts ('success') that stems from the fact that 3ST is unable to operationalize commercial opportunities and monetize innovative ideas.

One failed opportunity refers to the design and development of smart locks for gun lockers. As the smart lock requirement for guns is very unique unlike 3ST's existing product portfolio, despite numerous exchanges of ideas and several rounds of change requirements for the prototypes, the project eventually did not take off as both design and cost did not meet the customer's requirements. A key issue was the lack of collaborative, customer centric prototyping skills.

Practical recommendations to enhance 3ST's innovation culture derived from the panoptical study include: 1. Turn the concept of innovation into concrete habits by promoting innovation awareness and active ideation engagement at all levels; 2. Create a knowledge depository for the transfer of knowledge and ideas across the organization; 3. Introduce a robust innovation governance framework while reducing bureaucracy in order to make innovation work; 4. Appoint innovation agents and champions to improve the participation of employees in innovation initiatives; and 5. Provide more internal and external resources to speed up the prototyping process to leverage promising innovation opportunities both within 3ST and amongst external stakeholders.

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At the same time, I would like to dedicate this achievement to my family, especially to my mum and also to fellow DBA classmates, Dr Kevin Cheong and Dr Josephine Tan for their constant encouragement, nudging and support as I slowly inched my way towards the DBA finishing line.

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Chapter 1: Introduction

In any nation or company, innovation is hailed as a crucial driver of industry and competitiveness (Galia & Legros, 2004; Storey, 2000). According to Foster and Kaplan (2000), without economic value that could be reaped, innovation remains an invention. The ability to change and adapt business models to value-add customers' life and produce economic value represents a distinct competitive advantage (Hamel, 2000). Innovation can involve creating a new product, service, process, and way of operating a business. According to Hurley & Hult (1998), one important aspect of innovativeness is being open-minded towards innovative ideas.

Disruptive technologies from machine learning to big data, are creating new challenges in the marketplace in which firms operate. These emerging disruptions are forcing companies to reinvent their business models through innovation to remain relevant. For some companies' survivability is at stake unless they innovate product designs and manufacturing strategies.

As a nation with a population of 23 million residing on a 14,000-square mile island, Taiwan is considered a relatively small domestic market, inadequate to support the growth without help from its exporting economy. According to some observers, Taiwan's future success of its technology export-dependent economy will rely on the nation's ability to innovate (Sui, 2013). During the early eighties till late nineties, Taiwan was enjoying exceptional economic growth spurred by developments on some key industries such as the personal computers, textiles and electronics appliances sectors, However, this economic success had gradually turned vulnerable for Taiwan following

price competition from other low-cost countries as well as the exodus of some technological firms (manufacturers of personal computing, mobile devices and component system) relocating to China due to cheaper labour cost. Consequently, Taiwan's advantage in low-cost hardware manufacturing is facing an impasse as it struggles to seek new innovative ecosystem opportunities or drivers to replace the old vanishing technology ecosystem. In 2015, the World Economic forum (WEF Global Competitive Report, 2015) highlighted that adoption in industrial technology requires firms to invest in acquiring new technologies from overseas or other domains. This implies that the success of Taiwanese firms is highly dependent on their willingness to invest in innovative technologies to enable them to compete and prosper in future. Then again, most of these Taiwanese firms are contract or OEM manufacturers generating modest profits which discouraged the businesses to take on more risks in adopting modern technologies to transform their businesses. The other hindrance is that Taiwan has a high business ownership rate. According to the 2019/2020 global report by the Global Entrepreneurship Monitor, Taiwan is ranked eighth in the world. The country has a very large number of family-owned and rather traditional small and medium-sized enterprises. Due to the business complacency of these traditional businesses along with an obsessive focus on short term gains, these business owners could act as a distorting intervention by impeding the efficiencies within their business ecosystems resulting in less motivation for technological adoption in the long run.

To maintain its relevance in a fourth industrial global network, Taiwan is forced to reinvent the economy to focus on innovation. For this purpose, the

government had initiated an ecosystem of start-ups in Taoyuan focusing on Internet of Things (IOT) technology that would create commercialization opportunities by capitalizing on Taiwan's high tech manufacturing advantage. At the same time, the government also subsidizes selected Taiwanese start-up teams to spend a few months in Silicon Valley, normally with Valley-based accelerators. With the help of mentors from the accelerators, these teams have the potential to gain first-hand knowledge of the American market. That in turn can shape modifications to their products, services, and business models. They also come into direct contact with consumers and buyers beyond Taiwan itself. In some cases, they have found U.S.-based business partners and investors for their companies (Feigenbaum, 2020).

According to Bloomberg's global innovation study in 2014, Taiwan ranked 10th overall among 215 nations for its capacity to innovate and 4th among Asian nations, behind South Korea, Japan, and Singapore (Vukoszavlyev, 2019). In 2020, Taiwan ranked 5th out of 135 economies by Bloomberg Economics (Taiwan News, 2020) for economic innovation. In the report, Taiwan scored the highest in IT deepening with 2.9 out of 3 but lowest in Human Capital with a score of 1 and a 2.1 score for Business climate. Given the high score in IT deepening, it is no wonder why Taiwan has the most copyrights in the world, placing it first in the list of intellectual activities. However, the low score in human capital exposes Taiwan's ability to cultivate the next wave of talent to support innovation goals. With the highest overall score among the more than two hundred evaluated nations, South Korea is the most innovative nation in the world, ahead of Sweden, the

United States, Japan, Germany, Denmark, Singapore, Switzerland, Finland, and Taiwan, but it does not top any of the seven survey-ascertained criteria (Amerio et al., 2020). China ranked 25th overall for creativity. In another separate report by the World Economic Forum (WEF) from 2019, WEF rankings placed Taiwan 4th on "Innovation Capability" and 12th overall out of 141 economies. Taiwan turned out to be the seventh-best performing economy out of 63 in the 2022 IMD World Competitiveness Assessment (Table 1). Taiwan also maintains its strong competitiveness in the sub-indices for both science and technology infrastructure. These outcomes show the impact of Taiwan's initiatives to promote R&D. The summary of the rankings is shown in the table appended.

Table 1

IMD World Competitive Assessment

Source: The World Competitiveness Yearbook 2022 (IMD), Jun 2022
The Global Competitiveness Report 2019 (WEF), Oct 2019

IMD Ranking				WEF Ranking	
Technological Infrastructure		Scientific Infrastructure		Innovation Capability	
1st	Singapore	1st	USA	1st	Germany
2nd	Finland	2nd	Germany	2nd	USA
3rd	Denmark	3rd	Korea	3rd	Switzerland
4th	Netherlands	4th	Switzerland	4th	Taiwan
5th	Sweden	5th	Israel	5th	Sweden
7th	Hong Kong	6th	Taiwan	6th	Korea
9th	Taiwan	8th	Japan	7th	Japan
11th	USA	9th	China	13th	Singapore
12th	China	16th	Singapore	24th	China
19th	Korea	23rd	Hong Kong	26th	Hong Kong

Even though Taiwan was hailed as one of the biggest manufacturing economies in the world, there is increasing competition from neighbours that may undercut this comparative advantage (Sui, 2013). Compared to its neighbouring high-performing Asian economies like South Korea, which

have huge government-backed companies with ample resources to spend on R&D and which are more willing to take risks, Taiwan is lacking in huge governmental support and backing. Thus, companies channel less resources into R&D and marketing. Some analysts have argued that Taiwan lacks a culture of being customer-centric (Guo & Zhong, 2021) because of their long history of doing B2B, producing products that are marketed under the brand names of companies based elsewhere (Sui, 2013). This possibly suggests a lack of market awareness with regards to understanding how to commercialize an innovation when introducing it into the marketplace – a view aligned with Burgelman and Sayles (1986) argument that a very important criterion for success in innovation is being able to commercialize it.

When explaining the lack of innovation in the nation, one could dig deeper and look at the corporate cultural constraints of the nation. The relative lack of innovation in Taiwan has also been attributed to the government's lack of adequate push as well as the culture of most companies (Sui, 2013). Besides the government's largely hands-off approach, many companies are family-owned and led by older generations which are more hierarchical in their thinking with a tendency to favour long hours rather than creativity. This somewhat stifling work culture and undynamic management culture has been rather stagnant since the 1980s. This could be one key reason why Taiwanese companies are facing difficulties in moving onto the next stage of growth of pursuing productivity (Sui, 2013). According to Liu, Chen, and Wang (2017), the level of internal innovation is negatively correlated to the level of family ownership. Innovation efforts and investment were significantly lower in

firms with high degree of family ownership. The existing cultural constraints also add onto the unsupportive environment for innovation as people find it difficult to do things differently without the support of the dominant elites at the top management level. When an employee's main goal is to work and clock in long hours, he can only carry out instructions and has little space or time to reflect on growth and innovation opportunities.

In response to structural innovation barriers, the Taiwanese Government established The Hsinchu Science Park in 1980, which is essentially a government-backed initiative to encourage an innovative culture in the nation. Research suggests that there are various factors that are necessary for the development of innovation parks: organizational trust, market orientation, innovation performance, regional development, and localized competition (Chen et al., 2016). Moreover, Drucker (2012) has highlighted the importance of economic factors, demand conditions and supply chain management for creating such knowledge hubs. Huang, Wu & Tsai's (2016) study of Hsinchu Science Park in Taiwan showed that the government's R&D expenditures and patent quantity have a long-term and stable relationship with performance, as well as a positive correlation with performance, and a hysteresis effect on performance. The hysteresis effect of R&D expenditures and patents on performance is significantly different in different industries. These findings suggest that the government's R&D expenditures can bring economic effects to enterprises and improve the enterprises innovation capacity.

The concept of innovation has been mostly centred around the high-technology and IT industries which depend heavily on research and

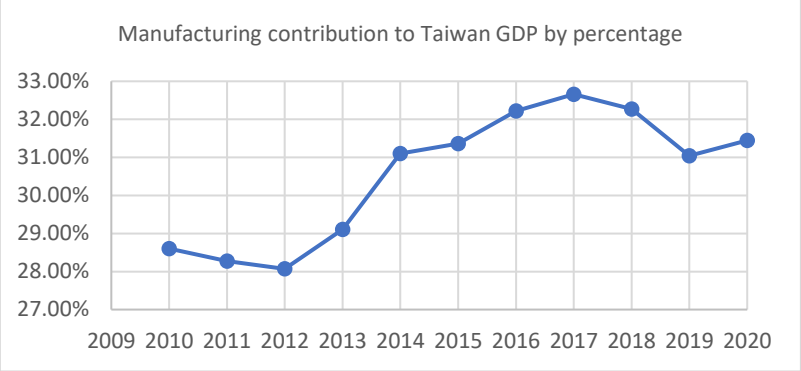
development (R&D) (Armbruster *et al*, 2008). It was only in the recent years that researchers started shifting their focus on traditional or low-and-medium-technology industries (LMT) as well as SMEs (Dadura & Lee, 2011). The results of a study by Hsueh & Tu (2004) show that three principal areas of innovation had a positive relationship with operational performance of new enterprises. Innovative action had the biggest impact on sales growth, whilst the cultivation of an innovative atmosphere and the ability to innovate within the organization had the biggest impact on profits. In a bid to reboot the ailing economy of Taiwan and restore its manufacturing global competitiveness, entrepreneurs in Taiwan are actively innovating and pursing new innovation technologies with financial support from the Taiwan government, and this innovation is increasingly reflected in the performance of their enterprises (Hsieh & Chou, 2018). More often than not, when management leadership changes business direction and adopt digital transformation in their products, processes or services, employees find themselves falling behind in the learning curve or adoption process. The fact that the Taiwan government is only interested in investing into new future-oriented industries or start-ups, the lack of IT-savviness or resistance to change means that companies in the traditional or LMT industries (low-technology and medium technology industries) struggle as the world economy digitalizes.

1.1 Reasons for Choosing the Manufacturing Industry as Study Context

Against this background, this study aims to examine the innovation culture of a particular type of LMT (codename 3ST), a Taiwanese OEM door lock manufacturing company. Manufacturing is the second largest contributor at

31.45% to Taiwan gross domestic product (GDP) of about US$669 billion (Economy-Taiwan.gov.tw). The contribution of manufacturing to Taiwan's GDP over the years is shown in Fig 1.

Figure 1
Contribution of manufacturing industry in GDP of Taiwan (Source from Statista, 2021)



There are many reasons for choosing to study the manufacturing industry. According to the McKinsey Global Institute (2012), the role of manufacturing in the global economy will continue to evolve and grow. Firstly, even though manufacturing output is increasing, the role of manufacturing in job creation experiences a shift overtime. Companies worldwide now integrate technology in the processes to drive productivity, causing employment rates in the manufacturing industry to fall as lesser people can now fulfil the job tasks. Thus, as economies mature, manufacturing becomes increasingly important to drive productivity growth, innovation, and trade exports. On the other hand, emerging economies are becoming both the source of new demand as well as the source of low-cost production as a supplier for manufactured goods (McKinsey Global Institute, 2012).

Secondly, innovation is critical for the manufacturing sector in view of the uncertain and volatile climate in the world economy and financial markets today (McKinsey Global Institute, 2012). Advanced economies need to move away and avoid sticking to the traditional old approach of doing business, as old strategies are increasingly put at risk in a volatile business climate. Apart from fluctuating prices, trade wars, disruptions in supply chain and even natural disaster are reasons to destabilize or adversely affect a manufacturing company that obtains its different parts from different parts of the world. Hence, innovation in the manufacturing sector remains crucial, and this study aims to help manufacturing companies especially in advanced economies, who are in urgent need of innovation, so as to leap into their next stage of growth.

Based on a survey conducted by McKinsey (Barsh, Capozzi, & Davidson, 2008) with 600 Global Executives, people and corporate culture were the most crucial drivers of innovation, and innovation was seen as the product of an innovative culture. Given that innovation processes are dependent on the type of industry and may be different depending on the stage of development, the rate of technological change, organizational forms as well as institutional factors (Malerba, 2005; OECD, 2005), this study will be centred specifically on a Taiwanese manufacturing company as a case study to obtain diagnostic insights into the firm's culture of innovation using an established Innovation Quotient instrument. The broad goal is to identify inconsistencies between perceptions and actual behaviours as well as thoughts and actions of different entities within the firm and to come up with suggestions to improve the firm's innovation culture.

While there have been studies done on innovation culture and organization (e.g., Villaluz & Hechanova, 2018), they are mostly focused on a more macro, industry level. Empirical insights into the innovation reality gained from an internal company perspective are relatively scarce, and this is what this study intends to contribute. The purpose of this research study is to better understand why traditional manufacturing firms are facing difficulties in innovating and reaping the benefits of innovation based on a real-life case study with findings grounded in real-life accounts of staff leading and running the company. Data were obtained from confidential surveys and interviews conducted in 3ST, a Taiwanese lockset OEM manufacturing company established in 1954.

This study analyses the company's level of innovative culture using a framework by Rao & Weintraub (2013). According to their conceptualization, an innovative culture rests on a foundation of six "building blocks": resources, processes, values, behaviour, climate, and success. These building blocks are dynamically linked. For example, the values of the enterprise have an impact on people's behaviours, on the climate of the workplace and on how success is defined and measured. The culture of innovation model builds upon dozens of studies by numerous authors which attests to its validity and reliability in assessing and identifying gaps of the company's culture. As such, deploying the assessment tool will provide us with an initial summary of the company's innovation culture with regards to these building blocks that could lead to further follow-up interviews to attain a better understanding of the results.

1.2 Introducing the Case Company 3ST

When it comes to making innovation work more effectively by investing resources such as acquisitions of physical infrastructures, assets or people do not necessary precipitate the path to true innovation. To actively innovate in a sustainable manner and to build a strong innovation culture, the way of thinking and behaviour of both the organization and people needs to evolve. In their article, "How Innovative is Your Company's Culture", Rao & Weintraub (2013) argue that corporate culture is an essential driver of radical innovation based on research performed on 525 enterprises in 32 countries (these participating countries are highlighted in blue in the Fig 1. below).

Figure 2
Source from innoquotient.com, Jun 30, 2022

As corporate culture was singled out as the key factor to drive innovation, the article highlighted the use of employing the 360-degree assessment tool to sensitize the innovation culture within the organization. Many young companies along with other older but illustrious companies such as GE and 3M were mentioned. It is interesting to note that apart from China, no other Asian countries or companies originating from Taiwan participated in the

innovation assessment. As such it is noteworthy and meaningful to use a Taiwanese company for our research since no company in Taiwan has participated in the assessment. It would also be interesting to see how the results compare against the rest of the countries that had participated in the research by Rao & Weintraub.

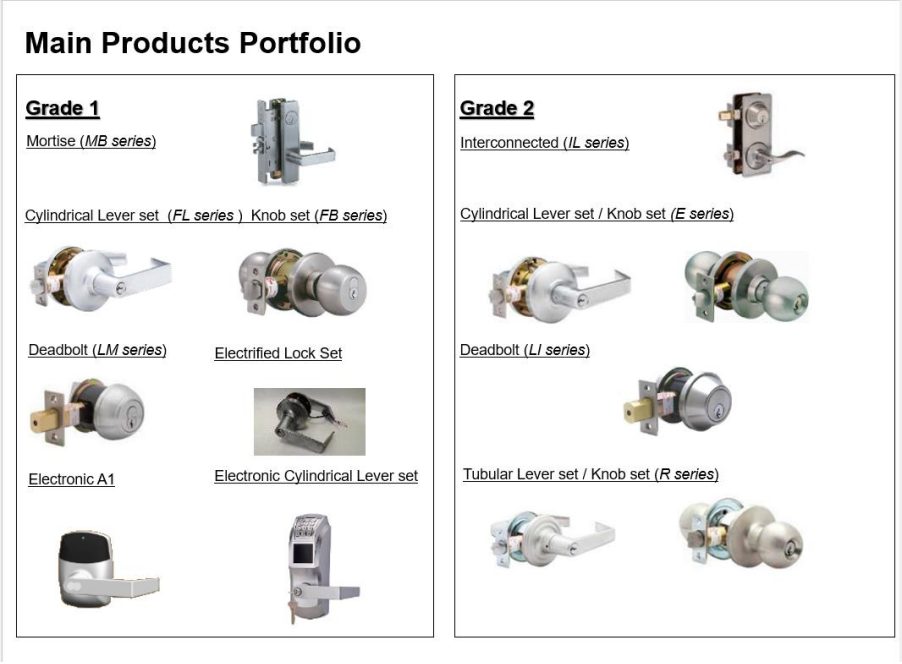
The establishment that I have picked for my study is a Taiwanese based manufacturing company located in Chiayi, a rural area with a resident population of not more than 250,000.

Figure 3
Location of 3ST
Source from Google Map

The company sits on a site area of about 28,000 square meter and has a staff strength of 249 employees with more than six decades of manufacturing experience in door locks. The company started off as a family-owned enterprise. It commenced operations in 1954 and progressively emerged as a global leader producing residential and commercial locksets in the 80s to early 90s. However, over the past 20 years, the company has undergone several changes of ownership and restructuring. The business was reorganized into residential and commercial units which were subsequently

sold to separate interested parties. In late 2017, the European company that I worked for, had acquired the commercial unit from our competitor in the USA for a value of USD700 million (3ST in Taiwan was also part of this acquisition). Following up on the post-acquisition, I was appointed as project manager in 2018 responsible for the integration of this Taiwanese subsidiary business unit into our existing network. The business unit involved is an OEM manufacturer of commercial door locksets with 60 years of manufacturing and distribution of locksets (Fig.4). After the acquisition, the company's annual sales turnover reached a record as it grew from CHF 26 million in 2017 to approximately CHF 30 million in 2019.

Figure 4
Source from SSST, September 2020



Over the past two years, the company has undertaken several initiatives to transform its business operations (including both organizational set up and product development) such as creating new business development roles to evaluate current and future product portfolios as well as developing an innovation roadmap to meet the demands of our future competitive

landscape. Concurrently, the company had also tried to collaborate with local technical universities in conceiving new ideas for our products but without much success as well as to implement new processes in a bid to stay competitive in the Original Equipment Manufacturer (OEM) market for door locks. Although there was organic growth in the business, the growth was not contributed by new product launches but by relying on existing products that have been on the market for decades. A significant share of the company's revenue currently comes from two key product lines. These two product lines have also been in the market for more than two decades and as such constantly face cost reduction pressures from market price competition. Apart from market competition and aging product line issues, the company is also facing rivalry emerging from China's supply base that produces similar and cheaper products of comparable designs.

To survive and avoid being dragged into any price wars by competitors, the company would need to innovate in both their product and processes. Despite several rounds of brainstorming and implementing key initiatives to improve our situation, there has been little or no evidence of any breakthrough innovations.

Incidentally, I came to learn about a diagnostic tool to assess 3ST's innovation culture by coming across the article entitled "How Innovative Is Your Company Culture?" by Rao & Weintraub (2013). Driven by both business interest and curiosity, I decided to initiate a companywide survey in 2020 by applying the assessment tool on this 60-year-old company so as to cognize our current innovation culture as well as understanding the challenges we need to overcome. Rao & Weintraub's diagnostic tool was

picked because of its structural methodology in effectively assessing our company's innovation culture. It provides good credentials to both validity and reliability as the diagnostic tool was jointly developed by Harvard school academicians and has been successfully deployed in companies across 32 countries. The tool helps to determine areas of inconsistencies, strengths, and weaknesses with regard to innovation practice, followed by making recommendations to improve these chasms accordingly aimed at strengthening a firm's innovation culture. Other than interest and curiosity, business planning was another key consideration in using the diagnostic tool. The strategy is to utilize the results of the assessment to define the future innovation and technology roadmap for the company since the company was lacking pace in introducing new products or processes over the last few years. 3ST does not seem to be able to increase the depth or breadth of its product lines, nor are we able to develop products with new technologies such as smart locksets. Process-wise, 3ST is still relying on existing labour-intensive workflows and it is not making any headway in transforming its business processes. The company is either oblivious or slow in embracing smart technologies such as Industry 4.0 solutions, harnessing big data and Internet of Things/IOT, process automation, for instance introducing Cobot (Collaborative robot) automation to 3ST's existing manufacturing processes. Although the diagnostic assessment had already been conducted in 525 different companies from 32 different countries across the globe, it is interesting to note it has never been used in Taiwan. Past studies concentrated mostly on western countries such as the USA and Europe (refer to Fig.1). Hence, this study will offer new information on the culture of innovation

assessment within a Taiwanese company, including making a contribution towards the literature of innovation assessment culture. New data points collated from our study on this Taiwanese firm 3ST may contribute interesting findings to the discussion about the innovativeness of Asian enterprise and by suggesting ways of how to make innovation work better in an Asian cultural setting.

Chapter 2: Literature Review

In this section, I have reviewed the relevant literature linked to innovation and organization culture. The review of the existing literature addresses the concepts of innovation, organizational culture, how innovation diffuses within an organization and barriers that are hindering an organization's adoption of innovation itself.

For many nations, the phenomenon of information spill over from one organization to another has enhanced the overall level of productivity of industries and achieved sustained economic growth (Romer, 1986). In other words, due to the spill over effect of information between organizations, it created an ecosystem and series of industrial clusters that are favourable for expansion and productivity growth for countries (Sonobe, Kawakami & Otsuka, 2003). In fact, according to Schumpeter (1912), information spill over is a crucial process that involves the dissemination of new ideas from those who innovate to followers who imitate and adopt the changes. Noting that high-performing East Asian economies are characterized by rapid capital accumulation but less of innovative technological improvements (Kim &

Lau, 1994), it is therefore important to analyse how innovation takes place within an Asian organization.

Many scholars are largely focused on the process of innovation diffusing at an industry level, spreading from one organization into another instead of the adoption process occurring within an organization (Dadura & Lee, 2011; Sonobe & Kawakami et al., 2003). Other researchers have emphasized the adoption of innovations being an issue of choice instead of the actual process in the course of industry development (Makkonen, 2008; Makkonen & Johnston, 2014).

2.1 Innovation

The concept of innovation has been widely acclaimed to bring windows of opportunities to businesses (Tsai *et al*., 2009). Whilst innovation is seen as a key driving force for achieving competitiveness (Galia & Legros, 2004), Christensen (2013) categorises innovation into both disruptive and sustaining. Sustaining innovation refers to continual efforts to improve existing functionality of products for current customers and market. Disruptive innovation focuses on "brand new" innovations that could alter the landscape and displace an entire industry. "Resources, Processes and Values" are three key factors that impact the organisation culture and capability to react to external technologies and market changes. As opposed to start-ups, incumbent organisations or titans are typically slower to react and serve an entirely new market segment due to inflexible processes along with a fixed set of dominant values. In summary, management is rendered helpless if the company's value, resources, and processes do not correspond to the target segment.

Schumpeter (1934) further defined innovation as the replacement of old traditional rules with new ones. For businesses, innovation entails changing the old ways from doing things towards successfully commercializing new products by introducing new systems as well as capturing new markets. With globalization, the rapid increase of technological capabilities, shortened span of product lifecycles, and global demand intensifying competitions, innovation is increasingly important and becoming an indispensable aspect of firms and nations.

According to Garcia and Calantone (2002), "innovation is an interactive process initiated by the invention which leads to a development, production and marketing tasks striving for the commercial success of the invention". This suggests that the successful marketing and spreading of the invention into the marketplace is the differentiating factor that sets innovation and invention apart. On the other hand, to avoid business failures, successful companies need to create new growth engines, leveraging assets to achieve new markets and maximizing resilience through repositioning of existing businesses to respond to disruptive shocks in the era of technological transformation (Anthony, Gibert and Johnson, 2017). Given that innovation is a broad topic of research that extensively reaches many other different subjects and industries, there are consequently many differing definitions, techniques, and analyses (Chandler et al, 2000; Tidd, 2001; Goktan, 2005). Anthony and Duncan (2012) have highlighted that for companies to continue their momentum and growth, they need to establish a system where innovation work is both replicable and reliable. To a greater extend, this is even more significant for companies journeying through a period of

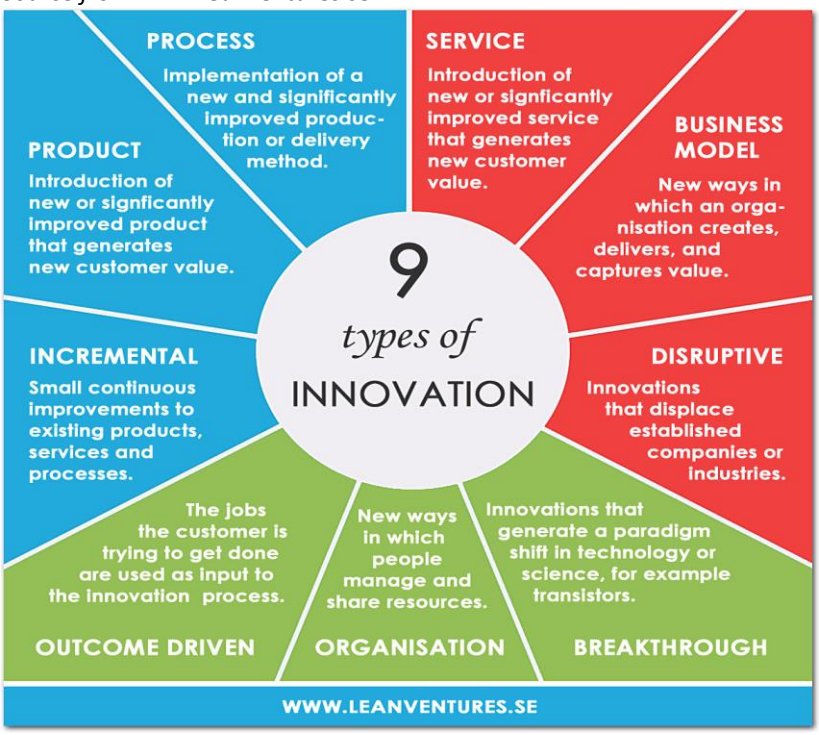
downtime. During such difficult times, firms may trim their resources to contain cost and by doing so will invariably impact the availability of resources. However, in any adversity lies a golden opportunity, Firms would need to seize the chance to innovate by making bold strategic transformation moves by co-sharing innovation risk with others. They could then offer simple, affordable solutions or providing game changing offerings that would appeal to their clients (Anthony, 2022).

According to Horibe (2001), developing an innovative culture within an organization requires building common ground amongst visionaries, dissenters, and other "troublemakers". Organizations fail at innovation because organizations cannot come to terms with the fact that innovation is disorderly by nature and is meant to disrupt planned orderliness. Here, disruption means people having different directions, visions, and views compared to the majority. He contends that organizations need to cheer on people from expressing their own 'different' voices and views. Additionally, a study found that the perceived work environment by employees influences the level of creativity that people have in organizations (Amabile, *et al*, 1996). Damanpour (1991) found that managerial attitude towards change, and internal and external communication were positively related to innovation.

With innovation becoming an extensive topic of research growing steadily, the OECD (Organization of Economic Cooperation and Development) and the European Commission have collaboratively produced the Oslo Manual (Dadura & Lee, 2011). This manual delineates the guiding principles for data collection and interpretation for innovation (OECD, 2005). Inside the

manual, there are four different categories of innovations, namely process innovation, marketing innovation, product innovation and organizational innovation (OECD, 2005). There are many innovation models but the stronger ones pivot on company culture, its process, products, and services as well as having full grasp of the market development so that the company can attune its business model to create and capture value (Fig.5).

Figure 5
9 different types of innovations
Source from www.leanventures.se



As Dadura & Lee (2011) have noted, having product innovativeness does not mean having company's innovativeness, i.e., a firm's level of innovativeness can be assessed in many different aspects. While a study found that many companies were generating more than half of their sales from new products and services (Kuczmarksi et al., 2000), the newness of a product does not quasi automatically have a positive effect or influence on an organization's overall innovativeness. Hence, considering that 3ST's latest product

innovations are not generating much sales, this study serves to analyse the company's innovativeness and to identify innovation culture gaps (e.g., to improve sales revenues).

"Innovation is a function of an organization's culture" (Yates, 2011). Despite the numerous research studies done on the effects of culture on people, there is a gap in the existing literature for studying the effect that cultures can have on the process of innovative thinking (Yates, 2011). While managers may set the directional change for the company to embrace digitalization and innovation, the success of innovation is dependent on how effective the adoption or diffusion process of innovation trickles down to the employees. Particularly in the manufacturing industry where the factory workers make up the foundation of processes to manufacture products, their participation and receptiveness is crucial for effective diffusion and adoption to take place.

2.2 Organizational Culture

While studies regarding innovation as topic have flourished, there is also an increased attention towards organizational culture that emerged from the increase in competition among firms worldwide (Tharp, 2009). For instance, considering how successful foreign companies such as Toyota were at one point in time, it set off a debate on the effects of different corporate values and practices on a firm's performance (Tharp, 2009). Organizational culture was viewed as a value trait of a company that could be trained and managed to boost performance (Guiso, Sapienza & Zingales, 2014).

'Culture' is a vague and intangible concept, and researchers have struggled to define it and related terms such as 'organizational culture' (Barnes &

Smith, 2008; LaCasse, 2010). Others have tried to come up with different categorizations of cultures. According to Quinn and McGrath (1985), a corporate culture can exist in four forms: rational culture, developmental culture, consensual culture, and hierarchical culture. Wallach (1983) developed three typologies of organizational culture, namely bureaucratic culture, innovative culture, and supportive culture. Additionally, Petrock (1990) suggested different cultural types: clan culture, market culture, adhocracy culture as well as hierarchy culture. To sum it up, an organization's culture includes shared attitudes, beliefs, unspoken norms and experiences by employees in a company and also works as a manual for what is expected of an employee (Yates, 2011; Rao & Weintraub, 2013). Organizational culture serves as a significant part in deciding about the qualities, beliefs and working systems that give rise to form a workplace climate (Morcos, 2018).

2.3 Open/Closed Systems

According to Bertalanffy (1981), there is a remarkable difference between an open and closed organizational system, and this difference lies in the way energy is transferred within the organization. A closed system is one that does not give to or receive energy from its environment. On the other hand, an open system takes energy from and gives energy to its environment. Newer forms of innovation management such as open innovation (Chesbrough, 2003) fall into this category. Although Bertalanffy had claimed that all systems would eventually open up as closed system would eventually cease to exist, critics have argued that general systems theory has failed to

appreciate the diversity of values and organisational conflict that could arise within the organisational systems (Peery, 1975). In contrast to a silo and secrecy mentality exhibited by a closed system, open innovation acts as a bridge that allows extensive exchange of knowledge (both in and out flow) between internal team and external networks to solicit new ideas and solutions to hasten internal innovation to attain market expansion. An organisation is viewed as a system which embodies many sub-systems. Whilst the organisation may be open, some of the sub- systems may be closed (Allen, 2018). A closed system will inhibit individuals from seeing themselves connecting with other systems. This can happen amongst different business functions internally. It can also prevent keeping in touch with external stakeholders and their ideas. According to Allen (2018), the state in which an organisation is either an open or closed system would also influence the perception of leadership of the organisation. It is also maintained that firm's boundaries existed between an organisation and the external environment for a closed system and assumed such external dynamics would not have impact the organisation internal dynamics. Such a dividing line would effectively preclude any individual from interacting with a connected sphere that is filled with relationships. A closed system will also impede any organisation to succeed as it wasn't looking outside for evolving technologies or landscapes for new businesses due to its controlled governance or policies. Separately, with his emphasis on multicultural dimensions, G. Hofstede (2011) refers the concept of open and closed systems to internal and external communication and the ease of which

external parties and new joiners are perceived and integrated into the organisation.

2.4 Diffusion of Innovation within an organization

There has been much research done by studying the diffusion of innovation between organizations instead of within an organization, and there is a widely accepted assumption that diffusion of innovation between and within organizations are similar processes (Mansfield, 1968). Given that effective diffusion of innovations can help to narrow the gaps between the information known within an organization and what is practiced, understanding how the spread of innovations works within a company can be a practical concern. Innovation in a manufacturing context will take a long time for effective diffusion to occur (Cool, Dierickx & Szulanski, 1997). The same researchers also noted that power struggles within a system may affect the rate of diffusion. It is said that innovations are usually started by at least one individual who then tries to persuade others to help and garner interest in their execution, effective communication is critical in this persuasion process (Johnson, 1990).

From the perspective of a successful diffusion process, the rate of diffusion will experience a sharp and quick growth effect following a stagnant and lacklustre initial start period. This sharp growth usually takes place after 20-25% of the potential adopters have adopted the innovation (Rogers, 1983). This follows the S-curve model, which delineates a process where the innovation has been communicated and disseminated through certain channels over time among the members of a social system (Rogers, 1983).

The four key elements of the diffusion of innovations as described by Rogers (1983, 1995, 2003) are innovation, communication channels, time, and the members of the social system.

Innovation diffusion theory by Roger describes the speed and pattern at which new ideas, practices or products spread through a population. The theory's main actors are innovators, early adopters, early majority, late majority, and laggards. The process through which certain people are more likely to accept the invention than others rather than happening simultaneously in a social system is known as "innovation adoption". According to research, those who adopt innovation sooner than those who acquire them later have different traits. Innovative methods and equipment for enhancing processes and goods are only useful to the extent that they are put to use. It serves no purpose for higher management to invest in an informational technology innovation that will be used by all parties involved in the organization to increase efficiency or effectiveness unless those parties actually use the innovation and use it well. Internal diffusion of innovation happens when the innovative products are being utilized and adopted by the internal members of an organization (Min et al., 2021). The external diffusion of innovation happens when the innovation is successfully communicated to the outside society and utilized (Min et al., 2021).

Successful (internal) diffusion of innovation happens when members of the system have received and are aware of the innovation. When a sufficient number of members has adopted the innovation, the rate of diffusion of innovation will sharply increase to infect others within the system. Essentially, the process of diffusion will start off with establishing an

innovation and then utilizing ‘innovation champions’ who are influential early adopters to capitalize on their large network of influence to reach the later adopters in the social system (Rogers, 1995).

However, if one were to adopt Rogers’ (1983) way of explaining the diffusion process, one might be assuming that all adopters of innovation are situated in similar contexts and opportunities to adopt an innovation. This would be myopic as we neglect the conditions faced by potential adopters (Cool et al., 1997). As diffusion occurs within the organization, it will pass through many channels and requires time. Simultaneously, this innovative idea could be revamped and tweaked while it spreads to different people. The changes made to the innovation may subsequently affect the outlook and adoption decision of the late adopters (Nord & Tucker, 1987). Moreover, within an organization network, the diffusion of innovation could be catalysed or adversely affecting the spread to the rest of the organization in the presence of power struggle – which effectively renders the traditional view of how the spread of innovation could work. What this means is that the powerful elites could exercise power when deciding if the innovation would be beneficial to their own interests or not, which in turn dictate the pick-up of the innovation by adopters (Cool et al., 1997).

2.5 Banality of Organizational Innovations

Some theorists view organisational phenomena as either substance or process. Whilst some view innovation as novel outcomes with recognisable properties serving the needs of users with fixed and known preferences (substance), others have viewed innovation as processes denoted by fluidity

and change (Langley, Smallman, Tsoukas, & Van de Ven, 2013). Whilst substance phenomena are viewed as discrete events with steady properties where organizations need to develop substantive view, i.e., a central philosophy that built on innovation governance (Deschamps, n.d.) to perform. Processes on the other hand perceive how the phenomena unravel activities over time typified by "interactive relatedness, wholeness, activity (self-development), innovation/novelty" in a fluidity approach (Rescher, 1996, p.35), in short, organization would need a processual view to transform.

There is a difficulty in sustaining innovation as part of a company's activities. This difficulty arises because of the incongruity – innovation journeys are usually characterized by uncertainty while companies are usually structured in fixed ways that are and requires certainty as a management (Garud, Gehman, Kumaraswamy 2011). Researchers have argued that innovation should feed on ambiguity and complexity to sustain the innovation journey as opposed to organisations which seek clarity and consistency through scientific management principles. Thus, one would need to employ substance-process duality to examine innovations and organisations (Garud, Gehman & Kumaraswamy, 2011b; Dougherty & Dunne, 2012). Meanwhile other researchers have reconciled the two ways and perceive organizational phenomena as both substances and processes (Garud & Turunen, 2017), giving rise to the duality of substance and processes. More importantly, this duality is intensified because of the advent of technology in recent years that enables the "dematerialization" (Normann, 2001) of innovations. In other words, technology has intensified the speed by which new products and

services enter the marketplace, resulting in challenges to differentiate the time lapses (Schrage, 2013; Yoo, Boland, Lyytinen & Majchrzak, 2012).

2.6 Resistance to Change

As this study focuses on innovation taking place within an organization and given that social groups exist within all organizations, an interesting question is how social groups contribute to organizational innovation changes. Top management who seeks organizational changes within the manufacturing industry face the uncertainty of whether workers would accept and support the changes (Betlejeski, 2017). Maurer (2011) has highlighted that 70% of change initiatives by organisation fail due to workers' resistance. The failure is largely attributable to workers' resistance. Many organizations fail to consider how resistance could impede change initiatives as the workforce in many industries often oppose change efforts to preserve the status quo (Stonehouse, 2012). This workforce preserving status quo needs to be disrupted if one wants to innovate. Unless they benefit from the change, workers would tend to resist them (Hodson, 2010) whilst other workers would compare potential benefits and advantages with the current system (Rogers & Havens, 1962). If a worker perceives that there is little advantage to make a change, the worker tends to hold back and refrain from adopting the innovation (Rogers & Havens, 1962).

2.7 Barriers to Innovation

According to Freel (2000), innovation is a necessity for a country's economic growth, and it is key for firms to be competitive. Understanding the barriers to innovation is beneficial so that firms can work on encouraging innovation or developing an environment well suited for innovation itself (Hadjimanolis, 1999). According to Bergemann (2005), uncertainty and ambiguity of the innovation journey deter the firm from innovation. If an innovation is accepted by the marketplace and brings high returns to the firm, it is desirable. However, an innovation failure together with poor decision making could affect a firm adversely. Thus, risk-averse firms tend to create higher barrier to innovation (Hausman, 2005). Previous research revealed that some of the barriers to innovation included cost, people, institutional constraints, organizational culture, accessibility to information and governmental policy (Mohen & Roller, 2005; Baldwin & Lin, 2002).

There are two categories of barriers to innovation – internal barriers and external barriers (Madrid-Guijarro, Garcia & Auken, 2009). Internal barriers are potential obstacles that the firm may face internally such as the low availability of financial resources and perceived risks. External barriers will be discussed further below.

Amongst the barriers to innovation, cost has been singled out as one of the greatest barriers to innovation because of the uncertainty of innovation which may deplete financial resources (Bergemann, 2005). Another significant internal barrier of innovation is the people factor – specifically having weak management commitment can be a sign that the firm is not supportive of innovation (Madrid-Guijarro et al., 2009). Within the organization, both

employees and innovators often contend against an innovative strategy and the value it brings (Storey 2000). Resistance is often aligned to a direct management style, and employees resist innovation because of poor communication, existing corporate norms, and poor commitment of top management (Zwick, 2002; Osterman 2000). The adoption of innovation requires employee commitment and effort (Acemoglu and Pishke, 1999). Moreover, Baldwin and Lin (2002) posited that the resistance to change could be possibly an outcome of insufficient training or poor employee skills, which remains an organizational challenge.

Considering the fact that 3ST has been operating as a family-owned business for a long time prior to the acquisitions, all past key business decisions were decided by selected family members at senior positions with little or no participation from other levels of employees, basically a top-down directive. Thereby, it was observed that the innovation leadership at 3ST was not highly visible. The involvement of the middle management team in innovation activities was unidirectional. Even if they had disagreed in silence, the managers would just accept the directives from higher management without any hesitation. They would in turn expect their direct reports to execute despite concerns raised from the ground.

On the other end, external barriers could also exist in form of pressure or reasons for contributing to an unsupportive environment for innovation – such as global competition, governmental policies, and economic uncertainty. According to Khan & Manopichetwattana (1989), there is a positive relationship between external economic uncertainty and the rate of innovation. In other words, organizations placed amidst a more happening

external environment are more inclined to innovate because they are forced to remain competitive for survival. A lack of information in market opportunities, policies and technology can be barriers to innovation (Frenkel, 2003; Hadjimanolis, 1999).

2.8 Executive Hubris

Hiller & Hambrick (2005) have posited that a deep sense of positive self-inflating ego would adversely affect a firm's decisions and outcome. This problem is so widespread that many studies have looked at the phenomenon of executive hubris occurring within an organization (Hayward, Shephard & Griffin, 2010). Executive hubris refers to an extreme level of perceived self-evaluations and self-confidence that high ranking executives possess (Hayward & Hambrick, 1997) which significantly affects the firm's decision making and direction. Tang, Li & Yang (2012) extended the concept of executive hubris to the context of firm innovation. Firm innovation denotes as creating knowledge during a firm's operations (Daft, 1982; Wadhwa & Kotha, 2006). Miller and Toulouse (1986) further argued that a firm's innovation could be shaped by senior executives. Executives with an external locus of control are more passive toward innovation as opposed to those with an internal locus of control where executives are more self-assured with regard to their innovation efforts. Such cognitive characteristics can influence decision making and a firm's innovation. Additionally, the executive hubris phenomenon could be explained by the Upper Echelons theory which states that the mental qualities of top management in a firm can impact company's choice and results subsequently (Hambrick & Mason,

1984). Demographic and characteristics of high-ranking executives have the power to influence and shape a firm's innovation. With reference to top executives' demographics and characteristics, a study by Young et al. (2001) found that in an instance when a public hospital's top executive was older, with better education and prior exposure to innovative practices, the medical facility was more likely to adopt innovative practices (Young et al.2001).

Additionally, cognitive characteristics of executives could also influence decision making and firm's innovation. Having an internal locus of control refers to the situation where people are self-assured that any behavioural outcomes is the direct cause of their own efforts, as compared to an executive with an external locus of control and are more passive with innovation as they believe that such events are beyond their control (Miller & Toulouse, 1986). Thus, top managers with an internal locus of control are found to be more inclined to pursue product innovation. Hubristic executives who perceive themselves to have a lower chance of failing are generally willing to bear more risks, which in turn makes them pay greater attention to innovation and increase their desire and tenacity for innovation cause (Galasso & Simcoe, 2012).

All in all, as executives' hubris increases, they become increasingly drawn towards the potential higher returns of firm innovation and consequently allocate more managerial resources to that innovation cause (Tang, Li & Yang, 2012).

2.9 Behavioural approach to organizational innovation adoption

The effective adoption of technologies is a crucial step for a company to reap benefits from technological development and to achieve competitive advantage (Makkonen, Johnston & Javalgi, 2016). The challenge to study how an organization reacts to or adopts innovations lies with the fact that there are currently no unanimous views of defining innovation adoption despite various attempts by researchers to unify the diverse concepts, variables, and processes (Makkonen, 2008). While numerous authors have highlighted the distinction between Adoption *Choice* and Adoption *Process* (e.g., Makkonen, 2008), Mohr (1982) distinguishes between *variance* (analogous to choice) and process approaches from the perspective of organizational phenomena. He articulated that innovation adoption should be understood as choice since it has traditionally been classified under diffusion research. Simultaneously, seen from a process perspective, innovation and change of behaviour takes time (Frambach & Schillewaert, 2002). In other words, the effective adoption of a technology innovation can be analysed in a stage-wise manner as a process instead of a choice issue. One can view the adoption of innovative technology as a matter of choice only when faced with innovation that is completely new and significantly superior to the old one – for example, a farmer deciding whether to plant a hybrid seed corn in replacement of his old traditional planting of natural corn seeds (Ryan & Gross, 1943). In such straightforward cases, innovation is focused on deciding whether or not to take up the innovation technology.

However, when analysing the adoption of innovative technology within a firm, this may involve many other stakeholders who may have differing

concerns and reactions. More importantly, focus should be on the adoption process and behaviours that are associated with the change and not on newness or novelty (Makkonen et al., 2016).

An organization is made up of many different individuals playing different roles and there are inherently social relationships embedded within the workings of a company. Thus, when an innovation is introduced from the top management down to the support level staff, it might prove useful to study how the social system works in the company. The act of effective adoption and diffusion of innovations in a company can be analysed on a social-system level diffusion pattern, which is essentially "the process in which an innovation is communicated through certain channels over time among members of a social system" (Rogers, 2003). In this instance, the emphasis is placed on the *how* – which explores explanatory factors that enables effective adoption to take place. These factors serve to explain *why* innovation adoption can happen successfully and is focused on "the macro-level diffusion pattern rather than the micro-level adoption pattern" (Makkonen et al., 2016). The researchers posited that for effective adoption and diffusion of innovations to take place, one would need to look to its communications and process of imitations.

According to Rogers (2003), being aware and knowing that a certain innovation exists is the first step of the adoption process. However, other researchers argue that during development, the firms are continuously collecting and analysing information, making it difficult to accurately deem the first step of being aware of an innovation (Makkonen, Johnston & Javalgi, 2016). Often times, the firm gains new information while gathering

information and is already aware of the different potential or alternatives out in the market even before an innovation process begins. Thus, organizational adoption behaviour of innovative technology is dependent on how well the company prepares, perceives, and matches potential and actual needs with solutions (Makkonen et al, 2016). This is an ongoing process that requires continuous adoption.

2.10 Personas to represent innovation culture

Personas, which properly characterize customers and articulate what they want to achieve, are a typical design tool to better understand individuals and enhance the creation of products and services (Cooper, 1999). Personas can serve as representations of archetypal users and make it easier to comprehend their behaviours, requirements, motivations, traits, and constraints (Haines, Victoria, and Val Mitchell., 2014). Particularly for large corporations or multi-partner initiatives with a wide collection of stakeholders and holistic user research challenges, having a modest number of personas can help to make genuine users more visible. Such personas are used to represent the actual users. To make accurate depictions of the user base, they are given genuine names, photos, demographic data, and text descriptions (Marshall et al., 2015). For example, as described by Burrows et al. (2015), in order to provide a more complete picture of the technological interactions of home automation users in actual settings, a set of personas were used to portray these users. Marshall et al. (2015) demonstrated the use of personas in assessing the availability of rail transportation. Their findings highlighted

navigational and ticketing failure points at stations, which influenced design recommendations.

Personas can be employed for a variety of reasons, including to facilitate focused design and serve as a climactic communication tool. All project team members can receive information from personas based on market research, user testing, and prototypes (Grudin and Pruitt, 2003). In order to combat automated thinking in the design process, the persona description strikes a balance between data, understanding of usage and use contexts, and fake information added to further involvement (Nielsen ,2011). According to Kelly and Littman's (2005) thesis of the "10 Faces of Innovation," a business needs 10 different types of personas to support a stimulating environment. Each of the three categories is broken down into the ten various personas. The 10 different personas are in turn grouped into three categories. The first group consists of personas that are always seeking out fresh information. The organizational personas fall under the second group; they are primarily concerned with organizing a work of the organization and maintaining a perspective of what has to be done. The final group, which possesses the abilities to create the ideal setting for innovation, is the building personas. Different types of personas are (Kelley & Littman, 2005):

1. Learning Personas

a. Anthropologist

Employ scientific methodology to everyday situations and use findings to inspire new inventions.

b. Cross-Pollinator

To discover new inventions, interconnect ideas and/or thoughts that may not be immediately clear. brings oddly outside concepts to the company.

c. Experimenter

a risk-taker who frequently experiments with various settings in a bid to give ideas a shape. There is a strive for efficiency throughout the entire process.

2. Organizational Personas

a. Hurdler

a person who enjoys solving problems and is especially drawn to new situations. are adept at overcoming possible difficulties while maintaining a cheerful outlook. Looks at failures as turning point to successes.

b. Director

Establishes the scene and is aware of the wider picture. They can see what has to be done thanks to this overview, which also serves to inspire employees.

c. Collaborator

A genuine team player who values cooperation highly. a motivator who propels team members toward common goals within a company.

3. Building Personas

a. Experience Architect

Focus on creating extraordinary personal encounters. are adept at transforming the commonplace into something extraordinary.

b. Set Designer

Establishes the working conditions that encourage innovation in organisations. To encourage innovation, they stay up with changing needs and adjust things to the actual work environment.

c. Storyteller

Can elicit feelings and actions from their audience, which promotes cooperation. They lead everyone's future travel in the same path.

d. Caregiver

Establish personal relationships with each customer which gives valuable customer insights.

Chapter 3. Problem Statement, Purpose of Study and Conceptual Framework

The literature review suggests that an organization's culture has a significant effect on the performance of organizations (e.g., Idris, Wahab & Jappar, 2015) such as 3ST. Despite being a pioneer in the lock manufacturing industry for six decades, the company in study seemed to be unable to leap into the next phase of growth – growth that is driven by innovative technology and capitalized on the 4th wave of disruptive technologies. Whilst the company attempted to develop technologically enabled smart locks in recent years, the contributions coming from this newly minted portfolio had not been encouraging. The main source of earnings supporting the company financial performance is still attributable to their mechanical locks. As Dadura & Lee (2011) have noted, product innovativeness does not equal a company's overall innovativeness. Thus, this study aims to examine how company culture could affect the level of innovativeness inside the firm. It is common for workers to have the tendency to maintain status quo and resist change efforts (Stonehouse, 2012). Therefore, we are interested to find out if and how a company's compliance culture influences a company's innovative

environment. Assessing 3ST's innovation culture could also help other companies that possess a similar (compliance) culture to gain valuable insights so that they can take corrective action and build a stronger innovation culture.

3.1 Purpose of study

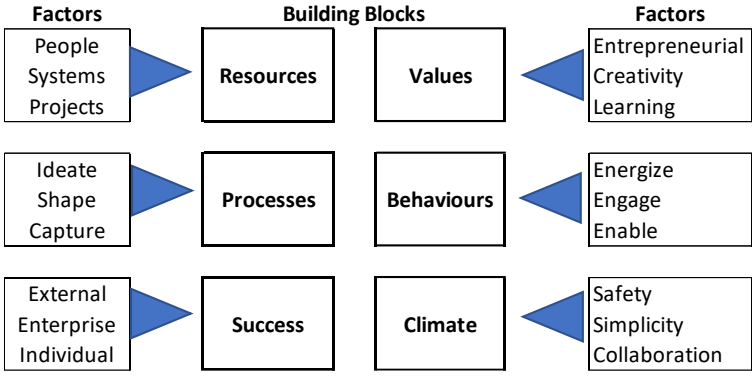
This research tries to examine in what ways the Organization Innovation culture assessment framework by Jay and Weintraub (2013) can benefit a Taiwanese manufacturing company (3ST) to make innovation work more effectively as it takes on the fourth industrial wave involving disruptive IOT. The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Globalization is a disruptive wave that will consume and affect organizations and those unable to keep up with this trend would perish. The research aims to contribute to the limited literature about how a company's culture affects the adoption and diffusion of innovation within a firm. Another goal is to contribute to the existing theory about the relationship between an organization's culture and innovation, specifically for an organization that has a less-open culture. The findings and recommendations can be used for the development of public policy aimed at supporting and encouraging innovation in traditional industries with compliance culture organizations or they could be used as actionable insights for managers who want to encourage greater innovation in their firms.

Using the analytical insights gained from surveys and in-depth interviews with all levels of employees in the company, we will be able to breakdown and identify potential discrepancies between employees at the top management level, the executives as well as the supporting staff. In sum, the findings can provide a comprehensive view of 3ST's innovation culture and capture the perceptions of many internal stakeholders aimed at making recommendations for further enhancing the firm's innovation management approach.

3.2 Conceptual Framework: Rao & Weintraub's Culture of Innovation Model

The design of the research has incorporated the assessment instrument by Rao & Weintraub (2013) to survey different layers of the company, namely the managerial, executives and support staff levels. To assess the innovativeness of a company, one could consider assessing the innovative culture that exists within the company. Given that the objective of this study is to shed light on the "how" and "why" of 3ST's innovation culture, we will integrate Rao & Weintraub's (2013) Framework Analysis approach as a structured method for organizing, categorizing, and analysing multiple data sets.

Figure 6: *Six Building Blocks & 18 Factors*



Taking the company as a unit of analysis and given that 'culture' is difficult to measure, the study utilises Rao & Weintraub's (2013) 360-degree assessment tool of the 'Six Building Blocks of An Innovation Culture' (see Fig 6). The intent of this diagnostic tool is to generate insights about the state of a company's current innovation culture and work on specific areas where improvements are required to build a stronger innovation culture. The analytical process of Framework Analysis enables the assessment of the current processes and brings to light some of the underlying issues with regard to the implementation of policies, socio-behavioural patterns, and procedures (Srivasta & Thomson, 2009).

An innovative culture is formed by the Six Building Blocks of Innovation: resources, processes, values, behaviour, climate, and success (Rao & Weintraub, 2013). These blocks of innovation are interlinked by the sequential or casual relationships where one block could affect another block. To illustrate, the *values* that the company uphold may lead to a certain environmental *climate* that employees work in, encourage certain employee's *behaviour*, and determine how the company views *success*. In practice, many firms excel at managing the technical, hard tangible aspects of innovation

such as ‘resources’, ‘processes’ and ‘success’ – the left-brained, rational, and tools-like building blocks. There is a lesser focus on ‘values’, ‘behaviour’ and ‘climate’ – the right-brained, soft, emotional, and human-centric tools that inevitably forms innovative culture (Rao & Weintraub, 2013).

In this analysis, each of the six building blocks entails three factors and within each factor, there lie three other underlying elements – amounting to a 54-item measurement in totality. Moving from the abstract building blocks towards more concrete elements enables us to better measure the innovative culture of an organization. From example, the abstract block of behaviours involves the factor of energizing, can be further broken down into inspire, challenge and model (Rao & Weintraub, 2013).

Values – values are beliefs that reflect what a company stands for and values. Values also determine where the company place their resources. An innovative company channels their time, energy, and monetary resources on igniting creativity, building an entrepreneurial spirit as well as enforcing a culture of lifelong learning (Rao & Weintraub, 2013).

Behaviours – behaviours are the actions that managers and employees undertake during innovation. At the management level, such actions include getting employees involved to envision tomorrow’s future together and moving away from a rigid conformity of rules. On the employee level, actions such as thinking out of the box to solve problems and persevering in times of technical obstacles are important behaviours (Rao & Weintraub, 2013).

Climate – climate is the environment of the workplace. Having an innovative climate means having a collaborative and enthusiastic workplace that is fuelled by trust. This would serve to create an ecosystem of independent

thinkers amidst a learning environment. Climate is key in fostering an innovative company culture because it helps to enhance employee engagement and open-mindedness to change, which is crucial mediating channel between the individual employee and firm-wide performance (Rao & Weintraub, 2013).

Resources – resources play the role of supporting innovation initiatives and efforts. It is made up of namely individuals, assignments, and processes. Individuals who promote and push for innovations are crucial because such leadership have the power to mould the company's values and climate overtime. People can come together to form a community that has a strong support system and work towards a common goal of innovation (Rao & Weintraub, 2013).

Processes – processes are the procedures or ways in which ideas and thought-leadership is disseminated or shared in the company. It consists of three factors – ideate, shape and capture. While many company have mastered or have innovative processes set in place, they are missing the puzzle piece of having human systems that could pair and complement the processes effectively (Rao & Weintraub, 2013).

Success – success looks at how innovation performance is viewed, assessed, and rewarded. An innovative culture relies on the success in three areas – external, enterprise and personal. Success plays a significant role as a feedback loop that affects the other five building blocks of innovation (Rao & Weintraub, 2013).

Using Rao & Weintraub's (2013) framework analysis, the scores would be able to sieve out inconsistencies between perceptions versus reality and

provide insights that could help diagnose the company's strengths and gaps. Having a breakdown of 54-item blocks (see Fig.7) would be helpful in navigating the complexities of a company's innovation culture and help to further pinpoint areas for focused growth. Using this innovative assessment tool can be a first step for a company to enhance its culture of innovation, especially if it has a compliant culture.

Figure 7*:*

Fifty-four Elements of Rao & Weintraub's Framework

Values	
Factors	Elements
Entrepreneurial	Hungry
	Ambiguity
	Action-oriented
Creativity	Imagination
	Autonomy
	Playful
Learning	Curiosity
	Experiment
	Failure OK

Behaviours	
Factors	Elements
Energize	Inspire
	Challenge
	Model
Engage	Coach
	Initiative
	Support
Enable	Influence
	Adapt
	Grit

Climate	
Factors	Elements
Collaboration	Community
	Diversity
	Teamwork
Safety	Trust
	Integrity
	Openness
Simplicity	No bureaucracy
	Accountability
	Decision-making

Resources	
Factors	Elements
People	Champions
	Experts
	Talent
Systems	Selection
	Communication
	Ecosystem
Projects	Time
	Money
	Space

Processes	
Factors	Elements
Ideate	Generate
	Filter
	Prioritize
Shape	Prototype
	Iterate
	Fail Smart
Capture	Flexibility
	Launch
	Scale

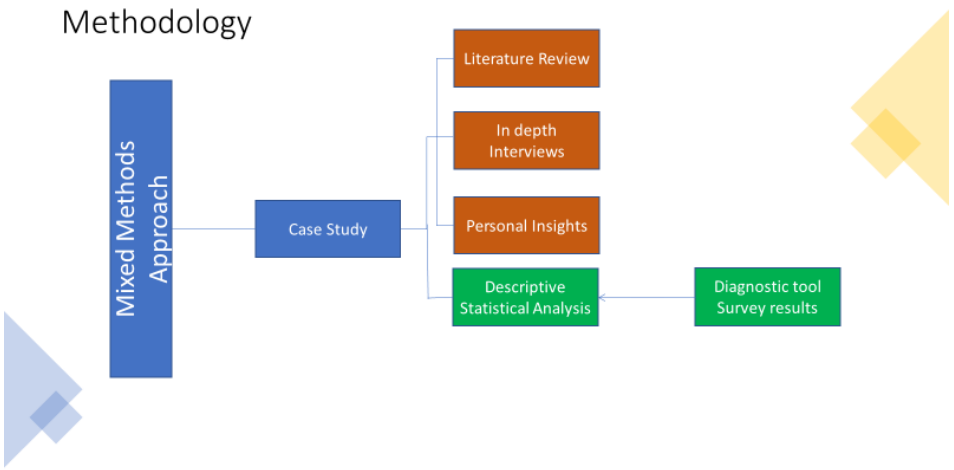
Success	
Factors	Elements
External	Customers
	Competitors
	Financials
Enterprise	Purpose
	Discipline
	Capabilities
Individual	Satisfaction
	Growth
	Reward

Chapter 4. Methodology

The study employs a case study analysis of a door-lock hardware manufacturing firm in Taiwan, using the Six Building Blocks of Innovative Culture (Rao &Weintraub, 2013) as grounded framework of analysis. The case study chosen for our research involves the inclusive study of a real-world subject or event (Yin, 2014). Whilst a case study may fall short of generality as opposed to surveys with large scale fixed point, it offers more depth, a better contextual understanding of issues and the benefit of accuracy (Woodside, 2010; Dekkers et al., 2013).

There are three different research methods a researcher can undertake, namely qualitative, quantitative and the mixed method (Jain, Sharma & Jain, 2015). The research methodology chosen is the mixed-method measure. It is a mix of both a qualitative case study of a Taiwanese manufacturing company and a quantitative analysis of survey data (See Fig.8).

Figure 8:*Methodolgy*



According to Corbin and Strauss (2008), using qualitative analysis is a way of analysing and making sense of the data, which then helps the researcher gain insights, deeper sensing, as well as build up empirical theory. This investigative process in qualitative measure highlights the significance of studying factors and make meaning out of a behaviour or certain group or individual (Creswell, 1998). On the other hand, quantitative analysis is a more systematic way of classifying numerical data to sieve out important patterns or phenomena taking place. We have chosen a combination of both for this case study. However, we will not enter into a deep discussion using the quantitative approach. We intend to investigate if relationships exist between the building blocks as well as the variables that we have introduced. The statistical analysis of the measured data will further complement our

study by offering quantitative insights that may lend grounding as well as new contextual knowledge for our study.

4.1 Case Study Design

At the initial stage of this qualitative study, there were a few research designs to be considered – narrative, phenomenological and case study. These three different research designs differ in their purpose of what the study aims to find out. It is necessary to understand all the research design to understand which will be accurate for the current study to be used. Firstly, a narrative research design is one that is grounded on personal recounts, stories, diaries and even interviewing so that the research can echo these narratives altogether to form a picture (Yin, 2014). However, as Tsang (2014) has noted, it is insufficient to decide or provide concrete recommendations for a company simply based on personal stories. Next, the phenomenological research design is usually employed when the researcher is interested to find out about an experience that many people went through before (Jain et al, 2015). While this may be helpful to find out about employees' experiences working inside the organization, there is the possible risk of having biased opinions since it is based on personal recounts. Thirdly, the case study research design is typically having a closer look into an organization and the researcher would be able to find out more (Yin, 2014).

I chose the case study design for data collection and an in-depth dive into the organizational reality of 3ST. A qualitative single case study is well suited to the objective of our study: identifying cultural innovation gaps within the case study organization and to contribute to the scarce literature pertaining to innovative culture. Given the variety of data collected through various

methods, the study explores and covers multiple perspectives, which in turn helps us to find behavioural patterns that exist in the organization (Baxter & Jack, 2008). Qualitative studies have the strength to make valuable contributions to the existing theory and empirical case studies (Merriam, 2009). While using a case study has its limitations with regards to general applications or extended use for a wider area of research, it helps to discover underlying issues that take place in the real-life corporate context. Opponents of qualitative studies have challenged the usefulness and validity of qualitative studies, citing reasons such as the lack of structure and rigor which can lead to weak conclusions (Baxter & Jack, 2008; Srivastava & Thomson, 2009; Stake, 1995). According to proponents such as Yin (2003), case studies are very valuable and are linked to evaluative research in five ways, namely explanation, description, discovery, illustrative purposes as well as to act as a launch pad for meta-evaluation analysis. Yin (2003) posited that by employing case studies, one would be able to find out the process and rationale within a real-life context. Others have emphasized the lack of available tools useful for qualitative analysis (Attride-Stirling, 2001) and suggested for data to be carried out in a methodical analysis manner so that the qualitative research would become more useful and meaningful. Hence, this study will utilize the Six Building Blocks of Innovative Culture (Rao & Weinstraub, 2013) diagnostic tool as it is a valid and reliable instrument for assessment purposes when measuring a company's innovative culture. We will adopt a two-stage approach: (i) firstly, we will analyse a secondary dataset that was obtained through Rao & Weintraub's (2013) diagnostic survey tool which 3ST applied in 2020. As part of the analysis, we will look

at the scores collected for the six building blocks and eighteen factors, and we will benchmark our results against the Rao & Weintraub's databank to identify singularities of our survey results; (ii) secondly, we will conduct in-depth interviews with selected employees based on the initial responses gathered during our initial diagnostic survey to clarify inconsistencies and dive deeper into particular innovation issues. Employees representing the different ranks will be randomly selected to ensure fairness and non-biasness. The purpose of these interviews is to give employees a platform to inductively opine their thoughts surrounding the topic of innovation cultures and the survey findings. Given the employees' anxiety about their job security in the long run, especially those long serving employees, the company's future outlook will be a common key interest to many of them. Moreover, since the future of the organization is dependent on its ability to innovate and transform, it is therefore crucial to extract qualitative sentiments on the issues identified in order to enhance the innovation culture within the organization. One approach would be to establish multiple *personas* for the different group of participants after processing and analysing the interview data. Through these personas, we might be able to identify the barriers relating to innovation and recommend propositions to overcome the challenges.

4.2 Surveys

During the surveys, participants were given a list of questions adapted and altered from the 54-item list by Rao & Weintraub (2013). Having an effective and systematic method to identify what is working and what is not working for the company makes it clearer and more actionable for positive changes in

future (Rao & Weintraub, 2013). The survey questions are tinged with other factors that could provide us with insights beyond the referenced framework analysis. Additional factors that we tested include the demographics such as the age of employees and their level of experiences which can help to offer deeper insights into their thought processes and behavioural patterns. In the survey, employees are asked to rate their organization in terms of their perceived corporate innovation efforts. The surveys use a Likert scale ranging from 1 to 5. Each number represents to what extent the participants agree or disagree with statements related to innovation: 1= not at all; 2= to a small extent; 3=to a moderate extent; 4=to a great extent; 5=to a very great extent. Examples of statements include:

- We have a burning desire to explore opportunities and to create new things.
- We encourage new ways of thinking and solutions from diverse perspective.
- We are good at asking questions in the pursuit of the unknown.
- Our leaders inspire us with a vision for the future and articulation of opportunities for the organization.
- Our leader devote time to coach and provide feedback in our innovation efforts.
- Our leaders persist in following opportunities even in the face of adversity.
- We have a community that speaks a common language about innovation.

- We minimize rules, policies, bureaucracy, and rigidity to simplify our workplace.

The full list of survey questionnaires can be found in Appendix A.

4.3 In-depth Interviews

According to Marshall & Rossman (2006), in-depth interviews represent one of four primary methods of obtaining information. By conducting in-depth interviews, we would be able to obtain perspectives of each of the staff (directly or indirectly involved with the innovative activity of the company), which helps us piece together an overall situation of their involvement and consequently their views of how innovative the company is perceived to be from within. Apart from discovering and seeking to understand employees' viewpoints, in-depth interviews can value-add to survey data collected for further analysis and insights.

For the personal interviews, we created our own list of questionnaires (see Appendix B) that corresponded to the selected framework analysis, i.e., the six building blocks of innovation by Rao & Weintraub (2013). Each interview was scheduled for 90 minutes individually, and the interviews were held over the course of one month. In order to gain concrete insights about employee's perceptions of how innovative the company is, we used open-ended questions that would enable interviewees to share their views (Lee & Krauss, 2015). While some participants needed some prompting and follow-up questions to guide them to share more and seek clarity, all of the interviews were successful. At the end of each interview, the researcher assured the participants again about the confidentiality of their answers.

4.4 Population and Sampling

In our study, we worked on secondary data that were gathered in 2020 in the context of 3ST's internal innovation culture assessment study. For this case study, a sample of 197 survey participants of manufacturing workers from all levels (managerial, executives and support staff) was drawn from the approximately 249 people working within the organization. About 10 percent of the surveys had to be discarded as they were not duly completed with some pages unanswered. The rest of the respondents did not participate in the study as few were not comfortable responding to the survey and few were overwhelmed with all the feedback requests. Apart from consenting to partake in this research study, the participants were also willing to provide their demographics and personal information such as age, years of education, gender as well as country of origin.

Of the pool of participants who were willing to partake in the surveys, a sample of 15 participants based on their company positions were randomly chosen for personal, in-depth interviews. We used purposeful sampling to draw and examine individual perceptions and accounts about the company to gain deeper insights that could possibly be explanatory and edifying (Neuman, 2011). In selecting the 'right' interviewees, the researcher exercised his own personal judgement to pick out participants who are perceived to have the most relevant the information (Green et al., 2015).

Specifically, the researcher employed criterion based purposive sampling, which is a deliberate sampling approach that picks out participants when they match a specific or certain set of criteria that is key for the study topic (Etikan, Musa & Alkassim, 2016). Given that we only had a small sample size of

fifteen interviewees, the selection of these interviewees was deliberate so that the data collected would be able to cover diverse profiles. Using purposive sampling is also deliberate as study participants are drawn out based on their level of experience in term of years in the company, position level and department. We varied the different number of years working in the company (1-5 years, 6-10 years, 11-20 years, and 20 years above), position level (manager, supervisor, executive) as well as departments (such as product development, sales, marketing quality management, just to name a few). This varied sample of participants enabled us to better analyse and gain insights of reasons pertaining to the survey results, as well as provided us with a more diverse viewpoint coming from differing positions within the company (Neuman, 2006). Having a sizable number of participants as well as conducting repetitive processes help to achieve data saturation in this qualitative research study via theme repetition (Yin, 2017). During the interviews, this consistency in being repetitive is crucial to data saturation.

4.5 Research Questions

- How robust is 3ST's innovation culture and how strong are the company's "building blocks"?
- What are particular weaknesses of 3ST's innovation culture, its building blocks and why do they exist?
- How do the various corporate groups (managers, supervisors, team leads, executives and operators) and business functions within the organization (General Management, Finance, HR, IT, Logistics, Procurement, Product Development, Quality Mgt., Sales and Manufacturing)

perceive 3ST's culture of innovation and what can be done to overcome discrepancies, inertia, resistance to change and innovation theatre (if any)?

- How can innovation assessment tools such as the Innovation Quotient survey instrument by Rao & Weintraub help SMEs such as 3ST to enhance their culture of innovation?

4.6 Role of the researcher

According to Robinson (2014), by having a disclaimer of the role of the researcher, this makes the empirical research study more credible. Firstly, as a researcher, I have to carefully and deliberately select the research method and research design to suit my topic of study. Moreover, this study requires choosing which company as the case in point, having a pool of right participants, conducting the interviews, data collection as well as synthesizing and analysing the data collected.

Robinson (2014) cautioned that in a study, the researcher should not have any form of personal or previous connection with the participants in order to reduce any personal interviewer bias. Given the fact that I am the business leader of the organization and have known the participants beforehand, I requested an intern (a graduate) in my Human Resource department who does not have any previous relationship with the participants to act as an investigator to administer the survey. With such an arrangement, I assumed that there would be no direct contact or influence on the participants and that it would help to reduce any potential biases that may arise if I had been the one conducting the interviews. The chosen intern had done research studies previously and was trained in data cleaning and data validation.

Although I was not the one performing the interviews personally, I ensured that the setting of the interview is conducive for the interviewees and that the conversations were causal and spontaneous without any distractions (McDermid, Peters, Jackson & Daly, 2014). This is a crucial step because the setting and environment where any researcher collects data can potentially affect the quality of data collected (Schmidt, 2016). We made sure that the participants were comfortable and felt safe to be open and honest. Prior to the commencement of interviews, we reviewed and appraised those scripted interview questions to ensure that there would be consistency in the flow of questions (Appendix B). The approach would be to start off with some relatively easy questions, eventually progressing to more preceptive questions relating to the organization innovation culture.

4.7 Ethical Research

Ethical research entails ensuring privacy, confidentially and integrity of both of the research study and participants. One way to achieve ethical research would be through gaining participant's informed consent, which essentially protects the participants undertaking the study (Newman & Glass, 2014). Even though the survey at that point of time was conducted for commercial purpose, we ensure that the survey was conducted in the same academic rigor that would apply to any academic research. Prior to the commencement of each survey session, we would provide brief explanation and the intent of our study. We also assured the participants that the study is voluntary, and they could reject or withdraw from the survey at any time. They were also at liberty to skip any questions which they are uncomfortable which is similar

to other surveys such as our “Employees Satisfaction” survey that were previously conducted. Throughout the investigation, we ensured that confidentially and privacy were kept as no names, employees’ numbers nor signatures were required. The survey questionnaires were also not marked for traceability. For administration purposes, only attendance of the participants was noted as they were given time off from work to participate in the survey and we needed to account for the productivity hours.

Participant’s personal particulars and answers were anonymous, and their identification was replaced with a random number. I referred to an individual interviewee as a number and assigned pseudonyms to each interviewee according to their role such as Manager 1 and Supervisor 2. Their details would only be available and accessible by the intern for analysis and in crafting out the interview questions. Participants were also assured that participating in this study is voluntary and that they could at any time withdraw in case they felt uncomfortable or unwilling to continue with it. In cases of participants withdrawing, we rendered their records invalid, and they were taken out of the analysis.

In this study, the researcher has strictly adhered to *The Belmont Report* protocol, which serves as a manual guide that outlines process of research studies that involve human subjects (Newman & Glass, 2014). Given that the study is analysing de-identified data where the dataset had been stripped of all identifying information that could link back to the subjects from whom it was originally collected, it was confirmed that such a secondary analysis of existing data does not require IRB approval.

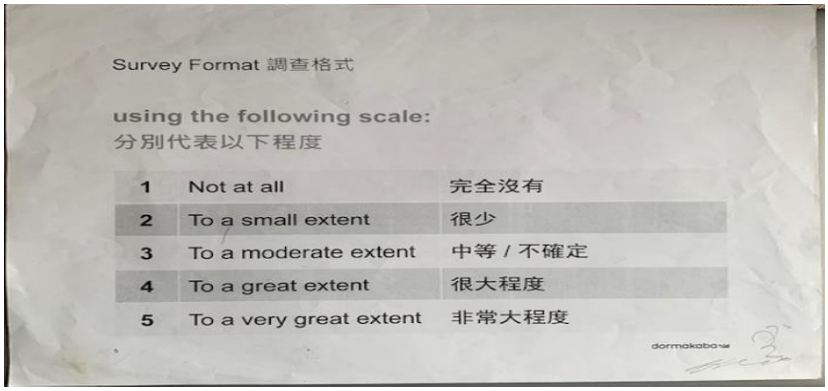
4.8 Data Collection and entry

Data were collected through (i) a questionnaire survey and (ii) in-depth interviews with selected employees of the organization. Both interviews and survey were conducted in Chinese and for some participants in the native Hokkien (a form of colloquial) language. The survey was held in a quiet meeting room, away from any interruption of the manufacturing floor, and it lasted for approximately 45 minutes in total. It was conducted in small groups of 2-5 employees at a time to enable the interviewer to better manage and to ensure that participants were clear of what they were answering. This group setting was also deliberate because senior employees might require the interviewer to explain the questionnaires in the native local Hokkien language.

At the start of the survey, participants were briefed and assured that their responses and personal comments responses would be anonymous and that the company would not have any access to the raw data. The company would only have access to the aggregated and analysed data after processing and synthesizing them. The assurance of confidentiality is of utmost priority to ensure that the participants are put at ease and that they would open up to share their real viewpoints and perceptions of the company's efforts regarding innovation. After which, the interviewer shared the definition of innovation with the participants and explained the Likert scale to the participants. As the questionnaire consists of several pages and the scale is printed on the first page of the survey forms, we provided an additional copy of the enlarged Likert scales on a A4 size paper so that participants could refer to the scale with ease whilst trying to answer the fifty-four questions,

(Fig.9). At the end of the survey, the research assistant collected the survey results which were dropped into a box, and then performed raw data entry and data transcription onto an Excel spreadsheet.

Figure 9
Likert Scale



The data for the current study was collected by providing the respondents with the questionnaire and interacting with them which enabled us to better improve and craft out the interview questionnaires (Thai, Chong & Agrawal, 2012). After reviewing the results of the assessment, we then tailored interview questions to dig deeper and get more insights. The interview process was conducted at the company itself where participants worked at. It was held privately in one of the meeting rooms where the researcher could interview the participants in a private and conducive setting without any interruptions. Interviewees were briefed prior to the interview, and there was a list of questions the interviewer followed strictly. The responses were then recorded accordingly and put aside for data analysis.

4.9 Data Analysing Technique

After data collection, data analysis was carried out. From the surveys which were based on the list of questions asked, we calculated an average score for each question, the distribution of the responses for each question, an average

for each factor and then finally the average for each building block. For better clarity, I have also created an example (Table. 2) to further illustrate what has been described earlier.

Table 2

Score Aggregation Template

	Buiding Block One (E.g. Values)							
	Factor 1 (E.g Creativity)			Factor 1 Average	Factor 2 (E.g Learning)			Factor 2 Average
	Question 1 Imagination	*Question 2 Autonomy*	*Question 3 Playful*		*Question 4 Curiosity*	*Question 5 Experiment*	*Question 6 Failure OK*	
Participant A	2	2	5		3	4	5	
Participant B	3	2	4		3	4	5	
Participant C	2	2	3		3	4	5	
Participant D	2	4	2		3	4	5	
Participant E	3	5	2		4	4	5	
Average Score of Participants	**2.4**	**3**	**3.2**	**2.9**	**3.2**	**4**	**5**	**4.1**
Distribution	0.5	1.4	1.3		0.4	0.00	0.00	

Factor 1 average (qn1 to 3)	2.9	(Sum of Average score for Qn1 to 3 divided by 3)
Factor 2 average (qn 4 to 6)	4.1	(Sum of Average score for Qn 4 to 6 divided by 3)
Building block average (factor 1 &2)	**3.5**	(Sum of Factor 1 average & Factor 2 average score divided by 2)

The final average of the six building blocks represents the company's overall score, referred to as "Innovation Quotient". This Innovation Quotient functions as an instrument to gather information on the culture of innovation within an organization (Danks et al., 2017). The instrument is used to identify how participants perceive their company performance in relation to the six building blocks of values, behaviours, climate, resources, processes, and success as defined by Rao & Weintraub (2013). Each building block comprises of three unique factors resulting in 18 factors in all, and every factor is further stratified into three elemental questions, giving a total of 54 elemental questions. Taking Table 2 as illustration, the building block of *Value* includes factors such as *Creativity* and *Learning*. Creativity is then drilled down into the elements of *Imagination*, *Autonomy* and *Playful* with questions designed around these 54 elements. As Rao and Weintraub (2013) have pointed out, there was a need to move the abstract building block toward these substantive elemental questions to ensure that the culture of innovation

is more measurable and better managed. In the same article, Rao and Weintraub (2013) also shared how the founders of Ritz-Solutions, a systems and software development company, decided to focus on the "Processes" factor by designing a procedure to tap on employees' collective wisdom for ideation and decision making after realizing their limited capability in generating good ideas.

Likewise, it is planned that 3ST will use the outcome of the survey data to identify strengths and weaknesses of the firm's performance with respect to the 54 elements of innovation culture. This will then allow the researcher to suggest specific actions or processes for improvements towards a more robust innovation culture.

The organization structure of 3ST comprises of managers, supervisors, team leads (*applicable only for operations*), executives *(individual contributors*) and operators (see Table 5) working in various business functions (see Table 3). To see how 3ST performs against each block or factors, we plan to tabulate the survey results by mapping the six building blocks scores against different clusters of employees (see Table 14) or business functions (see Table 15) and other variables. These variables will be discussed in a later chapter of our study.

The assessment tool helps to rank the factors and elements that support innovation within an organization. It is straightforward and easy to use for practitioners who can zoom into the strengths and weaknesses of the innovative culture. Responses will be summed up and grouped into the different building blocks for further thematic analysis.

4.10 Reliability & Validity

Given that the research is a mixed-method study using both qualitative and quantitative data collection methods, it is important to defend reliability and validity. To put it simply, reliability refers to the accuracy while validity refers to how credible the research is (Noble & Smith, 2015). In a qualitative study, data collection and analysis require more nuances as they are more complex, which necessitates the proof of reliability and validity (Noble & Smith, 2015).

Validity refers to the accuracy of the research. In other words, valid research will always produce the same results if the entire process is repeated again. By paying attention and ensuring a standardized step-by-step way of interviewing and data collection, validity can be achieved (Merriam& Tisdell, 2015). According to Mills (2007), validity can also be achieved by making sure that the assessment tool measures what it was meant to measure. In this case, we employed Rao's and Weintraub's (2013) framework as a measurement tool which is a valid and reliable assessment. Using the method of triangulation where the review of participant's answers in both the surveys, interviews, and observations, we established internal validity in this study (Zohrabi, 2013). The researcher ensured that there was a structured and standardize format of the interview process. Every participant in the survey and in the in-depth interview faced the same set of questionnaires previously set. The interviewer religiously followed each step in asking questions and adhered closely to the follow-up prompting questions, which helped to achieve validity because every interview had a proper process of asking questions (Lincoln & Guba, 1981). This thoroughness and repeated process

of data collection and reporting helped to ensure that the data collected was dependable and accurate, thereby achieving internal validity (Creswell, 2012). The interviewer who conducted the interviews was trained to not impose any personal bias or judgements. The interviewer was cautious about his expressions, actions, and tone of voice so as to not influence the participants in any way.

Apart from establishing internal validity, the study also had to ensure that there was external validity. External validity means that the research can be used to generalize or extend out to other study in a parallel context (Creswell, 2012). Incorporating a tested and proven assessment tool of measurement enhances the reliability of the study and allows future studies to build on it. Reliability means that another study would expect comparable results to appear if the study was conducted separately (LeCompte & Goetz, 1981). Given that the study used the survey as a form of field study to enable us to improve our interview questions for the in-depth interviews, this enhanced the reliability of the study (Thai, Chong & Agrawal, 2012).

Chapter 5. Results and Discussion

The purpose of our case study is to examine employees' responses to the Innovation Quotient assessment and their perceptions of 3ST's innovation efforts. Through the assessment and in-depth interviews, our study aims to identify potential innovation culture weaknesses within the firm and recommend improvement actions pertaining these areas of concern to enhance the innovation culture of 3ST. Another objective is to identify key

themes that might influence an employee's propensity to support the change effort towards a more robust culture of innovation.

5.1 Data Sample

A total of 222 out of 249 employees at all levels participated in the survey. However, twenty-five survey forms had to be excluded as their forms were incomplete with missing responds whilst the remaining 27 employees chose not to partake since the survey was non mandatory. Some older workers considered the survey to be non-value add as they were nearing retirement whilst others were overwhelmed with work. Prior to examining our Innovation Quotient results, we have organized our 197 participants by business functions (Table 3) to exhibit the overall participation rate from the company. Almost 80% of the respondents for the study falls under the manufacturing function which comprised of several operational sections. Overall, we have achieved good participating rate of 79% from all business functions and 89% if we were to include those invalidated survey forms. Unfortunately, we were not able to redo these surveys as we were unable to trace these affected participants.

Table 3

Business Functions Population size

Functions	Sample size
General Management	2
Finance	4
Human Resource	5
Information Technology	2
Logistics	2
Procurement	3
Product development	6
Quality	7
Sales	9
Manufacturing (Operations)	157

Total	**197**

In terms of the gender profile of our participants, 44.2% of the study respondents were male while 55.8% of the respondents were female (Table 4).

Table 4

Gender Profile

Age Range	Gender					
	Male	%	Female	%	Total Sample	%
20-30	12		6		18	**9.1%**
31-40	22		26		48	**24.4%**
41-50	24		47		71	**36.0%**
51-60	21		24		45	**22.8%**
>60	8		7		15	**7.6%**
Total	87	**44.2%**	110	**55.8%**	197	100.0%

The above table also shows that 36% of the respondents for the study belonged to the age group of 41-50 while 24.4% of the respondents belonged to the age group of 31-40. Moreover, 22.8% of the respondents belonged to the age group of 51-60. Further, 9.1% of the respondents belonged to the age group of 20-30 and 7.6% of the respondents belonged to the age group of above 50. Since we have more female operators at the assembly area, it is acceptable that we have more female representations in our survey.

Table 5

Organisational Level

Organisation Level	Gender			
	Male	Female	Total Sample	%
Management	8	2	**10**	**5.1%**
Supervisor	15	6	**21**	**10.7%**
Team Lead	7	4	**11**	**5.6%**
Executive	9	12	**21**	**10.7%**
Operators	48	86	**134**	**68.0%**
Total	87	110	**197**	**100.0%**

The above table shows the percentage of the respondents' level in an organization. It was observed that **68.0**% of the respondents belonged to the operator level in the organization. Given that 3ST is a manufacturing company, it is common to see a large pool of operators in our survey population, but it is also important to note that these operators represent different departments such as manufacturing, stamping, assembly, and maintenance. **10.7**% of the respondents belonged to the supervisor and executive level each whilst **5.6**% of the respondents belonged to the team lead level. Further **5.1**% of the respondents belonged to the managerial level.

Table 6

Length of Service

Length of Service (Years)	Gender					
	Male	Female	Total Sample	% Male	% Female	Overall %
1-5	24	23	**47**	12.2%	11.7%	**23.9%**
6-10	13	15	**28**	6.6%	7.6%	**14.2%**
11-20	8	12	**20**	4.1%	6.1%	**10.2%**
>20	42	60	**102**	21.3%	30.5%	**51.8%**
Total	87	110	**197**	**44.2%**	**55.8%**	**100.0%**

The above table shows the percentage of the year's respondents have spent in the organization by gender. It was observed that more than half (51.8%) of the respondents for the study have been with the company for over 20 years while 23.9% of the respondents have years of service between 1-5 years. Since one group are long serving employees whilst the other is

relatively young It would be interesting to review the performance of these two groups given the size and understand if there are differences in their perception with respect to innovation culture within the company. Moreover, another 14.2% of the respondents belonged to the group of 6-10. Further 10.2% of the respondents belonged to the age group of 11-20.

Table 7

Education Level

Education Level	Gender				Total Sample	%
	Male		Female			
< Senior High School	13	6.6%	42	21.3%	**55**	**27.9%**
High School	42	21.3%	50	25.4%	**92**	**46.7%**
University graduate	28	14.2%	15	7.6%	**43**	**21.8%**
> Postgraduate	4	2.0%	3	1.5%	**7**	**3.6%**
Total	87	44.2%	110	55.8%	**197**	**100.0%**

Table 8

Age Range

Age Range	Postgraduate		University graduate		High School		< Senior High		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
20-30	0	0	11	3	1	3	0	0	18
31-40	0	2	10	5	9	14	3	5	48
41-50	4	0	5	5	14	24	1	18	71
51-60	0	1	2	1	13	8	6	14	45
>60	0	0	0	1	5	1	3	5	15
Total	4	3	28	15	42	50	13	42	197

From the table above, we observed that 46.7% of the respondents have high school standing. A further examination of this “High School” category reveals that 41.3% or 38 participants are between 41–50 years of age. If we look into the academic background, it is interesting to note that male participants have higher academic qualifications than the female cohort although there are 110 women against eighty-seven male participants. Our profiling shows there are more male graduates and postgraduates in 3ST.

There are thirty-two male participants who had obtained a degree or postgraduate degree as compared to the female participants of eighteen. Also, it was observed that the average age of male participants with degree or above is younger than their female counterpart with 5.5% (11 out of 197) of the male cohort with university degree holder belongs to the age group of "20-30" and another 5% (10 out of 197) going to the age group of "31-40". Female cohort only had 1.5% (3 out of 197) falling into the "20-30" age group and 2.5% (5 out of 197) belonging to the "31-40" grouping.

5.2 Data Analysis and Key Findings

Now that we have presented the demographic characteristics of our participants, it would be interesting to examine how these variables influence the survey outcome. I will start by looking at the scores for the six building blocks before we dive deeper into the factors and elements. After tallying up all the ratings and taking the average of the six building blocks score, the Innovation Quotient (IQ) index for 3ST is at **3.60** (Table 9).

Table 9

3ST Innovation Quotient Score

Building Blocks	**Survey Score**
Resources	3.44
Processes	3.54
Success	3.61
Value	3.63
Behaviours	3.75
Climate	3.66
IQ Index (Average)	**3.60**

In the table above, both Resources and Processes obtained rather low scores compared to the remaining blocks. This implies that there are hidden

concerns or challenges in relation to these two blocks. Employees may be concerned about 3ST's ability to launch new products to the markets as well as limited means to finance new projects. Although, Taiwan had no prior participation in the assessments until now, we have shared the performance of those countries which had participated in the surveys (Table 10). As more Taiwanese companies participate in the IQ survey in future, it would be interesting to see how Taiwan would measure up to these highly innovated countries. Since the climate of innovation culture in corporate Taiwan varies across all industries and cities, it would be extremely fascinating to look at these comparisons of innovation indices by industries, size of firms and technology maturity (High or LMT setup). This would also help us understand the overall cultural innovativeness of Taiwan as a country.

Except for its leadership position in global semiconductor industry and its focus in incubating start-ups, Taiwan's innovativeness or technological ecosystem quality lags behind the likes of Sweden, USA, Germany, and UK. According to the ranking of the 2021 Global Innovation Index by the World Intellectual Property Organization (WIPO) where Taiwan had been excluded due to political sensitivity, Sweden, USA, and United Kingdom were placed second, third and fourth respectively along with Germany taking the 10th position for most innovative economies. Whilst we cannot compare our results to these countries at this moment, we can apply statistical testing to validate any inter-item relationships of the building blocks and to identify which factors and actors contribute to the relatively high IQ index of ***3.60*** for 3ST.

Table 10

Source: www.innovationquotient.com

Surveyed Countries	**IQ Index**
Austria	3.85
Hungary	3.52
Columbia	3.49
Brazil	3.48
Saudi Arabia	3.45
Sweden	**3.42**
Chile	3.41
Canada	3.36
Mexico	3.36
Argentina	3.27
Turkey	3.24
Peru	3.24
France	3.17
China	3.12
Portugal	3.09
Ireland	3.07
Germany	**3.06**
Spain	3.05
UK	**3.00**
USA	**2.30**

In practice, executives of many firms do excel at managing the technical, hard tangible aspects of Innovation such as *Success*, *Processes* and *Resources* – the left-brained, **rational** aspect, and tools-like building blocks. But there is often a lesser focus on *Values, Climate & Behaviour* – the right-brained, soft, **emotional** aspects, and human-centric tools that inevitably forms innovative culture (Rao & Weintraub, 2013). Conversely to what Rao and Weintraub (2013) had described in the literature, 3ST actually scored high on the emotional blocks (*Behaviours, Climate & Value*) and less well on the rational blocks (Success, Process & Resources) (See Table 11).

Further verification on the ten managers' performance also presents almost similar movements to the overall rating shown in table 11. The average ratings for the top three building blocks assessed by the managers were Behaviour (3.63), Success (3.33) and Value (3.28) whilst Climate (3.13) Resources (3.09) and Processes (3.07) came in as the bottom 3. Whilst

Climate had a higher score in the company ratings, the managers' grouping placed Climate as one of the bottom 3. Apart from the significant deviation of 0.53 and 0.47 between the manager and the company scores for both "Processes" and "Climate" building blocks (Table 12).

Table 11

Top & Bottom 3

Top 3

Building Blocks	Survey Score
Behaviours	3.75
Climate	3.66
Value	3.63

Bottom 3

Building Blocks	Survey Score
Resources	3.44
Processes	3.54
Success	3.61

Table 12

Deviation bet. Manager & Company ratings

	Behaviours	Climate	Values	Resources	Processes	Successes
Company overall score	3.75	3.66	3.63	3.44	3.54	3.61
Manager score	3.63	3.13	3.28	3.09	3.07	3.33
Std Deviations	0.08	0.37	0.25	0.25	0.33	0.20

Table 13

External Benchmarking of 3ST block results against companies including ABB

External Benchmarking of 3ST block results against InnoQuotient Database & ABB Sweden

RATIONAL	databank	3ST	ABB Sweden
Resources	3.14	3.44	3.48
Processes	3.06	3.54	3.06
Success	3.27	3.61	3.49

EMOTIONAL	databank	3ST	ABB Sweden
Values	3.46	3.63	3.63
Behaviours	3.19	3.75	3.42
Climate	3.25	3.66	3.43

The above databank update is as of January 2016 based on a seminar presentation by Jay Rao (Ganatra, n.d.). Unlike the earlier countries benchmark we have presented, the IQ index of each building block shown in Table 13 above is derived from the survey results completed by 188 firms from different countries such as Belgium, England, Germany, Portugal, Scotland, Spain, Chile, Colombia, El Salvador, Mexico, Panama, Argentina,

Guatemala, Saudi Arabia, and USA. No Asian country was known to have contributed to the database.

From the table, we can observe that the top three building blocks in the database are Values, Success, and Climate - two of the blocks Values and Climate coincide with our top three building blocks of Behaviors, Climate and Values despite the sequence of order for the two sets of data. Both results contradict Rao &Weintraub's (2013) argument that lower rank employees would give lower ratings for the emotional blocks. Despite certain similarities, we observed that the variances between the two sets were sizeable. Even if we benchmark our result against ABB Sweden which is a 130-year-old global pioneering technology leader with Process automation, Motion (Powertrains) and Robotics & Discrete Automation businesses spread across 100 countries, we appeared to fare better in four out of the six building blocks when Sweden as a country is also highly ranked by any innovation agencies in the world. Given the idiosyncrasies of our results which are generally higher than any of our benchmarks, the results may be a red flag suggesting that 3ST might be experiencing an issue of inconsistences between the employees' actual behaviors against their perceptions of innovation as well as their differences in their thoughts and actions. It is therefore imperative for us to examine the details of scores by the various variables such as functions, organization level and age groups to understand the underlying root cause. We will also examine the top ten and bottom ten items to gain insights into what the participants value.

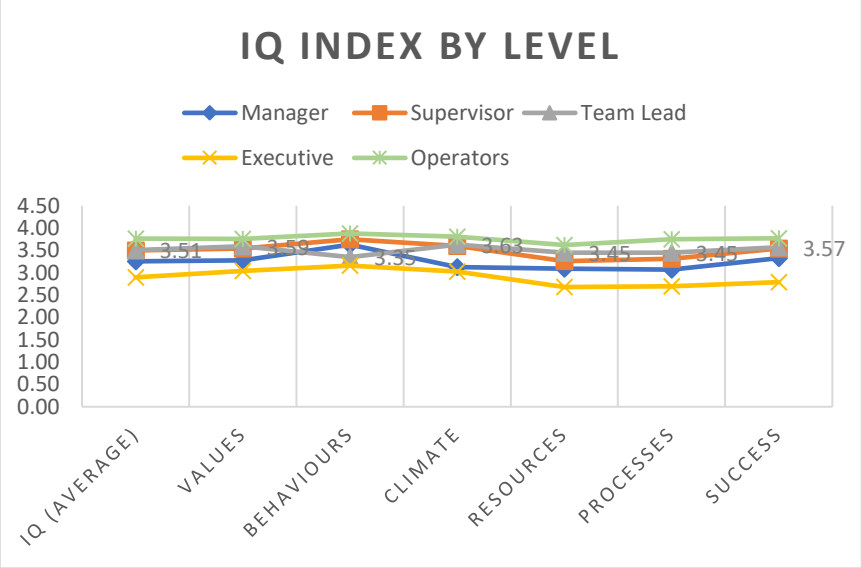
Table 14

Innovation Quotient Index by Organization level

Organisation Level	IQ (Average)	Values	Behaviours	Climate	Resources	Processes	Success
Manager	**3.26**	3.28	3.63	3.13	3.09	3.07	3.33
Supervisor	**3.50**	3.54	3.75	3.60	3.26	3.31	3.54
Team Lead	**3.51**	3.59	3.35	3.63	3.45	3.45	3.57
Executive	**2.90**	3.04	3.16	3.03	2.68	2.70	2.79
Operators	**3.77**	3.76	3.88	3.81	3.62	3.75	3.77

Figure 10

IQ Score by Level



Our IQ results point to perceived differences across different groups of employees. Particularly low scores are highlighted in red, e.g., executives (for details see next slide). Related implications will be further investigated further below by adding insights from the interviews so that necessary interventions can be introduced to make 3ST's culture more innovative

From the tabulated summary, we noted that there are two visible scores branching into opposite directions. Whilst the executive rating is clearly very much lower than the company index of 3.6, the operators' rating is clearly above the norm, in fact higher than any of the participating groups. Moreover, we also observed that regardless of the ratings, the trends are generally

consistent except for two differing ratings by the team lead. Apparently, the team leads category had differing opinions from the rest of the team for both Behaviours and Climate.

Until now, the Innovation Quotient index is just a measurement of 3ST innovation culture where ratings of the blocks and factors are observed in silos. We would term this as “Silo” framework since there is no association of “inter-blocks” relationships that has been explored. The situation also applies to the ratings in Table 15 below. All that we saw was the assessment results by each business function. As seen from the results, the Procurement function perceived 3ST as low in innovation culture contrary to the Manufacturing and Quality functions. Whilst the Procurement function felt that there is too much bureaucracy and rigidity within the organization which impeded 3ST’s performance, it also believed that there was some level of a blame culture at work such as getting accused of delivery or quality issues from suppliers resulting in shipment delays to customers. Conversely, Manufacturing would continue to push procurement to scramble for parts to avoid any plant shutdown situation even if issues arouse from poor production planning or high number of inhouse manufacturing rejects. We also noted that both the General Management and Procurement functions had several opposing ratings. General management was a new team that was brought in to expand new businesses (whether expanding the new customers base or seeking new collaborations with other industries such as makers of smart gun lockers) for 3ST. In this respect, they turned out to be highly charged, tending to look at every opportunity as possibility which may not hold true for the Procurement team which had a disapproving view of our

product development ideation and capturing process as well as the manufacturing process to produce the parts.

Table 15

Innovation Quotient by Functions

Functions	Values	Behaviours	Climate	Resources	Processes	Success	IQ Index
General Management	2.33	3.67	2.33	2.50	2.17	3.06	2.68
Finance	3.44	3.72	3.42	3.11	3.17	3.39	3.38
HR	2.91	3.22	3.31	2.47	2.38	2.20	2.75
IT	2.78	3.06	2.83	2.61	2.56	2.56	2.73
Logistics	3.72	3.72	3.50	3.33	3.33	3.33	3.49
Procurement	2.56	2.37	2.07	2.33	2.30	2.41	2.34
Product Development	3.39	2.81	2.93	2.59	2.65	2.63	2.83
Quality Management	3.67	3.89	3.70	3.56	3.35	3.70	3.65
Sales	3.04	3.37	3.10	2.89	2.99	3.14	3.09
Manufacturing	3.74	3.85	3.76	3.59	3.72	3.77	3.74

Figure 11

IQ Score by Functions

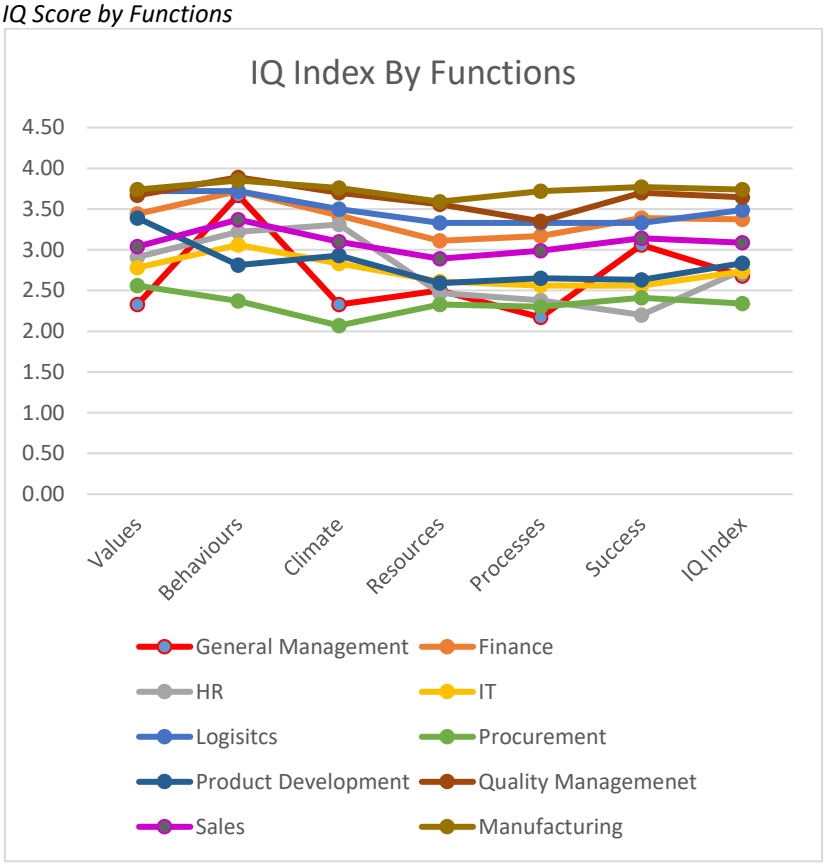


Table 16

Distribution of Ratings by Participants

Building Blocks	Factors	Element	Score				
			1	2	3	4	5
Values	Entrepreneurial	hungry	5	18	51	85	38
		ambiguity	5	20	52	90	30
		action oriented	7	30	77	63	20
	Creativity	imagination	0	13	38	80	66
		autonomy	2	26	50	80	39
		playful	9	31	59	70	28
	Learning	curiosity	3	28	52	74	40
		experiment	5	18	52	75	47
		failure ok	8	18	49	76	46
Behaviours	Energize	inspire	6	18	38	65	70
		challenge	2	13	49	76	57
		model	2	20	40	69	66
	Engage	coach	8	20	49	65	55
		initiative	7	41	65	58	26
		support	4	15	41	80	57
	Enable	influence	7	16	54	85	35
		adapt	3	14	54	87	39
		grit	5	14	44	77	57
Climate	Collaboration	community	7	24	57	73	36
		diverysity	10	11	54	74	48
		teamwork	4	17	47	86	43
	Safety	trust	1	9	40	81	66
		integrity	2	16	53	81	45
		openness	7	24	60	65	41
	Simplicity	no bureaucracy	14	32	63	56	32
		accountability	9	33	57	61	37
		decision making	6	18	59	72	42

Table 16

The building blocks provide a high-level view of the company's performance with regards to the diagnostic tool. It allows us to populate our results and arrange the building blocks in a sequential order. For example, the ratings can be divided into two segments, the top and bottom three performers even when the ratings for the six blocks are high or relatively close. Failing to look beyond the building blocks and into eighteen factors, there is little connotation to what the results may imply, perhaps coming up with ideas to set actions to work on the weaker blocks, whilst some other leaders may decide to focus on strengthening their stronger blocks.

Firstly, we have added the 197 participants scores to the respective five ratings (from 1 to 5) to populate the distribution of the ratings. Given our high index of 3.60, it is therefore not surprising to see the majority of the participants rating pivoting towards the right or extreme right side of the

table. The table above provides the participants count by score. Table 17 presents the factor scores by the four variables we have ascribed.

Table 17

Factor Averages by Four Key variables

Building Blocks	Factors	Element	Overall	Factors Avg	Factors Average by Variables: Org.Level Overall Average	Education Overall Average	Functions Overall Average	Length of Service Overall Averall	Age Overall Average
Values	Entrepreneurial	hungry	3.68	3.53	3.37	3.24	3.14	3.48	3.59
		ambiguity	3.61						
		action oriented	3.30						
	Creativity	imagination	4.01	3.68	3.48	3.48	3.22	3.60	3.79
		autonomy	3.65						
		playful	3.39						
	Learning	curiosity	3.61	3.67	3.47	3.37	3.11	3.64	3.78
		experiment	3.72						
		failure ok	3.68						
Behaviours	Energize	inspire	3.89	3.89	3.73	3.71	3.57	3.81	3.97
		challenge	3.88						
		model	3.90						
	Engage	coach	3.71	3.62	3.39	3.33	3.13	3.51	3.68
		initiative	3.28						
		support	3.87						
	Enable	influence	3.63	3.74	3.55	3.56	3.41	3.71	3.79
		adapt	3.74						
		grit	3.85						
Climate	Collaboration	community	3.54	3.66	3.46	3.42	3.13	3.64	3.80
		diversity	3.71						
		teamwork	3.75						
	Safety	trust	4.03	3.78	3.58	3.58	3.32	3.77	3.88
		integrity	3.77						
		openness	3.55						
	Simplicity	no bureaucracy	3.30	3.46	3.26	3.15	2.84	3.39	3.55
		accountability	3.43						
		decision making	3.64						
Resources	People	champions	3.82	3.60	3.32	3.26	3.00	3.50	3.68
		experts	3.68						
		talent	3.30						
	Systems	selection	3.49	3.46	3.28	3.16	2.95	3.39	3.53
		communication	3.50						
		ecosystem	3.41						
	Projects	time	3.29	3.27	3.07	2.96	2.75	3.21	3.37
		money	3.25						
		space	3.27						
Processes	Ideate	generate	3.41	3.50	3.25	3.22	2.96	3.47	3.60
		filters	3.46						
		prioritize	3.64						
	Shape	prototype	3.39	3.52	3.30	3.23	2.93	3.49	3.66
		iterate	3.61						
		fail smart	3.56						
	Capture	flexibility	3.58	3.59	3.22	3.22	2.70	3.51	3.71
		launch	3.52						
		scale	3.68						
Success	External	customer	3.51	3.47	3.15	3.02	2.67	3.37	3.62
		competitors	3.43						
		financial	3.48						
	Enterprise	purpose	3.85	3.77	3.54	3.40	3.20	3.67	3.85
		discipline	3.69						
		capabilities	3.76						
	Individual	satisfaction	3.32	3.59	3.51	3.39	3.18	3.53	3.63
		growth	3.64						
		reward	3.79						
				3.60	3.38	3.32	3.07	3.54	3.69

The objective of our study is not to focus on the score for each factor but to look at the scores attributed by each variable. The measured variables are Organization grade (Manager till Operators), Education level, (Postgraduates to less than high school leavers), Business functions (General management

to manufacturing), Length of service with 3ST and lastly the various age-band of the participants. We observed that the ratings for both length of service and age-band variables are generally higher compared to the rest. At odds with Rao and Weintraub's (2013) article where leaders felt that lower ranked employees would perceive lowly on the values, behaviours and climate blocks, the length of service and age-band groups had recognized that the company had performed well for the emotional block of values, behaviour, and climate by awarding high scores. We will briefly discuss the possible contributions to these observations when we come to the appended Table 21 and 22 below. Contrastingly, the business function group had the lowest ratings amongst the four other variables. Out of the eighteen factors that were measured, the business function group had ranked External, Capture and Projects factors as the bottom three performers as indicated in Table 17. Given the low rating for External factor, it would seem to suggest that the *function* teams did not approve of the company innovation effort which had led to no financial success. Apart from External factor, the function team also doubted the company ability to penetrate markets with tremendous opportunities, hence the low score for Capture. Nevertheless, since there are ten business functions within our firm, we would still need to verify the ratings by each function to determine the underlying reason for the overall low score from function team. Additionally, we would also need to determine if the ratings are consistent throughout the ten functions or if there is considerable variation across the various functions.

Although the business functions as a cluster had given a low average rating for most of the factors, a closer examination of Table 18 revealed that

employees at different organization levels may not share similar perceptions of innovation culture resulting in different ratings, for example the executive bucket had given a low rating of **2.9** for the Engage factor but the managers on the other hand had given a rating of **3.43**. This would indicate that whilst the executive cluster did not think employees in 3ST were actively pursuing innovation, the manager cluster on the contrary, believed that there are high levels of participation within 3ST to pursue high innovativity within the organization. These two views would need to be reconciled as any wrong perception of participation would defeat the company's effort to propel the innovation journey.

On the contrary, we observed that the Operators cluster had the highest Factor average at 3.76 (See Operator Column of Table 18) as compared to other clusters. Although the score from this group is generally high, we observed that ratings related to Leadership questions were higher than other elements. This could be due to the camaraderie that was developed over time between the leaders and the operators (with some as long as twenty years). As a result, I would assume the high scores were an indication of their approval for their immediate supervisors or team leads who had worked closely with them over the years.

We shall now look into the Executive category which had given an average score of 2.9 for the factors. The three factors that received the lowest scores are financials (2.24), competitors (2.29) and talent (2.38). The question on financials focuses if the company innovation effort has led to a financial advantage over our competitors. As only twenty-one executives (see Table 5) participated in the survey, I would assume that the majority of these

executives is cognizant of the innovation effort by the company, failing which the score would be augmented. Further examination on Table 20 revealed the respondents were coming from General Management (2.0), Procurement (2.0), Product development (2.0) with Human Resource reporting the lowest score at 1.87. The result is interesting as the lowest score would actually come from a supporting function instead of coming from product development. The Product Development team (PD) is responsible for the development of new products be it increasing the depth of our product mix for market or customer penetrations or to completely create a new range of products incorporating the latest technologies for smart offices or homes. However, in recent years, the PD has failed to launch successful products to the market despite developing a three-year technology roadmap and the HR team is aware of the innovation bottleneck as they are responsible for collating information for monthly business review with management. Another indicator is the drop in hiring to support the business which could explain the low score from HR. For the other two factors on Talent and Competitors, we can think of two possible explanations. The talent rating is viewed as the company's attractiveness to entice talented prospect. Unless the company starts to transform, our existing business line may struggle to attract new joiners to 3ST whilst the other challenge lies on the location of our firm. 3ST is located at Chiayi, sitting in between two big cities, Kaohsiung, and Taichung. New talents would naturally be drawn to more established technological firms in these areas. Apart from these two cities, we also have to compete with talents with Hsinchu (Silicon Valley of the East) which is about 180km away from Chiayi and Taoyuan (Incubation hub

for starts up). Although there are not many competitors in our industry, the rivalry can be very intense coming from this small pool of competitors. especially the ones located in Taiwan.

Table 18

Factors By Organization Level

			Organisation Level							
Building Blocks	**Factors**	**Element**	Mgr. Factor Ave	Supervisor Factor Ave	Team Lead Factor Ave	Executive Factor Ave	Operators Factor Ave	Overall Factor Ave	Mgr./Sup Factors Ave	Non Mgrs. Facto Ave
Values	Entrepreneurial	hungry	3.17	3.54	3.48	3.05	3.63	3.37	3.35	3.39
		ambiguity								
		action oriented								
	Creativity	imagination	3.47	3.62	3.45	3.05	3.83	3.48	3.54	3.44
		autonomy								
		playful								
	Learning	curiosity	3.20	3.48	3.82	3.03	3.82	3.47	3.34	3.56
		experiment								
		failure ok								
Behaviours	Energize	inspire	3.90	3.97	3.48	3.29	4.00	3.73	3.93	3.59
		challenge								
		model								
	Engage	coach	3.43	3.56	3.27	2.89	3.78	3.39	3.49	3.32
		initiative								
		support								
	Enable	influence	3.57	3.73	3.30	3.32	3.86	3.55	3.65	3.49
		adapt								
		grit								
Climate	Collaboration	community	3.23	3.62	3.58	3.06	3.81	3.46	3.43	3.48
		diversity								
		teamwork								
	Safety	trust	3.33	3.78	3.67	3.21	3.92	3.58	3.56	3.60
		integrity								
		openness								
	Simplicity	no bureaucracy	2.83	3.41	3.64	2.83	3.59	3.26	3.12	3.35
		accountability								
		decision making								
Resources	People	champions	3.23	3.37	3.48	2.70	3.82	3.32	3.30	3.33
		experts								
		talent								
	Systems	selection	3.07	3.44	3.52	2.75	3.60	3.28	3.26	3.29
		communication								
		ecosystem								
	Projects	time	2.97	2.97	3.36	2.59	3.44	3.07	2.97	3.13
		money								
		space								
Processes	Ideate	generate	2.97	3.32	3.45	2.81	3.69	3.25	3.14	3.32
		filters								
		prioritize								
	Shape	prototype	3.30	3.30	3.48	2.71	3.70	3.30	3.30	3.30
		iterate								
		fail smart								
	Capture	flexibility	2.93	3.30	3.42	2.59	3.86	3.22	3.12	3.29
		launch								
		scale								
Success	External	customer	2.90	3.30	3.52	2.32	3.72	3.15	3.10	3.18
		competitors								
		financial								
	Enterprise	purpose	3.47	3.76	3.45	3.08	3.92	3.54	3.61	3.49
		discipline								
		capabilities								
	Individual	satisfaction	3.63	3.56	3.73	2.97	3.68	3.51	3.59	3.46
		growth								
		reward								
			3.26	3.50	3.51	2.90	3.76	**3.38**	**3.38**	**3.39**

We have already discussed some observations for organization level, but we also noticed one interesting observation. We went further to consolidate the levels into Manager and Supervisors as one unit whilst the remaining three had been grouped as another unit of analysis. By looking at both the building blocks and factors independently against the two new sets of variables, we did not observe any significant difference in the result and therefore does not need further discussion.

Table 19

Factors By Education Level

Building Blocks	Factors	Element	< Snr High Factor Avg	High Scholl Factor Avg	University Factor Avg	Post Grad Factor Avg	Education Average	< High School Factor Avg	> University Factor Avg
Values	Entrepreneurial	hungry	3.59	3.62	3.45	2.29	3.24	3.61	2.87
		ambiguity							
		action oriented							
	Creativity	imagination	3.81	3.72	3.60	2.81	3.48	3.76	3.20
		autonomy							
		playful							
	Learning	curiosity	3.66	3.78	3.66	2.38	3.37	3.72	3.02
		experiment							
		failure ok							
Behaviours	Energize	inspire	3.99	3.92	3.82	3.10	3.71	3.95	3.46
		challenge							
		model							
	Engage	coach	3.76	3.70	3.47	2.38	3.33	3.73	2.92
		initiative							
		support							
	Enable	influence	3.79	3.79	3.69	2.95	3.56	3.79	3.32
		adapt							
		grit							
Climate	Collaboration	community	3.82	3.68	3.60	2.57	3.42	3.75	3.08
		diversity							
		teamwork							
	Safety	trust	3.97	3.84	3.55	2.95	3.58	3.91	3.25
		integrity							
		openness							
	Simplicity	no bureaucracy	3.62	3.53	3.31	2.14	3.15	3.57	2.73
		accountability							
		decision making							
Resources	People	champions	3.85	3.64	3.44	2.10	3.26	3.74	2.77
		experts							
		talent							
	Systems	selection	3.64	3.52	3.33	2.14	3.16	3.58	2.74
		communication							
		ecosystem							
	Projects	time	3.60	3.25	3.12	1.86	2.96	3.43	2.49
		money							
		space							
Processes	Ideate	generate	3.69	3.54	3.38	2.29	3.22	3.62	2.83
		filters							
		prioritize							
	Shape	prototype	3.70	3.58	3.36	2.29	3.23	3.64	2.83
		iterate							
		fail smart							
	Capture	flexibility	3.93	3.63	3.36	1.95	3.22	3.78	2.65
		launch							
		scale							
Success	External	customer	3.78	3.50	3.34	1.48	3.02	3.64	2.41
		competitors							
		financial							
	Enterprise	purpose	4.01	3.80	3.64	2.14	3.40	3.91	2.89
		discipline							
		capabilities							
	Individual	satisfaction	3.87	3.50	3.56	2.62	3.39	3.69	3.09
		growth							
		reward							
			3.78	3.64	3.48	2.36	**3.32**	**3.71**	**2.92**

Overall, the ratings from University and Postgraduates level are noticeably lower than the non-graduate level. Given that the majority of non-graduates were operators, they are mostly shop floor based and have very little interaction outside their workspace. The source of information they received would generally come from the managers or senior management town halls which would normally deliver positive communications about the company. The information would have given them the impression that the company had

been doing well. This would explain for their higher ratings as opposed to the graduate levels which might be more critical in the information they have acquired. Moreover, unlike the graduate level, the non-graduates may interpret any improvement done at the shopfloor as being part of innovativeness. Their interpretation of innovation may also differ from the graduate level which had a better grasp of what true innovation meant. The results seem to validate a point that scores and education have an inverse relationship, i.e., scores are correspondingly lower as the level of education increases. Per our results, score is lowest at postgraduate level at 2.36 and highest for those with less than senior high education. This would suggest a good correlation between education and ratings. To correct this disparity, 3ST would need to develop an effective training system on innovation catered for these non-graduates' employees.

Unlike Singapore, where there are only a handful of autonomous universities, Taiwan has one of the largest number of universities (both public and private). The ratio of graduates will continue to increase as these cohorts will eventually replace those non graduates someday. Due to this change, the demography of 3ST employees may evolve over time and may influence the outcome of future surveys.

Table 20

Factors By Functions

Factors	Element	Factor by Functions: General Mgmt. Factor Ave	Finance Factor Ave	HR Factor Ave	IT Factor Ave	Logistics Factor Ave	Proc.Factor Ave	Prod Dev. Factor Ave	Quaity Factor Avg	Sales Factor Avg	Manufacturig Factor Avg	Overall	Mgrs rating Comaprison: PD Mgr Factor Avg	Sales Factor Avg	Mfg Factor Avg
Entrepreneurial	hungry														
	ambiguity	2.00	3.17	2.80	3.17	4.00	2.56	3.67	3.57	2.85	3.63	3.14	4.67	2.33	3.83
	action oriented														
Creativity	imagination														
	autonomy	2.83	3.58	3.07	2.67	3.33	2.78	3.28	3.71	3.15	3.80	3.22	5.00	2.33	4.00
	playful														
Learning	curiosity														
	experiment	2.17	3.58	2.87	2.50	3.83	2.33	3.22	3.71	3.11	3.80	3.11	4.67	2.33	3.67
	failure ok														
Energize	inspire														
	challenge	4.17	4.00	3.27	3.33	3.83	2.78	2.78	4.00	3.52	3.99	3.57	5.00	2.33	4.83
	model														
Engage	coach														
	initiative	3.00	3.33	3.00	2.83	3.67	2.22	2.67	3.81	3.04	3.75	3.13	4.67	2.33	3.83
	support														
Enable	influence														
	adapt	3.83	3.83	3.40	3.00	3.67	2.11	3.00	3.86	3.56	3.82	3.41	4.67	2.33	4.00
	grit														
Collaboration	community														
	diversity	2.67	3.42	3.07	2.67	3.67	2.22	2.94	3.67	3.15	3.80	3.13	4.67	2.33	3.67
	teamwork														
Safety	trust														
	integrity	2.67	3.58	3.67	3.00	3.67	2.44	3.00	3.90	3.33	3.89	3.32	4.00	2.33	3.83
	openness														
Simplicity	no bureaucracy														
	accountability	1.67	3.25	3.20	2.83	3.17	1.56	2.83	3.52	2.81	3.60	2.84	4.00	2.33	3.33
	decision making														
People	champions														
	experts	2.50	3.33	2.53	3.00	3.33	2.44	2.39	3.67	3.00	3.76	3.00	4.00	2.67	4.00
	talent														
Systems	selection														
	communication	2.50	3.25	2.67	2.67	3.50	2.11	2.78	3.57	2.89	3.60	2.95	4.00	2.00	3.50
	ecosystem														
Projects	time														
	money	2.50	2.75	2.20	2.17	3.17	2.44	2.61	3.43	2.78	3.41	2.75	4.33	2.00	3.83
	space														
Ideate	generate														
	filters	2.33	3.17	2.47	2.83	3.67	2.44	2.72	3.33	2.93	3.66	2.96	3.67	2.00	3.67
	prioritize														
Shape	prototype														
	iterate	2.50	3.25	2.33	2.50	3.33	2.56	2.72	3.29	3.11	3.68	2.93	5.00	2.67	3.83
	fail smart														
Capture	flexibility														
	launch	1.67	3.08	2.33	2.33	3.00	1.89	2.50	3.43	2.93	3.82	2.70	4.33	2.33	3.50
	scale														
External	customer														
	competitors	2.00	2.75	1.87	2.83	3.17	2.00	2.00	3.62	2.78	3.69	2.67	3.67	2.00	3.50
	financial														
Enterprise	purpose														
	discipline	3.33	3.75	2.27	2.67	3.33	2.33	3.11	3.95	3.37	3.91	3.20	5.00	2.33	4.00
	capabilities														
Individual	satisfaction														
	growth	3.83	3.67	2.47	2.17	3.50	2.89	2.78	3.52	3.26	3.70	3.18	5.00	2.67	4.50
	reward														
		2.68	**3.38**	**2.75**	**2.73**	**3.49**	**2.34**	**2.83**	**3.64**	**3.09**	**3.74**	**3.07**	**4.46**	**2.31**	**3.85**

In this table, we focus on two key functions namely the Manufacturing and Product Development (PD) functions as both units have significant influence and contributions to the company financial results. Whilst the PD function is responsible for product innovation, manufacturing must be focusing on process innovation, which means introducing smart machineries into our manufacturing capabilities and reducing our reliance on manpower by harnessing latest technologies. Most of the current machines are labour intensive and unproductive with some machines reaching their maximum life span. Except for Manufacturing, the rest of the results fell within expectation. Manufacturing had the highest ratings, but it was noted that majority of the respondents are operators, and their answers may not truly reflect the current state of our manufacturing capability and processes. Whilst some questions in the survey require some ability to reason or rationalize, others may confuse

improvements over innovation. A good example would be looking at Lean as one of the innovation processes and probably the cause for the high ratings in manufacturing even though Lean is usually thought to be incremental rather than transformational innovation. Another interesting observation is that both PD (4.46) and manufacturing managers (3.85) have higher ratings than their own functions average, another exciting observation to examine. If the scores ascribed are indeed the genuine appraisal of their functions, this would be rather disconcerting for the company. Clearly their ratings do not mirror the issues of an aging product line and outdated processes and technologies faced. It is disconcerting because they are part of the leadership team to nurture the DNA of our innovation culture. One key suspect could be the effect of executive hubris on these managers who continues to leave on the legacy of the past prime and successes. This observation is clearly evident when we benchmarked the scores of the two managers against another manager in Sales function with a rating of 2.3. This acute rating from the Sales manager could be the outcome of constant interaction with the customers and market development including competitors' activities. Perhaps too much inward facing of business will affect one's ability to appraise any situation.

Table 21

Factors By Length of Service

Factors	Element	Length of Service				
		1-5 yrs Factor Avg	6-10 Factor Avg	11-20 Factor Avg	> 20 yrs Factor Avg	LS Overall
Entrepreneurial	hungry	3.52	3.32	3.50	3.59	3.48
	ambiguity					
	action oriented					
Creativity	imagination	3.74	3.32	3.55	3.78	3.60
	autonomy					
	playful					
Learning	curiosity	3.82	3.39	3.68	3.67	3.64
	experiment					
	failure ok					
Energize	inspire	4.07	3.50	3.75	3.94	3.81
	challenge					
	model					
Engage	coach	3.74	3.12	3.45	3.73	3.51
	initiative					
	support					
Enable	influence	3.91	3.37	3.80	3.75	3.71
	adapt					
	grit					
Collaboration	community	3.84	3.24	3.83	3.67	3.64
	diversity					
	teamwork					
Safety	trust	3.87	3.45	3.95	3.80	3.77
	integrity					
	openness					
Simplicity	no bureaucracy	3.52	2.86	3.60	3.56	3.39
	accountability					
	decision making					
People	champions	3.82	2.92	3.58	3.69	3.50
	experts					
	talent					
Systems	selection	3.69	2.83	3.52	3.52	3.39
	communication					
	ecosystem					
Projects	time	3.38	2.82	3.28	3.34	3.21
	money					
	space					
Ideate	generate	3.65	3.08	3.62	3.53	3.47
	filters					
	prioritize					
Shape	prototype	3.71	2.96	3.73	3.55	3.49
	iterate					
	fail smart					
Capture	flexibility	3.77	2.88	3.68	3.69	3.51
	launch					
	scale					
External	customer	3.64	2.74	3.52	3.59	3.37
	competitors					
	financial					
Enterprise	purpose	3.83	3.14	3.82	3.90	3.67
	discipline					
	capabilities					
Individual	satisfaction	3.52	3.24	3.67	3.70	3.53
	growth					
	reward					
		3.72	3.12	3.64	3.67	**3.54**

Sometimes, we will prejudge by assuming that the long duration of service will imbue loyalty which in turn impacts positively on the ratings. However, this assumption does not hold true for our case study as the higher score actually came from the youngest serving cohorts. Our study demonstrates that the highest score actually came from this group of respondents. One reason could be that they are still fresh and still in the learning phase. So, everything would still appear interesting at this stage. Additionally, we also

observed there is no significant deviation between those respondents whose length of service exceeds 20 years against those serving between 11- 20 years. The results are similar because our data indicated that most of these respondents between the 11-20 years are tipping towards the 20 years bracket.

Table 22

Factors By Age group

Building Blocks	Factors	Element	Age Group					
			20-30 Factor Avg	31-40 Factor Avg	41=50 Factor Avg	51-60 Factor Avg	> 60 Factor Avg	Age Gp overall Average
Values	Entrepreneurial	hungry	3.65	3.50	3.41	3.63	3.73	3.59
		ambiguity						
		action oriented						
	Creativity	imagination	3.81	3.62	3.50	3.83	4.18	3.79
		autonomy						
		playful						
	Learning	curiosity	4.04	3.72	3.47	3.70	4.00	3.78
		experiment						
		failure ok						
Behaviours	Energize	inspire	4.06	3.86	3.66	4.09	4.18	3.97
		challenge						
		model						
	Engage	coach	3.63	3.59	3.50	3.75	3.91	3.68
		initiative						
		support						
	Enable	influence	3.85	3.86	3.58	3.76	3.91	3.79
		adapt						
		grit						
Climate	Collaboration	community	4.06	3.70	3.41	3.75	4.11	3.80
		diversity						
		teamwork						
	Safety	trust	4.02	3.79	3.60	3.81	4.18	3.88
		integrity						
		openness						
	Simplicity	no bureaucracy	3.57	3.48	3.24	3.56	3.91	3.55
		accountability						
		decision making						
Resources	People	champions	3.69	3.56	3.44	3.76	3.96	3.68
		experts						
		talent						
	Systems	selection	3.54	3.51	3.28	3.61	3.71	3.53
		communication						
		ecosystem						
	Projects	time	3.20	3.37	3.04	3.43	3.80	3.37
		money						
		space						
Processes	Ideate	generate	3.67	3.50	3.34	3.59	3.91	3.60
		filters						
		prioritize						
	Shape	prototype	3.74	3.53	3.33	3.56	4.13	3.66
		iterate						
		fail smart						
	Capture	flexibility	3.78	3.64	3.38	3.70	4.04	3.71
		launch						
		scale						
Success	External	customer	3.70	3.51	3.20	3.66	4.02	3.62
		competitors						
		financial						
	Enterprise	purpose	3.83	3.68	3.65	3.93	4.13	3.85
		discipline						
		capabilities						
	Individual	satisfaction	3.46	3.51	3.45	3.84	3.87	3.63
		growth						
		reward						
			3.74	3.61	3.42	3.72	3.98	**3.69**

Although our earlier hypothesis on loyalty and length of service was incorrect, this occurrence seems to coincide for our Age group classification.

In Table 22, respondents aged greater than 60 years old had the highest value attached, and the value is also above our overall age group average. One possibility for this high value could be they truly appreciate the company effort on innovation whilst another possibility is that they may not fully grasp the innovation questions. Another interesting event that was observed when we compare Tables 22 and Table 21. In Table 21, we noted that the difference between the 11-20 years and greater than 20 years of service is marginal, but we did not see these similar observations in Table 22 for the 41-50 and 51-60 age group categories even though the age gap is close. On the contrary, we observed a 0.3 difference between these two groups. In fact, the 41-50 category ended with the lowest value across all age group. One explanation could be due to the fact that they are caught in a bind unlike the two senior groups who are able to retire and receive a lump sum of non-portable pension fund. The only condition attached for such arrangement is that the workers cannot leave the company any earlier prior to retirement or they will risk losing their entire pensions. However, once they cross the threshold of twenty years' service in the same company, the employee would have the option of early retirement to receive their pensions. One thing to note is that the timing of when to retire would impact the calculation of the eventual amount received. This might explain why the ratings of the two senior groups are generally higher.

As a result of subsequent change of policy in the employment law, employees are now free to leave any organization without affecting their pension fund. This change may turn up as a raw deal for this age group. As previously mentioned, Chiayi is a remote city with a population of only 250k, and there

are not many companies the size of 3ST. The only option left would be to travel outside the city to search for better paying job. Given the age and commitment, this may not be an option for the group. As such they may be stringent in their ratings to urge the company to change. Although their scores may be higher than the executive category in the organization level, consequently both their lowest rating pointed to similar factors focused on financials, customers, and competitors.

Table 23

Top 10 items Summary

Top 10 Items

Block	*Factors*	*Elements*	*Question*	*Value*
Climate	Safety	Trust	We are consistent in actually doing the things that we say we value.	4.27
Value	Creativity	Imagination	We encourage new ways of thinking and solutions from diverse perspectives.	4.01
Behavior	Energize	Model	Our leaders model the right innovation behaviors for others to follow	3.90
Behavior	Energize	Inspire	Our leaders inspire us with a vision for the future and articulation of opportunities for the organization.	3.89
Behavior	Energize	Challenge	Our leaders frequently challenge us to think and act entrepreneurially.	3.88
Behavior	Engage	Support	Our leaders provide support to project team members during both successes and failures.	3.87
Success	Enterprise	Purpose	We treat innovation as a long-term strategy rather than a short-term fix.	3.85
Behavior	Enable	Grit	Our leaders persist in following opportunities even in the face of adversity.	3.85
Resources	People	Champion	We have committed leaders who are willing to be champions of innovation.	3.82
Success	Individual	Reward	We reward people for participating in potentially risky opportunities, irrespective of the outcome.	3.79

Table 24

Bottom 10 Items

Block	Factors	Elements	Question	Value
Resources	Projects	Money	We have dedicated finances to pursue new opportunities.	3.25
Resources	Projects	Space	We have dedicated physical and/or virtual space to pursue new opportunities.	3.27
Behaviour	Engage	Initiative	In our organization, people at all levels proactively take initiative to innovate.	3.28
Resources	Projects	Time	We give people dedicated time to pursue new opportunities.	3.29
Resources	People	Talent	We have the internal talent to succeed in our innovation projects.	3.3
Climate	Simplicity	No bureaucracy	We minimize rules, policies, bureaucracy, and rigidity to simplify our workplace.	3.3
Values	Entrepreneurship	Action-oriented	We avoid analysis paralysis when we identify new opportunities by exhibiting a bias towards action.	3.3
Success	Individual	Satisfaction	I am satisfied with my level of participation in our innovation initiatives.	3.32
Values	Creativity	Playful	We take delight in being spontaneous and are not afraid to laugh at ourselves	3.39
Processes	Shape	Prototype	We move promising opportunities quickly into prototyping.	3.39

As highlighted in our earlier discussion, the fixation would be on the outcomes of what the six building blocks Innovation Quotient instrument can deliver. In the case of 3ST, we have also organized our results based on the top ten and bottom ten performers (see Tables 22 & 23). According to the results, the Behaviors block (Engage, Enable and Energize) had several similar factors ranked in the top 10. This could mirror a strong affirmation of the leadership by the respondents. The presence of the Success block (Individual & Enterprise) suggests that regardless of success or failure of high-risk projects, teams or individual believed that they will be rewarded to ensure the long-term innovation success for the firm.

In contrast, we observed that the deviations amongst the bottom ten factors were marginal as opposed to our top ten values. Moreover, we also noted that

the values for all the bottom ten factor have values of three or above. This observation is against our expectation of less than three for these bottom ten factors.

I have commented earlier that a weakness of the six-building block is the absence of calibration of values to denote a good innovation value instead of just ranking the factors by values. Regardless of this nuance, the Resources and Value blocks were raised as concerns or barriers in taking our innovation effort forward. The team raised financial accessibility as their number one concern to fund new projects. This is indeed an accurate view even though most participants were not aware of the governance imposed. The group controller had directed all potential projects would need to be submitted for corporate evaluations and approvals. Key considerations for endorsement would include fast payback and a high return on investment. At times, they may even ask if customers are willing to invest or sign up for the projects which may cause setbacks for nurturing our culture of innovation. This will be a contentious topic to maneuver as it involves senior management approvals. Conversely the space constraint is baffling as we sit on a 28,000 sqm of land with almost one third of our factory underutilized. The elements of time and talent are debatable. In the word of business, time is money and time to market is a critical success factor to survivability. The Management team would put emphasis on urgency whilst they also understand that product ideation to creation takes time. Like many other companies, we would nurture internal talents as part of succession planning and we also regularly sent our key or potential employees to other part of our sisters network such as plant visits to gain learn new knowledge as well as sharing of best practices

on innovation processes, for example the adoption of industry 4.0. where some plants were ahead of 3ST.

5.3 Data Analysis (Descriptive Statistics)

5.3.1 Introduction

In this concern, the previous chapter was directed towards unveiling the method through which the underlying objectives of the current study can be accomplished. With regard to this, the current chapter aims at showcasing the results acquired through the questionnaire and analysed using the SPSS software.

5.3.2 Descriptive Statistics Testing

Descriptive statistics is instrumental in representing the changes that occur in the data acquired. In a simpler and more precise manner, it can be highlighted that descriptive statistics is conducive for delineating the underlying trends, patterns, and implications within the data. As a result of this, the current study uses the descriptive statistics for illustrating the mean, median, mode, standard deviation, and frequency in the data for familiarizing with the responses gained.

Validity Test

As a general rule, the higher the validity coefficient the more beneficial it is to use the test. Validates for selection systems that use multiple tests will probably be higher because you are using different tools to measure/predict different aspects of performance, where a single test is more likely to measure or predict fewer aspects of total performance.

Based on the significant value obtained by the Sig.(2 tailed) of 0.000 <0.05, so it can be concluded that Values of Building blocks is valid. Based on the count value obtained TOTAL 0.887, r(195)= 0.887 > 0.0.159 (Critical value), so it can be concluded that item of Values is valid.

Therefore, as all the items in the questionnaire are significant at 0.000 <0.05 level of significance. Based on the count values obtained TOTAL at r (195) >0.159 (critical level), so it can be concluded that all the items in the questionnaire is Valid.

Correlations

		V	B	C	R	P	S	TOTAL
V	Pearson Correlation	1	.775**	.733**	.784**	.794**	.752**	.887**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	197	197	197	197	197	197	197
B	Pearson Correlation	.775**	1	.717**	.817**	.788**	.753**	.894**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	197	197	197	197	197	197	197
C	Pearson Correlation	.733**	.717**	1	.725**	.744**	.711**	.859**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	197	197	197	197	197	197	197
R	Pearson Correlation	.784**	.817**	.725**	1	.877**	.833**	.930**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	197	197	197	197	197	197	197
P	Pearson Correlation	.794**	.788**	.744**	.877**	1	.874**	.937**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	197	197	197	197	197	197	197
S	Pearson Correlation	.752**	.753**	.711**	.833**	.874**	1	.911**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	197	197	197	197	197	197	197
TOTAL	Pearson Correlation	.887**	.894**	.859**	.930**	.937**	.911**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	197	197	197	197	197	197	197

**. Correlation is significant at the 0.01 level (2-tailed).

Reliability Statistics

Cronbach's Alpha is a reliability test conducted within SPSS to measure the internal consistency, i.e., the reliability of the measuring instrument. It is most commonly used when the questionnaire is developed using multiple Likert scale statements and therefore to determine if the scale is reliable or not. The table below shows our reliability statistics. The Cronbach's alpha is 0.975, which indicates good internal consistency and scale reliability.

Reliability Statistics

Cronbach's Alpha	N of Items
.975	54

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Entrepreneurial - Hungry	190.93	1561.011	.618	.974
Entrepreneurial - Ambiguity	191.00	1561.082	.632	.974
Entrepreneurial - Action-oriented	191.31	1570.552	.495	.975
Creativity - Imagination	190.60	1562.231	.658	.974
Creativity - Autonomy	190.96	1555.060	.694	.974
Creativity - Playful	191.22	1558.865	.593	.975
Learning- Curiosity	191.00	1554.735	.673	.974
Learning- Experiment	190.89	1553.453	.690	.974
Learning- Failure OK	190.94	1555.731	.619	.974
Energize- Inspire	190.73	1549.159	.687	.974
Energize- Challenge	190.73	1559.402	.663	.974
Energize- Model	190.71	1548.360	.752	.974
Engage- Coach	190.90	1548.241	.691	.974
Engage- Initiative	191.33	1548.875	.721	.974
Engage- Support	190.74	1552.458	.721	.974
Enable- Influence	190.97	1557.280	.660	.974
Enable- Adapt	190.87	1558.142	.703	.974
Enable- Grit	190.76	1552.836	.703	.974
Collaboration- Community	191.07	1552.205	.687	.974
Collaboration- Diversity	190.90	1553.792	.655	.974

Collaboration- Teamwork	190.86	1551.170	.757	.974
Safety- Trust	190.34	1528.857	.234	.982
Safety- Integrity	190.84	1559.490	.669	.974
Safety- Openness	191.06	1550.502	.692	.974
Simplicity- No bureaucracy	191.30	1550.652	.642	.974
Simplicity- Accountability	191.18	1549.140	.675	.974
Simplicity- Decision-making	190.97	1554.019	.681	.974
People- Champions	190.81	1545.003	.777	.974
People- Experts	190.93	1546.617	.746	.974
People- Talent	191.31	1544.194	.779	.974
Systems- Selection	191.14	1549.333	.734	.974
Systems- Communication	191.11	1547.396	.770	.974
Systems- Ecosystem	191.20	1550.673	.702	.974
Projects- Time	191.32	1551.413	.691	.974
Projects- Money	191.38	1548.981	.703	.974
Projects- Space	191.34	1544.481	.773	.974
Ideate- Generate	191.20	1551.333	.763	.974
Ideate- Filter	191.15	1549.626	.734	.974
Ideate- Prioritize	190.97	1555.387	.721	.974
Shape- Prototype	191.22	1556.518	.711	.974
Shape- Iterate	190.99	1546.658	.776	.974
Shape- Fail Smart	191.05	1554.340	.662	.974
Capture- Flexibility	191.03	1544.494	.763	.974
Capture- Launch	191.09	1543.957	.737	.974
Capture- Scale	190.93	1545.684	.747	.974
External- Customers	191.10	1545.826	.770	.974
External- Competitors	191.18	1544.871	.776	.974
External- Financials	191.13	1543.258	.752	.974
Enterprise- Purpose	190.76	1552.134	.717	.974
Enterprise- Discipline	190.92	1543.112	.798	.974
Enterprise- Capabilities	190.85	1548.415	.763	.974
Individual- Satisfaction	191.28	1553.796	.604	.974
Individual- Growth	190.96	1552.565	.624	.974
Individual- Reward	190.82	1544.252	.729	.974

5.4 Thematic Analysis

5.4.1 Introduction

One technique for identifying and deciphering thematic patterns (themes) in qualitative data is thematic analysis. According to Clarke & Braun (2014), thematic analysis (TA) can be used via a range of theoretical perspectives, from analytical TA to essentialist, phenomenological TA, as well as thematic applied linguistics. Thematic Analysis is an evolution of qualitative research and can be categorised as a method of content analysis (Joffe, 2011). Accordingly, we used TA in this study to examine 15 interview transcripts to reach acceptable conclusions. Table 25 presents information about the four phases of thematic coding and classification as done in this study.

5.4.2. Familiarizing with data

Phase one in the analytical TA process is to familiarise oneself with the data. To become familiar with the obtained data, the researcher must analyse and evaluate it. Data are reviewed and examined several times before conclusions can be reached (Clarke & Braun, 2014). Accordingly, we first familiarized ourselves with the interview data by reading and re-reading the transcripts and forming an overall idea about the responses.

5.4.3 Demographics

Out of the total respondents, about 73 per cent of the respondents revealed that they had not received any specific training in innovation.

➔ Moreover, 40 per cent of the respondents agreed that they knew some specific processes in the company to manage new business ideas.

➔ 66 per cent of the respondents suggested that they had never used such processes.

5.4.4 Generation of initial codes

During phase 2, the data must be completely and precisely coded. The codes should consider any data features that may become evident throughout the coding stage and may be relevant to the investigation. The code should consist of a single sentence that refers to the key elements of the data and (potentially) the researcher's critical viewpoint. The codes must be able to effectively work with the information because themes are made up of codes and coded data. This stage must be finished by assembling all the codes and the relevant data (Clarke and Braun, 2014).

After we had familiarized ourselves with the data by reading and re-reading the transcripts, the next step was to extract initial codes, by performing colour coding in phase one, where the responses are coded into relevant patterns that relate to the data and research objectives. Phase two involved searching for themes or categories, where the initial codes were segregated into relevant themes to which they relate. In phase three, the themes were reviewed to refine them. They were either modified, deleted, or edited to ensure better clarity. It is essential for the themes to be in alignment with the data obtained from the transcripts. During phase four, the themes were reviewed and

matched again with the responses of the participants. A thematic map can help to demonstrate the relationships among them. The last step of a TA is the development of a report which provides an explanation of the themes and also summarizes all the finalized codes. Table 25 provides information about how we implemented the four TA phases in this study.

Table 25

Thematic Coding and Classification

Phase 1 **Data Extract**	Phase 2 **Coded for:**	**Category**	Phase 3 **Search and refine**	Phase 4 **Define and name themes**
Qualitative comments related to Innovation Culture	Discovering new products & ideas	Innovation effort	1.Rather not change	1. Absence of innovation effort
	Need to improve Thinking process		2.Truth is hidden	1.1 Overview of Innovation
	Review current manufacturing process		3.Not at all	1.2 The innovation efforts of 3ST organisation
	Reduce manpower		4. No lead in driving innovation activities	
	Relying too much on LEAN as innovation driver, incremental instead of radical			
	lack of Knowledge Transfer			
	Harder time to adapt			
	Find ways to troubleshoot manufacturing process			
	Rather not change			
	Truth is hidden			
	No lead in driving innovation activities			
	Not at all			
	Ideas may be rejected by middle management	Need for Innovation improvement	1. Vague communication on innovation strategy	2. Innovation impediments
	Lack of training programs		2. Outdated work processes	2.1 Improving innovation in 3ST organisation
	Not thinking out of box		3. Need to improve skillset	2.2 Innovation culture can be helpful to 3ST
	Old school method		4. Silo thinking, no functional interlocking	
	Collaboration towards firm's goal		5. Ideas may be rejected by middle management	
	Need to understand market		6. More work load, shirking	
	lack of communication & knowledge management		7. Lack of ideation process	
	Need to improve skillset		8. Not finding the ground truth	
	Not finding ways to change ways of working			
	Outdated work processes			
	lack of ideation process			
	Not taking initiatives			
	Silo thinking, no functional interlocking			
	Not finding the ground truth			
	Take responsibility instead of accepting responsibility			
	More work load, shirking			
	Vague communication leading to poor innovation			

Phase 1 **Data Extract**	Phase 2 **Coded for:**	**Category**	Phase 3 **Search and refine**	Phase 4 **Define and name themes**
	Trying new things	Understanding innovation culture	1. Lack of confidence	3. Organisational culture hindrance
	Improving current products		2. Following competitors	3.1 Innovation culture within the company
	Take risks		3. Lack of time and resources	3.2 Weakness of 3ST innovation culture
	New breakthroughs		4. Harder time to adapt	
	Ways of doing things differently		5. Shirking	
	Improve work process		6. Not willing to do more	
	Sharing opinions & knowledge		7. Not coming out with new products	
	Competitiveness	Benefits of Innovation culture	8. No change in way of doing things	
	Overall performance		9. No change compared to 10 years ago in terms of products and processes	
	New customers		10. Fear of taking risk, waiting for retirement	
	Digital locks (new products introduction)		11. No external exposure to outside world	
	New products and processes		12. Mindset and perception rejecting change	
	Adapting to change		13. Afraid of failures affecting performance appraisals	
	Building skills		14. Lack of guidance or guidelines	
	Improve efficiency		15. Frequent change of ownerships	
	Enhance profitability		16. Reactive instead of proactive	
	Need to work together		17. Issues may be known by employees but they are afraid to tell and no one try to understand the root cause	
	Beneficial for employees		18. Employees do not dare to share their opinions and there is no platform to share their thoughts, resulting in workplace grievances	
	No change in way of doing things	Innovation culture within the company	19. Lack of opportunity to learn	
	No change compared to 10 years ago in terms of products and processes		20. Legacy continuation	
	Following competitors			
	Lack of confidence			
	Lack of vision			
	Lack of time and resources			
	Not coming out with new products			
	Harder time to adapt			
	Improve through innovation to come out with new products			
	Improve work efficiency			
	Reduce time			
	Fear of taking risk, waiting for retirement			
	No external exposure to outside world			
	Mindset and perception rejecting change			
	Afraid of failures affecting performance appraisals			
	Lack of guidance or guidelines			
	Constantly waiting for customer needs rather than discovering			
	Frequent change of ownerships creates fear of job security			
	Innovation need to be led by people who are willing to make change			
	Employees do not dare to share their opinions and there is no platform to share their thoughts, resulting in workplace grievances			
	Only see improvements in processes but yet to see new products			
	Traditional thinking due to legacy handed down			
	Lack of opportunity to learn			
	Issues may be known by employees but they are afraid to tell and no one try to understand the root cause			

Phase 1	Phase 2		Phase 3	Phase 4
Data Extract	**Coded for:**	**Category**	**Search and refine**	**Define and name themes**
	Lack of awareness	Differences in survey results	1.Lost of communication Gaps in expectation	4. Incongruence of perception to Innovation culture
	Job security threfore fear of telling the truth and reprisal from top		2. Communication	4.1 Difference in cohort results
	Employees of different level exposed to different information		3. Gaps between expectations	4.2 Difference in results of managers and other team members
	Behaviour		4. Lack of awareness	
			5. Mismatch of understanding between improvements over	
	Communication		innovation	
			6. Gaps between expectations such as meeting the objective and	
	Varying Interpretations of innovation by different level of employees		satisfying the expectations	
			7. Varying Interpretations of innovation by different level of	
	Job security and good pay package within Chiayi		employees	
			8. Leaders behaviour or mindset will change according to their	
	Reprisals from leaders		beliefs	
	Employees may not be able to adapt to the change as lower level			
	employees may not be cognizant to company current situation or		9. Lower level do not know the directions of the company and the	
	understand their superiors directions, hence fear and confusion set		intent of innovation, hence they will give higher score even though	
	in which explains the direct in the views of innovation		innovation could be marginal	
	Lower level do not see as much as higher level		10. Access to company direction	
	Higher level will always demand more to see the change where lower			
	level failed to see		11. Not all gets to see the big picture	
	Mismatch of understanding between improvements over innovation		12. Employees of different level exposed to different information	
	Not all gets to see the big picture			
	Leaders behaviour or mindset will change according to their beliefs			
	Lower level do not know the directions of the company and the			
	intent of innovation, hence they will give higher score even though			
	innovation could be marginal			
	Gaps between expectations such as meeting the objective and			
	satisfying the expectations			
	Different outcomes			
		Differences in results of managers and		
	Broader vision	other team members		
	Lost of communication Gaps in expectation			

Phase 1 **Data Extract**	Phase 2 **Coded for:**	**Category**	Phase 3 **Search and refine**	Phase 4 **Define and name themes**
	Closed Culture	Open or Close org. culture	1. Company not willing to change	5. High Degree of conformity due to closed organisation culture
	Open culture		2. Lack of sharing opinions	5.1 Open or closed culture within the company
	Company not willing to change		3. Afraid of presenting the truth	5,2 Open or closed culture in Taiwan
	Lack of sharing opinions		4. Afraid of taking responsibility	5.3 Taiwanese employees are typically compliant
	Afraid of presenting the truth		5. Follow directives	5.4 Complaince culture, ratings of results and innovation culture
	Passing the responsibility of change (Shirking)		6. Culture of obedience	5.5 Length of service and conformity
	Lack of acceptability		7. Herd mentality	
	Acknowledging feedback		8. Imposition or respect for seniority	
	Company is not willing to change or accept new concepts from external		9. Country culture impact on organisation culture	
	Employee mindset is to retain past practices		10. Education	
	Lower level opinions unable to reach the higher level		11. Upbringing	
	High level employees not willing to listen to suggestions		12. Collectivism	
	Legacy issue, long service employees will not question but just do, hence no thinking required		13. Legacy issue, long service employees will not question but just do, hence no thinking required	
	No freedom or avenue to openly give suggestions to upper mgmt.		14. Used to (accustomed)	
	Initial content may be changed in order to please the management		15. Lack of openness	
	Rather someone to take on the responsibility unless there is proof of benefits	Open or closed national culture	16. Senior level unwillingness to accept or acknowledge new ideas	
	Views recommendation as a disrespect to their way of working		17. Need justification for change	
	Company is more traditional as employees just listen follow directions		18. Avoid confrontation	
	No point in giving suggestions as mgmt. will not have same view		19. Higher level may still not very willing to listen to advice	
			20. Legacy, people will not question but just do, hence no thinking required	
	Affect individual performance		21. No freedom or avenue to openly give suggestions to upper mgmt	
	Any change recommended usually will not take effect and employees would stop giving ideas over time		22. Views recommendation as a disrespect to their way of working	
	Higher level may still not very willing to listen to advice		23. View suggestions as a challenge to authority	
	Afraid/fear		24. Company is more traditional and it has becomes a habit that employees just listen and follow directions	
	Herd mentality		25. No point in giving suggestions as mgmt. will not have same view	
	Imposition of seniority		26. Change of content by superiors	
	Agree			

Phase 1 **Data Extract**	Phase 2 **Coded for:**	**Category**	Phase 3 **Search and refine**	Phase 4 **Define and name themes**
		Taiwanese employees are typically		
	Avoid confrontation	compliant	Avoid confrontation	
	Herd mentality		Obedience	
	Impede		Not taking responsibility	
	Obedience		Rejections of Initiatives	
	Good for regulation		Used to (accustomed)	
	No new ideas		Prefer status quo	
	Sharing opinions & knowledge		seniority based	
	Vision of leader			
	Not taking responsibility			
	No effect			
	Two-way communication			
		Compliance culture will help or impede		
	Innovation	the innovative culture		
	Rejections of Initiatives			
	Company culture			
	Individual attitude			
	Less innovation			
	Longer the service , longer the compliance			
	Shielding the issues			
	Used to (accustomed)			
	Prefer status quo			
	Change is Painful			
		Length of service and compliance		
	Learning	culture		
	seniority based			
	lower level compliance			
	New challenges			
	Knowledge transfer			
	Enhanced efficiency			
	Improved collaboration			
	Time and resources			
	Not taking initiatives			
	Job security			
	Resource optimisation			
	Knowledge sharing			
	Value creation	Open feedback		
	Communication			
	Changing the company culture			

5.4.5. Search for themes

This phase's purpose is to organise the initial codes into themes, which are related patterns identified in the qualitative data. In the preceding phase, 161 initial codes were produced by meticulously and painstakingly reviewing the transcripts for managers, supervisors, operators, team leaders and executives. The 161 codes obtained respectively were divided into relevant broad themes that are more particular to the study's objectives. The preliminary themes (Category), as well as the codes that pertain to them, were listed in phase three as illustrated in Table 25. For convenience, all of the codes were grouped into one or more themes (initially with the help of colour coding during an earlier analysis phase).

5.4.6 Review of themes

All of the codes had previously been grouped into thirteen distinct categories. During the analysis process, it is necessary to analyse, modify, and double-check that all of the themes are relevant. To achieve the most precise estimation and interpretation of the data, any recurrence, whether in the themes or codes, must be detected and deleted. At this point, the data for each subject and key will be double-checked, and it must be determined if the data support the developing themes. Furthermore, it must be confirmed that all themes are relevant to the current research area. We confirmed that each theme is distinct from the others and that none of them overlaps. The completed themes are shown in Phase 4 in Table 25 above, with the codes left uncoloured.

5.4.7. Discussion and Writeup

Theme 1: Absence of Innovation Effort

Sub-Theme 1.1: Overview of Innovation

Innovation can be interpreted distinctly as the procedure of trying new things, improving current products, taking risks, reaching new breakthroughs, doing things differently, improving the work process, and sharing opinions & knowledge. This can be observed from the response, “Walking the same path will not help you learn anything, trying new ways will make you improve.” and “Innovation is about improving our current products or process to be better, in terms of efficiency, reducing the time of production.” While the aspect of risk is observed in the statement “Innovation culture is to take risk. The company need to weight the risk and opportunity for any innovation.”

More specifically, the managers’ understanding of innovation included trying new things and improving current products. The supervisors believed that innovation involved taking risks, improving new products, and involving new breakthroughs. Team leaders were of the perception that innovation is a way of doing things differently. On the other hand, the operators believed that innovation involves improving current products and improving the work process. Finally, the executives believed that innovation revolves around sharing opinions & knowledge along with the improvement of current products and work processes.

Sub-Theme 1.2: Innovation efforts of 3ST

Innovation efforts used within the organisation are seen as important to discover new products, ideas and thinking processes. This can be observed from the response, “Discover new products and ideas, will share with employees. Also, improving our thinking processes with our management team and members from the old school thinking, sharing experience with others.” One of the respondents lamented about the lack of innovation efforts within the organization. This can be affirmed by the response, “Not at all. Initially wish to make a change but employees are not willing to make the change. There are less people who are willing to make the change in this company. They will rather not change, prefer not to say, and result in the current situation where the truth is being hidden.” As one interviewee poignantly mentioned “Currently we are lacking in coming out with new products, innovation. We are used to waiting for requirements or waiting for our customer needs and another manager commented. Employees need to take more initiatives to seek help to bridge the gap on things that they do not know how to do.” On the other hand, it was also noted that the organization worked on enhancing their manufacturing process to optimise their manpower by redeploying their employees. In this context, a respondent revealed, “Improve the manufacturing process. Review current way of process and constantly improve our work process to reduce time and improve efficiency. One method is to do things concurrently. The other method is to combine steps to reduce manpower and manufacturing time.” Other than this, using LEAN and knowledge transfer are the other two innovative strategies used by the organisations. In this context, one of the respondents stated,

“Improve processes such as using LEAN to improve work efficiency. Constantly improve our work processes to improve efficiency. (Process) The other thing would be transferring of knowledge (Process). When supervisor learns some new knowledge through the workshop, will take initiative to transfer this knowledge to employees or within own department.” Other efforts included Fast Product modelling and reviewing manufacturing problems as can be observed from the statement, “Fast Product modelling (SMED) method (Process?), reduced the setup process time of modelling from 38 minutes to 14 minutes. Currently, it is still in the process of reducing time and improving employees' work efficiency. Also, any faulty products or any manufacturing problems will be reviewed to find the cause and make the necessary changes. Make use of current company technology to make minor changes and improve the process.” Also, taking part in innovation, regular feedback and saving resources were other innovative strategies highlighted.

Concerning the innovation efforts of the organization, the managers revealed that they discover new products and ideas, enhance the thinking process, improve the manufacturing process, and that they reduce manpower. One manager was of the perception that no innovative efforts were employed within 3ST. Additionally, the supervisors stated that the innovation efforts utilised within the organisation include the use of LEAN, knowledge transfer, fast product modelling and reviewing manufacturing problems. Two of the team leaders affirmed that no innovation efforts were implemented, while the other two were of the perception that LEAN and regular feedback was provided. The operators interpreted saving resources as an innovative effort,

while the majority of supervisors felt that no innovative efforts have taken place at 3ST.

Theme 2: Innovation Impediments

Theme 2.1: Need for innovation improvement

That innovation within 3ST can be improved by implementing training programmes can be ascertained from the following response, “Employees are positive on innovation but there is no clear reward that can help employees take initiatives. Skip through the chain of command to share ideas as ideas may be rejected by middle level. Bring in training programming of thinking process. Help employees think out of the box instead of old school method.” Besides innovation training, interviewees felt that increasing sales, launching new products and skill set improvement can lead to innovation. As one of the respondents argued, “Firstly, sales need to be improved. They need to understand the market demands and aware of our product ability. Also, new products are needed. The skills of our developers and engineers need to constantly improve their skill set in technology and the way of doing things to find a breakthrough to help the company remain competitive. Understand why others is doing better and not why we are better than others. They are the departments that spearhead the company, and it is crucial that they help to set the direction of the company.” Another respondent suggested, “One is to improve our company work process to improve our efficiency. This also includes developing new products as we are currently behind our competitors in coming out with innovation. This is because employees may not be used to manufacturing new components, which increases the time needed to

manufacture these parts. Employees need to take more initiatives to seek help to bridge the gap on things that they do not know how to do. Therefore, we can equip employees with the required skill sets needed for the future."

Also, 3ST must work towards collaboration for achieving the firm's goals, better product storage, and material management. This is observed from the response, "Currently, the change would be to reduce the product storage (*resource*) as we are facing a lot of products stored in the storage and not using. Better material management (Process) and understand customer demands to products the products. Hence, reducing the need to store products in storage for a long time." To further enhance innovation, communication and knowledge management are required as well as empowerment, investing in resources, and resource optimisation. This is affirmed by the statement, "Communication needs to improve for anyone with a new idea or concept, nobody will want to listen if they do not understand or see the need. This can be also others may feel that it is not beneficial to them and there is no need to be involved. Such innovation ideas can also involve more than one party where it will affect their current work, hence they do not wish to participate. This should be the responsibility of a person to take charge of the innovation decision and not a decision made by the owner of this idea as they may not have the power to initiate. Company can also invest resources such as time, money or more manpower to push for a new initiative that might help the company improve or breakthrough."

The managers suggested that in order to improve innovation within 3ST, it is important to incorporate training programmes, increase sales, introduce new products, and improve skill sets. The supervisors believed that innovation can

be improved within the organisation by launching new products, collaborating toward the firm's goals, enhancing product storage, proper material management, communication, and knowledge management, and reducing flaws. The team leaders were of the opinion that it is firstly essential to find the root cause regarding the lack of innovation also, they believed that innovation can be improved by communication and knowledge management. The operators believed that innovation could be improved by empowering the employees, investing in resources, resource optimisation, launching new products, and improving their skill sets. Finally, the executives believed that product development, collaboration toward the firm's goals and the launch of new products can assist in improving innovation in your organization.

Sub-Theme 2.2: Innovation culture can be helpful to your organization

The majority of the respondents believed that Innovation culture can be helpful to 3ST. The respondents stated that innovation culture helps in enhancing competitiveness and the overall performance as can be observed from the response, "No matter if it is product, processes, we will need innovation to help us improve in our competitiveness or value in the market. Improve our overall performance."

Innovation helps to attract new customers and also assists in improving new products and processes. This can be asserted from the statement, "Yes. Lock manufacturing have been around for a long time, and we need to improve through innovation to come out with new products to replace the traditional locks. Company needs to move along with the technology and market demands to stay competitive. A few industry competitors are already in this traditional mechanical business. Hence, we should move forward and find

out the market demands, moving away from this traditional lock business to find new customers."

Additionally, innovation culture can help in adapting to the change as can be seen from the response, "Yes, customers will never be satisfied. They will always think that there will have better functionalities or product of similar product at a better price. Hence, they are always looking for a change. Thus, the company must adapt to this change to stay competitive in the industry." Other than this, innovation culture helps in building skills, improving efficiency, enhancing profitability and is beneficial for employees. This is pertinent from the statement, "Yes. If employees can share their views regardless of level, employees will feel that the company treasure them and will help motivate everyone to be passionate to help change the company today. The mood of employees will help improve the innovation works and culture."

The managers believed that the innovation culture can be helpful to the organization as it helps in enhancing competitiveness, overall performance, digital locks and also attracting new customers. Supervisors argued that innovation culture assists in enhancing new products and processes, helps in adapting to change and also assists in attracting new customers. Team leaders stated that innovative culture helps in building skills, and attracting new customers, products, and processes. The operators revealed that an innovation culture helps to develop skills, improves efficiency, and enhances profitability. Interviews executives felt that innovation culture is beneficial for employees, that it enhances competitiveness, helps in building skills, and improves profitability.

Theme 3: Organisational culture hindrance

Sub-Theme 3.1: 3ST's Innovation culture

Some of the respondents opined that 3ST has no innovation culture: "No. From a new employee opinion, there is no change in the way of doing things. Although there are new initiatives on innovation, it will still need time to mature. For example, lean, where it helps to improve our effectiveness. Otherwise, there is no change compared to 10 years ago in terms of process or product." One employee believed that following competitors is the only innovative culture practice 3ST pursues. This can be observed from the statement, "Currently, the company is in the process of doing innovation, but it is not as fast as our competitors. In another word, we are following our competitors' footsteps in innovation. The company needs to be the one that is leading this industry in lock innovation breakthrough to stay competitive." The reasons for low innovation include lack of confidence, lack of vision, lack of time and insufficient resources. This can be concluded from the response, "No. Everyone is afraid of failure while doing new products or processes. Thus, lack of confidence and courage to try new things. This is because employees are used to their routine work. Avoid the need to spend time for a change. Do not fix things that are not broken. Any change in company product or processes will require a lot of time for planning, analysing etc. which may affect their performance. It can also be there is a lack of guidelines for innovation. Thus, no one is willing to take the lead to make a change nor willing to take the responsibility. In conclusion, it can be no one have the vision for innovation or no one willing to take the challenge and responsibility to make the change." Also, it was observed that employees

generally face problems in adapting to innovative culture as can be seen from this statement, “Currently working towards innovation. More experienced workers may have a harder time to adapt as they have their ways of doing things. Company had been through several rounds of ownership change and hence the focus may not be in innovation but rather, improving the sales. Therefore, the idea of the company needs to change to bring in this innovation culture to help the company improve.” Additionally, it was observed that an innovative culture can assist in improving work efficiency, reduce time, and enhances new skills, new products, and new customers. This was concluded by the statement of respondent, “The company is moving towards innovation. We are developing new products but have yet to meet the customer demands. We need to understand and take the initiative to find out the market demands, predict their needs and develop our product based on these needs rather than having the customer tell us what they wish to see in our product. This will help us move ahead in innovation and market standing.” and “company may have traditional thinking with many of our employees have been here for a long time. Hence, by encouraging employees with such rich experience to seek way for improvements, constantly having meeting and discussion sessions to seek ways of improvements.”

Managers predominantly believed that there exists no Innovation culture within 3ST except for LEAN. One manager believed that 3ST’s innovation efforts were dependent on following competitors. Supervisors argued that there is no innovation culture within the company due to a lack of confidence, lack of vision, lack of time and resources and a harder time adapting to such innovative culture within the company. Some team leaders felt that there is

an observable innovation culture at 3ST as there is an improvement in work efficiency, reduction in time and enhancement of new skills. However, due to a lack of time and resources, the innovation cannot be realised to its full potential. The operators further suggested that lack of confidence and lack of time and resources are the major reasons for no innovation. However, some innovation can be observed due to the introduction of new products and new customers. The executives were of the opinion that there is no innovative culture at 3ST, primarily because of a lack of confidence and lack of vision.

Sub-Theme 3.2: Weakness of 3ST's Innovation culture

Our thematic analysis has highlighted several weaknesses within 3ST. One of the weaknesses is the fact that there is little or no change in how 3ST operates its business from a product or process perspective. This is exemplified by several quotes from various employees, "From a new employee perspective, there is no change in the way of doing things", "No one is willing to take the lead to make a change" or "Therefore the idea of the company needs to change to bring in innovation culture to help the company improve". As Executive 2 subtly put it, "Either its management, process or products, there isn't any improvements for the past few years." According to interviewees' feedback, the company is always waiting passively and only reacts to customer requirements rather than embarking on discovery path to anticipate customers' future needs. Employees are afraid to take on risk in changing as they are fearful that any failure would affect their performance appraisals, preferring to take the safer route in preserving status quo. Another key highlight is deference to seniorities due to the Taiwan's education system as well as upbringing. Respect for elders together with this

consciousness of etiquette are carried through to the workplace. Individuals with authority or length of service are given great respect. This observation of deference has also been confirmed in other parts of our thematic analysis on compliance (or conformity) and will be discussed separately.

This culture of deference to elders is a significant hindrance to 3ST as junior or new employees are afraid to highlight any problems that they encountered for fear of disrespect or reprisal. By ignoring these ground issues that could be significant may impede the innovation progression of the organisation as these sharing of opinions and knowledge are circumstantially neglected. As one operator states "Even if changes are being made, it may have worsened the situation instead of making progressor improvements. It may be because the direction of change is right, but the ground issues have yet to be highlighted." Furthermore, due to the baggage of past legacy, some employees may find it difficult or intimidating in adapting to new changes especially those initiatives that could disrupt their usual ways of working as what one executive pointed out "It is also harder for seniority-based employees to change their way of doing things as they are used to it." Additionally, they also view these changes as new workload which they are unwilling to undertake, something which resembles the discussion about "Quiet Quitters" within an organisation. One key definition of quiet quitting implies that employees perform duties assigned to them and do not go above and beyond what their job description requires them to do. As one manager said, "They would rather not do any change and cause more workload or take more risk." Another manager echoed, "Employees will rather not take the lead to do new process or change their way of doing things to seek

improvements." This is also further supported by the comment of one of the team leads, "Employees rather not say anything or give recommendations to avoid taking responsibilities." Another key concern that surfaced is collaboration. As one supervisor explained, "Everyone should think from the other's perspective where the benefit should be for the company and not your own department". Similarly, another respondent (Executive 4) pointed out, "Different departments can come together and help the company to gain more profits, reduce cost and improve efficiency."

Theme 4: Incongruent Innovation culture perceptions within 3ST

Sub-Theme 4.1: Cohort differences

The reasons for cohort differences are lack of awareness and job security as can be concluded from the following response, "This is because for compliant and their job scope. Their daily routines have always been producing and executing their tasks, not aware of the company situation". This phenomenon matches our earlier literature description of a closed system. Employees feel that 3ST has good benefits and that their pay is one of the best in Chiayi. Hence, they will be afraid of losing their job. This might have caused the lower-level employees surveyed to give a better score rather than saying something that is bad, "In case their superior finds out, they will be blamed and outcasted, which may cause them their job." Adaptability and behaviour are other prominent reasons for the difference in results. This can be affirmed from the response, "The current company direction is moving towards innovation, but employees may not be able to adapt to the change. The lower level can only see (observe) the company is taking initiative in doing

innovation, but they may not be cognizant about the company current situation. The higher level will know the company directions better and their expectations will be higher than the lower-level employees. The middle level employees may not understand their superiors' directions and feel that any changes will affect their overall workflow, the lower-level employees job performance. Hence, by not understanding they will execute a different behaviour to those around them, which explains the difference in their view of innovation." Communication issues and gaps between expectations and different outcomes are other important aspects. This can be observed from the response, "Communication is the key … For example, the lower levels will not see the direction or situation of other departments. Therefore, lower levels do not see as much as the higher level. A higher level will know the direction and situation of the company. Hence, they will know the problems better than the lower level." Another factor is information asymmetry, "Lower-level employees thinking also differs from higher level employees as any small change, they will feel that it is an improvement but from the higher level, it may be not. This is because higher levels can see more information where they will see if there is any impact on the company, but at the lower level the change they see may not directly affect or improve the company's performance. Hence, the higher level will always demand more see the change."

The managers believed that the differences in the cohort results are mainly due to a lack of awareness, job security, adaptability, and behaviour. The supervisors believed that the difference in cohort results is caused by communication gaps, gaps in expectations, and different outcomes. The team

leaders believed that job security was the primary reason for the difference in results and the operators affirmed that job security and adaptability led to different results. Finally, the executives revealed that the difference was due to a lack of awareness and job security aspects.

Sub-Theme 4.2: Different results for managers and other team members

Also, when analysing the difference in results as far as of managers and other team members are concerned, it was observed that the reasons for this difference included broader vision, lost communications, gaps in expectations and access to the company direction. This can be concluded form statements such as, “Manager will have to see the company from the top level. They will know the company direction first-hand. However, the lower the level, they will not have the vision of the highest management. Hence, they do not know the standards. Also, the middle or the higher level are not teaching or telling the lower level that there is room for improvements. They are not doing any change and thus, many of the lower level will think that the company is doing good but not from the highest-level point of view. There will be lost of communications from top down or bottom up. Top to down, the higher level did not inform the lower level or did not pass down the full detailed information. From bottom up, ideas are filtered or rejected in between hence it will not reach the highest level.”

“For the middle level, which is the team leaders, they have experience in the company to become the team leaders. They are aware of the ground issues and understand the feelings of the lower-level employees. However, once they are being pressurized by the higher and lower levels to meet both expectations. and by trying to manage both expectations, their views of the

higher management and lower management will change. May be aware of many situations happening in the company but dare not say as they will offend their superior." Access to knowledge pertaining the company's direction is critical as highlighted in the following response, "This is because managers have more access to the company direction as compared to the other levels. Hence, they will know the situation better than the other employees." In summary, the managers felt that the difference in results of managers and other team members was due to a broader vision, lost communications, gaps in expectations, and strategic knowledge about the company's direction.

Theme 5: High degree of conformity due to closed organisation culture

Sub-Theme 5.1: Open or close culture within the company

Almost all respondents stated that 3ST has a closed culture, and the most prominent reasons for this were not willing to change, lack of sharing opinions, fear to present the truth, passing the responsibility of change, lack of acceptability, and the prevalent nature of just following directions. This can be observed from the responses, "Company is not willing to change, is not willing to accept the new concept from external. Employees mindset is that we have been doing it the same way as before hence there is no need for a change. This have been the culture of the company. Do not wish to change, want to be safe and not risk any failure if there is any chance. Do not have the exposure to the outside world to see what others is doing." and "Lower-level employees' opinion are not able to reach the higher level. This is because there are some high-level employees not willing to listen to the lower

level, it can also be due to seniority, whereby the higher-level feel that they have the right for the lower level to listen and agree with them." Also, the aspect of being afraid of presenting truthful facts and shirking responsibilities is highlighted from responses such as this one, "After being acquired, it is moving towards open culture. However, company is still in a closed culture environment because employees are still afraid to present the truth. They are unable to adapt to the change the company is trying to move into." and "Employees will have their own perspective and they feel that they are the champions in their own area. Hence, they will need action to prove that there is benefit for a change. Therefore, most employees would rather pass on the responsibility of change to others than willing to do it themselves. Hence, they are less willing to listen to others unless there is a proof of benefit." respectively. Additionally, one of the respondents revealed that their company had an open culture and asserted that the reason for this is the acknowledgement of the feedback provided as can be affirmed from the statement, "feedback supervisor and management will help to pass the message or address the issue. Hence, company is more towards open culture than close culture."

Managers, supervisors, team leads, and operators suggested that the company has a closed culture. The majority of the executives also felt that 3ST has a closed culture. The managerial staff argued that the company has a closed culture because it is not willing to change in addition to a lack of sharing opinions and employees' fear to present the truth. The supervisors believed that the culture within 3ST is closed because the higher authorities generally pass the responsibility of change, are not willing to change, and also

employees are afraid to present the truth. The team leads affirmed that the closed culture is depicted by a lack of acceptability and fear of presenting truthful facts. The operators stated that 3ST's closed culture is characterized by the unwillingness to change and fear of presenting the truth. Finally, most executives believed that the firm's closed culture is a result of fear of presenting the truth and too much emphasis on following pre-suggested guidelines. However, there was one executive who stated that 3ST has an open culture, and he believed that the company acknowledged employees' feedback.

Sub-Theme 5.2: Open or closed culture in Taiwan

Most respondents felt that there exists a closed culture in Taiwan and that this is due to the education system and culture of obedience. This can be affirmed from the statement, "Closed culture. Taiwanese always feel that the leaders have the rights to demand their followers to follow. Any task that is not under their responsibilities will just have to delegate to others, not take the initiative to complete. This behaviour is the way of Taiwanese culture. The way that everyone was brought up. The way of Taiwan education system where the lesser the students ask any questions; it will be better. For example, whatever the teacher say is right and you must follow. Not like other countries where they encourage questioning, and everyone share their views and opinion to solve the question today." One of the respondents argued that Taiwan is moving towards an open culture due to the competition from the outside world and stated, "Taiwan companies are slowly moving towards open culture. This is because of the pressure from competitors outside of Taiwan

whereby innovation is the key to company success. Hence, they will need to adapt to this change to be competitive." Apart from this, the other reasons for following a closed culture are legacy, herd mentality, and seniority imposed. This can be concluded from statements such as the following, "Closed culture. Taiwanese are afraid of failure as it will waste company resources in terms of both money and materials etc, which may lead to pointing out who should take the blame (accountability?). In the Taiwan culture, failure is not acceptable. This is because most people will just follow instructions and let the leader lead the company directions. It is the leader to bear the responsibility, not a low-level employee working for that leader." and "Closed culture. This is because of the family business legacy as there are emotional attachments. They treasure relationship and will try not to have disagreement and try to maintain a good working relationship. Hence, anything that they feel is not right and their higher level will not agree with them, they would rather not say.

Also, the Taiwanese would rather not to take the lead or being in the spotlight. Hence, most of the things they would rather go with the flow and not have any disagreement with the majority."

The managers believed that Taiwan has a closed culture and that this is due to the education system and culture of obedience. However, one of the managers believed that Taiwan is slowly adopting an open culture due to enhanced competition. Supervisors believed that Taiwan has a closed culture since the Taiwanese are afraid of failure embedded in a culture of obedience and because of the established education system. The team leaders pointed out that Taiwan is portrayed as having a closed culture since people are afraid

of failure due to the established education system, legacy, and herd mentality. The operators stated that the close culture within Taiwan is due to the importance of seniority and the culture of obedience. The executives suggested that Taiwan has a closed culture due to the education system, fear of failure, obedience, and open culture.

Sub-Theme 5.3: Taiwanese employees are typically compliant

Most respondents agreed that Taiwanese employees are typically compliant due to obedience, legacy, and education culture. This can be observed from the response, “The traditional way of teaching is to listen to orders. This is also due to many Taiwanese males undergoing national service, obey to the direct orders and do not question. Also, Taiwan was under the leadership of Japan. Therefore, grandparents have been influenced by the way of Japanese where respect and compliance is the top priority. Finally, most Taiwan companies are in OEM where we do what our client wants and will not question their requirements. We do not question because of our education culture. We do what others tell us, we are used to it and will not questions others' orders.” Other than this, lack of opportunities, job security, avoiding confrontation and herd mentality were seen as other important reasons of compliance in Taiwan. This is concluded from the statements, “It may be due to Taiwan faltering economy where it is not as stable as the other countries which lead to lack of opportunities for a job switch or even hard to find jobs. Therefore, employees are afraid to lose their job. Being compliant will not offend their superior, do what they are being asked to protect their job.” and “Taiwanese are kinder and more peaceful, will not try to have disagreement.

They would prefer to have good relationship than saying anything that will cause unhappiness in the work environment. Hence, mostly will just listen to their superior decision, and follow their instruction. Employees that is not compliant will usually leave the workplace as they do not find the joy in working and superior would rather not have someone that will disrupt their teamwork and affect the discipline in their team." respectively.

Managers believed that Taiwanese employees are typically compliant due to conventional teaching, obedience, legacy, education culture, lack of opportunities and job security. Supervisors believed that this compliance behaviour is primarily due to the education system and obedience. Similarly, the team leaders believed that Taiwanese employees are compliant as they try to avoid confrontation, are obedient and are also due to the education they have received. The team leaders stated that this is due to herd mentality and obedience. Finally, executives felt that Taiwanese employees are compliant because of job security, obedience, and education culture.

Sub-Theme 5.4: Compliance and 3ST's innovation culture

Most respondents believed that compliance culture affects 3ST's innovation culture. Some respondents believed that it would impede the innovation culture because of immense obedience, and consequently to the lack of new ideas, sharing opinions, buying into the vision of the leader, and not taking responsibility. This can be concluded form the response, "Compliance might affect innovation because you will need the views, the opinion of others rather than just the leaders. Having the views and opinion of others will have more perspective, rather than depending on the leader. If the leader is in the

wrong direction, everyone will move towards the wrong direction. However, if it was the opinion of everyone, management can then decide using these views, opinion, or initiative to decide which is the best for the company instead of just one recommendation." Another interviewee opined, "This is because compliant employees will just execute task base on superior instructions, which will not give them space to think of alternative ways to come out with new ideas, new way of doing things. Although compliance is good as employees have good discipline, this may restrict the opportunity for innovation from the lower level where they are more aware of the current groundwork situation." One respondent voiced out his believe that compliance is important as it is helpful in maintaining discipline and regulation. It also enables a two-way communication, "Compliant may affect innovation. If compliant level is to the extend whereby employees do not dare to speak up, just listening to orders and act. This is more towards the need to be push. However, compliant may be following regulations of the company, respecting the decisions of superior. If the company have good communication across all levels, be open to opinions. Therefore, it is good to be compliant to stick to regulations but not to the extend where superior force their way of doing things and restrict their lower employees to the way of doing things."

The majority of the managers, supervisors, team leaders, operators and executives stated that compliance culture affects 3ST's innovation culture. Most managers argued that the compliance culture impeded the firm's innovation culture due to the obedience culture which was seen as detrimental for the generation of new ideas. However, one manages believed that it is

good for regulation. The supervisors also believed that a compliance culture impedes innovation because of obedience which can cause a lack of sharing of opinions which in turn can negatively impact the corporate vision. Most of the team leaders stated that a compliance culture impedes innovation because the vision of the leader gets impacted, and because employees are not interested in taking responsibility. Only one of the team leaders suggested otherwise. The operators felt that innovation culture is impeded due to lack of a two-way communication and obedience. The executives stated that compliance impedes innovation because obedient employees are reluctant to share their real views and ideas. Lack of openness was another concern they raised.

Sub-Theme 5.5: Length of service and conformity

The majority of the respondents agreed that the length of service impacted the compliance culture. Some interviewees believed that compliance culture was dependent upon the initiatives, company culture and individual attitude. This can be seen from the following response, “Employees are compliant. If the initiatives are rejected multiple times, they will no longer seek to recommend new initiatives. They will continue to follow orders from direct leaders.” And “This is also due to the company culture. Employees have been working together for many years and they are used to each other’s working styles. Therefore, if they know that superiors are not willing to make the change, they will rather not say and hide the truth since any opinion would not affect their superior decision. This will also hide the truth of the problems which make it hard for the company to innovate.” The longer the service, the

stronger is compliance as can be derived from this statement, “The longer the employees work, the longer they will adapt to this compliance culture. They will always follow what others say and just do the task. Hence, senior employee will feel that they are right, and you should follow them.

Hence this can go in both ways where employees will just follow or senior employees are not willing to change as they assumed they have more experience than you, there is no need to follow your way of doing things.

The more you comply, you will stop questioning, stop accepting new knowledge and keep using the same way of doing things. However, this will stop employees to come out with initiatives and thus, eliminating innovation.” While another respondent stated that longer the service less Compliance and suggested, “Employees that are younger in the company will be more compliant.” They would follow seniors’ instructions and learn from their seniors. Being unfamiliar with the environment will make them rather not say anything that might offend others. However, the older employee would appear more vocal than the younger employee as they have richer experience as well as they understand the company more. Senior employees will have discussion with their colleagues and would suggest feedback to their superior but will not insist. Overall, employees are more towards compliant in the company.”

The managers believed that as the length of the service increases, employees become more reluctant to change as they know each other's working styles. One of the managers believed that the compliance culture depends upon an individual’s attitude. One of the interviewed supervisors stated that the longer the service, the stronger is the level of compliance and the lesser is the

intensity of innovation efforts. Another supervisor felt that this depends more upon the characteristics of an individual. The team leads believed that the longer the service, the lesser the innovation efforts. They also suggested that the longer one's service, the less compliant an individual is. Operators argued that the longer one's service, the lesser is one's compliance culture. Finally, the executives had a mixed perception. One of them was of the perception that the higher the level of the employees is, the lesser is the compliance level, while others suggested that senior-level employees comply more. However, they also believed that the compliance level depends on the culture of the company.

5.4.8 Working With Personas

Personas are increasingly adopted as tools to help to govern business strategy, e.g., to enhance the innovation culture of an organization (Mulder & Yaar, 2006). One of the benefits of creating personas forces a person to spend time evaluating the different roles in the organisation and how these roles can contribute to innovation culture. Personas also build empathy and help managers to live in their "user" shoes - whereby the users I have selected here are the different members representing the various ranks within 3ST. With good data, the creation of personas can help to identify key actors that could contribute to improving 3ST's innovation culture as the discovery and discussion of personas can encourage consensus about the need to enhance the innovation culture. Every level of employees across the organisation are experts in their area of work and tend to have a different perspective on what innovation culture is and how they should be driven. As such, using personas to represent the views and expressed concerns of each level of the workforce leads to better decision because personas are grounded in research.

Moreover, we could use personas to uncover opportunities to improve 3ST's innovation culture by highlighting key concerns and challenges to propose suitable recommendations. Hence, stakeholders and interested parties can feel confident that the recommendations or proposed changes made will work. By developing a true understanding of the different levels of employees across the company, it may lead to a shift in the approach of driving the culture of innovation with greater focus on team effort as personas may provoke employees to think more explicitly about their roles. This may force the employees to re-examine their consensus approach on what they are

trying to build and better understand the rationale behind change measures. Such as approach may also combat innovation theatre which is common in many organizations. The success of applying personas can be hard to quantify as there may be other contributing factors that could otherwise influence the intended outcome.

For the purpose of our case study, we have based our personas on selected Managers, Supervisors, Executives and Operators. We have excluded the team leads as their role is similar to that of a supervisor except that the team lead is managing smaller teams.

Persona 1 : Huang

Occupation: Manager of TLHM

Demographic : 55 years old, Taiwanese citizen, married. He has been with the company for more than 30 years

Archetype : The Ruler

Traits : Business-like, Busy, Cautious, Strict, , Parochial, Superficial, Hypocritical, Hardworking, Demanding, Condescending, , Mindfulness, Dutiful, Educated, Subservient

Motivations: Reward and Recognition, Fear of failures, Power, Impressing the boss, Authority

Goals: No down time, Level Production, High Production Yield Rate, On Time Delivery, Implement Lean, Leaving office on time

Frustrations : Lack knowledge on Innovation, Struggle to find ideas to innovate, Handling of complaints (internal & external), Communicate the needs for change to his team, Providing team suggestions to management

Needs & Wants : Secure assistance to help in innovation activities, new equipment, less assignments outside routine work

Huang's story:

Huang has been working diligently for the company for more than twenty years. Similar to his some of his peers, Huang is 'old-school' as he was promoted from the ground up, and all his learnings about his work were handed down by his predecessors or through years of learnings. His knowledge other than his areas of work is very limited and he has been adhering to the same processes for the longest time. As such, he has a narrow outlook with regards to making improvements to his area of responsibilities. Given his age and low career mobility, Huang plans to work till retirement with this company. As a result, Huang is always mindful of his work performance and behaviour in front of his supervisors. He is always eager to please the management team and accepts any assignment readily without any deliberations. Although he displays some level of subservient to his leaders, he displays a different set of behaviours to his people and colleagues. As Huang is someone who will not accept mistakes easily due to fear of blemishing his work performance and the need to account to the leadership team, In the absence of any leaders, he would disagree and argue with emotions during departmental meetings especially to those new or junior managers. Apart from his belligerence towards his peers, he is also very strict and demanding with his people. He prefers his people to do rather than question and he dislikes opposing views. When there is an issue or new projects assigned, Huang will just delegate to his supervisors or team leads to work on but will claim credits when the work is completed. Huang does

not like changes and prefers to let things remain as status quo. Other than his routine work, Huang is passive and prefers to be left alone instead of making improvements to his work. Despite this mindset, Huang will never reject any assignments that he has been given regardless of the fact if he has any deep understanding of the assignment content. He will just do what the boss wants and get his people to work on the tasks. As a result, his people will at times find it challenging to execute his instructions due to the lack of understanding to the project intent. Instead of supporting, he would scold his team if they failed him.

What challenges Huang:

Huang prefers less challenge due to his knowledge limitations and little exposure on innovation. He has been working on the current knowledge for decades, and he does not know how and what to improve on. He feels that he is too old to learn and feels stressed about learning new things. Unlike his older staff, he also has to deal with a set of younger generation of workers who are outspoken, curious and demand more open communication and information sharing .

What Huang needs:

Huang wants more new equipment to help automate his processes. However, Huang needs to change his mind set on learning as he needs to get connected to the external world to get more exposure on emerging technologies so that he can contribute more effectively to the organisation. He has to learn how to communicate effectively to his team on the management initiatives.

Persona 2 : Lily

Occupation: Supervisor of TLHM

Demographic : 45 years old, Taiwanese citizen, married with a son. She has been with the company for more than 25 years

Archetype : The Caregiver

Traits : Passionate, Demanding, Selfless, Loyal, Committed, Energetic, Curious, Humble, Ernest, Hardworking, Diplomatic, Open-minded, Conformist, Supportive

Motivations: Teamwork, Harmony, Improvements, Fear, Getting the Job done, Learning, Company growth

Goals: Complete the daily output per the production plan. Implement Lean, Embrace Innovation

Frustrations : Lack of knowledge and training on Innovation, Language deficiency, Inadequate communication of initiatives from immediate superiors, Unable to move on with team suggestions. Caught in the crossfire between Direct superior and direct reports

Needs & Wants : Acquire new knowledge, take on new challenges outside the routine scope of work. Manager would listen, and receptive to suggestions. Courage to speak her mind.

Lily 's story:

Lily has been working for the company for over 25 years She is one of the few old guards who have seen the rise and fall of the company. She has been promoted from the ground up and therefore has a cordial relationship with her team. Lily is a hands-on person and will not hesitate to render assistance and support to her team within her mean. Lily embraces change and aspire to

make improvements to her workspace. As such, she embraces innovation and is committed to making it work. She will always think and seek clarifications to ensure she understand and contribute effectively to the project. reflect on However, she may at times struggle to understand the rationale behind the implementation as she only received the information from her manager. Being a supervisor, she is sometimes caught in the crossfire between her own supervisor and her team. She may be forced to institute certain changes by her manager even if she sees a problem and yet she has no way to reject. This may sow discontent and cause misery to her team resulting tepid response and participation with an undesirable outcome of the project implementation. Furthermore, Lily has to pacify and motivate her team. Although Lily exhibits passion in embracing innovation, her active is participation is hindered by her limited knowledge to innovation and her access to management's direction.

What Challenges Lily

Lily wants to excel in her role but is faced with her manager's reluctance to innovate. Additionally, she is also faced with the dilemma in speaking the truth or share her concerns with her manager. Lily rarely interacts outside her work area, and this affect her ability to learn and accept new knowledge. As the organisation's sub-units are all interrelated, any change in one area will affect other functions and lacking in coordination will render the change ineffective. Language proficiency is another challenge for Lily as she can only speak Chinese, and she struggles to communicate in English or read articles that have no translation. Time is another factor as the daily production

tasks can be overwhelming such as pushing for outputs, dealing with quality issues, thus leaving little time for Lily to focus on other key activities.

What Lily Needs:

Lily will need assistance to coach her on prioritisation and time management. Providing resources to her so that she can manage the routine tasks and free up time to work on some new initiatives. Provide the necessary training to upgrade her language skill and knowledge. Extend invitations to leadership meetings to her so that there is no communication gap.

Persona 3: Steven

Occupation: Executive at TLHM

Demographic : 38 years old, Taiwanese citizen, married with two kids. He has been with the company for about 10 years

Archetype : The Explorer

Traits : Curious, Passionate, Committed, Highly Energetic, Reliable, Open-minded, Driven, Motivated by self-improvement, Outspoken, Tactless, Independent, Daring

Motivations: Reward and Recognition, Company Growth, Quest for Knowledge, Success, Progression, Improvements, Finding a Purpose, Getting the Job done, Participation opportunities, Empowerment, Outside exposure.

Goals: To volunteer for new projects, learning new skills, Change management, Support company innovation initiatives

Frustrations : Living with legacy thinking, Trust issues such as filtering of information and shielding of true issues, Ideas getting rejected, Struggle to

find opportunities to learn, Finds communication lacking, Top management is seen as blindsided, Dealing with outdated products and processes, Always waiting for decision making outcome, Cannot disagree with decision made

Needs & Wants : Clear direction**,** Opportunity to learn, Empowerment and avenues to communicate upward. Leaders will listen and act on constructive feedback, Openness.

Steven 's story:

Steven has been working for the company for less than ten years, He has a good education background and likes to think independently and question. Given his experience and education background, Steven is deemed to be of high mobility. As an executive, Steven is seen as an individual contributor and interaction with other functions or external stakeholder is limited. Steven does not think there is any innovation within the company for a long time given 3ST's outdated processes in manufacturing and product ideation. He feels that this is due to legacy inheritance. Another issue is the limited understanding of ground issues by the senior leadership team. This leads to gaps in expectation within the organisation. Steven is not afraid to speak his mind, but he believes that his messages are not carried in full to the leadership team by his manager. Steven is motivated by rewards and recognition, and he wants to excel in his role. He is frustrated that he and his peers are not given sufficient opportunities to participate in the company's innovation initiatives. Steven believes TLHM has been cut off from the outside world for a long time and that he has a limited view of the outside world. He feels that cultural change is only possible when employees at all level adopts an open mind to accept new learning as well as embrace differing views. He believes that the

employees lack the courage and confidence to make changes or adopt new thinking. In his opinion, the compliance culture due to deep respect for hierarchy in workplace is big impediment for progress as people are afraid to break this cardinal rule.

Steven's Challenges

Steven is concerned about the future growth of the company, and he thinks that change is the only way to go. However, he thinks that he is not getting the support from his manager. He is even more frustrated that his manager "borrowed" his suggestions to impress the senior leadership team. He feels powerless to act when he sees a problem since there is no other communication platform for him to address his concern. He is highly energetic and feels that he can contribute more than to what he is doing and gets frustrated for not having the opportunity. He is also exasperated about his relationship with his manager due to communication gaps.

What Steven Needs:

Steven needs a stage to showcase his talent as he is always eager to learn and embrace new things. There should be a communication platform created for employees to provide honest feedbacks without reprisal from his manager. repercussion. He can be sent for exchange program to learn from the company sister networks and assume the role in the innovation space. However, he needs coaching to calibrate his expectation as change needs time and resources.

Persona 4 : Eva

Occupation: Operator

Demographic : 40 years old, Taiwanese citizen, married with a son. She has been with the company for more than 20 years

Archetype : The Innocent

Traits : Loyal, Committed, Humble, Hardworking, Quiet, Timid, Non-confrontational, Subservient, Conforming, Ignorant, Respectful, Taciturn

Motivations: Teamwork, Harmony, Fear, Job Security, Incentives sharing, Company Growth, Honest living

Goals: Support company initiatives, Keeping the Job. No disagreement. Leaving office on Time

Frustrations : Low awareness of company situation or level of innovation. No training on Innovation. Does not understand the rationale of implementation. No one guides her on innovation. Fear to seek clarification. Feels that information sharing is lacking. Manager not listening. Frustrated with Managerial Innovation Theatre, such as gaps in between saying and doing. Rushing due to tight timeline

Needs & Wants : Clear articulation of company initiatives, No change in ownership, stability, Effective and timely communication

Eva 's story:

As with her peers and leaders, Eva is an old guard and has been working for the company for more than twenty years. Eva's role in the company is simple, to process customers' order and do as what she has been instructed. She is contented with her current role and have no aspiration for promotion. As the company is a good paymaster in the area, she wants to continue her

employment and works till retirement. She enjoys her current pleasant working environment and established good relationships with her peers and supervisor. She feels that her supervisor is supportive and takes good care of her well-being. Although Eva is currently satisfied with her work, she also senses the presence of " Collectivism" and "Herd Mentality" at work within the organisation. She gathers that decisions are normally made at team level, and no one would express differing view even though they would discuss privately their disagreement or grievances. She also notices that her peers are either fearful or unwilling to express their opinions when problems arise to avoid taking more responsibilities and being penalise for highlighting . Eva wants to see the company grow so that she can enjoy good bonus pay out and as such she is willing to support any change initiative as long as they bring in benefits to the organisation although deep down inside her, she prefers not to change as this will mean more work.

Eva's Challenges

Job security and company are both Eva's two main concerns. However, she feels that her manager is not communicating succinctly on the company direction and strategy resulting in inadequacy of information on company's direction and progress. At times she isn't aware or understands what she was doing. Given her long service in the company, she is also concerned that TLHM is not launching new products nor securing new customers orders. The uncertainty of being acquired is another key apprehension looming in Eva's mind as she has undergone four rounds of ownership changed. She feels that change of ownership will disrupt organisation stability and impact her job security, consequently such worry is affecting her motivation and

morale at work. Although Eva is aware of some of the deficiencies in her workplace, she is reluctant to speak up as she is afraid of reprisal from her manager as these gaps would reflect badly on her managers. She feels that "Silence is golden" because if she intends to propose changes to existing process or methods, it may appear that she is showy and disrespectful to the team's decision or existing method. She is mindful of not damaging the relationship by wounding the team's camaraderie and ending up being isolated. Ironically, Eva knows that by remaining silent, "the company may be missing a lot of opportunities for innovation."

What Eva Needs:

Succinct communication on the company's overall directions including innovation and not just financial performance.

Eva should be enrolled into 3ST's innovation program and nominated to lead one or two improvement initiatives to bolster her confidence and increase her understanding of innovation as an approach to unlock the company's innovation opportunities. Reinforcement and acknowledgements are needed for individuals who speaks up.

5.4.9 Recommendations based on Thematic Analysis Results and Personas

Overall, 3ST has a lot of issues to work on to improve both its innovation effort and culture. By assimilating all the themes in entirety instead of examining individual themes, our thematic analysis done in conjunction with the study of our personas have highlighted several underlying concerns that could impact the robustness of 3ST innovation culture. From both persona and thematic studies, our investigation has uncovered varying perception gaps in innovation culture across all levels of employees as well as a high degree of conformity amongst employees that could adversely impact the organisation innovation effort to improve its innovation culture. Whilst some variables identified such as "Ideation process" "Differences in the perception of innovation culture across the organisation level" and "Talent" were in line and discussed in our early diagnostic investigation, there are other deep-seated concerns such as "Quiet quitting or shirking", "Reluctancy to engage due to fear", and "Deference to elders" that were conspicuous across our themes that were not uncovered in our earlier diagnostic survey. In our thematic analysis, we also detected innovation theatre at play and some level of misalignment of innovation culture due to poor communication. Moreover, there is also a need to invigorate the interlocking between business functions. These disquietudes if left unattended will seriously erode 3ST organisation's innovation effort as well as crippling the firm's innovation culture and that could be detrimental to 3ST future business value and growth. We shall examine some of these key weaknesses and propose actions to improve the current situation.

Overcoming Deference - Deference to elders or authority has always been acutely indoctrinated in most Asian cultures. It is only natural that such phenomena would exhibit in our workplace given that we were constantly reminded in our daily routines to honour and respect our parents, elders, and teachers. If one is discouraged, whether implicitly or explicitly, to openly criticise or provide alternative thoughts, and where it has become a norm to accept rather than rebuff against any hierarchical authority, deference prevails. Furthermore, if leaders cannot be advised on trivial matters, it will be almost implausible for anyone to highlight or correct matter that is more substantial. Ironically this phenomenon runs against the grain for any innovative firm as an innovative organisation needs their workforce across all organisation levels to generate ideas, offer differing views and openly debate them. To correct this status quo, senior leaders need to adopt a hands-on approach to demonstrate to the people that they are earnest in making this change and eradicating this negative peculiarity. As time is needed to gain trust for the workforce to open up as well as changing their deferent behaviour, 3ST could adopt the proposal made by one of the interviewees that leaders could commence by engaging an external consultant or advisor for employees to seek advice and at the same time act as a communication channel to the top. Not only will this approach lower the employees' wariness about possible backlash, but it will also effectively curtail the "innovation theatre" brought about by some middle leadership team as there were speculations that middle management team would alter the original suggestions from the contributors in an attempt to delight the top leadership team. As a result of this deferent phenomena, people are always waiting for

directions or someone at the top to make decisions instead of striving on a self-discovery journey on innovation. Individual teams should embark for self-sufficiency and offer views, ideas, and business over their areas of work. Moreover, it is important to minimise the "dominancy effect" to downgrade the fear factor of failures since we want to discourage people from charting the safe path but to be more aggressive in generating bold and disruptive propositions to win and not picking a judicious path to avoid losing, Such an approach would greatly encourage employees to undertake key strategic decisions that are related to their areas of responsibilities instead of waiting for someone to make the decisions. Consequently, humility from people with authority or long service seniors is a key success factor for this initiative to work. Often than not, people with authority or long service employees would always assume they know everything and will feel threatened and subconsciously display symptoms of discomfort to the team through their behaviours if they are ever questioned on the decisions by his team thereby preventing the team from speaking up. To resolve this conundrum, we should encourage seniors to coach newcomers and not dictate or demand. We should strive to create openness within our system that allows two-way communications. Trainers should be sent for training course relating to coaching methods to reinforce the positivity of coaching and learning simultaneously to avoid possible confrontations and reduce the negativity of unnecessary hierarchical conformity during trainings.

In parallel, the organisation can also establish a separate platform as suggested by one employee such as creating an innovation circle managed by innovation champions or third party where employees can share their

thoughts and opinions freely or anonymously without fear of any reprisals. Apart from making the contributors feel valued and finding meaning in their work, this would also embolden their courage to highlight issues and eliminate any possibility of shielding or filtering of "bad" news flowing to the top. 3ST should also act in retrospection by recognising and bolstering those individuals who are outspoken with their views. If people felt that they are not appreciated or rebuffed, they may rescind their participations which would eventually lead to another issue of "Quiet Quitting."

Strengthening Team Cohesion - Quiet quitting is not a new terminology but merely another expression for shirking or slacking. Similar to deference to elders, quiet quitting can be harmful to 3ST's journey to innovation. Quiet quitters in 3ST occur because exasperated employees feel that their ideas are often rejected or pilfered by their superiors for the purpose of impressing the senior leadership team, again an act of innovation theatre at work. Another group of quiet quitters are shirkers who just do not want to take on additional workload or responsibilities. This group of employees especially those nearing retirements are here to make a living and behaves indifferently to the company's initiatives on innovation culture. For this group of employees, company would need to constantly engage them to tap on their rich experiences and rekindle their passion towards the organisation to avoid shirking. According to Nalbantian and Schotter (1997), to counter shirking, 3ST can introduce gain sharing scheme or tournament-based scheme as a form of group incentives. To avoid shirking which occur under a scheme of dominant strategies, we could further introduce the concept of social

embeddedness by Granovetter (1985) in our incentive model from the perspective of “intra-team” and “inter team” to reduce the opportunism for any member to shirk. Unlike a rational actor who chooses the best action according to personal preferences and self-interest, social actors make their choice driven by a “context-defined” set of rules within their network. Instead of choosing their courses of actions based on costs and benefits calculation, these social actors react and respond to their social relation environment in which they interact. Intra-team refers to members working as a group whilst inter-team refers to team to team interactions regardless of job functions. So how do social forces bind a team together? According to Turner (1982), team membership is formed based on individual perceptions and not the fondness for one another. It acts on how the individual perceives him- or herself and other members of the team. Separately, Alderfer (1983) asserts that members who share common organizational experiences such as work-cells, team, length of services, profession and employment status are deemed to hold comparable organization views and are likely to be embedded in a larger social structure. As such individuals belonging to a team could also to a certain extent represent other organizational group even when they are executing the team’s business. Alderfer & Smith (1982) further observed that all interactions amongst the team members with the team are likely to form part of the “intergroup events”. Given the embedded social relationships between team members within the team as well as the intertwining network amongst teams, the “shadow of the future” could promote cooperation. For example, shirkers would continue to shirk if they assessed that the current benefit outweighs the future and cooperate if the opposite holds true. The

future benefit and returns become a key consideration to shirk. There is even lesser incentive for any worker to shirk if he foresees that he could face rejection or ostracism from his team and other teams in the long term due to his shirking behaviour.

On the other hand, the density of the intra-team and inter-team bond is another key determine to reduce shirking. Creating a positive and closer relationships (both intra and inter) in the wake of preserving the economic and social relations will enhance the degree of trust which in turn reduce the opportunity to shirk. The intimacy of the team will develop a culture and open communication where team members discourage anyone from shirking. This is especially pertinent since members of the team trust their own information and assumed that their information is better than others when such information are related to the performance of their peers. In return, most members believe that it is possible for them to detect any shirking by fellow worker easily with low monitoring cost. As opposed to a large group, the economic motivation in continuing the relationships will most likely drive workers operating in smaller groups to organize voluntary policing to act against shirkers. This is especially more noticeable when the group incentive amount gets larger, and the cost of intervening is low (especially in relation to individual incentive received). Build on intra-team relation, team member may deter shirking in their group through peer pressure and non-economic or monetary sanctions. They could adopt the shaming or personal guilt approach to coerce a shirker to cooperate. In other situations, they might even ostracize the shirker in both the intra and inter team network leaving the shirker very

little room to manipulate. If all else fails, the team may even resort to punishment by kicking the shirker out of the team leaving him possibly jobless as no other team will be willing to receive him or her. Such approach may be high handed and ruthless, but it may be effective in counteracting the shirking effect by changing the behaviour of shirkers and at the same time continue to enforce team norms of high effort. Separately, the presence of other teams and their performances within the 3ST network in attaining the group incentives may provide constructive cues for inter-teams' competition and encourage other teams to attain similar or better performances. Team members may be intrinsically motivated to succeed as a high-performance team and thereby giving their best performance. Lastly, although there is no effective method to eradicate shirking completely, it is predicted that the embeddedness of intra- and inter relations could negate shirking due to the strengthening of cohesion within the team and amongst teams, thereby creating an attraction to draw this group of apathetic employees into our incentive model.

On the other hand, for the other disenchanted group of quiet quitters who might feel unappreciated or disengaged, company leaders should avoid the mentality of "hustle culture" of long hours of working hard. Instead, 3ST should rethink how they currently operate and reengage their employees in changing the way they have been operating for years. Additionally, they should place its emphasis on creativity and working smart and help the team to prioritise. This will help the employees to feel valued and motivated at work. Apart from providing acknowledgements, timely constructive feedback and positive reinforcement will also encourage them to be more

engaged in their roles and taking up more responsibilities. Lastly, leaders need to listen to the employees and deliberate on their suggestions. Lower-level employees just need to see leaders walking the talk by deploying some of their proposals to demonstrate that leaders appreciate the input from them thereby inadvertently taking a huge step toward innovation culture and deter quiet quitting at workplace.

Embrace failure - Another observation in our analysis is the presence of a fear factor resulting in poor employee engagement in driving change. There is fear of antagonising the superiors and jeopardizing one's job security or performance appraisal as well as becoming an outcast if one speaks up too often. The culture of 3ST is to avoid confrontation and to keep the status quo due to their risk adverse nature. In 3ST like in many Asian contexts, failure is not an option, and any failure is viewed as a form of shame and may subsequently affect their confidence and performance. This is further supported by Xie and Paik (2019) who pointed out that Taiwanese have the tendency to overthink before they choose to act. Due to their cautious nature, they seek for precision before offering their propositions. To correct this paradigm, the organisation needs to learn how to embrace failures and learn from our failures and there is no inherent shame in failing. In fact, the organisation needs to establish a habit of processing failures to reflect on what went wrong and share the findings. Shifting of blames should be discouraged whilst interlocking of business functions goals need to be reinforced to avoid silo thinking. We need to establish a culture where every idea matters and sends across the message that nothing within 3ST should remain static. Employees should be able to freely criticise any impractical proposal without

suffering from any consequences. Another key element to encourage employees' engagement is to lean toward accepting the notion of "good enough" instead of pursuing for perfectionism as people tend to do less knowing that they are never going to meet the expectations which will run counter to our initial objective of promoting participations. To motivate team reengagement, company needs to set pragmatic goals for the team as well as knowing when to accept the "good enough" instead of insisting on the stretch targets. Furthermore, to encourage employees to dispel the fear in presenting opposing opinions, leaders may need to play the role of antagonists to raise differing views to spur further discussion of which sone opinions may prove crucial to resolve problems at hand.

Reinforcing communication - The low diffusion of innovation at the lower level of employees is apparently attributable to the lack of communication within the organisation. Although most respondents were able to describe innovation and its relevant benefits to an organisation, most predominantly believed there exists no innovation culture within the organisation. The dissemination of innovation information at different levels has led to incongruency of perception of innovation culture across all levels with some groups having more insights than others. Moreover, any poor understanding of the innovation governance by the middle management may also bring about different interpretations and incorrect communication to their respective teams leading to disconcerted actions towards innovation effort. All interviewees acknowledged that open communication is key to building a successful innovation culture. Based on this observation, it is therefore crucial that 3ST's leaders should create a setting where employees could

approach them with ease about their problems or concerns at hand. Leaders should encourage open communication by proactively engaging their people instead of waiting on their responds. Leaders would need training to strengthen their interactions and communication skillsets. This approach should enhance the level of engagement between the employees and their leaders where employees are more willing to discuss open issues that matter to their area of work. Given some of the non-managerial employees in the shop floor worked in a closed system where they have little or no interaction outside their workspace, active communication plan needs to be emplaced on a regular basis, perhaps quarterly town hall specific to address innovation progress. During this session, content should be timely and apparent focusing on results and challenges. Nominated innovation champions on a rotation basis should be invited to introduce their projects progress or reporting on ideas that they are currently championing on. They should also share their learnings on both the “what” and “how” in their execution to ensure things are done in the right way. Recognition and rewards should be also accorded during this town hall to raise the innovation awareness of the people and to attract more people to come forward with ideas and participation.

Alignment of innovation direction - To bridge the gap between functions and across different organisation levels, as well as improving the innovation diffusion within 3ST, it would be preferable for 3ST to create an Innovation Manifesto such as “Powering Innovation Together” and communicate this manifesto across the entire organisation. The innovation manifesto should include

- Individuals & interactions over processes and tools
- New products over ideation
- Team collaboration over participation
- Responding to change over following a plan

The aim of manifesto creation is to ensure that 3ST understands its business intents before setting off to change its culture to pursue the innovation chasm. Leaders would then need to articulate these demanding actions to the team to ensure a coherent effort in its innovation pursuit.

Chapter 6. Conclusions and Synopsis of Recommendations

The thesis began by studying a set of existing and de-identified assessment data that were collected for the purpose of understanding 3ST's innovation culture performance with the help of an Innovation Quotient (IQ) survey. Based on the survey results collated, a round of thematically analyzed interviews was subsequently performed from a random pool of employees across different organisational levels to gain more insights and an accurate interpretation of our survey results.

As 3ST was facing bottlenecks in both manufacturing processes and product development, the outcome of both the diagnostic approach and thematic analysis were meant to support our company journey of transforming 3ST's culture of innovation. To do so, we must first recognize our company's current innovation culture and the factors that impact and limit our ability to innovate. The term innovation culture refers to the work environment that leaders cultivate in order to nurture unorthodox thinking and its application. Workplaces that foster a culture of innovation generally subscribe to the belief that innovation is not the province of top leadership but can come from anyone in the organization.

The current study was conducted with an aim of understanding and enhancing the innovative culture of 3ST, a medium-sized manufacturing organization in Taiwan. We hope our research will provide useful and practical insights to the literature from an Asian perspective since we are the first to embark on the study of the innovation quotient in Taiwan inspired by Rao & Weintraub's (2013) diagnostic tool. Through a real-life case study of a low-medium technology (LMT) lock manufacturer in Taiwan, the study sheds light on

some of the key building blocks of innovation culture using a valid and reliable diagnostic innovation culture framework developed by Rao & Weintraub (2013).

Our study was carried over two phases. During Phase 1, we focussed our quantitative analysis on the results gathered from the Innovation Quotient survey instrument. Our aim was to understand how the six building blocks can help to uncover the robustness and weaknesses of 3ST's innovation culture and how we can use the results of the survey instrument by Rao & Weintraub to help 3ST to enhance its culture of innovation.

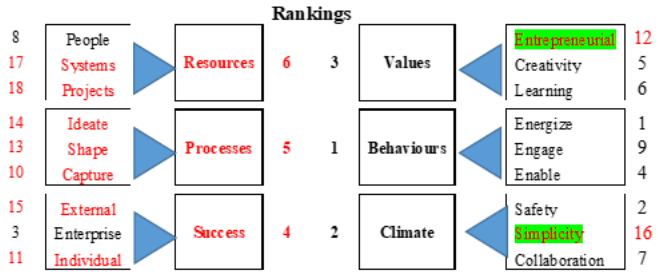
In Phase 2 of our research, we carried out a thorough interviews with 15 randomly selected employees who had responded to our initial survey. A thematic analysis approach was adopted to examine the free text commentaries shared by the interviewees to gain further insights so that we can discover new perspective or deep-seated issues that were not captured in our earlier diagnostic survey. To further support the findings from our thematic analysis, we also utilized the persona concept.

In this section, we will discuss the challenges and weaknesses that were uncovered during our analyses to offer several pragmatic recommendations for enhancing 3ST's innovation culture. As behaviours and attitudes take time to transform, we can only focus on three to four key behaviours and attitudes that have significant impact on the firm's organisation innovation culture.

6.1 Conclusion and Recommendations

Incorporating all these tabulated data and results discussion along with the outcomes of our thematic and personas analysis, it is timely for us to reorganize our dataset and observations to provide a summary of findings and present our recommendations on the areas that need improvements. In phase 1, we approached our study by determining the overall IQ index of 3ST. We next looked at the individual scores of the six blocks and eighteen factors. We proceeded to sort the survey results and arrange their rankings according to their scores.

Figure *12*
Blocks and Factors Ranking



The ranking results were arranged in accordance with the scores for both Blocks and Factors (see Figure 12). Our initial results had suggested that 3ST had performed poorly on the Resources, Processes and Success blocks along with the nine low performing factors highlighted in red. Two factors (*Entrepreneurial & Simplicity*) out of the nine did not belong to the three non-performing blocks. Upon closer examination, we noticed that not all factors related to these three underperforming blocks performed poorly. For example, the "Enterprise" factor for Success block performed well and conversely, the "Simplicity" factor was ranked as the second lowest even though the Climate block was highly ranked on the innovations block.

Given this finding, it would be inappropriate to focus solely on the Building Block scores to devise an improvement plan for 3ST by ignoring those low scoring Factors and Elements. To get the overall picture of where 3ST should focus on with innovation-related improvements, we need to further examine the low performers for both the eighteen factors and fifty-four elements to formulate a concrete action plan for improvements. After examining the ratings for all the fifty-four elements, instead of exhibiting all the placings for all the fifty- four elements, we have chosen to narrow down our attention to the bottom ten performers. The ranking shown below is based on the average scores for each of the fifty-four elements that we received from the participants.

Table 24
Bottom 10 Elements

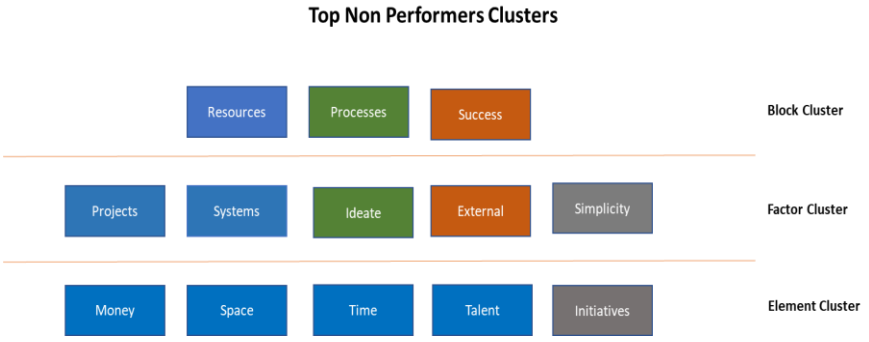
Blocks	Factors	Elements	Value	Ranking
Resources	Projects	Money	3.25	1
Resources	Projects	Space	3.27	2
Behaviour	Engage	Initiative	3.28	3
Resources	Projects	Time	3.29	4
Resources	People	Talent	3.3	5
Climate	Simplicity	No bureaucracy	3.3	6
Values	Entrepreneurship	Action-oriented	3.3	7
Success	Individual	Satisfaction	3.32	8
Values	Creativity	Playful	3.39	9
Processes	Shape	Prototype	3.39	10

Given all the blocks, factors and elements ranking results that we have collated in the study, we have decided to consolidate these rankings by *clustering* them into a Blocks cluster (bottom 3), a Factors cluster (bottom 5) and an Elements cluster (bottom 5) to shed light on the relationships between these clusters and to help us determining where to focus on when it comes to

recommending concrete innovation-related changes and solutions (see Fig.13).

Figure 13

Non-Performing clusters by Block, Factors & Elements

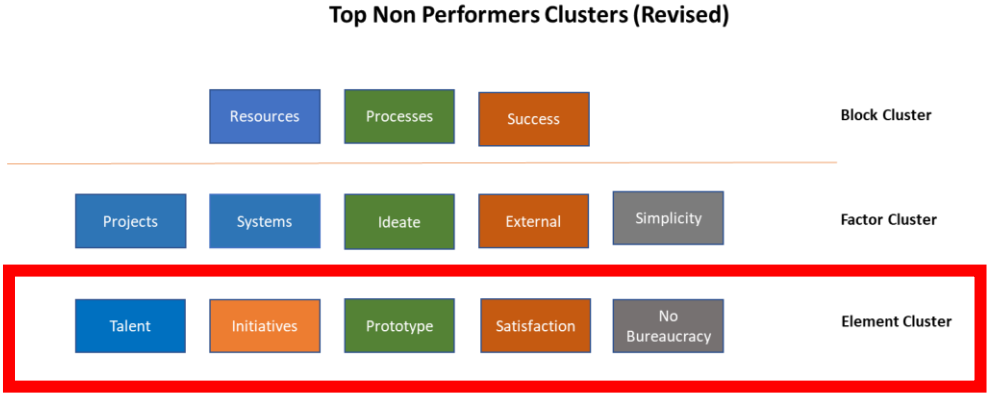


For clarity purpose, the Factor and Element clusters that belong to their respective Block have been assigned the same colour to indicate their relationships. For example, boxes highlighted in blue indicates that they belong to the Resources block and while green has been used for the Process block (see Fig. 13). Whilst we can colour code most of the non-performers in relation to the three non-performing blocks, there are still two shaded boxes in grey that fall outside the three non- performing blocks. Nevertheless, we have decided to focus on the Element level because these fifty-four elements are questions that were individually rated and would therefore offer better lucidity to the scores whereas the scores for both Blocks and Factors were derived from aggregating the element and factor averages. The method of how to derive the scores for both factors and blocks has already been discussed above (see Table 2).

After deciding to work on the Element level, we proposed to make some changes to the element cluster by replacing some elements from the bottom ten list (Table 24). The change is necessary as some low scoring elements

such as *Money* and *Space* were management related issues. Topics such as Finance and Asset utilization would typically not require involvement from non-managerial employees and therefore should be excluded whilst elements such as *No bureaucra*cy with the second lowest score should be included as it deals with rules and policies. Because we want to focus on developing activities that will enhance the overall innovation culture of 3ST, these proposed changes are more relevant as these elements are deemed to be critical success factors for the company and would require employees' participation at all levels. Furthermore, these exchanges would also not upset the ranking of the three low performing building blocks as there are elements that were related to these blocks that need to be work on (see Fig.14, highlighted in red).

Figure 14
Non-Performing clusters by Blocks, Factors & Elements



Our proposed change includes removing the *Money*, *Space* and *Time* elements and replace them with *Prototype*, *Satisfaction*, and *No Bureaucracy*.

Key recommendations to enhance 3ST's innovation culture as per the findings of the author's panoptical, mixed methods study include:

1. *Initiative* - Turning innovation into habits. Promote awareness by creating easy to remember innovation slogans that would resonate with the team. Run quarterly or bi-yearly innovation workshops with thirty to forty participants from all functions and all levels. Encourage a curiosity mindset on innovation and hand out awards for innovation ideas that work and add value to 3ST.

2. *Talent* – 3ST has a large pool of aged workers with a wealth of experiences in lock manufacturing, and such knowledge will be lost when they retire. It is therefore imperative to create a knowledge depository via video capturing or documentation to retain such learnings. Pursue specific trainings that are relevant to the future business of 3ST through external trainings and add on new resources with the necessary expertise for 3ST's expansion. Working with institutes of higher learning is definitely one of the recommended methods to obtain new knowledge on innovations through R&D collaborations and open innovation contests. It is therefore critical to understand why the last collaboration was less than ideal.

3. *No Bureaucracy* - Bureaucracy will impede any innovation effort but it is also important to establish a robust innovation governance framework (Deschamps, n.d.). The actual innovation governance approach must be shared and made known to all employees via all modes of communication. Policies may need to be revised to support the innovation culture and 3ST's new innovation processes. Whether the appointment of a Chief Innovation Officer (COI) is feasible needs to be examined.

4. *Satisfaction* – It would appear that employees are dissatisfied with their level of participation in the company's innovation initiatives. 3ST could consider appointing innovation agents or champions within each business function to act as catalysts for creating a stronger innovation culture with the General Manager acting as innovation sponsor. All agents will start off as "Innovation Pilots", and a handful of promising agents will be promoted to the roles of "Innovation Champions" as part of the recognition for their innovation effort. The key roles of these agents are to promote innovation awareness and identifying areas of innovation opportunities. They are to update the management team on the innovation progress of the organization and shared those identified challenges for resolution.

5. *Prototype* – This is an important element in our product development and manufacturing process, failing which will impact our product time to market and impact our ROI innovation effort. However, since 3ST has not delivered any new product in recent years, the team may struggle as they venture into unknown spaces with possible pitfalls. To overcome this limitation, 3ST could consider tapping on resources from its more innovation savvy sister companies or they could seek new partners to work with.

In essence, we adopted a two-phase approach for our single case study. In phase one we applied the Rao & Weintraub's assessment tool as a means of exploratory diagnosis on 3ST to determine the robustness and weakness of 3ST's innovation culture. Based on the evaluation of our diagnostic survey results, we crafted interview questions (see Appendix B) during Phase 2 that encouraged the interviewees to freely express their views on 3ST's

innovation culture. It was motivating to see that our in-depth interviews actually revealed some level of representation or feelings of certain sub-groups of employees that were concealed and remain undetected under the aggregated survey results.

Given that the above recommendations for improvements to enhance 3ST innovation culture are based on a generalised quantitative dataset derived from our diagnostic survey results, it is also crucial for us to study the qualitative insights and perspective of innovation culture shared by the different level of employees' representation. Our thematic analysis revealed interesting issues related to the ideation process and talent that were consistent with our earlier diagnostic study. There were other notable concerns that were not detected in our earlier findings such as attitudes pertaining "Failure (is not option here)" with its negative impact on a firm's innovation culture.

In the Asian context, "Success" and "Failure" is a core measurement of an individual's capability and competency. "Face" is another important cultural variable, especially in Taiwan. Any failure is seen as a disgrace to a team and individual, and this triggered the act of shirking or quiet quitting to take place stealthily. Consequently. individuals are also reluctant to volunteer for new assignments as they are afraid of affecting their performance if they fail and would therefore prefer to work within a safely charted working boundaries.

Apart from this issue of embracing failure, another key managerial implication is the "Value of Conformity or Compliance" that has been deeply ingrained into the Taiwanese culture - a paradoxically value widely

manifested in all other aspects of our society such as family, education system and workplace.

Although this appreciation of civility is positively and widely accepted by the society, the downside of this value cannot be disregarded. There lies a high level of trade-off between compliance to the values of the organisation and deference to elders as a sign of conformity.

Too much conformity would ruin the innovation effort where employees would follow rules and not create rules. The outcome is a non-participative role in a hierarchical regulated setting where employees will adopt herd mentality and will always wait for others to make decisions or do what they are been told to avoid confrontation (albeit superficially). Employees especially new joiners would feel demotivated and frustrated working in such a traditional and bureaucratic environment where incidentally, bureaucracy was also key finding in our earlier diagnostic investigation. 3ST needs to balance this value to fix the innovation culture so that employees will be more committed and motivated through active engagement within an open culture.

Furthermore, we have also noted ineffective communication has led to a low diffusion of innovation within 3ST. This could either be due to limited innovation information flowing to the employees since some of the employees work in isolation within their workspace as their work do not require external interactions or the middle managers may be sending mixed messages about innovation that may confused the people. To correct this deficiency, there must be a clearly defined communication plan to ensure consistency of the messages that are being delivered across to the team. Trainings of leaders to speak up is crucial to ensure clear articulations of

thoughts and holding people answerable in an effort to drive cultural change. One key aspect of broad-based communication is to develop an "Innovation Manifesto" to excite and inspire the employees so that the objectives are interlock across all levels and functions.

Additionally in our earlier 6 building block analysis, we have identified both Executives and Procurement function as having the lowest score for their groups. We shall now examine these two variables to determine the causes for the low performing scores. investigations,

Executives

The "Executive" level is the backbone of 3ST as most of them hold positions such as Sales, Product Development and Human Resource which contribute to revenue, new product creation and human capital management. Surveyed executives feel that 3ST's leadership should work on Success, Processes and Resources. Overall, this cohort does not consider 3ST as an innovative company. The cohort is concerned about the company's eroding market share and its inadequate reaction against competitors given the narrow focus on improving products for an existing market with no introduction of new products. One executive felt that 3ST is acting in a closed system "We lack understanding market demands and the skill sets to innovate new products." They have not seen 3ST succeeding with newly innovated products. The results also suggest that this group has a strong desire to partake in 3ST innovation activities. On the other hand, they were concerned that the ideation and prototyping processes are too long due to the lack of knowledge sharing and acquisition within 3ST. Moreover, they felt that 3ST's resources

always focus on selling, designing, and producing mechanical locks which could be our strength, but at the same time, it is also our Achilles heel that prevents the firm from moving forward with new opportunities. There were instances when a new business opportunity (e.g., arms for door closer) was offered by a subsidiary or to work with new customers on smart lock opportunities but 3ST was unable to grab these new businesses as the team lacked the expertise in these areas.

Procurement Function

When we look at the issues underlying the Procurement function, we noted that their concerns relate to the issue of functions working in silos with limited or no interaction to the outside world. This gives rise to their reluctance in assuming accountability for failures as well as their unwillingness to accept differing views. As expressed by one participant, "Different department can come together and help the company to gain more profits, reduce cot and improve efficiency whilst another echo. Everyone can share their opinion, regardless of their levels and position." As the majority of the procurement team members were externally recruited, they have this general perception that these functions have limited or no interaction to the external networks or stakeholders which affect their appreciation of external market dynamics and changes. This is supported by statements such as, "Current employees do not have much chance to learn or explore new knowledge from the outside or external world".

Table 26
Summary of Weakness and Recommendation

Summary of Weakness and Recommendation

Category	*Recommendations*
Talent	*Create a knowledge depository for the transfer of knowledge and new knowledge creation.* *Invest in core people to reach their potential* *Attract the right talent to pursue new opportunities*
Initiatives	*Turn the concept of innovation into concrete habits* *Pilot new open innovation contests* *Implement in parallel with Team Cohesion activities* *Team building – Greater focus on improving internal relationships.* *Celebrate small successes.*
Prototyping	*Provide more internal and external resources to speed up the prototyping process.* *Incorporate Human Centric design in our product ideation process*
Learning	*Upskilling or reskilling* *Train and apply "Design Thinking" such as IDEO , MIT process* *Monthly sharing of functional activities, visitation, external speakers to share industry trends*
Satisfaction	*Appoint innovation agents and champions to improve the participation, ideation, and value creation rate.* *Create a learning culture, organise business field trips to broaden exposure.*
No Bureaucracy	*Introduce a robust innovation governance framework to steer 3ST's innovation management approach towards building a stronger innovation culture.*
Overcoming Deference	*Leadership engagement and intervention, need for more transparency* *Engaging an external advisor to work with the team* *Create a platform as a sharing and feedback mechanism* *Behavioural corrections, reducing dominancy, recognise and reinforce individual for speaking up, accepting constructive criticism* *Accept dissenting views, start from the top.* *Freedom to debate and criticise inferior ideas*
Strengthening Team Cohesion	*Change behaviours and mindset. Encourage real teamwork and give more recognition* *Award incentives through team tournaments* *Focus group* *Introduce Innovation champions as catalyst of change* *Create focus group to address different issues such as product and process innovation*
Embracing Failures	*Admission of errors – Coach and not reprimand!* *No shaming and shifting of blames* *Create a "Failure Reflection" sharing system to share and reflect failures* *Learn to accept "Good Enough" to encourage participations*
Reinforcing Communication	*Encourage open communication* *Regular updates of Innovation development and progress* *Publicise rewards and recognition to encourage participations* *Effective Communication training for leaders*
Alignment of Innovation direction	*Develop and deploy a manifestation* *Done in conjunction with reinforcing communication*

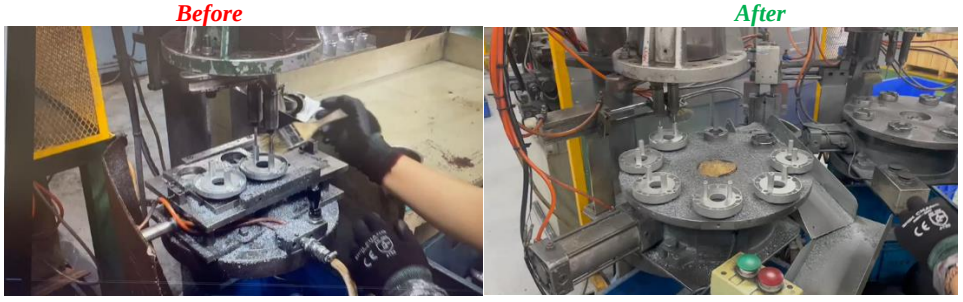
Together with the broad-based assessment results obtained during Phase 1 and the revelations obtained from both our thematic and persona study in Phase 2, we were able to elicit some profundity that led us to better understand the nuances and impediments of innovation at work within the organisation. Combining our Phase 1 and Phase 2 results and discussion points, we have tabulated a summary of recommendations and actions (see Table 26) to further enhance 3ST's culture of innovation. We suggest differentiated key interventions to address the low performers discovered in Phase 1 as well as the weaknesses identified during Phase 2. Some of these measures such as instituting "Innovation Champions" across the organisation to improve participation and inspire change as well as adopting a design thinking approach (Kelly & Littman, 2005) are pertinent to intensify the innovation diffusion to help integrate the innovation mindset into 3ST's cultural DNA.

Given that 3ST has a long legacy with outdated processes and aging products, we do not recommend focusing on just one but to work on both Product and Process innovations. These two variables are closely interlocked as 3ST's processes need to keep abreast of relevant technologies to support any product innovations. This is based on past learnings where new sales opportunities were lost due to process competencies deficiency. Furthermore, we should never confine our innovation mentality fixated on just product innovation as this will curtail our ability to innovate in other areas. Moreover, the risk of external disruptors could also derail our product innovation effort, for example the emergence of smart or electronic locks may lead to a convergence of our mechanical lock types or even replace our entire product

lines with their digitalisation capabilities. Rather than trying to fix product innovation, we should create a robust process to embed "Customer Centricity" into our product ideation process to cultivate and harvest ideas that could be operationalised and commercialised. This is also in line with our research findings that the company is always waiting for customers' input instead of proactively anticipating the market. Even though 3ST fell short in our product innovation process, we have made incremental improvements on our shopfloor with the help of our innovation champion by introducing simple automation to our production processes (see Fig 14) replacing decades old manufacturing processes. Besides lowering our manufacturing labour cost, the enhancements also enable the company to better utilise its manpower.

Before the tapping-related process innovation was implemented, a machinist could perform only 2 tasks at any time (see Fig. 15,picture on the left). With the innovative change (see Fig 15, picture on the right), the same person can now operate two machines, increasing output and productivity of the tapping process. One key takeaway supported by the survey data is the need for (more) "Innovation Champions" to persistently drive innovation for process or product creation.

Figure 15 *Process Automation*
Source from 3ST



Even though it is encouraging to see some form of process innovation taking place in the manufacturing front, 3ST would need to look at the bigger picture in pursuing cutting edge technologies and necessary competencies to support the implementation based on their existing and future business roadmap. To effectively maintain its twin pursuit for both product and process innovation, 3ST should focus on creating a repeatable and sustainable process by embedding the innovation culture into the organisation DNA such as using the 6 Building Block model to set up a better innovation infrastructure. Only when we turn the concept of innovation into concrete habits advocating innovation awareness, this characteristic will eventually turn into second nature and manifest itself in form of significantly enhanced 3ST innovation ecosystem to drive growth.

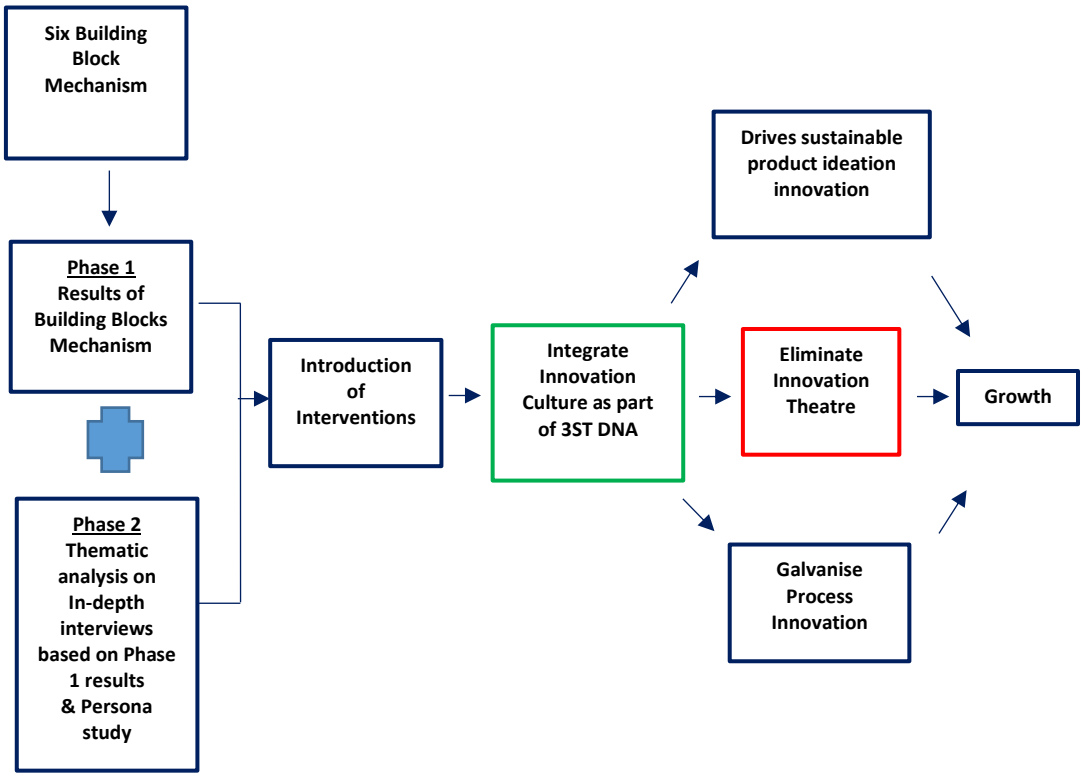
We advocate that everyone in the organisation subscribes to the innovation culture to eliminate the act of "Innovation Theatre". Innovation theatre can generate a brief innovation hype and distracts one from tackling real innovation issues. Whether its pressure or trying to impress the management, employees, especially managers, may fall into the innovation trap by resorting to work on superficial issues that would appear to be innovation related - but in actual fact these issues may be inconsequential because they do not generate real business value. To avoid falling into the innovation theatre trap, leaders should empower their workforce and focus their priorities on outcomes and not innovation activities.

The simple flow diagram depicted in Figure 16 succinctly recapitulates our thesis approach in exploring and capturing the panoptical view of the innovation culture within 3ST and how the utilisation of Rao and Weintraub's

mechanism has supported and satisfied the purpose of our study. Moreover, our study results helped to answer the research questions that we have set out to investigate by highlighting critical gaps in 3ST's innovation culture and recommending solutions based the rich data and insightful perspectives obtained through our mixed methods study. In sum, the findings provide a comprehensive view of 3ST's (challenging) innovation culture and capture the perceptions of many internal stakeholders aimed at making recommendations for furthering the firm's innovation management approach as stipulated in Table 26.

Figure 16

Diagrammatic flow of Research Approach



"*The world is not likely to return any time soon to the pre-pandemic days*" 3ST's deeper response to this shift must be to transform the organisation through innovation as well as reskilling and upgrading of relevant skillsets. The leadership team needs to dream big, setting sights on the next frontier and looking for better "solutions" and "fresh possibilities" by engaging the many layers of employees to showcase the collective innovative ideas that would lead the company to the next level of growth. They will also need to transform the way to operate new business whilst strengthening 3ST heritage in the lock business.

6.2 Practical Implications

Overall, there is relative lack of innovation in Taiwanese SMEs due to the distinctive phenomena that most SMEs are family-owned enterprise with a unique culture. Given that rich empirical insights into the innovation reality from an internal firm perspective are relatively scarce along with the limited literature on innovation culture matters in Taiwanese enterprise, leaders of Asian SMEs with similar corporate characteristics such as 3ST who wish to improve their innovation can benefit from our study. The results of our gap analysis and study provide an opportunity for SME practitioners to recognise differences in thoughts and actions of different entities within a firm and to understand at a deeper level how to make their innovation culture work. Additionally, our findings and recommendations can be used for the development of public policy aimed at supporting and encouraging innovation in traditional industries with a compliance culture or they could be used as actionable insights for managers who want to encourage greater innovation in their firms.

Besides contributing to both industry and the literature of innovation assessment culture, our study has proposed several suggestions to improve 3ST's innovation culture (see Table 26). In addition, it is important to increase the daily interactions amongst staff that can lead to improvement in the level and quality of engagements. According to Kumar & Pansari (2015), employee engagement has an impact on a firm's profitability. Disengaged employees do not innovate. Firms with higher employee engagement will report better financial results, and better profitability provides workforce stability. Furthermore, closer interactions with their managers will lead to better performance as employees feel motivated when they are able to better understand their superior's viewpoint and vice versa. Another implication of our research is to review the current Human Resource practice of recruitment to support the culture of innovation for 3ST. Besides the need to build a diversified team with various innovation competencies and roles, the company also needs to hire leaders who can help to process and support the change. In this respect, there is a need to revamp the HR policies and define the hiring criteria to assess both the cultural and job fit based on recruitment-based prerequisites that measured up to the innovation culture.

6.3 Limitations

Firstly, the participants were asked about their opinions of the company based on their perceptions and experiences working in the company. This introduces possible personal bias with regards to the data collected. Additionally, there is the possibility of the Hawthorn effect in place. The Hawthorn effect, also known as the Observer Effect, implies that participants

might have altered their answers and responses during the interviews as they know that someone is watching. In other words, the Hawthorn hinders the accuracy and integrity of the data collected because some of the responses may not have been truthful. This is especially because the case study is a Taiwanese company, and Taiwanese firms are often characterized as having a compliant culture – where employees tend to hide away their true viewpoints and not voice out. Moreover, given that the assessment tool may have been too direct, it might have put off some participants in giving a truthful response, which may ultimately threaten the integrity of the research study.

Another limitation of our research is that we did not include the effect of merger and acquisition (change of ownership) that could impact the innovation culture of 3ST. Since 2006, the firm has undergone several ownership changes. This frequent change of ownerships has invariably caused harm to the morale and motivation of the employees as it creates a sense of uncertainty and job security. Furthermore, the struggle to keep up with the different organisation cultures due to the acquisitions could also have caused confusion and distrust amongst the workforce. It might also have had a detrimental effect on the innovation progress due to conflicting priorities. The issue of short termism may arise as new owners choose to focus on paybacks such as sales revenue and profit instead of investing on long term innovation strategy whereby the payoff of these investment is unknown. Ironically, due to this recurring changes, the attitude of the employees would instinctively turn to preserving job security instead of innovativity due to the uncertainty on not knowing when the next acquisition would occur.

Lastly, as the original survey questions were written in English, translating this instrument may have resulted in some loss in translation due to difficulties finding the right word in Chinese to describe the questions. Also, as most of the interviews were done in the local language, potential translation difficulties may have affected our analysis.

6.4 Recommendations for Further Research

Future research can build on the findings of this study by comparing the results with that of another company that is characterized by a more open culture. In this way, we predict that a comparative case study could help to ascertain the difference between an open versus a compliance culture in terms of creating more sustainable innovation outcomes. Another possible research theme is to investigate how the inclusion of mindfulness could influence the innovation culture of SMEs. As studies by Meister (2015) and others have shown, the attribute of mindfulness can contribute positively to management outcomes. To what extent mindfulness can enhance the innovation culture of Asian enterprises needs to be examined.

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Appendixes Appendix A

3ST Innovation Survey (創新問卷)

1. Gender (性別)

- ☐ Male 男
- ☐ Female 女

2. Age (年齡)

- ☐ 20 - 30
- ☐ 31 - 40
- ☐ 41 - 50
- ☐ 51 - 60
- ☐ > 60

3. Level (級別)

- ☐ Manager 經理
- ☐ Team Leader 組長/領班
- ☐ Executive 行政
- ☐ Operator 現場人員

4. Years in TLHM (鑫東龍年資)

- ☐ 1 - 5
- ☐ 6 - 10
- ☐ 11 - 20
- ☐ > 20

5. First Job (第一份工作)

- ☐ Yes 是
- ☐ No 不是

6. Function (部門)

- ☐ Finance 財務
- ☐ General Management 總經理室
- ☐ HR 人資
- ☐ IT 資訊
- ☐ Logistics 物流(倉管)
- ☐ Procurement 採購
- ☐ Product Development 產品開發
- ☐ Quality Management 品管
- ☐ Sales 營業部
- ☐ Manufacturing 現場(製造&裝配)
- ☐ Legal & Compliance 法務部門

7. Employment Type (僱傭類型)

- ☐ Permanent 全職
- ☐ Contract 契約

8. Education(教育)

- ☐ < Senior High school 高中以下
- ☐ High school 高中/專科
- ☐ University graduate 大學
- ☐ > Postgraduate 碩士以上

9. Origin Country (起源國家)

- ☐ Local 本地（臺灣）
- ☐ Non-local 外地

2

BUILDING BLOCKS OF INNOVATION SURVEY

創新的建構障礙調查問卷

Our culture of innovation model has a total of six building blocks, 18 factors and 54 elements. (Each building block has three factors, and each factor consists of three elements.) Survey respondents should rate their organization on each of the 54 elements, on a scales of 1 to 5, using the following scale: 1 = Not at all; 2 = To a small extent; 3 = To a moderate extent; 4 = To a great extent; 5 = To a very great extent.
我們的創新文化模式共有六個建構要件，18 個因素和 54 個元素。（每個建構要件的區塊包含三個因素，每個因素由三個元素組成。）
受訪者按照以下等級中的 54 個元素針對組織內的情況個別進行評分，評分範圍為 1 到 5，分別代表以下程度：1=完全沒有；2=很少； ；3 =中等；4 =很大程度；5 =非常大程度。
The overall average scores for elements are further averaged to provide the factor score, and the factor averages similarly result in the building block average. That average of the six building blocks is what we call the group's "Innovation Quotient." Please note that the value of the survey increases asthe sample size increases, particularly when respondents come from different levels of the corporate hierarchy and differrent units of the company.
個別元素的得分加總平均後，推進為各因素的平均得分，各因素的加總平均值同樣地推進為各建構區塊的平均值。六個構建區塊的總平均值就是我們所謂的整體"創新商數"。請注意，調查的總值會隨著樣本數的增加而增加，當受訪者來自公司各個不同層級和公司的不同單位時尤是。

BUILDING BLOCKS 建構要件	**FACTORS** 因素	**ELEMENTS** 元素	**SURVEY QUESTIONS** 問卷題目	**ANSWER** 分數
VALUES 價值	**Entrepreneurial** 創業	Hungry 渴望	We have a burning desire to explore opportunities and to create new things 我們極度渴望有探索的機會並創造新的事物	
		Ambiguity 歧義	We have a healthy appetite and tolerance for ambiguity when pursuing newopportunities. 在追求創新的過程，我們有健康的態度並能容忍歧見	
		Action-oriented 以行動為導向	We avoid analysis paralysis when we identify new opportunities byexhibiting a bias towards action. 當發現有創新的可能時，我們避免去做停滯不前的分析而傾向於採取行動	
	Creativity 創造力	Imagination 想像力	We encourage new ways of thinking and solutions from diverse perspectives. 我們鼓勵新的思維方式和以不同的角度尋求解決方案	
		Autonomy 自治自主	Our workplace provides us the freedom to pursue new opportunities. 我們的工作場所提供給我們追求創新機會的自由	
		Playful 趣味性	We take delight in being spontaneous and are not afraid to laugh at ourselves 我們喜歡自發自主，不怕自我解嘲	

	Learning 學習	Curiosity 好奇心	We are good at asking questions in the pursuit of the unknown. 在追求不了解的事物過程中，我們能夠勇於提問	
		Experiment 實驗	We are constantly experimenting in our innovation efforts. 在為創新而努力的過程中，我們會持續不斷地嘗試	
		Failure OK 允許失敗	We are not afraid to fail, and we treat failure as learning opportunity. 我們不害怕失敗，而是將失敗視為一次學習經驗	
BEHAVIORS 行為	**Energize** **激勵**	Inspire **啟發**	Our leaders inspire us with a vision for the future and articulation of opportunities for the organization. 我們的領導者啟發我們對未來的願景並鼓勵為組織發言的機會	
		Challenge 挑戰	Our leaders frequently challenge us to think and act entrepreneurially. 我們的領導者經常給我們思考和行動創業的挑戰	
		Model 楷模	Our leaders model the right innovation behaviors for others to follow 我們的領導者為我們建立了正確的創新行為的楷模	
	Engage	Coach 指導	Our leaders devote time to coach and provide feedback in our innovation efforts. 在我們為創新而努力的過程中，我們的領導者會花時間給予指導並提供回饋意見	
		Initiative 主動性	In our organization, people at all levels proactively take initiative to innovate. 在我們的組織中，各個階層的人員都能積極主動地投入創新行動	

	積極投入	Support 支持	Our leaders provide support to project team members during both successes andfailures. 無論成敗與否，我們的領導者都能夠在過程中給予團隊成員提供支持	
	Enable 實現	Influence 影響	Our leaders use appropriate influence strategies to help us navigate aroundorganizational obstacles. 我們的領導者運用適當的影響力來幫助我們驅策掉來自組織中的障礙	
		Adapt 調適	Our leaders are able to modify and change course of action when needed. 我們的領導者能夠適時修正和改變行動方案的內容	
		Grit 堅持	Our leaders persist in following opportunities even in the face of adversity. 即使面對阻礙，我們的領導者仍能在隨之而來的機會中堅持不懈	
CLIMATE 風氣	**Collaboration** 合作	Community 社群	We have a community that speaks a common language about innovation. 我們如同處在一個共同社群，能夠有與創新相關的共同語言和話題	

		Diversity 多樣性	We appreciate, respect and leverage the differences that exist within our community. 我們欣賞、尊重並能藉由我們社群內部各自不同的差異性而互相提升	
		Teamwork 團隊合作	We work well together in teams to capture opportunities. 我們以團隊的形式共同合作並能擷取機遇	
	Safety 安全	Trust 信任	We are consistent in actually doing the things that we say we value. 我們實際上在做的事正是我們所重視的事，並能堅守如一	
		Integrity 廉正	We question decisions and actions that are inconsistent with our values. 我們會對與我們的價值觀不一致的決策和行動提出質疑	
		Openness 開放度	We are able to freely voice our opinions, even about unconventional or controversial ideas. 我們能夠自由表達我們的意見，即使是對於不因循舊或具爭議性的想法也能暢所欲言	
	Simplicity	No bureaucracy 無官僚作風	We minimize rules, policies, bureaucracy and rigidity to simplify our workplace. 在工作場所中，我們盡可能地簡化規則、政策、並減少官僚作風和僵化	
		Accountability 問責制	People take responsibility for their own actions and avoid blaming others. 每個人都能對自己的行為負責，避免責怪他人	

	單純樸實	Decision-making 決策制定	Our people know exactly how to get started and move initiatives through the organization. 整個組織中，我們的員工確切知道如何著手進行工作以及具備自主決斷行事的能力	
RESOURCES 資源	**People** 人員	Champions 冠軍	We have committed leaders who are willing to be champions of innovation. 我們都致力於力求創新冠軍的領導者	
		Experts 專家	We have access to innovation experts who can support our projects. 我們取得管道諮詢能夠支持我們方案的創新專家	
		Talent 人才	We have the internal talent to succeed in our innovation projects. 我們的內部人才可以為我們的創新計畫取得成功	
	Systems 系統	Selection 任用	We have the right recruiting and hiring systems in place to support a culture of innovation. 我們有適當的招聘和任用系統來支持創新文化	
		Communication 溝通	We have good collaboration tools to support our innovation efforts. 我們擁有良好的協作模式作為我們創新工作的支持工具	
		Ecosystem 生態系統	We are good at leveraging our relationships with suppliers and vendors to pursue innovation. 我們擅長借助與供應商和零售業者之間的關係提升追求創新的契機	

	Projects 專案計劃	Time 時間	We give people dedicated time to pursue new opportunities. 我們給予人充裕的時間專注於創新的機會	
		Money 金錢	We have dedicated finances to pursue new opportunities. 我們有專門的財務可用於創新的機會	
		Space 空間	We have dedicated physical and/or virtual space to pursue new opportunities. 我們有專門的實質和/或虛擬空間可用於創新的機會	
PROCESSES	**Ideate** 概念形成	Generate 想法生成	We systematically generate ideas from a vast and diverse set of sources. 我們有系統地從廣泛而多樣的資源中產生想法	
		Filter 過濾	We methodically filter and refine ideas to identify the most promising opportunities. 我們有條不紊地過濾和改進想法，以確定最有希望的機會	
		Prioritize 優先排序	We select opportunities based on a clearly articulated risk portfolio. 我們根據清晰明確的風險投資組合選擇機會	
		Prototype 原型	We move promising opportunities quickly into prototyping. 我們迅速將有希望的機會設計為初步的原型	

過程	**Shape** 成形	Iterate 迴路機制	We have effective feedback loops between our organization and the voiceof the customer. 我們的組織能針對客戶的反應建立有效的回饋機制並形成循環迴路	
		Fail smart 聰明的失敗	We quickly stop projects based on predefined failure criteria. 我們依據預先設定的失敗評斷標準快速決定停止計畫進行	
	Capture 握準時機	Flexibility 靈活度	Our processes are tailored to be flexible and context-based rather than control- and bureaucracy- based. 我們的流程是根據靈活度和情境而制定，並非因受制於他人或基於官僚作風產生	
		Launch 上市	We quickly go to market with the most promising opportunities. 我們能快速以最有前景的機會進入市場	
		Scale 規模	We rapidly allocate resources to scale initiatives that show market promise 我們迅速分配資源以開展具有市場前景的計劃	
	External	Customers 顧客	Our customers think of us as an innovative organization. 我們的客戶將我們視為一個創新型的組織	
		Competitors 競爭對手	Our innovation performance is much better than other firms in our industry. 我們的創新績效遠遠優於同行業的其他公司	

SUCCESS 成功	組織外部	Financial 財務	Our innovation efforts have led us to better financial performance than othersin our industry. 我們在創新方面的努力使我們的財務業績更優於同行業的其他公司	
	Enterprise 企業	Purpose 目標	We treat innovation as a long-term strategy rather than a short-term fix. 我們將創新視為長期的公司策略而非短期的解決方案	
		Discipline 紀律	We have a deliberate, comprehensive and disciplined approach to innovation 我們採用深思熟慮、全面而嚴謹的方式來進行創新	
		Capabilities 水準	Our innovation projects have helped our organization develop new capabilities thatwe did not have three years ago. 我們的創新方案有助於我們的組織發展三年前所沒有的全新的水準	
	Individual 個人	Satisfaction 滿意	I am satisfied with my level of participation in our innovation initiatives. 我對我參與創新計劃的程度感到滿意	
		Growth 成長	We deliberately stretch and build our people's competencies by theirparticipation in new initiatives. 我們有計畫性地讓員工透過參與創新計劃而擴展和增強能力	
		Reward 獎勵	We reward people for participating in potentially risky opportunities, irrespectiveof the outcome. 無論成敗與否，員工都可因參與存有潛在風險的創新計劃而得到獎勵	

Appendix B

Interview Questions

1. Have you ever received specific training in innovation?
2. Do you know if there are specific processes in the Company to manage new business ideas?
3. Have you ever used these processes?
4. Overall, I consider us to be an innovative organization?
5. What are the 1-2 things that you do well in the innovation efforts of your organization?
6. What are the 1-2 things you would do to improve innovation in your organization?
7. What is your understanding of innovation culture?
8. How do you think innovation culture can be helpful to your organization?
9. Do you sense any innovation culture within your company and why?
10. Why do you think the others (management, supervisor, team leader, executive, operator - where applicable) and your cohort results are different?
11. (For managers only) Why do you think the managers results are different from others particularly for a team leader and operator where they have different thinking patterns compared to others?
12. Do you think that your company culture is open or closed culture?
13. Why do you think that your company culture is open or closed culture?
14. Probe: In general, do you think Taiwan in general have an open or closed culture?
15. Do you agree that Taiwanese employees are typically compliant?
16. Why do you agree that Taiwanese employees are typically compliant?
17. Do you think compliance culture will affect the ratings of the results?
18. How do you think a compliance culture will help or impede innovation culture of a company? Why?
19. Do you think length of service has anything to do with this compliance culture? (That is the longer you work in the company, you tend to be more compliant?)

20. Why do you think length of service has anything to do with this compliance culture?
21. What additional information can you share with me to understand how your organization business leaders need to do to further the innovation culture with your company?