EDINBURGH NAPIER UNIVERSITY

THE BUSINESS SCHOOL

Resistance to Change: Exploring Singapore Blue-Collar Worker's Perceptions of Organizational Change Management Approaches in the Semiconductor Industry.

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Abstract

"Change" has never been as drastic as in 2020 compared to previous years. Technological advancements have always been a major driving force for changes in many high-tech companies. The escalating trade wars between the US & China, Hong Kong / China sovereignty and the Brexit have caused major disruption in the global markets and supply chains. The Covid-19 pandemic had become the latest catalyst in propelling technology adoption such as video conferencing, e-learning, contactless transactions, online-shopping etc. All these events are compelling Singapore companies to hasten innovations and change their old ways of operation. The study of change is not new with much literature, journals and models developed. While previous studies are mainly directed at the top & middle management level, what set this research apart from most studies is that it focuses on blue-collar workers in the Singapore Semiconductor sector. The aim of this research was to explore Singapore's blue-collar worker perceptions on organizational change management approaches in the semiconductor industry. Swift transformational change brought about by disruptive innovations and companies wanting to survive from competition can result in opposition among these workers expressed as resistance to change. Resistance to change is an important factor during organizational change. Hence, understanding their perceptions and response to change can aid stakeholders in their planning and execution of change initiatives.

Adopting a post-positive philosophical paradigm, cross-sectional mixed-methods design, the study captured both statistical and contextual data. It was an appropriate strategy as it achieved triangulation of the findings with multiple types of data. Using 3 analytical approaches, it was found that Group Dynamics among the blue-collar workers is a critical consideration for change. While Training, Participation, and Communication were found to invoke positive perceptions and reduce resistance to change, the study revealed deeper contextual interpretations and their influencing effects towards blue-collar workers. It was found that workers with between 1 to 5 years of experience in the semiconductor industry have the highest tendency to resign compared to other groups. Contrary to many studies, workers display more openness and lower resistance to change as they age. Recommendations are made according to the findings. Recommendations were also made for future researches as more research is needed to understand this vulnerable group.

Acknowledgement

I began this Doctor of Business Administration program as an opportunity to deepen my knowledge and to equip my skills in managing the current ever-changing business climate. The journey has been rewardingly challenging. Hence, I like to acknowledge all the guidance, advices, supports, and assistances rendered to me during my studies.

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List of Abbreviations

AOI	Automatic Optical Inspection
CPS	Cyber Physical System
DPS	Die Preparation Services
DRC	Dependency Ration Ceiling
EDB	Economic Development Board
FA	Failure Analysis
ICT	Information and Communications Technology
IoT	Internet of Things
ITM	Industry Transformation Map
MES	Manufacturing Executing system
MNC	Multinational Corporation
PIC	Productivity and Innovation Credit Scheme
QA	Quality Assurance
RBA	Responsible Business Alliance
SME	Small and Mid-size Enterprises
SOP	Standard Operating Procedure
SSG	SkillsFuture Singapore
WSG	Workforce Singapore

List of Glossary

Back-End	In PTI-SG semiconductor manufacturing, it's production lines which involve singulation of IC chip from wafer form to individual die.
Bumping Technology	Bumping is an advanced wafer level process technology where "bumps" or "balls" made of solder are formed on the wafers in a whole wafer form.
Chip probing	A process of electrical testing or programming of the dies in wafer form.
Dependency Ratio Ceiling	Refers to the maximum permitted ratio of foreign workers to the total workforce that a company in the stipulated sector is allowed to hire.
Die Preparation services	A specific Back-End manufacturing operation which include automatic Die Pick and place to place die in Waffle Pack, Tape & Reel or GelPack.
Economic Development Board	The Singapore Economic Development Board (EDB), a government agency under the Ministry of Trade and Industry, is responsible for strategies that enhance Singapore's position as a global centre for business, innovation, and talent.
EP Pass	A Singapore work visa issued by Singapore's Ministry of Manpower to foreign professional employees, managers, and owners or directors of Singaporean companies.
Flip Chip	Flip chip is a semiconductor device that has been designed to incorporate solder bumps over the connection pads of the Integrated Chip.
Industry Transformation Map	It is an initiative started by Singapore Government to transform Singapore business towards Industry 4.0.
Industry 4.0	A new phase in the Industrial Revolution that focuses heavily on interconnectivity, automation, machine learning, and real-time data.
Internet of Things	A concept that refers to connections between physical objects like sensors or machines and the Internet

Manufacturing Execution System	An information system that connects, monitors and controls complex manufacturing systems and data flows on the factory floor to ensure effective execution of the manufacturing operations and improve production output.
Productivity & Innovation Credit	A scheme that was introduced in Singapore to encourage businesses to get significant tax deductions or pay outs for investments in research & development, innovation, automation, and training.
Responsible Business Alliance	A non-profit coalition of leading electronics companies dedicated on improving labour and human rights, environment, health and safety, environmental and ethical conditions in their supply chains.
SP Pass	An employment pass that allows mid-level skilled staff to work in Singapore.
SkillsFuture Singapore	A statutory board under the Ministry of Education (MOE) that coordinates and promotes a culture and holistic system of lifelong learning through the pursuit of skills mastery and strengthens the ecosystem of quality education and training in Singapore.
Spring Singapore	An agency under the Ministry of Trade and Industry responsible for helping Singapore enterprises grow and building trust in Singapore products and services.
Work Pass	The most basic employment pass for Semi-skilled or unskilled foreign workers in in the construction, manufacturing, marine shipyard, process or services sector.
Workforce Singapore (WSG)	A statutory board under the Ministry of Manpower (MOM). It will oversee the transformation of the local workforce and industry to meet ongoing economic challenges.

1.0 Introduction: Semiconductor Industry – The Technological Force

"Change", the word is used in many areas of today's global affairs. The US-China Trade war and the Covid-19 pandemic had caused an unprecedented change to the global supply chain and affected the way we work (Akhtar, 2020; Rapoza, 2020; McCrea, 2020). It shows that no country lives in isolation. From political revolutions & social up-rising in many countries, to laws on environmental & economic controls, the tsunami of change cannot be avoided (Zhexembayeva, 2020). So much so that it is hard for any organization to ignore it in their business analysis and plans.

More than a decade ago, many researchers and practitioners anticipated that the business environment would experience severe competition due to globalization and rapid change in technology, pressurizing organizations to re-evaluate and change their business strategies, organization structure, processes and capabilities (Busco, Giovannoni & Scapens, 2008; Dockel, 2006; Drucker, 2012; Ghoshal et al., 2009; Govindarajan & Gupta, 2000). A decade later, the driving force for organizational change has not slowed but is more relentless (Iwinski, 2018; Thomas et al., 2011; Winby & Worley, 2014). Hence, accepting these changes is essential for the survival of all businesses (Beer & Nohria, 2000; Burnes, 2004a; Kotter & Schlesinger, 2008; Park, Shintaku & Amano, 2010).

With a focus on Singapore blue-collar workers perceptions of organizational change management approaches in the Semiconductor industry, this chapter aims to provide an overview of key developments and trends in this sector and the challenges they have created. This chapter begins from a global standpoint and charts its evolutions & trends, drawing on how its key changes and challenges have propelled Singapore's Government and its semiconductor companies to react. Finally, a brief introduction and focus on my own company, the plans, and actions it is making to keep pace with the global business competition. From this review, I identify the challenges faced by managers, specifically in managing human capital brought about by the industry (Figure 1). Reiterate my aim and objectives, I will conclude by linking the sector to my research study. As the research for this study will be conducted with a semiconductor company that I am currently employed. To ensure anonymity for the organization, the company will be named as P-Tech throughout in this study.

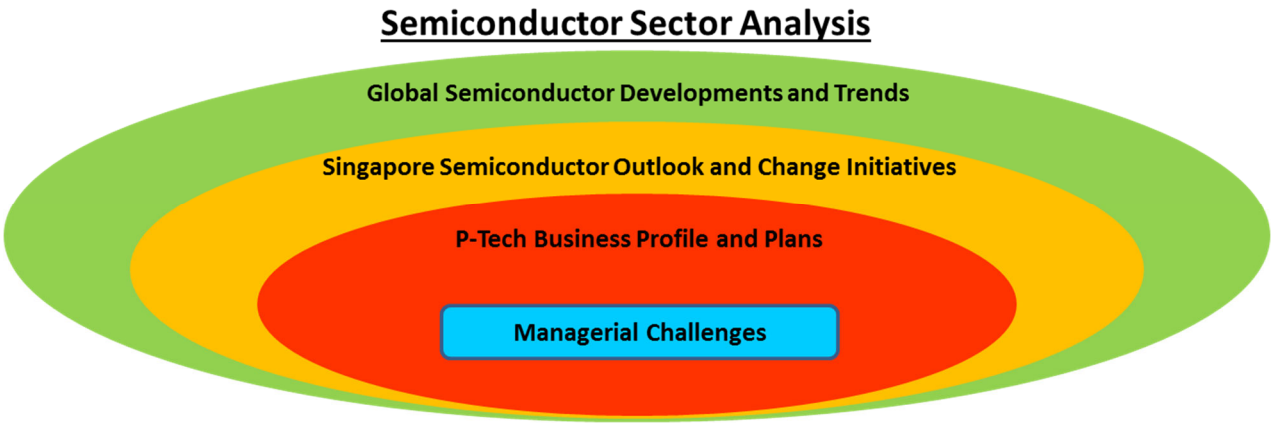
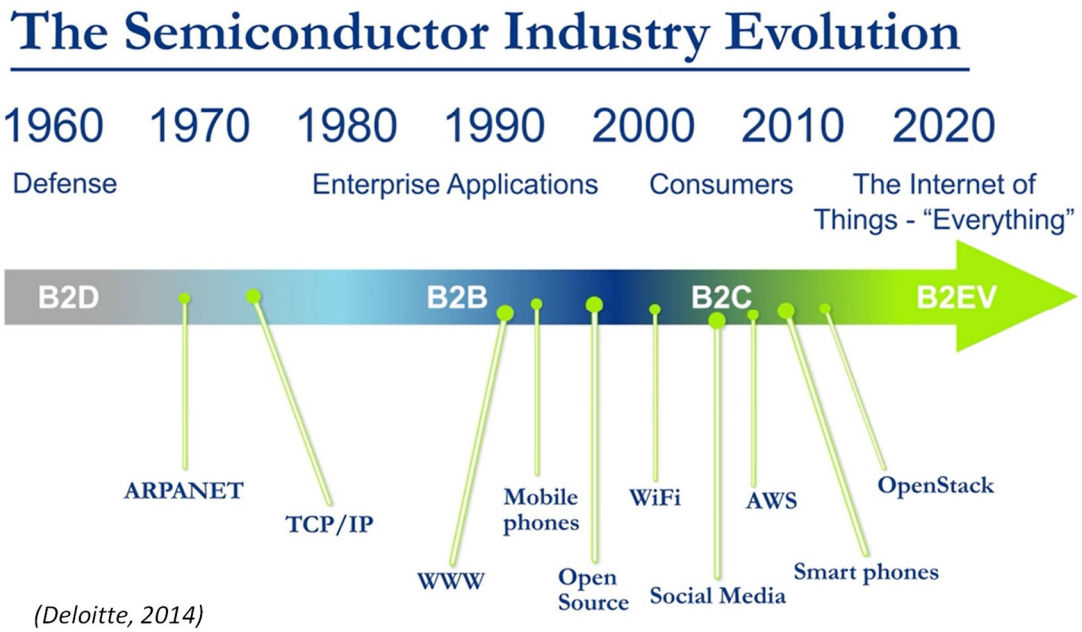


Figure 1: Semiconductor Sector Analysis Diagram

An industry engaged in the design and fabrication of semiconductor devices such as mobile phones, tablets, TVs, to pacemakers, driverless cars, medical monitoring devices, and the latest trend; Internet of Things (IoT), the arms of semiconductor business had reached and established a stronghold in our daily lives (Hagel, Brown, Samoylova, & Lui, 2013). In this section, the sector trends and development on 3 levels, Global level; National level (Singapore), and Single MNC level (P-Tech) located in Singapore will be reviewed.

1.1 Global Trends and Development

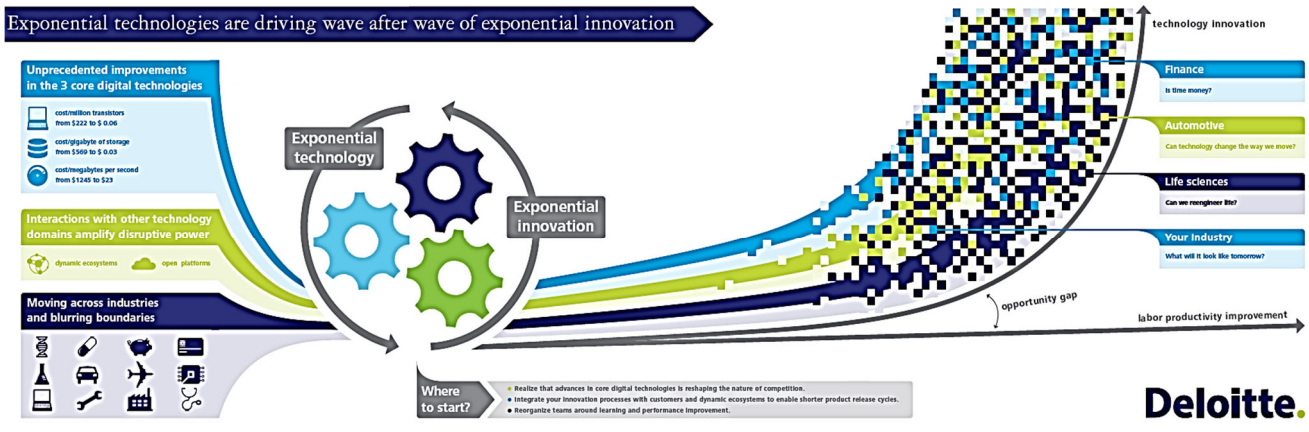
The semiconductor sector is moving through a seismic shift in demands (Business Insider Intelligence 2020; Yeo, D. et al., 2020). The evolution of technology had changed from the 1960's which focuses on the defence market, progressing through the consumer market for mobile devices in the 1990's, to the increasing demand in the application to support the Internet of Things (IoT) projected in 2020's (Figure 2).



(Deloitte, 2014)

Figure 2: Semiconductor Industry Evolution

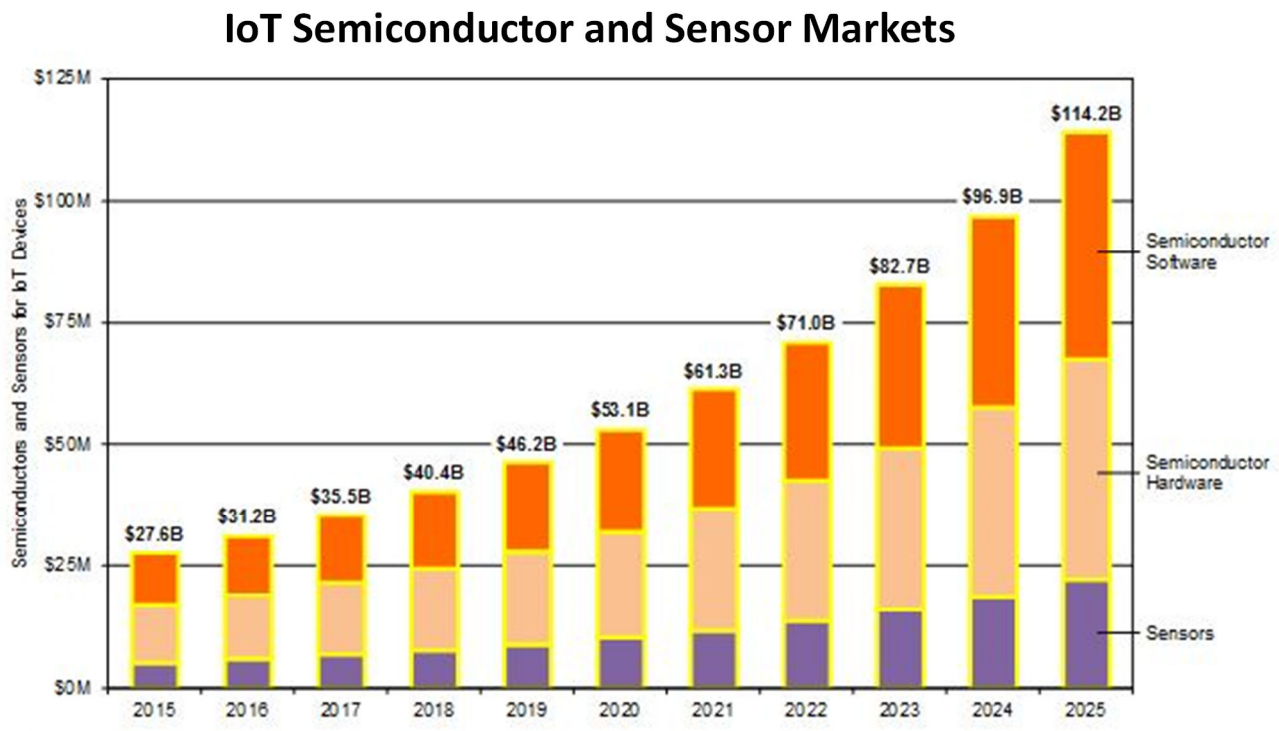
Forewarned by Scott Angel, Semiconductor Practice leader & Partner in Deloitte & Touche LLP, who suggested that companies needed to radically change their usual strategies of the past and evolve to a new model due to the impending inflection point in technology development (Deloitte, 2014). Hagel et al., (2013) highlighted three cores digital technologies; computing power, storage, and bandwidth that will move across sectors, blurring the boundaries of industries (Figure 3).



(Deloitte, 2014)

Figure 3: Exponential Technologies Infographic

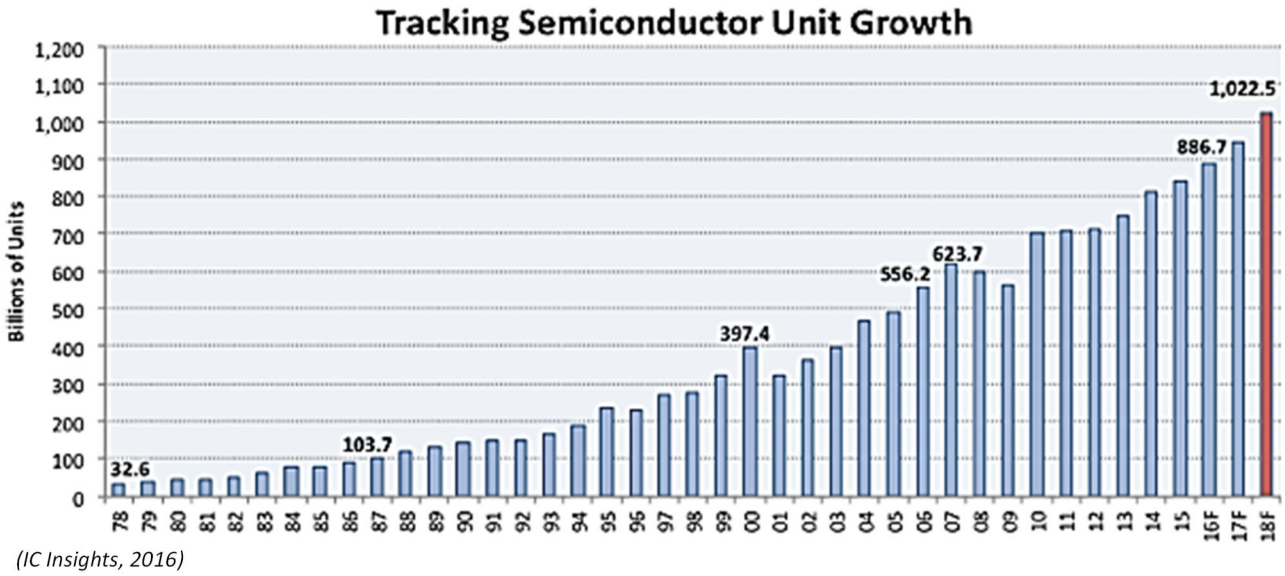
Jones (2015) in Figure 4 identified the IoT and sensor market as the main driving forces that were pushing the growth which cuts across to other industry boundaries and sectors such as Finance, Automotive, Digital Storage, Medical, Logistic, and home. In their forecast for 2018, Deloitte (2018), Ernst & Young (2017), Gartner (2018), KPMG (2018), Mckinsey & Company (2017) and PricewaterhouseCoopers (2017) have all also reported exponential growth trend in this industry.



(Jones, 2015)

Figure 4: IoT and Sensor Market Trend

Figure 5 from IC Insight (2016) which has tracked the industry over the 40-year period shows a growing trend of the shipment of semiconductor units. It is projected to increase to 1,022.5 billion devices in 2018 from 32.6 billion in 1978. Clocking an average annual growth rate of 9.0%, the trend reveals how the world has become increasingly reliant on semiconductors (IC Insights, 2016).

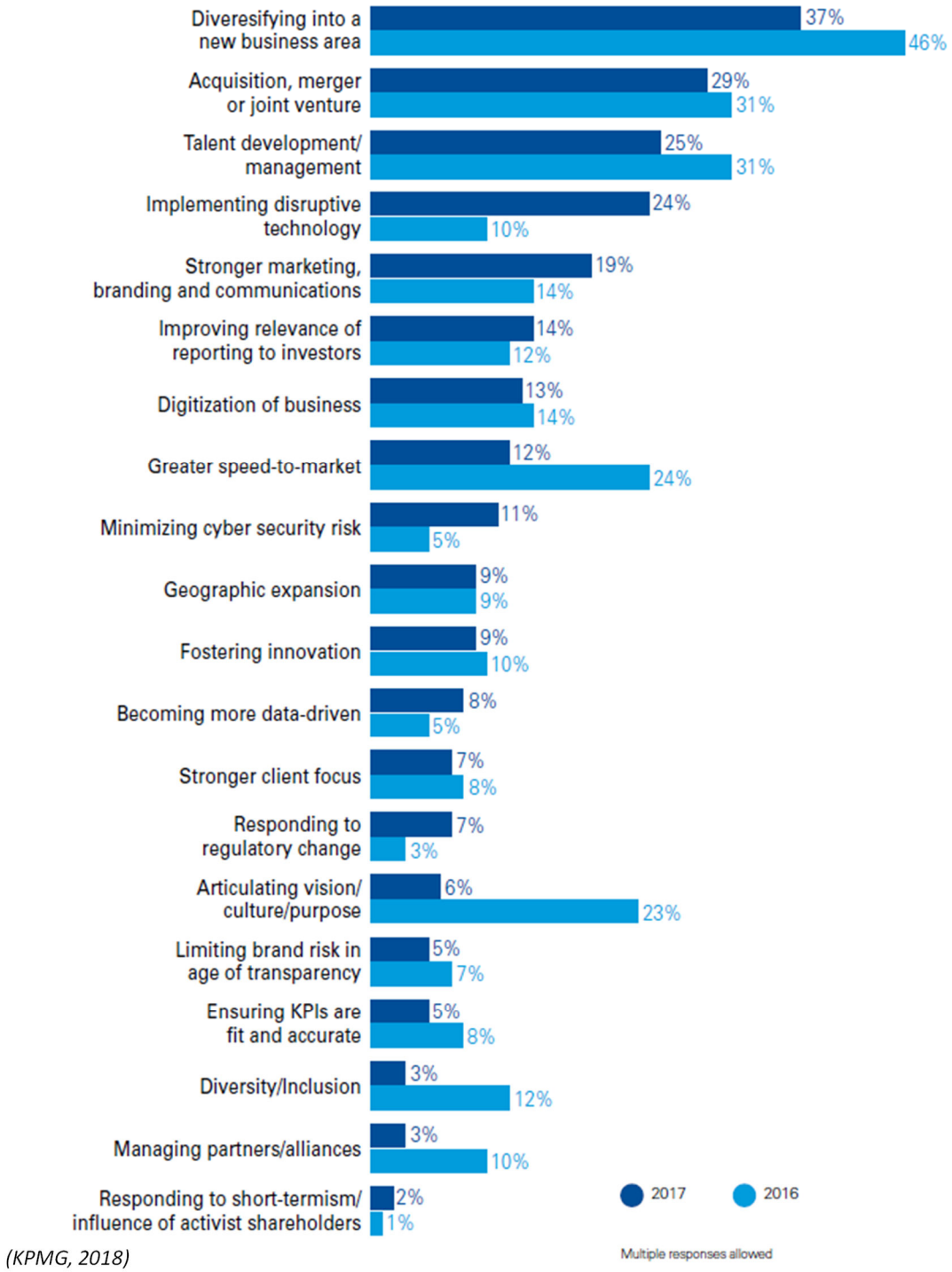


(IC Insights, 2016)

Figure 5: Semiconductor Unit Growth Projection

This explosion in semiconductor growth has mounted pressure on companies on a global scale to take actions in order to keep up with the competition. KPMG, in a global web-based survey of hundred-fifty semiconductor companies' senior executives during the fourth quarter of 2017, reveal strategic priorities over the next 3 years in Figure 6 (KPMG, 2018).

Strategic Priorities for Organization Over Next Three Years



(KPMG, 2018)

Figure 6: Organization Strategic Priorities

Topping the chart, priorities such as diversification of business, merger & acquisition, talent development & management and implementing disruptive technology echo the phenomena that are happening currently in the industry. In the period 2015 to 2018 there were reports of 12 high profile mergers and acquisitions (Table 1).

Table 1: Merger and Acquisition (2015 to 2018)

S/No	Company Affected	Price (US Billion)	Jobs Affected	Reference
1	Qualcomm acquiring NXP Semiconductors	$47	1500	Qualcomm. (2016). Qualcomm to Acquire NXP | Qualcomm. [online] Available at: https://www.qualcomm.com/news/releases/2016/10/27/qualcomm-acquire-nxp [Accessed 30 Jun. 2018].
2	Western Digital aquired SanDisk	$19	400	Western Digital (2016). Western Digital Completes Acquisition of SanDisk, Creating A Global leader In Storage Technology. Retrieved from https://www.wdc.com/about-wd/newsroom/press-room/2016-05-12-western-digital-completes-acquisition-of-sandisk.html [Accessed 30 Jun. 2018].
3	Intel aquired Altera (Dec 2015)	$16.70	12000	Intel. (2015). Intel Completes Acquisition of Altera. [online] Available at: https://newsroom.intel.com/news-releases/intel-completes-acquisition-of-altera/ [Accessed 30 Jun. 2018].
4	Avago Technologies' acquired Broadcom Corp.	$37	1900	Investors.broadcom.com. (2016). Broadcom Limited Announces Expected Completion of Business Combination Transaction Between Avago Technologies and Broadcom Corporation. [online] Available at: http://investors.broadcom.com/phoenix.zhtml?c=203541&p=irol-newsArticle&ID=2133869 [Accessed 30 Jun. 2018].
5	SoftBank plan to acquired mobile semiconductor design company ARM Holdings	$32	Not Disclose	Softbank Group. (2016). Completion of Acquisition of ARM by SoftBank. [online] Available at: https://www.softbank.jp/en/corp/news/press/sb/2016/20160905_01/ [Accessed 30 Jun. 2018].
6	Analog Devices aquired Linear Technology	$14.80	4922	Analog Devices. (2016). Analog Devices and Linear Technology to Combine Creating the Premier Analog Technology Company [online] Available at: http://www.analog.com/en/about-adi/news-room/press-releases/2016/7-26-2016-adi-and-linear-technology-to-combine.html [Accessed 30 Jun. 2018].
7	ON Semiconductor acquired Fairchild Semiconductor	$2.40	1350	ON Semiconductor. (2016). ON Semiconductor Successfully Completes Acquisition of Fairchild Semiconductor for $2.4 Billion in Cash. [online] Available at: http://www.onsemi.com/PowerSolutions/newsItem.do?article=3633 [Accessed 30 Jun. 2018].
8	Cypress Semiconductor to acquire Broadcom's wireless Internet of Things business and all related assets	$0.55	Not Disclose	Cypress. (2016). Cypress to Acquire Broadcom's Wireless Internet of Things Business. [online] Available at: http://www.cypress.com/news/cypress-acquire-broadcom-s-wireless-internet-things-business-0 [Accessed 30 Jun. 2018].
9	Cisco Systems plan to purchase networking chip designer Leaba Semiconductor	$0.32	2800	Cisco, A., Office, C., & Acquisitions, I. Acquisitions - Acquisition Summary. Retrieved from https://www.cisco.com/c/en/us/about/corporate-strategy-office/acquisitions/acquisitions-list-years.html
10	Renesas acquire Intersil to provides power management and precision analog solutions	$3.20	Not Disclose	Renesas. (2016). Renesas to Acquire Intersil to Create the World's Leading Embedded Solution Provider. [online] Available at: https://www.renesas.com/en-us/about/press-center/news/2016/news20160913a.html [Accessed 30 Jun. 2018].
11	GigOptix acquire Magnum Semiconductor	$0.55	Not Disclose	Businesswire. (2016). GigOptix, Inc. Completes Acquisition of Magnum Semiconductor, Inc. [online] Available at: https://www.businesswire.com/news/home/20160406005361/en/GigOptix-Completes-Acquisition-Magnum-Semiconductor [Accessed 30 Jun. 2018].
12	Silicon wafer manufacturer GlobalWafers in August plan to acquire SunEdison Semiconductor	$0.68	Not Disclose	Globalwafers. (2016). GlobalWafers Successfully Consummates Acquisition of SunEdison Semiconductor. Retrieved from https://www.sas-globalwafers.co.jp/eng/corporate/release/pdf/news_20161202_e.pdf

In view of the demands, these activities were mainly motivated by acquiring technologies, capabilities, and talents, to achieve a rapid competitive advantage in the market. According to Groot & Merchant (2000), it has become progressively challenging for any single organization to compete and excel in all aspects of a given business. Hence, they are compelled to look beyond their immediate environment and to take a strategic advantage position among competitors (Deveshwar & Modi, 2013). One of the ways, posited by Bena & Li (2014), Janiuk (2017) and KPMG (2018) that exemplify business diversification, is via merger and acquisition in order to attain competitive resource faster.

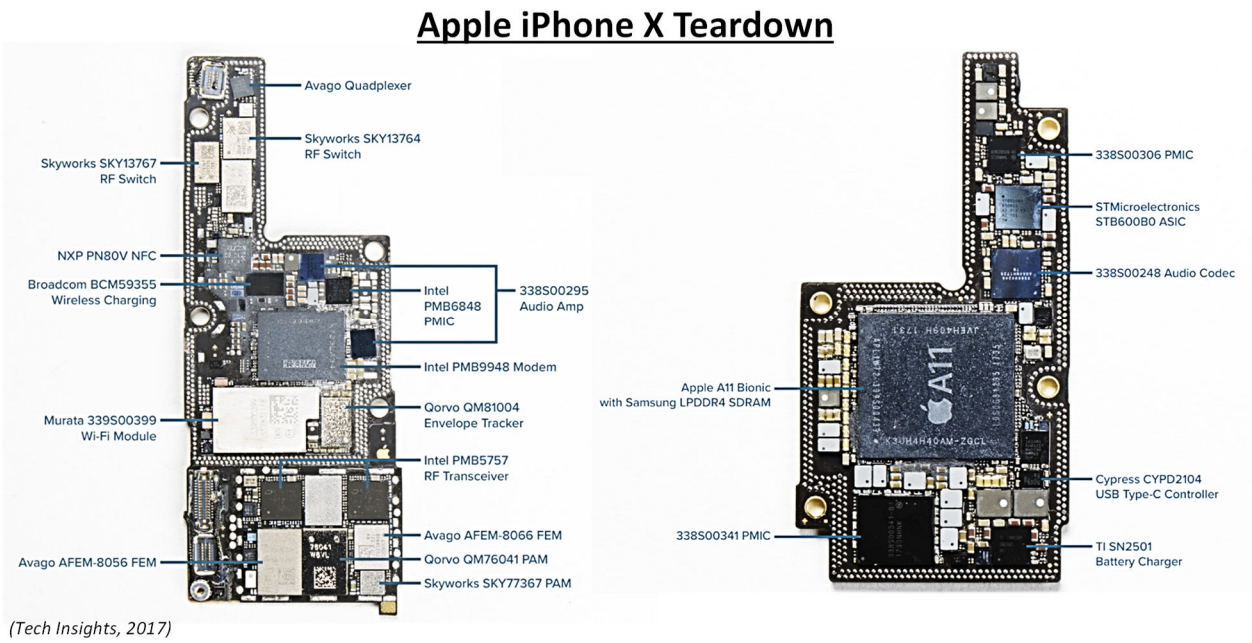
John Ciachella, Semiconductor Practice leader, Principal, Deloitte & Touche LLP, warned that the industry is going through diversification to a medium size market instead of a single dominant market (Deloitte, 2014). He projected that with the raising demand for IoT, the technology within the product will be varied and complex. Hence, companies need to be diverse, versatile, and multi-targeted, which may involve enormous cost. Specifically, organizations adapting to the evolving and dynamic semiconductor growth trend will require a fundament shift in their systems, processes & people in order to mitigate challenges and take advantage of the opportunities (Deloitte, 2014).

1.2 Singapore Semiconductor: Towards Transformation

In the current globalized economy, it is difficult to find a product that is fully manufactured by a single company. Taking Apple's iPhone X in Figure 7 as example (Tech Insights, 2017), you will find that the components inside are produced from many companies that are located all over the world. Each of these components is manufactured by a complex global chain of firms using different technological capabilities. Hence, changes taking place in the industry will have a chain effect on many companies globally. Singapore, a key node with one of the most diverse semiconductor industries in the Asia Pacific, needs to take action to remain relevant.

Singapore semiconductor industry, which has had an annual growth of 2-5% over the past decade, achieved an output of US$64.8 billion in 2015. This accounted for 31.6% of the manufacturing output (EDB, 2018a). Consist of many leading multinational companies that have chosen Singapore as the group's Pan-Asia headquarters outside their home country

(Contact Singapore, 2012), this sector employs about 70,000 workers in 2016 (EDB, 2018b). These are significant statistics considering the city-states total populations and its heavy dependence on foreign talents. In order to reduce the dependency for foreign talents, increase the productivity and capabilities & skill level of its citizen, and preparing the nation for a more resilient economy in the midst of the Covid-19 pandemic, the Singapore Government has introduced a number of nationwide initiatives to transform this sector.



(Tech Insights, 2017)

Figure 7: Apple iPhone X Teardown

1.2.1 Electronics Industry Transformation Map

The Singapore Government launched the Electronic Industry Transformation Map (ITM) on 20th September 2017 (EDB, 2017a). Semiconductor being a major area of growth in Singapore's economy contributed 4.4% or about S$90 Billion in manufacturing output (EDB, 2017a). The purpose of this initiative was to prepare Singapore to tap into the opportunities of the market which is poised for continual growth. With a two-pronged strategy, the Singapore Government wanted to first, encourage companies to diversify into new growth markets, and secondly, to transform the existing model of manufacturing to attract high-value investments (EDB, 2017a). The Government had rolled out a series of programs to help companies through this transformation (Table 2). The plan was to strengthen the current innovation ecosystem in

order to support companies in developing new capabilities, so that they could capture the growth opportunities. Through partnership of educational & research institutions, MNCs, SMEs and other industry players, the initiative also aimed to encourage co-development of new innovations, knowledge sharing and transfer that can upgrade company's capabilities. Spring Singapore's SG Accelerator program (Startup SG, 2019), Skillfuture Framework (SkillsFuture.sg, 2020) and WSG's Adapt and Growth program (Workforce Singapore, 2019) are also programs that companies can capitalized to growth their business and workforce to keep up with the pace of the transformation.

Table 2: Electronic Industry Transformation Map (ITM)

Electronic Industry Transformation Map (ITM)

S/No	Actions, Projects and Programs	Purpose
1	Government to strengthen the innovation ecosystem	To harness new growth opportunities and support companies in developing new capabilities.
2	Partnerships for Capability Transformation (PACT)	To foster collaborative projects between MNCs, SMEs and startups. for knowledge transfer, capability upgrading and co-development of new solutions.
3	Startup SG Accelerator programme by SPRING	To catalyse growth opportunities for IoT and electronics startups
4	Government to provide of future-ready infrastructure	To attract high value-add activities and capture new growth areas.
5	Government to work with companies to improve their manufacturing efficiency and adopt advanced manufacturing technologies.	a) To increase manufacturing productivity by reducing operating costs and optimising resources. b) The ITM targets for 100% of manufacturing plants in Singapore to be bestin-class compared to their global operations. c) Advanced manufacturing to bring about new skilled job roles in manufacturing.
6	Skills Framework for Electronics	To equip Singaporeans with the necessary skills to take on these jobs
7	Strengthen support on skill development Initiatives such as SkillsFuture Earn and Learn Programme, Enhanced Internship, Singapore Industry Scholarships and Professional Conversion Programmes (PCPs).	To support Singaporean in the electronics industry on their skills and career journey
8	WSG's Adapt and Grow initiative	To re-skill Professionals, Managers, Executives and Technicians (PMETs) for the Wafer Fabrication and Assembly & Test sectors.
9	Government will partner with Trade Associations and Chambers (TACs) such as the Singapore Semiconductor Industry Association (SSIA)	To expand resources to better support the industry.

(Extracted from EDB, 2017)

Through the launch of the Electronic Industry Transformation Map, Singapore's semiconductor sector is expected an increase in job opportunities and value add their manufacturing by an estimated S$22.2billion. The launch of this initiative will likely signal an imminent implementation and changes in policies that will involve industry to act upon. Companies such as P-Tech, not wanting to be left behind, were expected to embark upon aggressive change

plans to make the most of these government supports to build its own capability. In doing so, employees in P-Tech, such as blue-collar workers were expected to be impacted. The change to develop new capabilities would involve training of new skills, processes, and systems.

1.2.2 Singapore: Industry 4.0

When considering factors affecting the Semiconductor industry, one cannot ignore the Singapore Government's push for Industry 4.0 in which the Industry Transformation Map (ITM) is based. Industry 4.0 was introduced in 2011 during the Hannover Fair and officially announced in 2013 as a German strategic initiative to revolutionise the manufacturing sector. Explain by Xu, Xu, & Li (2018) in Figure 8, it charts the progression of industry from 1.0 to the current 4.0, which represent the ongoing trend of utilizing automation technologies, such as cloud computing, cyber-physical systems (CPS), and Internet of Things (IoT).

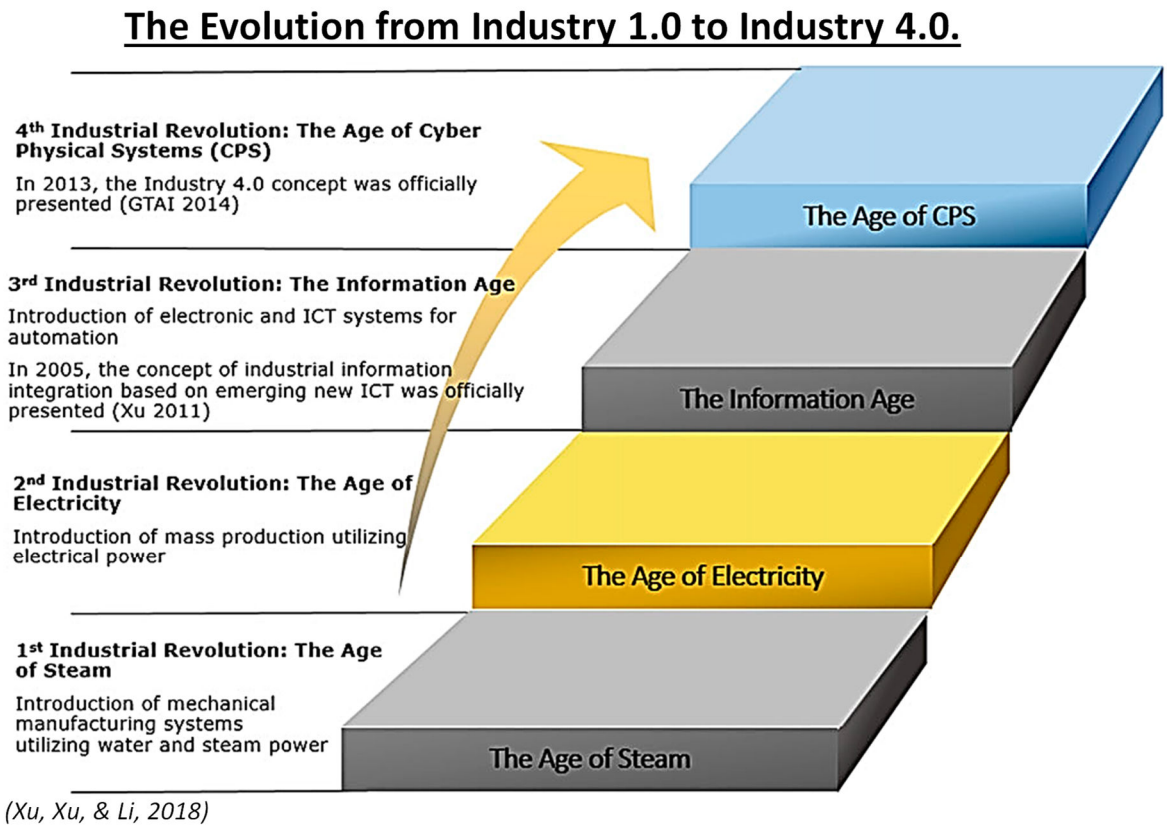


Figure 8: The Evolution from Industry 1.0 to 4.0

Industry 4.0 can help companies accelerate and sustain improvement in labour costs, throughput, and quality (Almada, 2017; Choudhury, 2017). It is projected to achieve productivity improvement of 30%-50% for direct labour and 10%-20% maintenance productivity (De Backer, Mancini, & Sharma, 2017).

Singapore manufacturing accounts for nearly a fifth of the nation's GDP. The Semiconductor industry being a major part of the manufacturing sector is viewed as a main driver of the country's growth (EDB, 2017c). This sector is facing great pressure from both regional competition and domestic restructuring. As the industry is also tackling with rising operational costs, domestic labour crunch and the weakening Singapore dollar, the Government has recognized the need to overhaul the industry to a more innovation-based and high-value production model (EDB, 2017c). Strong Government policy combining with robust infrastructure, Singapore ranked top in the Economist Intelligence Unit's 2016 Asian Digital Transformation Index (EDB, 2017d), Readiness for Future Economy (MTI, 2017) and Future of Production 2018 (World Economic Forum, 2018), indicating Singapore is well-positioned for Industry 4.0.

On November 13, 2017, the Singapore Smart Industry Readiness Index was launched. A partnership by the Singapore Economic Development Board (EDB), and TÜV SÜD, this is a world-first tool design to help companies across all industries and sizes to exploit the potential of Industry 4.0 in a systematic and comprehensive way so that Singapore's manufacturing sectors competitiveness can be enhanced (EDB, 2017b). As elaborated by EDB's Assistant Managing Director, Lim Kok Kiang, to maximise the benefits of Industry 4.0, this initiative will not only target the implementation of the latest technology but will also focus on the process and people (EDB, 2017b). Mr Yeoh Pit Wee, Director for Manufacturing Operations, Rockwell Automation further emphasized that companies often focus mainly on production floor automation and underestimate the equally crucial aspect such as processes and employees' competency (EDB, 2017b).

An assessment was conducted by an ISO audit firm on 11th October 2018 for P-Tech's Industry 4.0 readiness. It was found that the production floor lacks behind in automation, AI and connectivity. This implicated that change in systems and process technologies are needed in these areas in order to achieve the Industry 4.0 standards.

1.2.3 Accelerate Nationwide Digitalization

The Covid-19 pandemic had changed the nature of work and brought about much disruption to many daily activities that are taken for granted. Schools needed to be close and resort to online learning. Cash transactions were reduced, and digital transactions are preferred. Business travel was not permitted; hence, many meetings are now held via video conferencing. All these actions are intended to reduce human contact while keeping the daily activities going. In order to support these changes, strong digitalization systems are required. Therefore, the initial drive for digitalization to increase productivity has got a boost from the Covid-19 pandemic for keeping business and many daily activities safe (Deloitte, 2020)

In fighting the current virus and to emerge stronger post Covid-19, the Singapore Government announced the plan to spend S$3.5billion on an ICT system and infrastructure to accelerate digitalisation and support businesses (Infocomm Media Development Authority, 2020). This leveraging and modernising ICT infrastructure was instrumental in the Singapore technological response to the pandemic for contact tracing. This initiative will support tasks such as contactless transactions, working from home, electronic security, planning and many other critical functions etc. This effort will not only be confined to Singapore but will also require the collaboration of other countries to stabilize the disrupted business connectivity. There are also collaboration programs available for companies to tap on the resources to accelerate their innovative ideas (A*Star, 2018a; 2018b). A digital alignment on a nation level will improve efficiency, streamline information flow, and reduce red tape between stakeholders (EDB, 2017d, 2017e). Digitalization will require semiconductor components and product to support the infrastructure and devices. This implies that there will be a sharp demand increase for semiconductor production for these advance products to be rolled out as soon as possible. Hence, P-Tech, being in this industry as part of the global supply chain, will need to prepare for a new set up and changes to the current manufacturing would follow to meet the demands.

In summary, the Singapore Semiconductor Industry, trends and the Government initiatives to transform this sector will require significant changes not only in the systems it uses and processes it operates on; employees at all level will also need to be ready for the changes in their nature of work such as switching from traditional recording procedures to paperless systems.

1.3 P-Tech: Reacting to the Changing Environment

P-Tech is situated in the central part of Singapore and belongs to the back-end of the semiconductor industry that specializes in bumping technology. This is an essential process for a wide range of advance semiconductor devices. This technology is the key in enabling consumer products such as handheld devices to be small and thinner. A subsidiary to P-Tech Inc. in Taiwan, P-Tech Singapore dedicates itself not only to be the premier integrated & advanced solutions provider in Singapore and Asia Pacific region, but also an important gateway to North America and the European market. The current trade war between the USA and China has brought opportunities into countries in Asia as customers look for alternative sites out of China for their manufacturing to stabilize their supply chain (Financial Times, 2019). Singapore, being a major main air hub and seaport in the region with a stable government and financial system, stands to gain from this trade conflict.

P-Tech had been approached by many global companies to provide services in manufacturing ICs components. However, in order to capture these businesses, P-Tech would have to upgrade their capabilities and update their processes and systems to meet the needs of the customers. With the trends and development at the global and country level as investigated in the earlier section of this chapter, P-Tech was coerced to act to survive and ride the wave of changes that are taking place. In the end of 2017, P-Tech reviewed its business and decided not only to increase its existing bumping business, but also to expand its service portfolio in Singapore to include Chip Probing (CP) and Advance Back-End Packaging or Die-Processing-Services (DPS) (Figure 9). The expansion will involve investment in the latest equipment and systems. Key processes will be improved to meet the demands of higher product specifications.

The expansion and new setup will not only involve the upgrading of current manufacturing systems and processes; it will also introduce new processes, equipment, and procedures. Obsolete equipment, processes and workstations will be removed. With these changes, reassignments of workstations are inevitable. Therefore, new staff will have to be hired at all levels and existing blue-collar workers in the manufacturing line would need to undergo training.

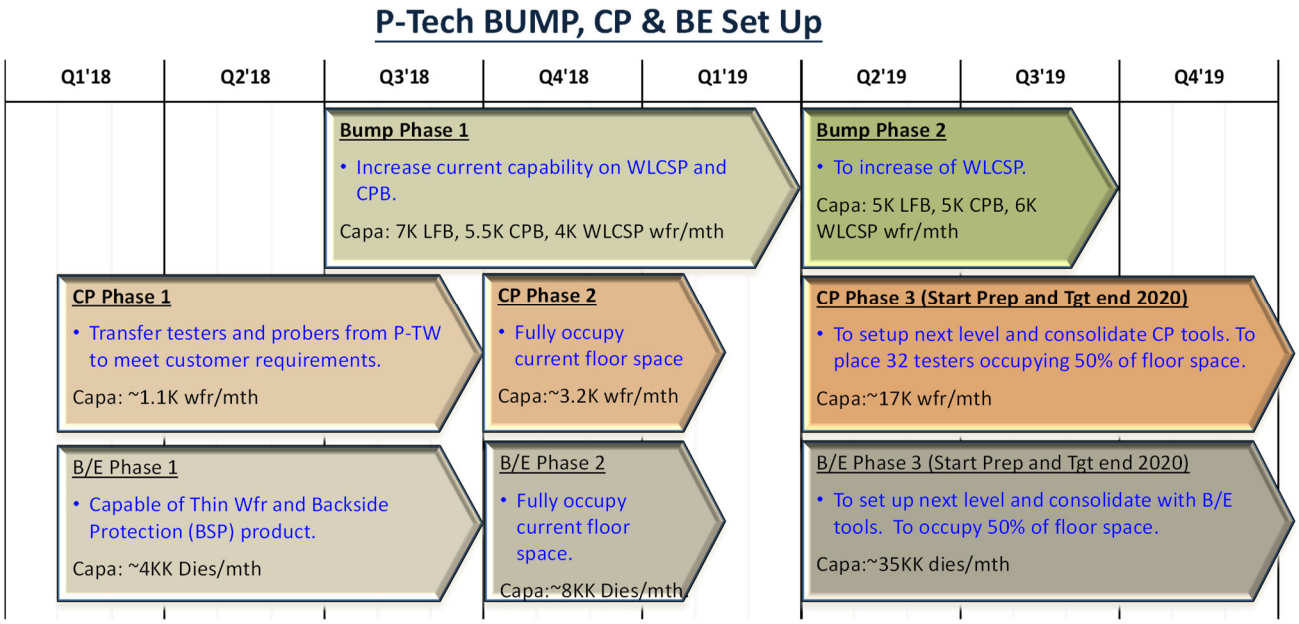


Figure 9: P-Tech Expansion and Setup Plan

Beyond the global business pressure, the Government push for Industrial transformation and Industry 4.0 implementation, P-Tech planned actions will affect all its employees. Upon the completion of this plan, P-Tech would be able to provide a full turnkey business in a single locality with capabilities to provide services for the latest technological requirements, such as IoTs, CPS devices and more.

1.4 Blue-Collar Workers Definition and Profile

It is important to define and elaborate the working condition of Singapore blue-collar workers in the semiconductor sector, as they are the focus for this study.

Job Role: Commonly known as Production Operators, blue-collar workers are considered No-Skill or Low-Skilled workers who tends to occupy the lowest level in the organization. They are mainly hired to cover jobs that are not automated such as manual visual inspection, operating processing tools and moving of goods & materials from one area of the production floor to another. Their roles are mainly routine and highly formalized with the need for strict

adherence to SOPs, working between 8 to 12 hour shifts in close proximity. However, as the semiconductor industry has evolved and with higher technological advancement not only in their products but also in systems and processes, blue-collar workers need to be upskilled to perform their tasks. However, with the rapid change that is taking place, the frequency of upskilling training, in order to reach an acceptable standard this development is compressed into a short time frame. These activities have added pressure on blue-collar workers to achieve the required performance standard and subsequent job security.

Cultural context: Singapore is a multi-racial country. The cultural makes up stem from the immigrants of the past that came to seek a better life, especially during the colonization by the British when it was established as a major port that sit along the trade routes between the west and the east. Behind the façade of a modern city that many would perceive to be very western cultured, the ethnical mixture of Malays, Chinese, Indians influences are still very evident. The work environment of the blue-collar workers is usually made up of many nationalities. A work group can consist of locals, Malaysians, and China Nationals, with a high mixed of race such as Chinese, Malays and Indians. The different cultural background and language can present a challenge in achieving a cohesive work team. A failure to synchronize their work may result in a backlog up of work in some stations, or leave some stations empty with accumulated backlogs. Conflict can also be common due to culture differences, seniority, and workload distributions. Therefore, to achieve expected performance, they need to coordinate their work closely as a team.

Training: New hires or reassigned workers go through 2 weeks of formalized training, followed by 8 weeks of On-Job-Training with a senior or a mentor assigned by the P-Tech training officer to learn how to operate at their assigned workstation. A test will be schedule on the 8th week. A failure to pass the written and practical test may result in an extension of probation, training period or re-assignment to another workstation. On some extreme cases, some may have their employment terminated. Therefore, pressure can be high for these workers to meet the performance expectations in a close-knit work environment.

1.5 Key Issues and Challenges for Managers

The reoccurring theme throughout this chapter has been on how the Singapore Government and companies are reacting to the changes that are happening in the semiconductor industry. In reality, central importance to making these changes falls on people that need to decide, execute, and implement them. Thus, the main challenges for managers would be on managing the human capital in their organization to accept and be ready for the changes (Bareil, 2004).

Until recently, Singapore relied heavily on foreign labour for its rapid economic growth over the past three decades (Fong & Lim, 1982; Lim, 1983; Miyamoto, 2006; Tsao, 1985; Wong, 1997). Employing skilled workers to fill in the gap where there is a lack of expertise is an easy solution to build competency quickly. However, Singapore recognizes that this foreign work policy is no longer sustainable. Since 2010, the Government has declared several measures to regulate the influx of foreign workers (Table 3). These include lowering the foreign manpower dependency ratio ceiling for the manufacturing sectors by 5 percent each year. In addition, there is also a 6% increase in the monthly levy paid for hiring overseas workers since 2011. This created a labour shortage among SMEs in the manufacturing sector across the industries in Singapore.

The Singapore Government believes productivity must be the key driver of our economic growth in a sustainable way. Hence, to help companies to overcome the labour curbing measures, there has been an aggressive push to increase the productivity of the existing workforce via schemes such as the **Productivity and Innovation Credit (PIC) Provision** (OECD, 2013). The PIC program has since evolved, and several more tailored schemes have been implemented in order to effectively render assistance to specific levels, groups, and categories of the work force. PIC ending in 2015 and was replaced with **SkillFuture**, a national movement to further support Singaporeans to develop their skills (SkillsFuture.sg, 2020), providing a scheme according to the stage of their career (SkillsFuture, 2020).

Table 3: Singapore Foreign Labour Curbing Measures

Date of Implementation	Description of foreign worker Curbing Measures
July 2010	July 2010 Progressive increases in foreign worker levies to be introduced over July 2010 to July 2012 for S Pass and Work Permit Holders. Progressive cuts in Man-Year Entitlement (MYE) for construction sector to be implemented from July 2010 to July 2013.
Jan 2012	Jan 2012 Further increases in foreign worker levies to be phased in from January 2012 to July 2013.
Jan 2012	Jan 2012 Raised Q1 Pass qualifying salary to $3,000 from $2,800, P2 qualifying salary to $4,500 from $4,000, with no change to P1 Pass at $8,000
July 2012	July 2012 Reduction in Dependency ratio ceilings: Services Sector DRC will be reduced from 50% to 45%, Manufacturing DRC will be reduced from 65% to 60%, and S Pass sub-DRC will be reduced from 25% to 20%, to be phased in from 2012 to 2014. Further reduction in Man-Year-Entitlement (MYE) for construction sector, bringing cumulative cuts to 45% by July 2013.
July 2013	July 2013 S Pass minimum qualifying salary raised from $2,000 to $2,200 for new applications. In addition, more experienced S Pass Holders have to be employed at higher pay to continue working here: According to the government's estimate, this will affect 1 in 2 existing S-Pass Holders. New criteria shall apply for all existing S Pass Holders by December 2014.
July 2013	July 2013 Additional foreign worker levies will kick in starting July 2013
July 2013	July 2013 Lower Dependency Ratio Ceilings (DRC) for new applications: The Services sector DRC will be lowered to 40%, from 45%, and the S Pass sub-DRC will be lowered to 15% from 20% from July 2013 for new applications.
July 2013	July 2013 Salary threshold for full-time employment will be increased to $1,000, from $850 previously: To calculate the Dependency Ratios, only a local earning $1,000 will be counted as a full-time employee. A local earning $500 to $1,000 will be counted as a part-time employee.
By end-2013	By end-2013 The government will tighten the criteria for EP Pass holders (currently those earning above $3,000).
July 2014	July 2014 Additional foreign worker levies to kick in.
July 2014	July 2014 Companies will have to comply with lower DRC ratios announced in Budget 2012 for existing workers.
July 2015	July 2015 More foreign worker levies to kick in: In particular, this sharpens the distinction between skilled and unskilled workers.
July 2015	July 2015 Companies will have to comply with lower DRC ratios announced in Budget 2013 for existing workers.
Jan 2019	DRC ratio at 40%. Firm whose workers are in excess of the new limits, DRC will appy as and whe the firme apply for renewal of permits
Jan 2020	DRC wil be lowered from 40% to 38% S Pass and Sub-DRC will be lowered from 15% to 13%
Jan 2021	DRC wil be lowered from 38% to 35% S Pass and Sub-DRC will be lowered from 13% to 10%

Source: Wan, M (2013), Ministry of Finance (2019)

In the case of P-Tech, the operation is still labour intensive. Especially for the blue-collar workers (Operators), who typically form 30%-50% of the company's headcount, will experience significant impact from the impending change taking place (De Backer, Mancini & Sharma, 2017, Platzer & Sargent, 2016). With a low supply of qualified workers, managers need to rely on the existing workforce to execute the change. The blue-collar workers are often viewed as an input in the manufacturing processes and accounted as a direct cost component, compelling the company to invest in production automation and implement changes such as job-redesigning. To increase the productivity with a leaner workforce requires blue-collar workers to be trained rapidly in new systems and processes. These workers need to acquire a higher level of skills and to be empowered with a bigger job role or wider job scope.

Therefore, to sum up this section, considering the various issues that been discussed, P-Tech managers may face resistance to change and learning issues which may result in production slowdown, moral issues, sabotages, and high turnover. Managers will have to minimise possible negative effects; and effectively & efficiency manage their human capital to implement organizational changes that are being brought about in the industry.

1.6 Linking Sector with Research Aim & Objectives

In reviewing the trend from a global, national, industry, and a local perspective, we can now problematize the issue in practice. In the area of change management, the focus on understanding blue-collar mechanism in coping with change is inadequate. Figure 10 shows the summary of the analysis linking to the research study. While there are many actions taken by the Singapore Government and organizations to mitigate the turbulence in the fast-evolving semiconductor sector, there are gaps in attention to address the blue-collar worker's needs. However, many companies are still facing various disruptions in the production or high turnover among the blue-collars working groups during when transformational change takes place in their work environment. The result of this is loss in revenue, increase in cost of hiring & training new workers and the potential for experienced workers resisting change. The moral and motivation of the blue-collar workers are also affected resulting in lower performances.

Considered less tech-savvy, under-qualified for many emerging roles, and located at the frontline of manufacturing, this group will be significantly impacted. It is important to understand from their point of view what they are experiencing and consequently, to develop recommendations that can reduce their resistance to change and increase their change readiness, so that the benefits that are being brought about by the semiconductor sector's developments and trends can be shared with them as well. Therefore, the following is the aim and objectives for this study:

Aim:

To explore Singapore Blue-Collar worker's perceptions of organizational change management approaches in the semiconductor industry.

Objectives:

a) To review organizational change literatures and change models relating to blue-collar worker.
b) To explore Singapore blue-collar worker perception in organizational change management approaches in the semiconductor industry.
c) To identify the influencing factors that could be improved worker's perception in response to job environment changes.
d) To develop recommendations to Stakeholders, to better manage change for blue-collar workers in the semiconductor industry.

In answering the research question, literatures of the following possible functional sectors relating to blue-collar workers will be reviewed:

a) Human Resource: Organizational Structure and Talent Management.
b) Strategic Management: Operational Organization and Planning.
c) Organizational Learning: Training and Development.

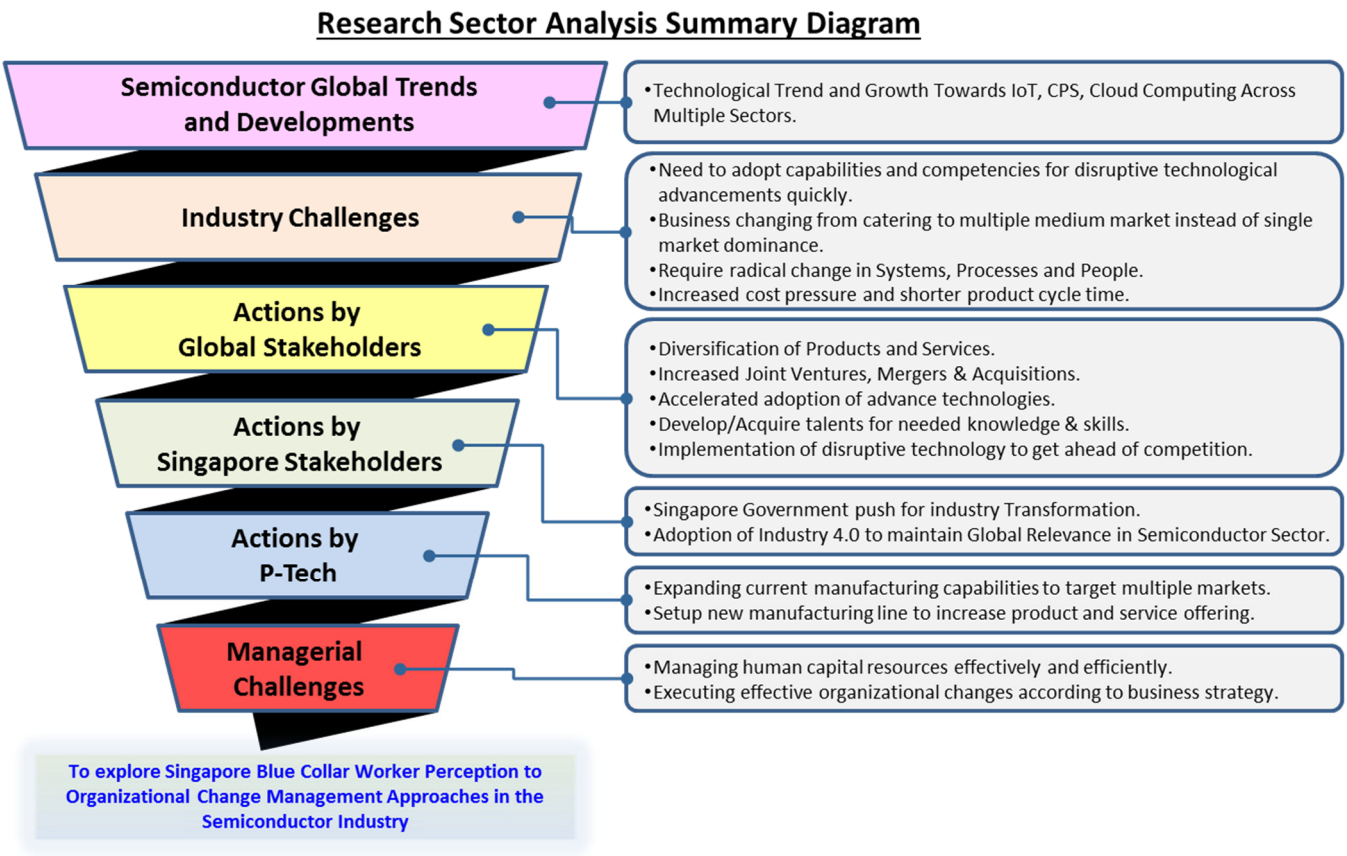


Figure 10: Research Sector Analysis Summary Diagram

The business environment today is confronted with unprecedented challenges due to an avalanche of rapid technology advancement and globalization. To mitigate this irrevocable seismic shift, the sector analysis found that many stakeholders are responding with transformative actions involving systems, processes, and people. Starting from a global standpoint and progressively narrowing it down to the company level, the key challenges facing managers are how well human capital can be managed, and how organizational changes can be executed effectively. Focusing on blue-collar workers, the aim and objectives are established for the research study. In the next chapter, the relevant literatures are reviewed.

2.0 Literature Review

Organizational change has been picking up pace faster than ever before (Miles, 2013), and so does the increasing need to understand the dynamics it brings along to organizations. The study of organizational change is notoriously known to be challenging because it encompasses numerous, simultaneous adjustments in the company's staffing, communication, work-process, decision making, and reward systems (Weiner et al., 2008). While many academics and professionals engaged in extensively studies to deepen their understanding of organizational change, many are unable to clearly identify the salient aspects that influence an individual's employee attitudes (Rafferty, & Griffin, 2006). There are even much fewer researches studies that are dedicated to addressing the blue-collar workers, who are the front-line workers that generate revenue but receive the greatest impact during organizational changes.

Researchers have been studying organizational change for many decades. Francesco & Gold (1998) describe it as "A reconfiguration of components of an organization to increase efficiency and effectiveness". Iqbal (2011) explained it as an alteration of structure, technology, culture, or people in the organization's environment. Change is due to the dynamic business landscape that organizations are pressured to adjust the way they do business (Reger et al., 1994), which is vital for its own survival (Abdel-Ghany, 2014; Greenberg & Baron, 2002). In short, organizational changes are for environmental adaptation and/or performance improvement (Dahl, 2011).

The significant of my study was to examine the effect on blue-collar workers who are experiencing significant impact from the changes that are being brought about in the semiconductor industry (De Backer et al., 2017, Platzer & Sargent, 2016). In executing the changes, a manager may face resistance, which may result in a production slowdown, moral issues, sabotages, and high turnover. These issues present challenges for managers to minimise negative effects of resistance to change and must effectively & efficiency manage their human capital to implement organizational changes.

However, critics that are studying change resistance stressed the importance of addressing individuals' subjective experiences and urged researchers to identify what factors entails during change management (Nord & Jermier, 1994; Oreg, 2006). This is especially important when

theoretical models on the subject have emphasized that resistance to change is a multi-faceted construct (George & Jones, 2001; Graetz & Smith, 2010; Piderit, 2000; Waddell et al., 2019). Examining workers' subjective experience may reveal that their resistance is not about the change itself but is due to an undesired perceived outcome (Dent & Goldberg, 1999), or the way changes are being executed.

In this chapter, organizational change literature and change models will be explored in greater depth. The literature on resistance to change will be reviewed as an important factor in organizational change in accordance to the study aimed at blue-collar workers in the Singapore semiconductor industry. Two key questions about organizational change will also be addressed in this chapter. First, what are the salient antecedents that blue-collar workers perceive in their workplace? Secondly, how do these antecedents of change influence individual response or outcomes? Figure 11 represents the basic conceptual framework and the overview of this chapter. From the review of relevant literature and key questions, I will further refine my conceptual framework through forming research questions and hypotheses that I can take forward into my pilot research study.

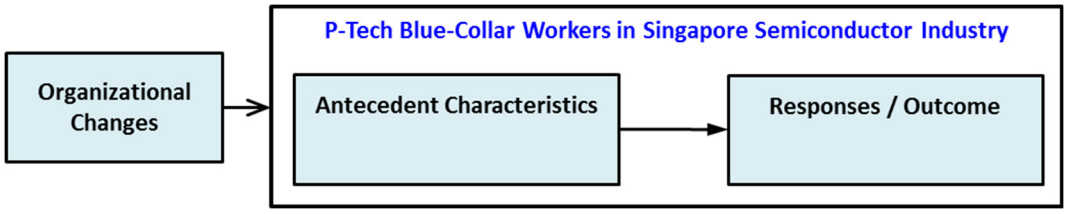


Figure 11: Conceptual Framework Overview

2.1 Change Literature Overview

Organizational change, often been synonymously and interchangeably termed as corporate transformation and organizational transformation (Bhatnagar et al., 2010), has become one of the most researched subjects for philosophy and practice of management in the past three decades (Claiborne et al., 2013; Van de Ven & Poole, 1995; Pettigrew et al., 2001; Doolin, 2003; Sturdy & Grey, 2003, Weick, & Quinn, 1999; Woodman, 1989; Weiner et al., 2008).

It has been estimated that the success rate for its implementation range from about 60% to as low as 30% (By, 2005; Isern & Pung, 2007). With such failure statistics, it prompted the pursuit of many researchers and practitioners to investigate this topic from their individual perspectives. Pierce & Delbecq (1977) define organizational change as adopting a new idea, process, and behaviour by an organization, while Bergmann Lichtenstein (2000) state that organizational change is a complex adaptive system model that involves three stages of transformation, "Increased dynamic ordering", "Tension and Threshold" and "Emergence of new organizing structures". Its objective is to move from the current plateau to a higher desirable future status so that organization's effectiveness and efficiency can be increased (George & Jones, 2002; Cummings & Worley, 2005). Change is initiated intentionally as an organization is a system open to react to the environmental shift (Jimmieson et al., 2004), and as a spontaneous natural response to a direct sequence of developing occurrences (Scott, 2003). Aldrich et al. (2020) argued that change is a process driven externally, and for an organization to increase their chance to remain legitimate for survival, an organization needs to focus on how it is responding and adapting to the environment.

It has also been illustrated as a multi-facet that cut across the organization's process revealing a disorderly phenomenon, as an organization journey through the process of continuous experimentation and adaptation in the attempt to keep up its capabilities to the requirement of a volatile environment (Burns & Scapens, 2000). Struckman & Yammarino (2003) also regarded change as an action or process; a system that manages the process and a behavioural response over time to an initiated event. Vakola & Nikolaou (2005) bring in the human aspect into the definition of organizational change as a form of challenge on how individual work is carried out in an organization that creates a sense of uncertainty and the stress of failure to meet the new condition.

While many researchers and practitioners have different definitions of organizational change, they have the same agreement. They emphasizes the essentiality for organizations to be prepared for change, as it need to evolve to confront the pressure and unexpected shifts from its environment in order to continue to grow and survive (Clarke, 1994; Meyer, 1982; Jimmieson et al., 2004; Kotter & Schlesinger, 1979).

2.2 Incremental or Transformative?

It is important to define the areas that clarify the type of change that is taking place in this research. Fundamental changes are classified into two categories; Incremental and Transformational, each required different strategically actions (Kindler, 1979; Swedberg & Douglas, 2003; Weerakkody, et al., 2011; Zafar & Naveed, 2014). The type of change implement may also affect the workers' perception. Due to the Singapore labour policy and the business environment, radical changes are taking place in P-Tech. The sweeping changes significantly impact processes and practices (Greenwood & Hinings, 1996; Hernandez et al., 2000), resulting in organizational structure change (Gersick, 1991), because the company needed to redefine its vision and strategies (Ho et al., 1999; Ingersoll et al., 2000). Such radical changes are usually driven by top-management (Waddell et al., 2000), and are often coercively executed with little of workers' participation. They are likely to produce more negativity among workers as compared to gradual incremental changes (Dunphy & Stace, 1990; Reichers et al., 1997).

The study of organizational change has developed a large variation of different theoretical perspectives. VanDe Ven & Poole (1995) identified as many as 20 different frameworks when researching nearly 1000 articles on this topic. Nevertheless, many researchers have narrowed to two dimensions of perspectives (Del Val & Fuentes, 2003).

The first group being "Evolutionary" (March, 1981; Gersick, 1991; Romanelli & Tushman, 1991; Haveman, 1992), "Incremental" (Weick & Quinn, 1999) and "First-Order" change (Watzlawick et al., 1974). It categorized change as being transitional and developmental, which involve moving from the present state via gradual incremental change in structure, technology, procedure, and people (Gersick, 1991; Haveman, 1992). The changes are small and seek to alter small aspects of improvement in the present organizational structures, environments, norms and resources, but maintaining the current working structure (Blumenthal & Haspeslgh, 1994; Goodstein & Burke, 1991; Greiner, 1972; Levy, 1986; Meziaz & Glynn, 1993; Nadler & Tushman, 1989; 1990).

The second group being "Revolutionary" (March, 1981; Gersick, 1991; Romanelli & Tushman, 1991; Haveman, 1992; Miller, Friesen & Mintzberg, 1984; Newman, 2000), "Episodic" (Weick & Quinn, 1999) and "Second-Order" change (Watzlawick et al., 1974). This category of change is transformational and involves abrupt and radical change in the fundamental and paradigms (Kuhn, 2012). Such change, in response to internal and external factors, involves considerable

risk with an uncertain performance outcome. This mode of change is risky, and its performance outcomes are uncertain. In response to internal or external influences, change produces dramatic results that are far-reaching in transforming organizational environment, work structures, resources, and norms (Dunphy & Stace, 1993; Gersick, 1991; Mintzberg & Westley, 1992; Newman, 2000; Haveman et al., 2001). Denning (2005) posit that such change is usually initiated by the leadership in their drive to modify the culture or strategy due to a significant event. This also strongly indicates that such a change is only possible to be decided from a top-down manner, as it affects the company's business future.

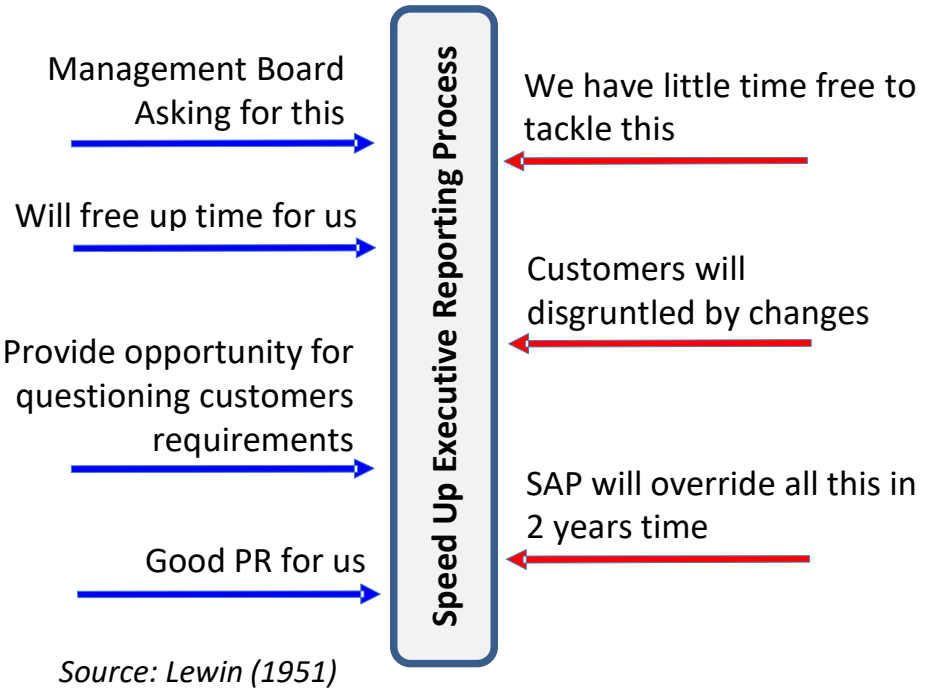
The change that is currently in progress in P-Tech falls under the second category. It is considered a transformational change as it involves a change in the business model and technologies. Old processes are becoming obsoleted and new processes, systems and talents are being introduced. This change requires the whole organization structure to be altered. Some workers, especially the blue-collar workers, need to be reassigned, trained, and certified for the new production lines. Working on a tight timeline to meet business expectation, workers need not only to adapt quickly to the new environment but also to be proficient at maximising the installed capacity and capabilities. Bartunek & Moch (1994) raise the attention on individual level cognition and interpretation during change. They posit that for second-order change to understand and adopt new behaviour, new schema may be required. Egri & Frost (1991) and Gersick (1991) refer to the change in the cognitive level that underlies organizational actions, structural change or created shared schemata that give meaning to these change initiatives. Witnessing such large-scale change would modify not only on many organizational formal structures and work systems, but will also impact employees, beliefs, and social relationships (Huy, 2001).

2.3 Organizational Change Models

As there are many perspectives developed on how organizational change affects workers, and there is no best way to manage change as emphasized by researchers (Burnes 1996; Hussain et al., 2016). While there are many change models developed by academics and practitioners (Burnes & Cooke, 2013). This section will discuss two different change models, reviewing their strengths & weaknesses, and how each model relates to this research.

2.3.1 Kurt Lewin's Force-Field Theory and Three-Step Model

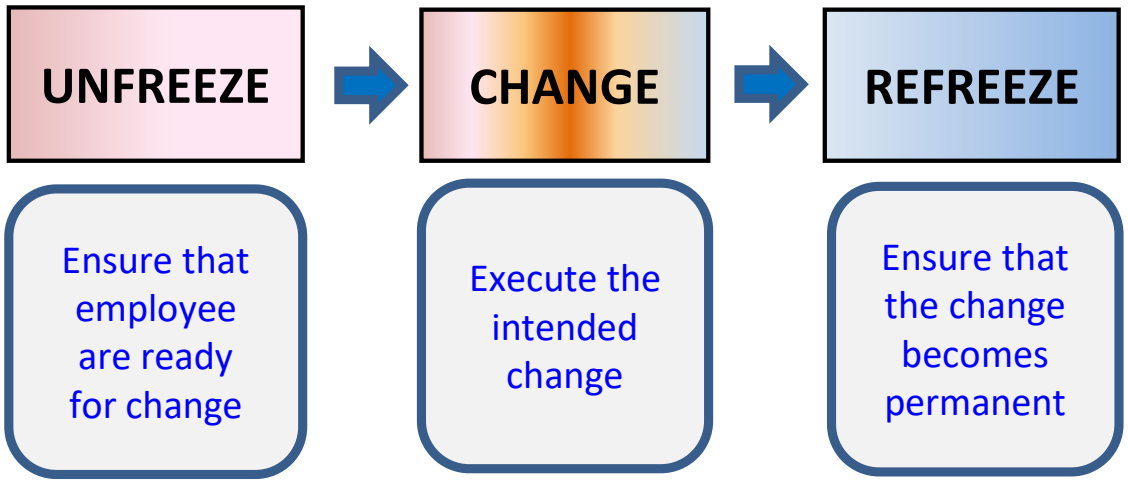
Kurt Lewin's (1951) works about organizational change are much quoted by scholars, researchers and practitioners today especially by nursing and education practice (Cathro, 2011; Kickert, 2014; Schriner et al., 2010; Shirey, 2013; Suc et al., 2009; Wells et al., 2011). According to Lewin's Force-Field Theory, two forces: (1) Driver for Change and (2) Resistance to Change, are in opposition to each other (Figure 12). For change to occur, managers need to reduce the resistance to change and increase the forces to drive change. Analysing the force field can be an excellent way for management to discuss and agree on the drivers and resisting forces in the existing situation and then tackle the issue accordingly.



Source: Lewin (1951)

Figure 12: Lewin Force Field Analysis

Lewin (1951) further propose that in order to attain organizational change, a Three-Step model: "Unfreezing", "Move" and "Freezing" could be use (Figure 13).



Source: Lewin (1951)

Figure 13: Lewin Three-Step Model

Lewin (1951) believed that the quasi-stationary equilibrium which human behaviour was based on needs to be unfrozen (Step 1: Unfreeze), in order to discard old behaviour and move into the next step (Step 2: Move), in order for new behaviour to be willingly and successfully adopted. The last step (Step 3: Refreezing) aims to establish a new stable quasi-stationary equilibrium so that new behaviours are safe from reversion. However, Cameron & Green (2015) has cautioned managers that it should be used as an organizational development process rather than as a planning tool because this ignores the fundamental assumption that groups of people will change only when they feel a need to do so.

Lewin model, based on planned change, is predominantly targeted at operation improvement, and increasing the effectiveness of organization staff via a participative, group & team-based change program (Burnes, 2004a; Hussain et al., 2016). Its group-based approach, consensual and relatively slow and consensual nature, it attracts many criticisms in its effectiveness and appropriateness (Burnes, 2004b). Critics argued that it is too bureaucratic, rigid, and slow to

change (Mitchell, 2013; Peters & Waterman, 1982). The model may not be appropriate for all change management as it is being framed from a static perspective, quaintly linear, too simplistic (Shirey, 2013). Kanter et al. (1992) summed up with a contemptuous comment that the quaintly linear and static conception Lewin's model is too simplistic and inappropriate, contend that organizations are never frozen and so cannot be re-frozen. He considers organizations as fluid bodies having many personalities, and their stages of change overlap and intertwined in important ways (Creed & Zutshi, 2014).

Reflecting and drawing a parallel to what is current happening in P-Tech, it is evident that the management has adopted the Lewin's change model in a more mechanistically way and do not regard much to the humanistic aspects of workers such as motivation, commitment, and the impact on blue-collar workers in adapting to the new technology. Demers et al. (1996) has asserted that organizations tend to be proficient at planning and organizing the transformation of structural and technological changes but are weak at leading and supporting employees to acclimatize to the associated change.

2.3.2 John Kotter's Eight-Step Model

Kotter's (1996) Eight-Step Model has been regarded as an archetype for administering change (Figure 14). His model centred on improving the communication among stakeholders throughout the change process. He states that through the setup of a suitable change management team that has clear and realistic visions, their responsible communication of vision, ideas, success, and failures within the organization would result in a successful organizational change (Kotter, 1995).

Figure 14: Kotter 8-Step Model

The prescriptive models illustrated provided a guide to manage change is characterized as a linear progression based on management actions, with each stage built on the previous one, providing an easy roadmap for the change agent (Blackman & Kennedy, 2011).

The reception of Kotter's 1996 book was interesting as there was no bibliography, and yet he achieves tremendous success academically as well as in practicality. Its popularity derives from the ease of use by end users such as the stakeholders involved in managing the change. Kotter's 1995 article and 1996 book were not primarily addressing the scholarly community but were providing change agent a practical and direct plan when comparing to other scientific consensus on the results (Appelbaum et al., (2012).

However, the 8-step model is not without its critics. Appelbaum et al., (2012) on reviewing Kotter's change model noted that both Kotter's (1995) article and the 1996 book lack reference to external sources and were established by his own business and research experience. However, By (2005) counter argued that its success is not unusual as currently available theories and approaches for practitioners and academics are frequently contradictory; have weak empirical evidence supporting unchallenged assumptions regarding managing current organizational. Rousseau (2006) noted that there is a lack of "evidence-based practice". Hence change agents tends to refer to grey literature, written in a practical perspective that is easier to comprehend and execute (Appelbaum et al., 2012)

The 8-step change model has been criticized for being universalistic & linear thinking (Baloh, 2018; Fernandez & Rainey, 2006). Some contexts are not applicable to some step, supporting a hierarchical top-down tactic with little regards to emergent changes (Appelbaum et al., 2012; Buhanist et. al., 2010; Lee & Krayer, 2003). These echoed the current way that organizational changes are implemented. It is top-down and with little participation from the blue-collar workers, citing their concerns and feedback of changes on the ground.

Besides the reviewed change model of Lewin and Kotter, there are also a multitude of other change models that have been developed. Some examples are listed in Table 4 such as Lueke 7-Step for Change, Mckensey 7-S, Nudge theory, ADKAR theory and more. All of them have their pros and cons which show that there is yet any comprehensive model to manage change.

Table 4: Other Change Models

Change Model	Originator	Reference
Ten Commandments for Executing Change	Rosabeth Kanter, Barry Stein, and Todd Jick	Kanter, R. M., Stein, B. A. and Jick, T. D. (1992) The Challenge of Organizational Change (New York: The Free Press).
Luecke's Seven Steps for Change	Richard Luecke	Luecke, R. (2003) Managing Change and Transition (Boston, MA: Harvard Business School Press). Moran, J. W. and Brightman, B. K. (2001) 'Leading organizational change', Career Development International, 6(2), pp. 111–118.
The McKinsey 7-S model	Robert H. Waterman, Jr. and Tom Peters	Alam, P. A. (2017). Measuring Organizational Effectiveness through Performance Management System and Mckinsey's 7 S Model. Asian Journal of Management, 8(4), 1280-1286.
Nudge theory	Richard H. Thaler and Cass R. Sunstein	Thaler R and Sunstein C (2009) Nudge (revised edition). London: Penguin
ADKAR Model	Jeff Hiatt	Hiatt, J. M. (2006). ADKAR: A model for Change in Business. Government, and Our Community, Prosci research, Lovelend Colorado, p3.
Bridges' transition model	William Bridges	Bridges, W., & Mitchell, S. (2000). Leading transition: A new model for change. Leader to leader, 16(3), 30-36.
Kübler-Ross' change curve	Elisabeth Kübler-Ross	Kübler-Ross, E., Wessler, S., & Avioli, L. V. (1972). On death and dying. Jama, 221(2), 174-179.
The Satir change management model	Virginia Satir	Wretman, C. (2016). Saving Satir: Contemporary Perspectives on the Change Process Model. Social Work, 61(1), 61-68.

It has been shown from the discussion that in organisational change literature, researchers and practitioners has developed several change models. With regards to establishing a conceptual framework for comprehending change management, there is an absence of consensus. The multiple models developed from different perceptive did not contribute to the development of methodical preparation and implementation practices to support the dynamic change processes.

Worren et al. (1999) argued that the absence of a comprehensive change model highlighted the complexity of change management. They were not successful in their attempt to assimilate various models into a universal model of change, catering to all multifaceted change phenomena as they found it to be too complex and vast to encompass all into a single holistic model (Worren et al., 1999). This is view supported by Pundziene (2004) who posit that there is no single systematic model or theory that would deliver a reliable account in explaining the organisational change phenomenon and their influencing factors.

2.4 Organization Structure and Role of Individuals

Change occurs at different hierarchical levels. However, managers and workers perceive change differently with a varying level of enthusiasm between individuals, level, and workgroups (Burnes & Cooke 2013; Swanson & Creed, 2014). While top management may see change as a business opportunity, it may be viewed by many workers as unnecessary and disrupting the stability of the current environment (Smith, 2005). Reichers et al. (1997) and Strebel (1996) assert that the consequence of this disparity is consistently being underestimated by top-management, which creates difficulties in estimating the effort essential to achieve acceptance for change.

2.4.1 Hierarchy Levels

Members in different workgroups at different level of the organizational hierarchy perceive change differently. Jones et al. (2008) highlighted the shortcoming of organizational change research arguing that the views and response to change by various work groups are not adequately considered (Jones et al., 2004; Terry & Callan, 1997). Top, middle, and front-line employees each may have their own perception of change. By understanding how a different group talk and understand about the change they are going through, we can consider their subjective meaning and address them specifically.

The group dynamic of the blue-collar worker is different when compared with top and middle management staff, or staff who works in the office environment. P-Tech organizational structure features a hierarchical, highly horizontal differentiation and formalization which is typical of high-tech manufacturing firms in Asia. It shows a "Machine Bureaucracy" structure (Mintzberg 1980) that is "Mechanistic" in characteristics (Bangert D & Doktor R., 2003, 2003; Burns 1990; Burns & Stalker 1994). Fukuyama (1995) observes that a highly hierarchical structure with centralized control would allow it to move decisively faster (Morden & Bowles 1998). It also means that critical decisions that are transformative to organization business are top-down.

Top management normally drives transformational type of change (Waddell et al., 2000) which typically demands coercive or directive leadership (Dunphy & Stace, 1990). This way of

execution is further intensified due to the speed that it needs to be executed, and secrecy in the competitive semiconductor industries. In the interviews conducted by Covin & Kilmann (1990) across various groups, they discover significant differences in their perception and understanding of the purpose of change. Unfortunately, the relative lack of involvement and participation, especially at the lower level, tends to result in more negative attitudes about the change (Reichers et al., 1997). Katz & Kahn (1978) posit that the position that an employee occupies in the organization hierarchy is a critical variable which influence one's behaviours. Kanter et al. (1992) who identified three group; Change Strategist (Top-Management), Change Managers (Middle Management) and Change Recipients (Non-Supervisor/Lower Level), found that the lower two levels in the hierarchy, especially the lowest level, face a greater threat from the effects of organizational change such as a loss of status and jobs during a major change when compared to the top-management.

Armstrong-Stassen (1998) proposed that different change effects felt between different hierarchical levels stem from the higher levels having more control over the decisions that affect their job. Managers usually have greater access to information which enables them to understand the purpose for change better; in contrast with lower level workers, who might sense disempowerment and feel less confident during organizational change (Haugh & Laschinger, 1996; St Amour, 2001). This view is echoed by Rafferty & Griffin (2006) as they observed that individuals in higher senior positions receive more information on impending change events, understand the reason, and are more involved in the planning & deliberating change strategies. Hence, they show stronger support for organizational changes. Individuals at a lower hierarchical level do not have such access to information. They may display more concern, feedback for clarification and resistance when they do not understand the reason for the change. Often, in a structured hierarchical organization, managers self-created hindrances and obstacles when they fail to exercise trust and empowerment to the lower level to think independently and take actions (Cacioppe, 1998). Hence, they view all feedback that goes against their actions as resistances.

Jones et al. (2008), cited studies by many researchers, showing that the employees at the lower level register higher levels of job ambiguity, and lower level on job satisfaction, job security, commitment, satisfaction with their supervisor, and acceptance of organizational change (Ahmad, 2000; Armstrong-Stassen, 1997; Nelson et al., 1995; Olson & Tetrick, 1988). Overall,

Jones et al. (2008) suggest that workers at the lower levels will be confronted with more widespread and significant changes compared to higher levels. Since workers' well-being and their sense of control are linked to job-related issues (Bordia et al., 2004), and the perception of losing control of their work environment is positively correlated with resistance to change (Oreg, 2006), I anticipated that the study of blue-collar work issues with respect to various work issues would be salient.

2.4.2 Role of Individuals

Organizational change is largely about managing "People" (Abdel-Ghany, 2014; Burke & Trahant, 2012). Organizations are made of people who are the real source and vehicle for change and will either support or reject change. Judge et al. (1999) has explained that a macro systems-oriented perspective has often been considered for the changes at the organizational level. Conversely, many researchers have also adopted a micro-level standpoint putting more importance on an individual's role in effecting changes (Armenakis et al., 1993; George & Jones, 2001; Greenhalgh et al., 2004; Hall & Hord, 1987; Isabella, 1990; Lau & Woodman, 1995; Tetenbaum, 1998). The main fundamental of this approach is that, at the core of organizational change, the focus is on the behavioural changes in individual organizational members (Porras & Robertson, 1992).

Abdel-Ghany (2014) posits that, ultimately, organizational change must go concurrently with change in workers within themselves. Choi & Ruona (2011) argue that successful organizational change will occur only when individual members in the organization alter their work behaviour appropriately. They further argue that change initiatives often fail because management underestimated the vital role that individual plays. Many researchers also found how supportive behaviours are manifested in an individual is influenced by their attitudes towards the change initiatives (Avey et al., 2008; Cunningham et al., 2002; Jones et al., 2005; Meyer et al., 2007; Weeks et al., 2004). In consequence, the success or failure of any change initiative is strongly linked to the cooperation and support of employees towards organizational change (Hendrickson & Gray, 2012).

Karim & Kathawala (2005), Muo (2014) and Visagie & Botha (1998) listed numerous reason for resistance to change to be manifested in an individual, such as; risks of job loss, income-power, legitimate-power; economic uncertainty, and fear of unknown. They also cited other causes such as dissonance triggered by new workers, processes & technology, loss of status among peers, unwillingness to learn new skills, and the reduction of influence or access to organizational resources. Hence, there is overwhelming literature on individual resistance to change; supporting the concept that how an organizational change is perceived by individuals' plays an important role in the success of its implementation.

Approaching from an economic standpoint, productivity suffers and results in financial loss if there is discontent and argument occurring in the workplace during a change process (Krueger & Mas 2004, Mas 2008). Changes occurring in a workplace can affect individuals at the mental level. In the area of applied psychology research, it has been established that mental health does influence one's work satisfaction and productivity (Harter et al. 2002, Adler et al. 2006, Brenninkmeijer et al. 2008), and can result in higher absenteeism, loss of focus and productivity at work (Stewart et al. 2003; Wang et al. 2004). The phenomenon is observable in P-Tech with a higher rate of absenteeism and resignation during the initial phases of their organizational change. It resulted in higher cost incurred in overtime, training, and in new recruitment. This underscores the significance of individual-level impact on organizational change, as these effects are often unanticipated & neglected by management, as they tend to put more focus on systemic changes.

2.5 Resistance to Change

The approach to this study started with resistance to change of the blue-collar as a core area to be investigated. However, there have been other factors which have also been considered such as approaching it from a "Change Readiness" perspective. However, in reviewing the literature further, the differences between them surfaces and resistance to change is adopted as it is more relevant to the study. In this section, the differences between resistance and readiness to change is reviewed and distinguished. A deeper exploration into the alternative perspective of resistance and how it has been limited in it focus on the blue-collar workgroup when organizations undertake organizational changes.

2.5.1 Resistance to Change Vs Readiness for Change.

Readiness for change is defined as the intentions, beliefs and attitudes of individuals when an individual considers the degree to which change is justified, and an organization can have the capacity to carry out the changes successfully (Armenakis, Harris, & Mossholder, 1993; Rafferty et al., 2013). Armenakis, Harris & Mossholder (1993) described change readiness as the "cognitive precursor to the behaviours of either resistance to, or support for, a change effort" by individuals.

The term resistance to change has regularly been credited to Kurt Lewin (1951). Until recently, is often presented in a negative light. Oreg (2006) defined resistance to change negatively as an attitude towards change. Oreg posits that this attitude is tri-dimensional, consisting three components: "Affection", "Behaviour", and "Cognition" Oreg (2006). Increasingly, there are more positive and objective approaches to this subject by researchers (Giangreco, 2002; Mathews & Linski, 2016). Ford et al. (2008) argue that resistance to change can be created by management bias during sense-making or can be a reaction to an unproductive, unethical change strategy. They further suggest that resistance observed can be a resource and feedback. By reviewing the information from the critics, managers can surface weaknesses and improve the effectiveness of a change plan (Ford et al., 2008).

One of the main differences between resistance to change and readiness for change is that resistance to change regards workers as an important factor with a reactive resolution to reduce its negative effects, while readiness for change is pro-active (Armenakis, Mossholder & Harris, 1990). Although readiness and resistance to change have often been placed at different ends of the same continuum (Armenakis et al., 1993), they share many similarities in contextual and dispositional antecedences (Oreg, 2006; Wanberg & Banas, 2000). There are many similar strategies in overcoming resistance and creating readiness in workers such as increasing participation & involvement, improving communication, training & education, providing support, and facilitation. However, what differs is the timing of their application (Armenakis, Harris, & Feild, 2000; Coch & French, 1948; Eby et al., 2000; Kotter & Schlesinger, 1979).

In Choi & Ruona (2011) conceptual article, they examine the works on readiness to change by Armenakis et al. (1993), Eby et al. (2000), Holt et al. (2007), Jansen, (2000) and Jones et al. (2005). It can be inferred from their definitions that the readiness to change is more relevant when it applies before executing the change. Susanto (2008) & Weiner et al. (2008) urged change agents that it is vital to evaluate the readiness of an individual prior to any change attempt.

In separate research by Weber & Weber (2001) and Rafferty & Griffin (2006), two sets of data were gathered from individuals for two periods of their research to explore the perception of support and organizational readiness. It would be more useful if 2 repeated surveys were conducted, each before and after the change, to evaluate the difference. However, as the change initiative in P-Tech has already begun, assessing the readiness to change at this point would not be possible. Reviewing the current situation together with P-Tech Human Resource manager, there are evidences that some blue-collar workers are displaying reactions in-line with resistance, such as increase absenteeism and slower production. With the type of change and change concept determined for my study, the literature review will be directed at blue-collar workers' reactions (Resistance to Change) to the organization transformational change.

2.5.2 Alternated Perceptive on Resistance to Change

Resistance to change is now appreciated as an acceptable, naturally occurring phenomenon (Krügel, & Traub, 2018). Many researchers suggest that it would be naïve for managers and change agents to think otherwise as resistance is unavoidable and has become a norm (Bereil, 2004; Baulcomb 2003; Cork 2005; Kunze et al., 2013; Price 2008). The literature studying resistance to change is as numerous as topics on organizational change. The listing in Table 5 shows just a minuscule portion of what is available. Just as the literature for organizational change, the views on resistance to change are varied and wide ranging.

Table 5: Research Papers Focus on Resistance to Change

Research Papers Focus on Resistance to Change

Author	Research Topic	Source of Data	Relevant Findings	Reference
Agboola & Salawu (2010)	Research focusing on how to manage deviant behaviours and resistance to change in some selected organizations.	Qualitative case study of 3 different organizations	Change affects four basic aspects of the company: its strategy, technology, structure and employees. It concludes that capacity to manage deviant behaviour and smoothly implement change is critical to organizational survival.	Agboola, A. A., & Salawu, R. O. (2010). Managing deviant behaviour and resistance to change. International Journal of business and management, 6(1), p235.
Alas & Sharifi (2002)	To examine the relationship between changes implemented and learning outcome in Estonian organizations.	Qualitative and qualitative analysis on 137 Estonian top management using Interviews and questionnaires	It is found that the relationship between organizational change and learning is seen differently in a country in transition	Alas, R., & Sharifi, S. (2002). Organizational learning and resistance to change in Estonian companies. Human Resource Development International, 5(3), 313-331.
Bovey & Hede (2001)	To investigates the relationship between irrational ideas, emotion and resistance to change	Quantitative analysis using data of 615 questionnaires from 9 separate organizations undergoing major change	Irrational ideas are positively correlated with behavioural intentions to resist change. Irrational ideas and emotion together can explain the variance in intentions to resist. Result help to outlines an intervention strategy to guide management in developing a method for approaching resistance when implementing major change.	Bovey, W. H., & Hede, A. (2001). Resistance to organizational change: the role of cognitive and affective processes. Leadership & Organization Development Journal, 22(8), 372-382.
Coch, L., & French Jr, J. R. (1948)	To study the relationship of worker participation in decision-making and the level of resistance to change	Qualitative and qualitative analysis on 4 different experimental group blue-collar worker	The research found that participation and changes to the method of work can affect the level of resistance among employees.	Coch, L., & French Jr, J. R. (1948). Overcoming resistance to change. Human relations.
Cutcher (2009)	To exploring the link between worker subjectivity and workplace change	Qualitative analysis by semi-structured interview on 20 bank employee from 4 branches	It identifies that tradition and place can be discursive a resources with which employees resist changes to work practices and roles which threaten to disrupt workplace and gender identities.	Cutcher, L. (2009). Resisting change from within and without the organization. Journal of Organizational Change Management, 22(3), 275-289.
Erwin & Garman (2010)	Review of recently published research to identify findings that provide research-based guidance to organizational change agents and managers in addressing individual resistance to organizational change initiatives	Research of 123 articles involving resistance to organizational change published in peer-reviewed journals from 1998 to 2009.	Research during the period provide practical guidance to organizational change agents in mitigating resistance to change. However, the lack of research methodologies diversity limit the perspective of resistance to organizational change. Recommend to broadened the research by qualitative and practice-based methods.	Erwin, D. G., & Garman, A. N. (2010). Resistance to organizational change: linking research and practice. Leadership & Organization Development Journal, 31(1), 39-56.
Folger & Skarlicki (1999)	Proposes that organizational fairness is a psychological mechanism that can mediate employee resistance to change	Existing Literature	Focusing on the effects of any one of these three types of justice (i.e. distributive, procedural or interactional justice) might fail to address resistance adequately. Examining how the three forms of justice interact to predict resistance to change, and provides some implications of this interaction effect for change managers.	Folger, R., & Skarlicki, D. P. (1999). Unfairness and resistance to change: hardship as mistreatment. Journal of Organizational Change Management, 12(1), 35-50.
Ford, Ford & McNamara (2002)	The research propose that resistance is a response to change initiative is a product of background conversations.	Existing Literature	Resistance to change is a function to the ongoing background conversations spoken and created the context for both the change initiative and the responses to it. Resistance is not a personal phenomenon but a social systemic occurrence	Ford, J. D., Ford, L. W., & McNamara, R. T. (2002). Resistance and the background conversations of change. Journal of Organizational Change Management, 15(2), 105-121.
Kumpikaite & Čiarniene (2008)	To understand the strengths and weaknesses of new technologies and implementation issues such as overcoming resistance to change	Quantitative survey on 724 employees across 18 enterprises in Lithuania of various activity profiles.	Research revealed relatively weak usage of new technologies and e-learning in human resource development processes.	Kumpikaite, V., & Čiarniene, R. (2008). New training technologies and their use in training and development activities: Survey evidence from Lithuania. Journal of Business Economics and Management, 9(2), 155-159.
Macrì, Tagliaventi & Bertolotti (2002)	To investigates the resistance to change in terms of interdependencies between the characteristics of economic environment and individual actions within the social network	Interpretive approach using ethnographic interviews on one Italian small manufacturing firm	Organizational change inertia is driven by a circular reinforcing process involving: Actors search for irreplaceability based on technical skills, low propensity to delegate, low cooperation, high standardization of coordination, absence of share learning and the fear of switching organization.	Macrì, D. M., Tagliaventi, M. R., & Bertolotti, F. (2002). A grounded theory for resistance to change in a small organization. Journal of Organizational Change Management, 15(3), 292-310.
Michel (2013)	The research test the moderating role of dispositional resistance in achieving sustainable organisational change.	Qualitative analysis using questionnaire on 447 employees at a German university	The studies confirmed positive relationship between benefit of change and commitment to change.	Michel, A., By, R. T., & Burnes, B. (2013). The limitations of dispositional resistance in relation to organizational change. Management Decision, 51(4), 761-780.

Research Papers Focus on Resistance to Change

Author	Research Topic	Source of Data	Relevant Findings	Reference
Oreg, S. (2003)	To develop a Resistance to Change Scale, designed to measure an individual's dispositional inclination to resist changes.	Exploratory analyses with 224 participants to confirm the scaling.	Resistance to Change Scale predicted people's affective reactions to the move as well as their functioning at work.	Oreg, S. (2003). Resistance to change: developing an individual differences measure. Journal of applied psychology, 88(4), 680.
Peccei, Giangreco & Sebastiano (2011)	To examining the role played by organisational commitment as a potential predictor and moderator in the analysis of resistance to change	Quantitative analysis using questionnaire on 359 middle managers from an Italian public sector service	Results showed that organizational change, along with employees' perceptions of the benefits of change and their involvement in the change process, had a significant negative direct and indirect effect on resistance to change.	Peccei, R., Giangreco, A., & Sebastiano, A. (2011). The role of organisational commitment in the analysis of resistance to change: Co-predictor and moderator effects. Personnel Review, 40(2), 185-204.
Perren (1996)	Explores the notion of resistance to change as a positive force within organizations.	Qualitative Analysis through 10 case studies on managerial reaction to change.	Resistance seen as a "natural" survival mechanism within organizations, which tests, adapts and sometimes stops decisions made by fallible and often ill-informed senior managers.	Perren, L. (1996). Resistance to change as a positive force: its dynamics and issues for management development. Career Development International, 1(4), 24-28.
Pieterse, Caniëls & Homan (2012)	To investigate how resistance to change might be a consequence of differences in professional discourse of professional groups working together in a change program.	Qualitative analysis through 27 semi-structured interviews with employees of the technical department	Condude that non-aligned interaction between different professional discourses can be a source of resistance to change, in addition to other well-known sources of resistance to change in the change management literature.	Pieterse, J. H., Caniëls, M. C., & Homan, T. (2012). Professional discourses and resistance to change. Journal of Organizational Change Management, 25(6), 798-818.
Powell & Posner (1978)	To examine the origins and past usage of the resistance to change concept to evaluate the merits of its continual usage and to discuss the managerial implications.	Existing Literature	Employees' evaluation on change is a results from (1) the amount of information (2) the extent of decision making participation (3) and trust of the initiators.	Powell, G., & Posner, B. Z. (1978). Resistance to change reconsidered: Implications for managers. Human Resource Management, 17(1), 29-34.
Reardon (2010)	To provide a framework to measure the response of blue-collar workers to new technology in manufacturing and to establish the relationship between learning culture and that response.	Quantitative analysis using questionnaire on 288 employees from 12 manufacturing sites.	Factor analysis identified seven dimensions of worker response: disgruntlement, job-security concerns, accommodation, informal learning, resistance, discussion, and formal learning. Learning culture had a large, statistically significant relationship with disgruntlement and medium, statistically significant relationships with job-security concerns, accommodation, informal learning, and formal learning.	Reardon, R. F. (2010). The impact of learning culture on worker response to new technology. Journal of Workplace Learning, 22(4), 201-211.
Ruth Alas & Wei Sun, (2007)	To explore the application of a resource based view when implementing organizational change in Chinese organizations.	Qualitative analysis via structured interviews conducted with top or middle managers in 160 companies.	Bureaucratic regulations and strict orders identified as main the core features of the process of implementing changes in Chinese companies. The intrinsic values and emotions of employees were neglected and coercion and manipulation was frequently used as a strategy to overcome resistance to change. Chinese managers are found to lack the skill to involve employees in the change process.	Ruth Alas, Wei Sun, (2007) "Organizational changes in Chinese companies: a resource-based view", Chinese Management Studies, Vol. 1 Iss: 4, pp.225 - 242
Schiavone (2012)	To investigate the resistance to industry technological change in old technology-based communities of practice.	Explanatory case study complementing with semi-structured questionnaire to 5 expert members of the worldwide ham radio community.	Condude that work on the social and learning conditions affect the process of diffusion of innovation within the "resisting" community.	Schiavone, F. (2012). Resistance to industry technological change in communities of practice: The "ambivalent" case of radio amateurs. Journal of Organizational Change Management, 25(6), 784-797.
Smith (2005)	To examine the nature of resistance to organisational change: why and how it occurs and the importance of effective response.	Existing Literature	Change resistance form a constructive part of the process of organisational change management. It emphasis the importance of a clear understanding of the reasons underlying change resistance and appropriate and effective responses.	Smith, I. (2005). Continuing professional development and workplace learning 13: Resistance to change–recognition and response. Library management, 26(8/9), 519-522.
Teare & Monk (2002)	To explores the changing nature of managerial and organizational work in relation to the opportunities that this affords for learning from change.	Existing Literature	Company need to affirm own agenda for learning via an internal business school structure and to create an internal template for learning that mirrors the business challenges and realities.	Teare, R., & Monk, S. (2002). Learning from change. International Journal of Contemporary Hospitality Management, 14(7), 334-340.
Trader-Leigh (2002)	To examines stakeholder attitudes about change and resistance to change in a management initiative within the US State Department.	Qualitative and quantitative analysis using a multi-mixed methods . 23 interviews and 600 questionnaires from 23 embassies	Improving the identification and understanding of the underlying factors of resistance may improve implementation outcomes.	Trader-Leigh, K. E. (2002). Case study: identifying resistance in managing change. Journal of Organizational Change Management, 15(2), 138-155.
Young (2000)	To examination the relationship of managerial resistance and managers' behaviour during periods of imposed organizational change.	Existing Literature	A framework is possible by applying the concept of ideology to both organizational and psychological structures, a comprehensive theory of managerial resistance provides an integrated explanation of what, how and why managers resist.	Young, A. P. (2000). "I'm just me": A study of managerial resistance. Journal of Organizational Change Management, 13(4), 375-388.

Many scholars have defined "Resistance" differently. Maurer (1996a) defines it as, "a force that slows or stops movement"; while Bridges (1986) suggests that it is an incomplete transition or an obstacle in responding to a change. Ansoff (1988) describes it as a "multifaceted phenomenon" that causes unplanned delays, costs, and uncertainties into the change process. While Zaltman & Duncan (1977) and Block (1989) define it as any conduct that serves to maintain a steady state against the pressure to change. Resistance to change has also been expressed as an observance of any behaviours or attitudes that impede the purpose of organizational change (Chawla & Kelloway, 2004), and any behaviour that wants to keep its status quo in the face of pressure to alter its existing state (Zaltman & Duncan, 1977). Bemmels & Reshef (1991) elaborated that these behavioural responses are usually perceived by management as attempting to stop, delay, or alter the change. Resistance to change is therefore most often associated with a negative attitude or with counter-productive behaviours.

So why is there resistance to change? A review of literature by Ford et al. (2010) reveals that resistance arises whenever the status quo is compromised (Beer, 1980; Hannan & Freeman, 1988; Spector, 1989), or when fears and anxiety increases due to imaginary consequences and unknowns (Coghlan, 1993; Myers & Robbins, 1991; Nadler, 1981; Smith & Berg, 1987; Steinburg, 1992). Concern in personal security (Bryant, 1989), ability to perform (Morris & Raben, 1995), and risk of established social relations (O'Toole, 1995) are also factors that cause resistance to change. Many scholars have agreed that resistance happens when employees do not trust those leading change (Block, 1993; Bridges, 2004; Ends & Page, 1977). Ledford et al., (1989) posit that resistance can also arise when employees question the values and rationality of change. This may prompt some form of defensive mechanism or behaviour as argued by Argyris (1990) and Staw (1981).

The success or failure of many organizational change initiatives are directly related to employee resistance (Bovey & Hede, 2001a; Del Val & Fuentes, 2003; Martin, 1975; Maurer, 1997; Spiker & Lesser, 1995). It is revealed in a longitudinal study of 500 organizations by Waldersee & Griffiths (1997) that the most frequently cited problem during organizational change confronted by management is employee resistance. There is overwhelming evidence found to suggest, that change effort often failed to live up to its expectations and success rate is low (Balogun & Jenkins, 2003; Fay & Lührmann, 2004; Fisher, 1994; Higgs & Rowland, 2000;

Hirschhorn, 2002; Knodel, 2004; Kotter, 2008; Meaney & Pung, 2008; Raynolds, 1994; Sirkin et al., 2005; Whelan-Berry & Somerville, 2010).

There are myriads of factors that an organization can attribute to its failed transformations. This includes overwhelming demands from the business environment and an inadequate organizational resource. Nevertheless, employee resistance has been branded as the main source of failure across various global industries and organisations for a long time (Erwin & Garman, 2010; Lawrence, 1969; Maurer, 1996a; Reger et al., 1994; Spiker & Lesser, 1995; Waldersee & Griffiths, 1997). Considering as one of the most ubiquitous of organisational phenomena by Mabin et al. (2001) & Schein (1988), no matter how cautiously and gradually the changes are introduced (Jex, 2002; Woodward, 1980), the understanding of resistance to change remains as an important goal for many researchers to identify the processes and factors, so that effective coping strategies can be developed that can promote successful organizational change (Callan, 1993).

It is regrettable that the word "Resistance" is attached with a negative connotation in the past (France, 1995; Giangreco, 2000; Hultman, 1979; Klein, 1984; Lawrence, 1969). However, Armenakis & Bedeian (1999) noted that when an employee shows negative responses such as cynicism, scepticism and stress, they can also show a "lack of" resistance, which is being neutral, or being positive, such as showing receptivity and commitment to the change. McKay et al. (2013) & Piderit (2000) noted that it is possible that individual cognition for change can be ambivalent or conflicting with their emotions with attitudes varying at different stages of change execution. Abdel-Ghany (2014) argues that an employee does not thoughtlessly assume a resisting attitude but would consider the possible negative consequence of their actions. Workers make assumptions, assessed the change process, ascribe meaning and develop a feeling about the proposed change (Hendrickson & Gray, 2012). Depending on the circumstances that the reaction occurs, resistance to change is not always negative, but can act as an indicator of other problems (Giangreco, 2002). Bauer (1993) note it can be a forewarning that the change process might be failing or as an indicator that the targeted change is taking effect. Waddell & Sohal (1998) & Leigh (1988) suggest that resistance to change can be an important source of feedback that could help to surface hindrances and benefit overall change process (Coetsee, 1999; Kegan & Lahey 2001; Kelman, 2005; Maurer, 1996).

According to Johns (2013), resistance can be the tipping-point of other issues to monitor. Resistance to change helped pinpoint pockets of low motivation and morale in the organization; highlight weak communication due to an inadequate understanding of change objectives and force change initiator & agent to devote additional focus to staff relations on impending events. This can facilitate managers to re-examine their purpose, clarify vision and modify a specific part of their plan (Bartlett & Kayser, 1973; Ford & Ford, 2010). Academics have shown that resistance to change can help organizational stability by creating an environment of trust & honesty (Maurer, 1996), and inject greater energy & commitment (Coetsee, 1999). Researchers have proposed that resistance to change may strategically add value to change planning and execution, hence should be discerned and managed carefully (Ford, Ford & D'Amelio, 2008; Ford & Ford, 2010).

Many agree resistance may be the necessary to trigger managers to value employee feedback or acknowledge failure, and manage change-related behavioural outcome, and to reconsider the impact of employee participation in change management's planning, execution and sustainability (Armenakis, Harris, & Mossholder, 1993; Courpasson et al., 2012; George & Jones, 2001; Lau & Woodman, 1995). A survey of 151 German firms shows that resistance can be constructive, shows loyalty and allows management to make better decisions as it allows workers to participate and reveal weaknesses in change initiatives (Hauschildt, 1999). Hence, resistance can foster greater scrutiny of the plans. Hence it can help to determine if a suggested change is inherently good and reveal better alternatives (Piderit, 2000).

Following a more positive interpretation of resistance to change proposed by a few researchers (Bauer, 1993; Marris 1993), this study of resistance to change in change management will attempt a more objective consideration and interpretation of the observed phenomenon among blue-collar workers in P-Tech.

2.5.3 Resistance to Change in Blue-Collar Workers

Resistance to Change is being recognized by many authors and scholars as an important factor in organizational change, attributing it as a cause for failure (Ford & Ford, 2010; Kotter & Schlesinger, 2008; Lawrence, 1969; Maurer, 1996a, 1996b; Michel, 2013; Reisner, 2002; Strebel,

1994; Waddell & Sohal, 1998). However, despite many acknowledgements on the impact of resistance to change by many scholars, there have been limited empirical studies as lamented by Bareil (2013), Herscovitch (2005) and Orth (2002). According to O'Conner (1993), managing employee resistance to change overshadows any other aspects of change activities.

Most literature addressing organizational change treats the phenomenon as a single entity and fails to differentiate the diversity of participants involved (Armstrong-Stassen, 1998; Larkin & Larkin, 1994; Lewis, 1999). They failed to take account of the perceptions and response from various internal stakeholders (Jones et al., 2004; Terry & Callan, 1997). Hauschildt (1999) found that internal resistance against changes reveal conflicts of motives between hierarchical levels. Many researches focusing on organizational change has shown that blue-collar workers are most deeply impacted by changes (Ahmad, 2000; Armstrong-Stassen, 1997; Nelson et al., 1995; Olson & Tetrick, 1988), when comparing with managers and supervisors who have more control and involvement in change activities (Haugh & Laschinger, 1996; Luthan & Sommer, 1999).

Hu et al. (2010) defines blue-collar workers' jobs as being primarily physical and having relatively restricted career paths (Gibson & Papa, 2000; Lederer, 1987; Prince, 2003). In contrast, white-collar workers are usually professional and semi-professional workers (Hammer & Ferrari, 2002). Hennequin (2007) posit that the two group hold different measures for work; such as view on the role of work life & identity (Dubin, Champoux, & Porter, 1977), attached different significances to work (Harpaz, 1986; Yuchtman-Yaar & Gottlieb, 1985), have different job involvement (Kaufman, 1982), and have different perception & response to job stress (Mathieu & Hamel, 1989). Gagnon et al. (2008) and Seppälä & Klemola (2004) found several differences between blue- and white-collar workers such as, education level associated to business topics. While white-collar are more able to judge the change strategies on their own due to their training and education, blue collars in manufacturing typically are unable to do so. Comparing with the white-collar, blue-collar also has limited information upon which they rely on to form opinion and perception (Gagnon et al., 2008). Their distinctive work experience will potentially cause them to think differently about their working environment.

In Singapore's semiconductor manufacturing sector, the adoption of new technologies; and changes in the work environment have been picking up pace in recent years. One group that is

significantly affected are blue-collar employees on the production floor. These blue-collar workers, having little option, must accept the change via training, reassignment, or job enlargement. Jones et al. (2008), Lupton (1991) and Martin et al. (2006) drew a sharp line between managers and operators (blue-collar) and expect that the lower level will mostly accept the change directives from the top management naturally and view all resistance negatively. Their resulting reluctance and opposition to these actions can be expressed as resistance to change (Levine, 1980). Blue-collar employees, mentioned here, refer to the workers that occupy the lowest level in a typical hierarchical structure of a manufacturing company in Singapore that do not have the power to make decisions on management strategies.

Pieterse et al. (2012) observe that an individual construe change plans differently in the language they use, and therefore influence their discourses (Barrett et al., 1995; Boje, 1991; Di Virgilio & Ludema, 2009; Garzone & Archibald, 2010). Although they were investigating the professional group, the same could be applied to the group of blue-collar workers who have their own language and jargons. The same information communicated can result in different meanings to different level of workgroup, resulting in developing different resistance to change. Negative affections can form as mutual understanding is impaired among different work groups/levels, affecting motivation to corporate. Hence, Pieterse et al. (2012) argue that individual sense-making for the change has significant implication to the change plans effectiveness (Weick, 1995; Homan, 2010), and can help to understand problems in change programs (Ford et al., 2008; Ford & Ford, 2010).

Many studies have revealed that technological updates and task restructuring due to organizational changes do impact individuals' day-to-day work routines in their workplace (Fedor et al., 2006; Herold et al., 2007; Judge et al., 1999). For P-Tech workers to be effective as production requirements change, they have to adapt to the consequences of change initiatives. This adaptation to changes not only requires the learning of new knowledge and skills. It also demanded the unlearning and surrendering of old work systems (LePine et al., 2000), and it is in such a situation that blue-collar workers in P-Tech are compelled to go through a chain of mandatory trainings in order to stay relevant in the company. Erwin & Garman (2010) evaluated peer-reviewed research papers which explored individual resistance to organizational change since 1998. They found 123 but eliminated most of them because

only 18 of those research articles reported their study results. A scan for research papers that specifically address Resistance to Change focusing specifically on blue-collar employees are just as inadequate (Table 6).

Table 6: Research on Resistance to Change by Organizational Level

Research on Resistance to Change by Organizational Level

Author	Management (Managerial level)	Skilled (Professionals / Engineering)	Low Skilled/Unskilled (Blue Collars / Operators)
Agboola & Salawu (2010)		X	X
Alas & Sharifi (2002)	X		
Bovey & Hede (2001)	X	X	
Coch, L., & French Jr, J. R. (1948)			
Cutcher (2009)		X	X
Erwin & Garman (2010)	X	X	
Folger & Skarlicki (1999)	X	X	
Ford, Ford & McNamara (2002)	X		
Kumpikaite & Čiarniene (2008)	X	X	X
Macrì, Tagliaventi & Bertolotti (2002)	X	X	
Michel (2013)		X	
Oreg, S. (2003)	X	X	X
Peccei, Giangreco & Sebastiano (2011)		X	
Perren (1996)	X		
Pieterse, Caniëls & Homan (2012)		X	
Powell & Posner (1978)	X		
Reardon (2010)			X
Ruth Alas & Wei Sun, (2007)	X	X	
Schiavone (2012)		X	
Smith (2005)	X		
Teare & Monk (2002)	X		
Trader-Leigh (2002)		X	
Young (2000)	X		

Among the five articles that address blue-collar employees, only two articles are relevant in the Singapore context. This is because while administrative or clerical jobs in some countries are considered as low level jobs done by blue-collar employees, such a job in Singapore, by definition, requires a higher level qualification, and these employees are not considered as the lowest level in the organization hierarchy.

Reardon & Valentine (2005) researching twelve manufacturing facilities found no area in literature describing blue-collar workers' responses when organizations impose technological transformation. They further argued that scholars had been more focused on aspects from a managerial standpoint, and there is a lack of effort to understand and conceptualize how blue-collar workers respond to change. Therefore, empirical research with convincing data in addressing Resistance to Change among blue-collar employees in Singapore's context unfortunately remains very limited.

2.6 Responding to Organizational Change

Many factors can influence the response to change. Factors such as group culture, group dynamics and motivational needs of individuals can either affect how the blue-collar workers develop resistance to change or encourage them to learn and adapt.

Cultural perspective by Cook & Yanow (1993) opens several issues for workplace learning. They note that change is not a necessary outcome for learning to take place but might be for preservation. As much of the learning in organizations is tacit and difficult to measure, learning can reinforce the social and cultural norms that make up the organizational identity. **Group dynamics** was observed by Paulsen et al. (2005) & Terry & Jimmieson (2003) to be disrupted during most organizational change. The blue-collar workers need time to accustom themselves to the group culture and the members of their newly assigned workstation and need time to gel and engage with each other.

P-tech is a culturally diverse organization, due to the way the company was established with different nationality groups. Accepting diversity is particularly testing when the ideas of individual/group are opposed by one another. **Motivational** needs are distinctive at different organization levels and within individuals (Alderfer, 1989; Maslow, 1954). For blue-collar workers, attaining psychological safety needs maybe most crucial to ensure that their training enables them to meet job requirements and be free from fear of being terminated due to performance issues (Garvin, Edmondson, & Gino 2008; Kozlowski & Salas 2009; Garvin 2000).

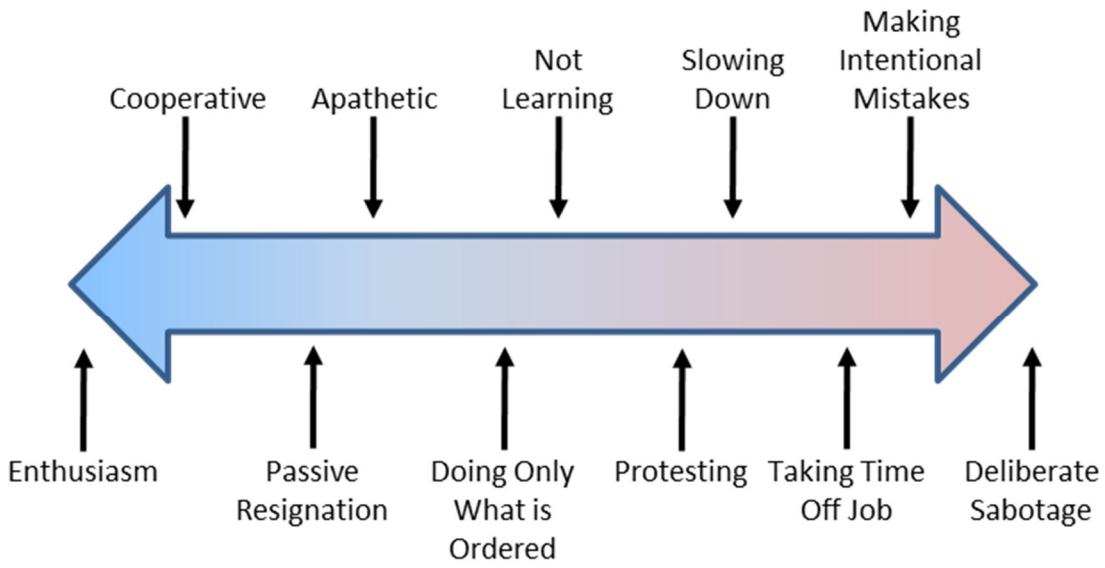
The resistance by members within the organization has been acknowledged for many decades by Kurt Lewin. Lewin believes that even when there is general agreement on change initiatives, organizations remain highly resistant to change due to human behaviour (Lewin, 1951).

Cameron & Green (2015) found that from a behavioural approach perspective, the results of organizational change are very dependent on the members' behaviour in the company. Oreg (2006) works in contemporary thinking on organizational change research have a major influence on this study. His early contribution in his research was establishing the construct of dispositional resistance to change in 3 aspects (Affective, Cognitive, and Behavioural) of individuals' reception toward change.

Working with P-Tech HR and key staff members, there are recurring feedbacks gathered from exit interviews and yearly climate surveys. It shows concerns in three areas: Training, Participation & Involvement, and Communication. To find out how the organizational change has affected the blue-collar workers in P-Tech, this study will be based on Shaul Oreg's work in 2006 to develop hypothesises for the concern areas/issues, establish the dispositional resistance to change reactions among the blue-collar workers, and related to work outcomes.

2.6.1 Response Components

Schiffer (2011) in her research in resistance to change establishes many behavioural responses by individuals from a wide span of industries, and she demonstrates that there are many varieties of negative responses which have been identified as resistance reactions. Behaviour such as unsupportiveness, reducing production, absenteeism and resignation are signs of resistance to change (Agboola & Salawu, 2010). Greenberg & Baron (2002), offer an overview in worker's reaction to organizational changes with some specific responses that they might have (Figure 15). According to them, they state that an individual's reactions are in a continuum, varying in degree from "Active Resistance" or "Acceptance" on both extremes, with "Passive Resistance" or "indifference" in-between. Eriksson (2004) and Powell & Posner (1978) found that an individual's reactions differ during change, with some embracing it, some resisting it passively, some openly challenging it.



Source: Greenberg and Baron (2002)

Figure 15: Worker Reaction to Organizational Change

Oreg (2006) built and established his model on resistance to change from Piderit (2000), where he defines it as a multiple dimensional attitude consisting of "Affective", "Cognitive" and "Behavioural" aspects. The affective aspect refers to how an individual "Feel". Workers cannot only feel angry or upset when they perceive the change as having negative impact on them but can also feel excited or happy if they see benefits about the change. The cognitive aspect refers to how an individual "Think". Workers will judge and reason about the necessity of the change and draw a mental conclusion on the chance of success. The behavioural aspect describes the intentions or actions in response to the changes that is taking place. Behaviour can be positive, such as initiating involvement in a workgroup or encouraging others about the change. The manifestation of resistance behaviour can be overtly, (e.g. conformity, complaining, open defiance or resignation) or covertly (e.g. slowing down production, absenteeism, hoard information) (Giangreco & Peccei, 2005; Lines, 2005; Recardo, 1995).

Giangreco & Peccei (2005) found that anti-change behaviour is more likely to be express passively or covertly. Recardo (1995) has warned that while resistance expressed overtly can be recognised easily by a change agent, covert behaviours are maybe more difficult to identify

and usually noticed only when it has already caused a detrimental impact on organizational outcomes. Covert Rejection refers to passive behaviour or a concealed reaction of an employee in showing resistance to the change. This form of resistance is not openly shown to managers or supervisors and usually confine within the immediate trusted social circle of employees. It includes, intentionally slowing production, conforming, or complying but without commitment (Lee & Ashforth, 1990; Coch & French, 1948; Crino, 1994; Kozlowski et al., 1993; Watson, 1971).

Fenton-O'Creevy, (2001) noted that disagreement and resistance from blue-collar employees are likely to be expressed in more covert forms of behaviour as compared to middle managers. This could be due to the self-perception of being lack of power (Legitimate or Expert) and being at the lowest level in the organization hierarchy (Pieterse et al., 2012). Nevertheless, this form of resistance can be more damaging to the organization than overt actions. This is because such behaviour can lead further into other covert responses such as sabotage/subversion (Chonko et al., 2006), selective ignoring (Fleishman 1984), complain & gossip (Hollander & Einwohner, 2004), blaming others (Scheck & Kinicki, 2000), and reverting to the old ways whenever possible (Chonko et al., 2006).

Researchers found that workers establish their personal security in familiar routines and work environment (Muo, 2013). A disruption of the status quo creates a sense of loss (Burke, Lake, & Paine, 2008; Diamond, 2003). Macrì et al. (2002) suggest that organizational change needs to be seen by workers as necessary and desirable in order to get support instead of adverse acts such as sabotage. The tendency of resistance in an individual may increase if there is affiliation with a workgroup that is against the change (Cohen & Wills, 1985). Therefore, ignoring the impact on workers will risk aggravating undesirable attitudes and hinder change initiatives. Management will also lose the opportunity to surface out gaps in their change strategy, chance of dialog about the resistance with workers to create buy-in and develop leadership trust (Courpasson et al., 2012; Ford & Ford, 2010; Lines, 2004; Mabin et al., 2001; Piderit, 2000; Waddell & Sohal, 1998).

Worker will begin to lose their commitment to work and the organization. These sentiments may eventually lead to resignation of the employee in order to avoid the work change (Fugate et al., 2008; Hollander & Einwohner, 2004; Judge et al., 1999; Scheck & Kinicki, 2000). Many researchers concur that when there is a loss of interest at work, everything else that follows will

become an appealing distraction (Cooper & Quick, 1999), diminishing commitment, and may create an excuse to be absent or resign from work (Cotton & Tuttle, 1986; Clegg, 1983; Firth et al., 2004; Luthans, 2002; Moore, 2001).

In essence, resistance does not form merely as an opposition to change strategies, but also when the effected individuals perceive it as unbeneficial or unethical to the stakeholders and the organization (Agocs, 1997; Oreg 2006; Piderit, 2000). While increased confidence, motivation, job satisfaction, and renewed commitment shows positive reaction to change, observing the degree of resistance responses can be a good indicator as to how employees are accepting the change (Kappelman & Richards, 1996).

2.6.2 Training

As training is acknowledged to be fundamental for successful change implementation in the workplace (Spacey, 2003), the training introduced due to the necessity of the changing job environment should expect resistance from the employees affected. Bovey & Hede (2001a) concurring with many scholars suggest that resistance is a natural part of the change process and is to be expected. To reduce the negative change effect, Alvesson (2012) have noted that workers can have a clearer understanding of change strategies with better relation to new skills, knowledge, and attitudes through training. With the purpose of keeping up with the evolving business landscape environment, organizations are putting more focus on training and educating their employees (Brum, 2007). The interrelationship between organizational change and training has not been explored in-depth (Talbot, 1993).

The practice of training workers to understand the new processes and operate new tools is very common in the semiconductor industries. It is noted that conventional hierarchical organizations such as P-Tech usually provide strategic/conceptual education to higher managerial levels, while the lower level employees tend to only receive skills training directly related to the operation needs Ashkenas et al. (2002). As a customer requirement, with each new launch of products & devices, operators are required to go through stringent trainings and certifications in order to be allowed to work at their stations. The newer technology requires

lower manual work due to automation, but the caveat is that it demands a higher level of technical knowledge and understanding.

The training approach in P-Tech is standardized across all blue-collar employees. For new hire and existing workers that are being reassigned, it consists of two weeks of formal classroom lessons; followed by 8 weeks of On-Job Training (OJT). During the 8 weeks of OJT, the trainees will be assigned to a mentor as a guide on the job. On the 8th week, the trainee will have to be tested and certified by the training officer before being allowed to operate independently. Failure to pass may result in a training extension or a reassignment to another job centre.

All these factors may introduce job-dissatisfactions, uncertainty or stability issues and induce greater stress. Hu et al. (2010) researching on blue-collar vs white-collar workers suggest that training in blue-collar should result in a greater job satisfaction and yield greater performance. Vakola & Nikolaou (2005) linked to employees' attitudes towards change in the administration of training, suggesting that workers be given assurance that they will be adequately trained to reduce their fear and uncertainty. Judson (1996) argues that training should not only prepare workers to be more effective at work, but also relieve them from doubts and fears about their own capabilities to handle new job roles and responsibilities.

I hypothesized that there exists a positive relationship between effective training program & methods and workers' responses towards the change program. Therefore, the following hypothesises can be formulated:

Hypothesis 1 (H1):

If blue-collar worker perceives the training program as effective to successful adaptation of the new work environment change, then the resistance to change response is likely to be low.

2.6.3 Participation

Waddell & Sohal (1998) found that research on employee participation to mitigate resistance to change has been investigated since the 1940s. They stated classic examples of Coch & French (1948) and Lewin (1991), which conclude that through involvement or participation in change initiatives, their resistance appears to be lower. Oreg & Goldberg (2015) classified participation as one of the important aspects in studying resistance to change. The theme of participation has also been incorporated into the popular 8-Step change model by Kotter (1995) and is practiced in many organizations. However, their goals are usually directed at reducing the resistance to change and rarely to suggest utilizing it (Waddell & Sohal, 1998). If the change driver could mobilize workers to be supportively involved in the change process, direct their energy into change activities instead of resistance, they could accelerate adoption of new attitudes (Moran & Brightman, 2001).

Kappelman & Richards (1996) agree that providing an employee some control over training can increase motivation and reduce their resistance to change. They further state that this action also demonstrates management commitment to include them as a participant in the change and are likely to increase employees buy-in for the change program.

The participative element is crucial in the implementation stage as noted by Meier et al. (2013). It has a positive influence on change itself because of the sense of control that participants get. Sagie & Koslowski (1996) found that participation allows workers to comprehend why change happens and give a sense of control and ownership of the change process. Cunningham et al. (2002) got the same observation of employees being more open to change when they are given more freedom in decision making on those working in a rigid environment. Through participation, there are also opportunities for active feedback and interaction with management to highlight gaps noticed in the change plan, thus allowing adjustments to change implementation (Weber & Weber, 2001). Overall, workers who perceive to have an opportunity to participate in change planning are inclined to exhibit more support for the change (Jimmieson et al., 2008; Lines, 2004; Marchington et al., 1994; Van Dam et al., 2008).

While there are limited areas for workers to decide on how P-Tech business should transform, there may be opportunities to allow participation in training and work arrangements. There may be room to let workers select which trainer they want to be assigned during their On-Job-

Training, one that they can trust and comfortable with. The timing of the test & certification can be accommodated to give workers some influence and control. Workers may apply to be certified earlier if they have sufficient confidence in their test, or later if they require longer training time. Thus, lower resistance to change. I hypothesized that there exist is a positive relationship between participation and workers' responses towards the change program. Considering the literature outlined, following is hypothesized:

Hypothesis 2 (H2):

If blue-collar workers perceive greater participation in change activities, then negative resistance response are likely to be low.

2.6.4 Communication

Moore (2002) found that communication deficiency between management and employees contributed to an increased work-stress and hence to their intention to resign. Oreg & Goldberg (2015), Wanberg & Banas (2000) and Schweiger & DeNisi (1991) have shown that workers perceived and are satisfied with information they received accept organizational change better. Gill (2002) and Coghlan & Rashford (1990) posit that communication deficiency leads to misunderstanding of a change purpose, resulting in heighten anxiety & rumours that affect moral and commitment. While McKay et al. (2013) and Miller et al. (1994) suggest that timely and useful information about the change will result in greater cooperation from workers. Folger & Skarlicki (1999) sympathized with the fact that realistic information may not be possible, therefore management fear to communicate information that may turn out as inaccurate.

Nevertheless, management can communicate what they know so that workers will get assurance that they are not being deliberately misled (Schweiger & DeNisi, 1991). Self & Schraeder (2009) reiterated the fact that by communicating, management creates confidence in the workers. Freese (2007) and Kramer et al. (2004) supports that increasing information about organizational change, anxiety and uncertainty will be reduced among workers due to more information. Workers also have a better understanding of the need to change and will in turn influence fellow colleagues. Thus, behaviour toward the change can be influenced by the

communication process (Ford, Ford & D'Amelio, 2008). Communication during organizational change is now widely recognized as an integral and critical part of the change strategies within organizations (Elving, 2005).

However, does the same communication methods and channels to white-collar workers apply to blue-collar workers, or do they require other forms of channels to get a better understanding of the change. Often, blue-collar workers felt that the information was given on a macro level which they were not able to see the relevance. Similar to the story that Quirk (1995) narrated about the CEO looking from the mountain top, warned his subordinate below about the approaching cold winds, but because they are sheltered by the warm grassy environment, they could not share his worries of the impending danger.

Therefore, information on change plans may need to be customized to blue-collars workers in order to ensure understanding. According to Battilana et al. (2010) and Flower (1962), the initial stages of change are often met with confusion and questions; thus, it is important to clarify doubts. Hence, it may not be enough to have a communication session conducted. It is just as critical to consider the appropriate communication method, format or channel is used to ensure that blue collars understand the reasons and expected results for the organizational change.

In view of the discussion, I hypothesized that there exists a positive relationship between the effect & appropriate communication and workers' responses towards the change program. The following is hypothesized:

Hypothesis 3 (H3):

If blue-collar worker understands the communicated reasons & expected result of the change, then the negative resistance response is likely to be low.

2.7 Conceptual Framework

Upon establishing the three hypothesises, I refine the conceptual framework further to show the detailed relationship of Training, Participation & Communication with the responses/outcome for the scope of this research (Figure 16). The approach to collect quantitative and qualitative data will be based on this framework for this study.

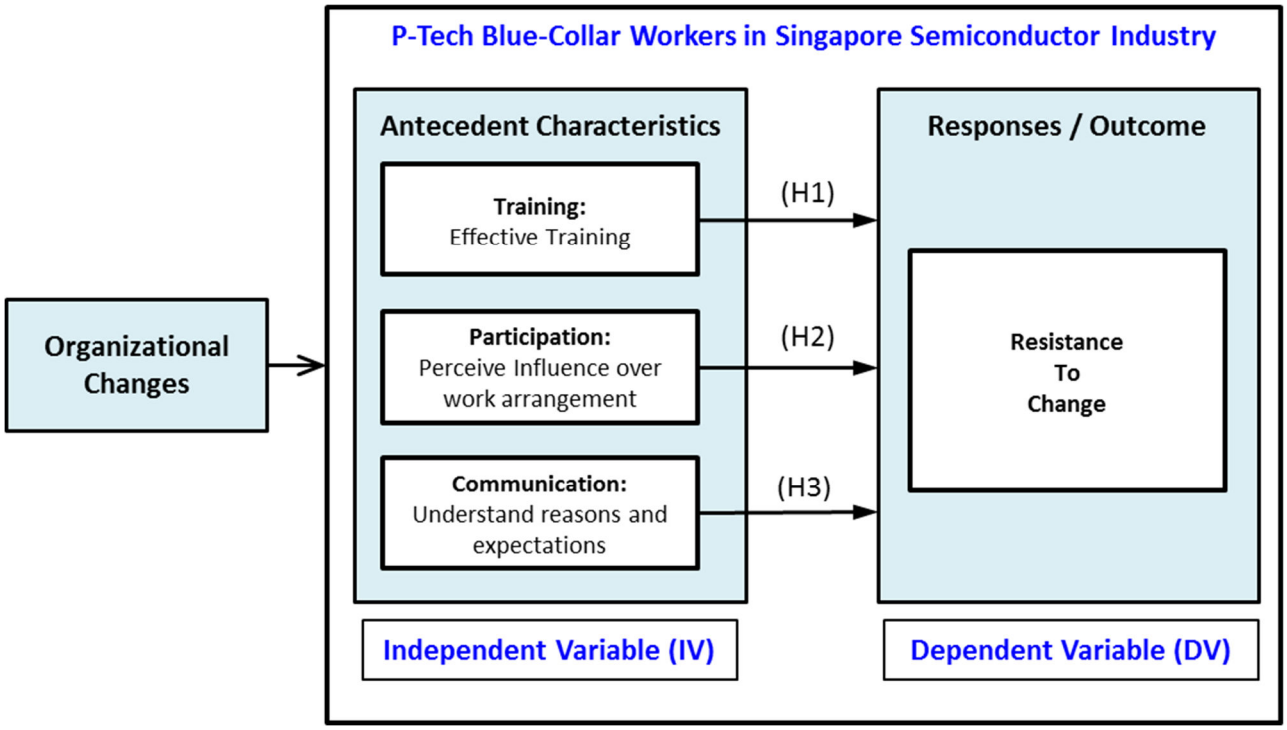


Figure 16: Refined Conceptual Framework

In the manufacturing sector, the industry is facing rapid radical change in automation implementation and process re-designing due to labour policy requirements and competitions. Bovey & Hede (2001b) agrees with many scholars that management often focuses the change effort on the structural or technical component and tends to overlook the importance of human component crucial for successful implementation (Levine, 1997; Huston, 1992; Steier, 1989; Arendt et al., 1995; Tessler, 1989; New & Singer, 1983). As Evans (1994) pointed out, in order to achieve successful organizational change, the individual must be willing to change.

In this chapter, I clarify that P-Tech is going through a transformative type of change. Literature on change models and how changes impact blue-collar workers in relation to company hierarchy and individual roles reviewed, showing a lack of consensus and inadequate studies on this subject. As P-Tech change initiatives have already begun before the study, resistance to change theory is used to investigate blue-collar worker response.

Confronted with unprecedented challenges due to an avalanche of rapid technology advancement and globalization, the organizational change that P-Tech is undergoing created an opportunity for me to investigate the effects of training; participation and communication have on blue-collar workers' resistance to the change. The key questions to be answered in this study are how effective training approach, inclusive participation and appropriate communication in the change plans can help P-Tech to mitigate the effect of resistance to change during an organizational change. It is my intention that through the findings, P-Tech gives greater attention and consideration to the needs of blue-collar workers, to make appropriate adjustment to its change executions and increase its success rate to achieve expected results.

3.0 Research Design and Methodology

In all research studies the research approach and data collection methods are influenced by the views and assumptions of the researcher (Altinay, Paraskevas, & Jang, 2015). This is echoed by Saunders, et al. (2009a, 2009b), that the choice of research philosophical approach is guided by the researcher's perception of the world. In this chapter, the philosophical approach and methodology chosen for this research is addressed. The chapter also gives an overview of some of the major philosophical approaches and the rational for the specific philosophical approach which underpins this study. A detail account of data collection using quantitative & qualitative methods and the data analysis techniques will be presented. The approach of how data were analysed will also be covered to achieve a rigorous and robust research result. Ethical considerations are identified and addressed to ensure good ethical conduct within this study. The chapter ends by providing a summary of the methodology & techniques employed in the main study.

3.1 Philosophical Approaches

Danermark et al. (2019) posit that in planning methodology, the research's ontology and epistemology should demonstrate a clear connection. Grix (2018) has emphasized the importance of establishing the ontology and epistemology as they form the foundation to any study and prevent any risk of the research following an appropriate process. A well thought out ontological and epistemological assumptions will underpin the choice of methodology, research approach, data collection methods and analysis processes (Saunders et al., 2009a). Holloway & Wheeler (1996) argued that there is no best method in any study; instead, we should look at the approach and methods needed in answering the issue in question. What would set this research apart from others would be the chosen philosophical approach & methodology use in seeking answers this research (Saunders, et al., 2009a).

A brief summary of some major philosophical approaches for comparison are shown in Table 7. The table also shows their Ontological, Epistemological, Axiological stance and their associated data collection methods.

Table 7: Philosophical Position

Paradigms /Philosophy	Positivist	Post-Positivist	Realist	Pragmatist	Interpretivist
Epistemology Continuum	Objectivism		Realism		Subjectivism
Ontology: the researcher's view of the nature of reality or being	Naïve Realism, External, objective and unbias to social actors	Critical realism, External, Modified objectivist; Finding is probably true.	Objective. Independently of social beliefs & thoughts or understanding of their existence (realist), but is understood via social conditioning (critical realist)	External, numerous, select best view that is able to answer the research question	Multiple reality, Subjective & socially constructed, ever changing.
Epistemology: the researcher's view regarding what is acceptable knowledge	Dualist & Objectivist, Only phenomana that can be observe is able to provide credible data, facts. Emphasis on cause & effect and support generalisations, reducing phenomena to its simplest form. Emphasis on theory verification	Modified dualist & Objectivist. Believe in constructed of reality. Researchers and the theoretical frameworks used can influence the research. Emphaize on falsifying thypotheses and establish probable truth	Credible fact & data collected via observation. Inadequate fact/data imply theres sensations inaccuracies (direct realism). Instead, misinterpretation can happen to phenomena create sensations (critical realism). Focus on explaining within a context or contexts	Depend on research question, either/both observable phenomena and subjective meanings can offer adequate knowledge . Research focus on practical application, integrating different perspectives to aid interpretation of data	Knowledge has subjective meanings depend on social context depending on details of situation. The reality behind these details is subjective and it motivate the actions
Axiology: the researcher's view of the role of values in research	Research is conducted in a value-free way. Researcher is independent & objective on the data	Reality is constructed, and that research can be influenced by the values of researchers	Value laden research. Researcher is influence by upbringing, culture, world views and upbringing.	Interpretation of results is influence heavily by value, Objective and subjective are adopted points of view	Value bound research. Researcher and research is inter-twine and unable to be independent of each other
Data collection Methods commonly often utilized	Very structured, large samples size, mainly quantitative.	Very structured, large samples size. Mixed methods of quantitative & qualitative can be use.	Quantitative or qualitative methods selected according to subject matter	Multiple/Mixed method, quantitative and qualitative	Small samples, qualitative method for in-depth investigations

Adapted from Various Source: Aliyu et al., (2015); Guba & Lincoln (1994); Lincoln et al., (2011); Saunders et al., (2009)

The list is not exhaustive, but it presents the major paradigms that are frequently used. The table arranged the paradigms from one that is most closely related of Objectivism with its focus on nature of reality (Positivism), along a progressive continuum to Post-Positivist, Realism (Realist) & Pragmatist, and ending with Interpretivism, which is placed in the Subjectivism category.

Objectivism and Subjectivism have been described by Holden & Lynch (2004, p. 4) as a "continuum's polar opposite" with philosophical paradigm that varies between them. While all of the philosophical position has already been studies and debated in detail by many academics, I would like to focus on the extreme ends of the epistemological continuum, which is Positivistism and Interpretivism.

Positivistism, anchored in being most objective, is observed to be a popular approach used by many researchers to determine the relationship of various variables. This is an accepted approach used by researchers who want to assume a neutral position that neither affect nor is affected by the subject of the research to determine the relationship of various variables (Remenyi et al., 1998), and truth is achieved via replication and verification of observable outcomes (Poole & Jones, 1996; Wolfer, 1993). The exploration of social reality using a positivist paradigm is centred on the philosophical ideas of the French philosopher, Auguste Comte (Comte, 1868). He emphasizes the use of reason and observation as ways of understanding human behaviour, stating that true knowledge is established on the experience of senses and can be acquired by experimentation and observation (Bogdan & Biklen, 2003, Collis & Hussey, 2013). Positivist believe that true knowledge is established on the experience of senses that can be acquired by objective observation and experimentation that is value free, where rational cause and effect deduction is possible (Henderson, 2011). This is a popular approach used by researchers who want to assume a neutral position that neither affects nor is affected by the subject of the research to determine the relationship of various variables (Remenyi et al., 1998) and truth is achieved via replication and verification of observable outcomes (Poole & Jones, 1996; Wolfer, 1993). It contrasts with an interpretive paradigm which is more concerned with contextual exploration of the focus issue rather than testing of theories and hypothesises (Bryman & Bell, 2015).

However, the study of social phenomenon using positivistic philosophy has received strong criticism (Crossan, 2003; Decrop 1999a, 1999b; Letourneau & Allen 1999; Suppe, 2000). Researchers view this philosophy to what is observable and measurable to that of a reductionist approach in the quest for a universal mechanistic rule. Criticized and demonstrated by researchers, positivism is inadequate in acknowledging the importance of subjectivity, social, cultural, relational, spiritual, and psychosomatics of a person (Allen et al., 1996; Bailey, 1997;

Darbyshire, 1994; Dzurec & Abraham, 1993; Horsfall, 1995; Mason, 1993; Moccia, 1988; Rolfe, 1994; Schratz & Walker, 1995; Schumacher & Gortner, 1992; Tinkle & Beaton, 1983).

Many debated that in the study of social phenomena, a non-positivism approach is more fitting in studying human behaviour and their organisation (Hirschheim, 1985; Remenyi, et al., 1998). Clark (1998) supported the subjectivity of human nature in which the understanding of reality is viewed to be interpretive, and that its existence is moulded from culture, history, past experience and future intentions (Koch, 1995; Walters 1994). Remenyi further argue that despite the significance of positivistic views, they do not provide good insights in explaining in deeper meaning (Remenyi, et al., 1998). Carson, et al. (2001) supported that interpretivism, place in the subjective end of the spectrum, is a more suitable approach when seeking a more personal level in answering the social problems in social field.

Conversely, Parahoo (1997) supports another standpoint. He posits that an interpretivistic approach using a qualitative method is inadequate. He suggested that while using qualitative method may produce unpredictable results, researchers are able to predict the final outcome if a quantitative method is applied. Interpretivism, according to Bryman & Bell (2015) would lead this research into an entirely different course because its philosophical stance and approach are more concerned with contextual exploration of the focus issue rather than testing of theories and hypothesises.

Interpretivism would require data collection methods such as interviews and subjective consideration on individual interpretation and context of the participants. This may inject various sentiments or feelings into the authors, hindering them from taking an objective view on the findings. However, from a positivist perspective, the aim is to assume a neutral position that neither affects nor is affected by the subject of the research as suggested by Remenyi et al. (1998), so that the findings can be value free and unprejudiced. This is a stark contrast to an interpretive paradigm which is more concerned with contextual exploration of the focus issue rather than testing of theories and hypothesises (Bryman & Bell, 2015).

3.2 Selected Philosophical Approach

In selecting the appropriate research approach, the methodology took into consideration the research problem, aim & objectives, and the nature of the phenomenon being investigated (Ghauri et al., 2020).

Trained as an engineer, the language used the Semiconductor industry is Positivist in nature. Statistics and objective observable cause and effect are what many decisions based on. However, as I progress to a managerial role, I began to recognize the subjectivity of staff need to be considered. As this research seeks to understand the perceptions of the blue-collar employee, the subjective nature would not sit well with a pure positivist stance. As we investigate resistance to change can be influence by social factors, quantitative data alone such as statistical results are not able to fully reflect the context involving the cause of resistance during change management. However, the result of the study should also yield operational data that can be presented in format that can be easily understood by management & key stakeholders and can be generalized to other similar area, and therefore interpretivism is not appropriate for presenting objective results and generalisation to a wider scope. Hence, in this research, I do not identify myself as a Positivist or an Interpretivist. But rather as a combination of both.

Realistically, a total objectivity and neutrality of for this study on P-Tech is not achievable as the changing environment there would also be affecting me. Therefore, I will be susceptible to various influences and biasness. Crotty (1998) echo this concern stating that no matter how strictly researchers adhere to scientific method research, the result can neither be certain nor bias-free. Due to decision making may be context specific only to my organization, there is a need to include contextual consideration when interpretive the data collected (Cutcher, 2009). Mintzberg (1979) asserted that research theory building often requires the rich knowledge that can only be found in qualitative approach. He posits that while empirical patterns can be observed from collected data, explaining "why it happens?" is central to the purpose of research. Shah & Corley (2006) cited many researchers, in support of the post-positivism approach adopted in this research, found many contexts where quantitative and qualitative methods can be employed concurrently to shape and refine the theory (Cialdini, 1980; Fine & Elsbach, 2000; Jick, 1979; Weick, 1979).

In post-positivistic approach, researchers and his perceptions are not seen as being totally detached from the topic being inquired, and acknowledge the inevitability of researcher biases (Bronowski, 1956; Schumacher & Gortner, 1992). The ontological stance, like positivism, assumed an existing reality, but contrasting positivism, this reality could not be truly "known" (Illing, J., 2014). Many academics have explained that the post-positivistic view reality is imperfect due to the human weaknesses of the researcher and the complexity of the social subject being inquired (Chilisa & Kawulich, 2012; Illing, 2014; Mertens, 2009; Ryan, 2006; Ponterotto, 2005). Post-positivist epistemology view objectivity as an ideal with the data critically examined. It acknowledges that regardless how rigour the scientific method is applied, the results are never absolutely certain or objective (Boykin & Schoenhofer, 1991; Chilisa & Kawulich, 2012; Illing, 2014; Sandelowski, 1993). Guba & Lincoln (1994) and Samdahl (1999) also posit that a Post-Positivistic paradigm can be used in the study of human behaviour, which is also one of the objectives of this research in understanding the behavioural responses to resistance to change, so that managers can plan action to reduce its negative effect.

For this research, its ontology is could not be purely positioned as Objectivism or Subjectivism, nor is the epistemology identified as wholly positivist or interpretivist. An interpretive paradigm with a qualitative approach would produce a rich context and a deeper understanding of the phenomena. However, one major weakness of qualitative approaches is that the findings could not be generalized to wider populations when compared with quantitative analyses to achieve the same degree of certainty. This is due to the research findings not being tested to determine if they occur due to chance or is statistically significant (Ochieng, P. A., 2009). As this research was focused on my current company that is undergoing changes, I would be susceptible to various influences and biasness, hence, a total objectivity and neutrality on the research is not achievable as the changing environment would also be affecting my work.

Hudaib & Haniffa (2009) suggest that it is advantageous during the interpretation, that the researcher has an understanding of the "local culture", so as to appreciation the wide repertoire of data gathered and enable the researcher in interpreting the patterns of meanings both as an "outsider" and an "insider" (Alvesson, 2003; Smircich, 1983). The axiology for this research is from a managerial stance as the value of the data could help manager to understand the effect of change among the blue-collar better, thus review their change plans and

execution. The data could also be used again for future comparison when the implementation of improved actions is executed to reduce the negative effect of resistance to change.

Aligned with my view of the corporate realities, Bachmann (2017) and Watzlawick, (1976, 2005) accepted that having a variety of opinions and perceptions of a systemic world is unavoidable and recognizes that there are multiple truths. Seeking an absolute and objective truth is not possible. In seeking a deeper understanding of the social situation, many academics acknowledged there are multiple influences, explanations, and "truths" (Bachmann 2017; Benton & Craib, 2010; Bryman & Bell, 2015; Howell, 2013). In this research, accepting both objectivism from survey data and subjectivism of different opinions from interviews are important. Therefore, adopting a post-positive philosophy would be the most appropriate as this approach enables the author to be reflexive about his position in relation to the research that he finds compelling (Dupuis, 1999). It provides a better way in understanding the employee's experiences (Stewart & Floyd, 2004), and adopting a learning role instead of a testing one (Ryan, 2006). Therefore, in this research, considering my ontology, epistemology, and axiology, I identify my philosophical stance as Post-positivism. Positivism and Interpretivism was eliminated.

3.3 Research Methods

The Post-Positivistic paradigm places emphasis on triangulating the findings with multiple types of data (Clark, 1998; Cooper & Quick, 1999; Illing, 2014). By using both quantitative and qualitative methods, it seeks to address the limitation of positivistic research in collecting insider views (Clark, 1998a; Cooper & Quick, 1999; Illing, 2014). For this research, a cross-sectional mixed-methods design consisting of quantitative and qualitative approaches was chosen as the appropriate strategy. The purpose of this two-phase approach, as Creswell & Creswell (2017) termed as **Explanatory Sequential Mixed Method**, is to produce a result that is easily comprehensible to aid management & stakeholder in refining policies and make better decisions for change management. Patton (1990) and Brannick & Roche (1997) have urged researchers to triangulate their results by using both quantitative and qualitative methodologies. Burrell & Morgan (1979) stated that only by adopting an intermediate philosophical position can triangulation be achieved. Using triangulation from both approaches

in the same research enables researcher to recognize that a diversity of truths is reachable through various forms of inquiries (Clark, 1998b; Denzin & Lincoln, 1994; Howe, 1988; Tashakkori et al., 1998; Van Maanen, 1979; Webb et al., 1966). This approach is consistent with Post-Positivist paradigm as it enables triangulation of data which enhances understanding because it allows two different data from the same target group to draw inferences from each other (Armenakis et al., 1990; Hitt et al., 1998; Judge & Zeithami, 1992; Karami et al., 2006; Leedy, 1997).

Phase-1 consists of a quantitative data collection method. In this phase, the focus is on systematizing the knowledge generation process of this research, quantitatively with a deductive approach to test the hypotheses. This scientific method to generate knowledge; the framework of principles; and assumptions taken by positivist, are determinism, empiricism, parsimony, and generality (Cohen et al., 1985). Phase-2 employed a qualitative method in order to understand the issues in greater depth and context. The rationale of performing quantitative method before qualitative method is shown in Table 8.

Performing quantitative data collection helped to filter a large quantity of information and define the scope & themes for qualitative data collection, so that quantitative data collection can be more focused. It also reduces the risk of researcher bias in establishing own assumptions than reflecting the issue from the population. Due to the small population size and close working environment, there is a need to complete data collection quickly to prevent sharing of questionnaire content.

These combinations of methods are often employed by cross-sectional studies (Easterby-Smith et al., 2008; Robson, 2002). Supporting my philosophical approach, using a combination of quantitative and qualitative techniques, is appropriate for the data collection approach for this study.

Table 8: Methodology Sequence - Quantitative Before Qualitative

Factors	Remarks
Scoping and defining boundaries	Performing Quantitative methods first will help focus and define the scope & themes to concentrate on for phase two interview. There is a risk that by conducting interview in phase one, the focus may drift and I may get too wide responses to efficiently address in the questionnaires.
Researcher biasness	Quantitative method have the ability to consistently ask the same questions across participants adding constraints to my biasness. Assuming all users are honest, quantitative techniques can provide more objective data than my own assumption and have an objective overview of how they feel or really need before I conduct the interview.
Establish scope when there are many unknowns.	Quantitative is a good starting point when my explorations or thoughts are still diverging and I am unsure what to give attention first. Quantitative is better to establish scope for the behaviours in a targeted participants with very diverse needs, goals, and priorities. By establish some context, the interviews can be adjusted according.
Funnelling of information according to conceptual framework	Aligning with the conceptual framework, the plan is to explore the effect of blue-collar workers resistance to change in response to Training, Participation and Communication. Upon gathering their responses, the deeper meaning and context will be explored.
Close working group	The target participants work in a close working group environment. There are risks of information contamination and influence of group thinking via sharing if interviews are conducted first.
Sampling size limitation	Only small sample size of the interview during pilot study, there is limit on how much information can be use for the construction of questionnaires.
Practicality & Speed	Due to the time frame allocated in this pilot, It would be more practical to achieve the completion of the assignment by conducting qualitative methods first.

3.3.1 Phase-1: Quantitative Data Collection Techniques

Cross-sectional studies often employ using a survey strategy such as questionnaires (Easterby-Smith et al., 2008; Robson, 2002). Saunders et al., (2009a) noted that there are limitations in utilizing questionnaires for data collection, such as rate and quality of the responses. There is also a limit to how many questions a questionnaire can contain, hence it is unlikely that the data can be wide ranging. However, it is commonly use in quantitative data collection because is a quick and accurate technique for data to be standardized and easily use for comparison across the participants, facilitating data processing (Brace, 2018; Malhotra, 2006).

Due to the multinational, low skill/no skill employees being employed, the questions design must be focused, concise and easy to understand in both the English and Chinese language in order to effectively test hypothesises. Back translation was used for developing the questionnaires in both English and Chinese language. Outline by Usunier (1998), as one of the methods which would be possible to translate the source questionnaire (English) to a target questionnaire (Chinese-Mandarin), and then back to the source questionnaire (English) again. By comparing the two new source questionnaires, a final version was created.

Reference questions from Oreg (2006) (Table 9) exploring resistance to change were adapted for use. This scientific method in generating knowledge uses analysed primary data collected to develop a theory base on the interpreted information (Collis & Hussey, 2013; Easterby-Smith et al., 2008; Robson, 2002). Following Ajzen (1991) suggestion, the questions for the survey was evaluated to ensure that they contribute to the quantitative data require to test each hypothesis. Open questions are included to solicit participants for contextual inputs of the topics.

Table 9: Survey Questions

Items for the change Attitude Scale	
1	I was afraid for the change
2	I had a bad feeling about the change
3	I was quite excited about the change*
4	The change made me upset
5	I was stressed by the change
6	I looked for ways to prevent the change from taking place
7	I protested against the change
8	I complained about the change to my colleagues
9	I presented my objections regarding the change to management
10	I spoke rather highly of the change to others*
11	I believed that the change would harm the way things are done in the organization
12	I thought that it's a negative thing that we were going through this change
13	I believed that the change would make my job harder
14	I believed that the change would benefit the organization*
15	I believed that I could personally benefited from the change*

Words marked with an Asterisk(*) were reserved coded

Oreg (2006)

Format: The self-administered questionnaire is structured in alignment with the hypotheses and research questions (Table 10). It is divided into 5 main sections.

Part 1 to 3: It addresses the antecedence characteristics: (1) Training; (2) Participation; and (3) Communication. Each part is further divided to 2 parts (A and B). Part-A aimed to gather data on the level of acceptance or rejection they have on the current changes, and Portion B aim to gather data on how their acceptance or rejection of the change could be manifested.

Part 4: Open short questions to allow participants to clarify their answers so that I may understand the deeper context of their responses in part 1 to 3. In so doing, guide and develop questions for the semi-structured interviews in Phase-2.

Part 5: Demographic questions such as gender, the year of service and age was set to understand if there are differences in the responses due to demographics. The current demographic interval is set according to the current spread so that no category would have only a single participant. Hence it would not pose as a risk for any operator to be single out.

Table 10: Hypotheses Table

Hypothesis	Hypothesis Category	General Response to current changes	Behavioural Response	Code
Hypothesis 1 (H1): If blue-collar worker perceive the training program as effective to successful adaption of the new work environment change, then the resistance to change response is likely to be low.	Training	Response to current training program and arrangement		H11
			Absenteeism	H12
			Resign or Intention to Resign	H13
			Production Restriction	H14
			Conformity & Compliance without Commitment	H15
Hypothesis 2 (H2): If blue-collar worker perceives greater participation in change activities, then negative resistance response is likely to be low.	Participation	Response to current level of participation		H21
			Absenteeism	H22
			Resign or Intention to Resign	H23
			Production Restriction	H24
			Conformity & Compliance without Commitment	H25
Hypothesis 3 (H3): If blue-collar worker understand the communicated reasons & expected result of the change, then the negative resistance response is likely to be low.	Communication	Response to current communication received		H31
			Absenteeism	H32
			Resign or Intention to Resign	H33
			Production Restriction	H34
			Conformity & Compliance without Commitment	H35

Scale: To provide a uni-mode design, a 5-point Likert-type scale was used for rating (Dillman, 2011). The scale ranged from 1 (strongly disagree) to 5 (strongly agree). All items in the questionnaire were phrased to report the level of agreement by using a 5-point Likert-type scale. To reduce acquiescent response, some of the questions are reversed scored (Liu, Conrad & Lee, 2017). While a 5-point scale is more superior to a 3-point scale (Danaher & Haddrell,

1996), Cummins & Gullone (2000) argue that the Likert scale makes the assumption that the psychometric distance between categories is equal, and suggest that a 7-point Likert scale be use. However, the interval difference for this study is not critical, as this study focuses on the magnitude of the answers and would not be performing statistical analysis dependent on the interval differences. Bandalos & Enders (1996), Lissitz & Green (1975) and Jenkins & Taber (1977) separately conducted experiments of increasing the categories noticed that Cronbach's alpha levelled off after 5 categories. Babakus & Mangold (1992) and Devlin et al. (2003) suggest that the 5-point scale is less complicated. It can also increase the response rate and quality by reducing the participant's frustration level (Buttle, 1996). Therefore, when considering the background of the operator, the 5-point Likert scale was used. The results were then collapsed into 3 condensed categories of Acceptance (High) or Rejection (Low), or Neutral for analysis.

Language: Due to the multinational, low skill/no skill employees being employed, the questions used had to be focused, concise and easy to understand in both the English and Chinese language in order to effectively test the hypothesises. The source questionnaire (English) was translated to a target questionnaire (Chinese-Mandarin), and then back to the source questionnaire (English) again. By comparing the two questionnaires, a final version was created (Usunier, 1998).

Survey Administration: This survey was conducted in the company rest room or training room where the environment is most conducive and private, without any security camera monitoring. Pens were provided and the completed survey forms were deposited into a box with a narrow slot. It was kept sealed until all the forms are collected from phase-1 to ensure further anonymity. Upon unsealing the box for consolidation, each form was numbered before data tabulation using excels spreadsheet. This was to facilitate checking of any entry error during the data analysis stage. All individual survey results were combined for analysis and were not scrutinized on an individual basis.

3.3.2 Phase-2: Qualitative Data Collection Techniques

To make up for the insufficiencies of quantitative techniques in understanding the psychological, and the emotional dimension (Huy, 2001), interviews were conducted in phase 2.

The focus was to investigate in depth the context of the responses from an individual. In addition to the short open questions contained in the questionnaire, interview data support the understanding of how change is perceived (Buchana & Badham, 1999; Isabella, 1990).

Format: Structured interviews often produce quantitative data (DiCicco-Bloom & Crabtree, 2006) and can develop constricting feeling (Mercer, 2007). On the other extreme, an unstructured interview centred on a limited number of themes, emphasises greatly of encouraging the interviewee to talk about a subject (Rowley, 2012). While the questions can be flexibly adapted according to the interviewee responses (Bryman, 2016), such interviews would require experience and skill to properly execute, and risk generating chains of transcripts that are difficult to integrate for comparison (Rowley, 2012). Rowley (2012) suggest that a semi-structured interview of 6 to 12 well-phrased questions with flexibility to probing questions is a good starting point for a novice researcher. Considering my research experience in this area, semi-structured questioning format is selected.

Interview Administration: The interviews were conducted in the company rest room or training room where the environment was most conducive and private, without any security camera monitoring. The interviewees are given the option to be conducted in location that they feel safe and comfortable. The consent form content was briefed and acknowledged to ensure that the interviewee understood the aim and objects of the survey, and their rights to withdraw at any point in time. The approval of consent for their interview to be recorded was also sought before and after the interview session in the case the participant changed their mind. In such case, the recording was erased in their presence. Field notes were taken during the interviews to capture observations and insights for later referencing during data analysis.

Language: The language requirement for the survey was also applied to the interview questions. Translation accuracy followed the method employed in creating bilingual questionnaires.

Questions source: Adapted from existing literature, referencing the works from Oreg (2006), 10 semi-structured questions were developed and form Part 4 of the questionnaire. From the initial findings from the survey, a list of semi-structured questions was developed for the interview session (Table 11). In anticipating probable responses, active probing questions were also developed to further understand the responses.

Table 11: Interview Questions

S/No.	Interview Questions (Semi-Structured)	Category
1	What are your perceptions towards change initiatives that are currently taking place	General
2	What is your view about the current training program in preparing you for the change.	Training
3	Could you suggest improves to the current training program that will help workers cope with the change.	Training
4	Do you have any involvement in the change initiative? If so, how are you involved?	Participation
5	What are the way do you think workers like yourself can involve in the change initiatives.	Participation
6	What is your opinion on the level of communication about the change activities to you?	Communication
7	What sort of information do you think is useful to you.	Communication

Note: *These are basic questions and they may not be asked in the sequence above. Probing questions will be interjected in order to investigate deeper meaning and context.*

3.3.3 Participants and Sample Size

There is currently only a population of 49 workers in P-Tech that are considered as blue-collar level. They mainly consist of operators that are working in 4 rotating shifts. In order to correctly represent the result targeting Singapore semiconductor industry, the below inclusion criteria were the considerations when selecting the participants for this research:

- Confirmed staff as per date of the data collection.
- Staff that is serving resignation notices
- China national that on short-term contract in P-Tech to be excluded.

Operators are to be confirmed and in active work to prevent data commitment issue in their answers. There are two China operators that are hiring on 2 years contract in P-Tech. They were also excluded from this research as the experience from China semiconductor industry work environment is vastly different compared to Singapore. The number of workers per shift could exceed 200 to 300. The manufacturing line is also more manual in nature. Although they have worked for more than a year in Singapore, they had been excluded to reduce the risk of contaminating the research due to cultural difference and short term stay and expectation in Singapore. Due to the small numbers, the main study targeted the entire blue-collar population

for the questionnaires in phase 1. In phase 2, using stratified random sampling, 12 workers from all work areas and shift was randomly selected to participate in semi-structure interviews.

Motivation to participate: Hargie & Tourish (2009) note that workers are frequently concerned if they believe that there might be any repercussion from the survey results. To motivate the blue-collar workers to participant in this research, a briefing based on the recommendation by Hargie & Tourish (2009) was conducted for the following:

- Brief on the background, Aim and objectives
- Sharing how the information and data would be utilised
- Gives assurances about confidentiality
- clarify the questionnaires and interviews are conducted
- How results would be shared to them
- Answering questions to clear any doubts and inquiries.

3.4 Process of Data Analysis

Acknowledging the Post-positivistic emphasis on collecting more than one type of data for triangulation, the processing of data analysing was also conducted using a multiple prong approach. It was performed in 3 stages (Figure 17). Besides processing the data from Quantitative and Qualitative using deductive and inductive inferences, an abductive approach was used in analysing both the data from Stage 1 & 2. In Stage 3, an abductive approach was used in addition to this research, not only to address the weaknesses associated with deductive and inductive approaches, but also increasing the robustness of the research.

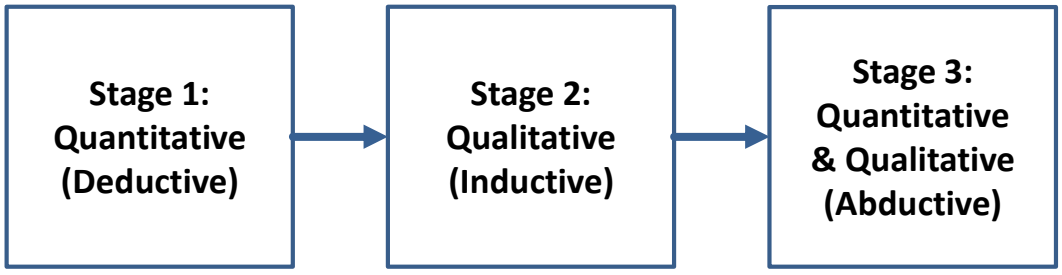


Figure 17: Data Analysis Sequence

Using example from O'Hear, (1993), Sklar, (1995), Zhu, (2010, p. 180) who interpret this method as "inference to the best explanation" is not entangled by the demand of conforming theory for a formal conventional deduction or induction logic. By deriving from both theoretical (deduction) and from observational (induction), it consents to multiple explanations and descriptions of the examined phenomena, thus producing new insights and "best explanations" (Kelle & Kluge, 2010; Lipton, 2004). Dubois & Gadde (2002) noted that this approach would require more effort but has the potential to yield more insights to the research problem. This is due to the potential advantage of acquiring both the systemic characteristics of the theoretical model and of the empirical world (Dubois & Gadde, 2002). Bachmann (2017) posit that the effectiveness of this approach depends highly on the researcher's knowledge and experience. Thus, taking advantage of my position as an insider in P-Tech, the inclusion of a third stage using abductive approach could produce more insights that may not be possible as an outsider.

3.4.1 Stage-1: Quantitative – Deductive Approach

In stage 1, the focus was on systematizing the knowledge generation process of this research, quantitatively using questionnaires with a deductive approach to test the hypotheses. This scientific method aimed to generate knowledge; the framework of principles; and assumptions taken by positivist, are determinism, empiricism, parsimony, and generalizable (Cohen et al., 2000). The primary data collected were analysed to develop a theory base on the interpreted information (Collis & Hussey, 2003). SPSS and JMP software were used for statistical calculation to facilitate data analysis.

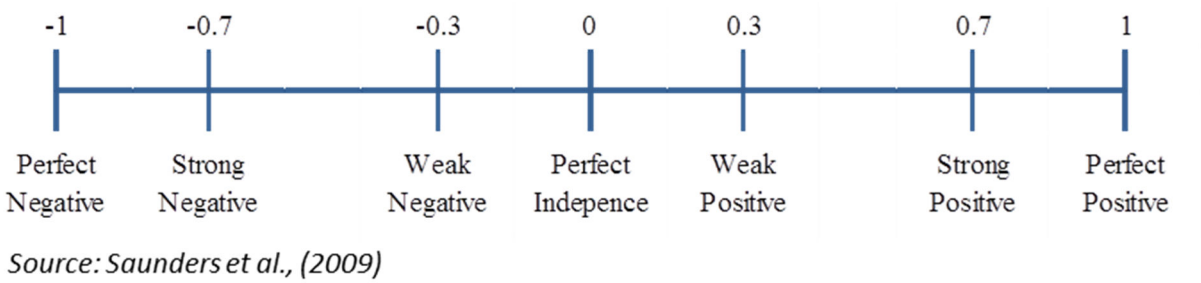
Demographics: This information was included in the questionnaires to enable a better understanding of the background attributes of the participants. However, to preserve anonymity, the design of the demographic groupings is categorized so that no single worker can be identified from the questionnaires. Demographic information of the participants was tabulated in order to analyse results across different demographic groups (Malhotra, 2006). The understanding of this information helped surface related influencing factors and prevented inaccurate findings which might have been created from a skewed distributed population.

Reliability of Data: To test the internal consistency for the questionnaires, SPSS version-23 was used to examine the Cronbach's Alpha (Cronbach, L. J., 1951). Known as the coefficient of reliability (Gall, Gall, & Borg 2007; Yu, 2001), a value of 0.7 or higher is set as the cut-off value for tests (Christmann & Van Aelst, 2006; Nunnally, 1978; Santos, 1999). Statistically, a sample size of 30 would be ideal (Johanson & Brooks, 2010). With the whole blue-collar population of 49 workers targeted for this stage, it was sufficient to meet the minimum 10 samples needed for Cronbach's Alpha calculation (Hertzog, 2008).

All questionnaires were examined for outliers as it may have created a statistical analysis biasness leading to incorrect assumptions (Liu, et al., 2007, 2010; Zijlstra, van der Ark, & Sijtsma, 2007, 2011). Barnett & Lewis (1978) suggested that the outliers be identified first and be omitted for analysis, followed by a separate analysis of the outliers as special cases. Hence, the outliers were removed and recalculated for a final result to examine if the final values fell into the acceptable range.

Statistical Analysis: Svensson (2001, 2012) stated that the use of ordered classifications tools such as questionnaires with rating scales are often implemented for assessing attitudes and perceptions. Hand (1996), Stevens (1955) and Svensson (2001) contended that questionnaires yield only ordinal data with only "rank-invariant properties" or "ordered-structure", that when numerically answers merely signifies an ordering of preference or perception, and do not possess a mathematical meaning. Jakobsson (2004) and Mu et al. (2012) argued that since the intensity or psychological distance between the rating scales for each question cannot be determined, therefore non-parametric statistics should be used. Hence the statistical representation to the data collected via questionnaires should be carefully selected for the right purpose, because treating ordinal data as continuous statistics would generate misleading results and wrong interpretations of the survey (Allen & Seaman, 2007; Jöreskog, 1994; Jöreskog & Sörbom, 1996).

Therefore, non-parametric statistic methods such as frequency table, bar charts, were used for the tabulation of results from the questionnaires for testing the hypothesis. Pearson's Correlation Coefficient between the hypothesis categories and responses variable would be conducted to objectively measure the strength of their relationship. The strength of the correlation coefficients would be gauged according to Figure 18 (Saunders et al., 2009a).



Source: Saunders et al., (2009)

Figure 18: Correlation Coefficients

A value of less than 0.05 would mean that this probability is very low and not significant. Vice-versa, if the probability is greater than 0.05 would indicate that the probability is high, and the value is of significant. To understand the significant of any differences present, a correlation table was generated to visually compare and show the relationship between the variables.

Hypotheses Testing: Using weighted-mean score, the 5-point Likert's scales were regrouped to 3 categories; "Positive", indicating an agreement of the hypothesis or a desirable response; "Neutral", meaning they are not decisive on their reaction, and "Negative", meaning they disagree with the hypothesis or an undesirably response. Weighted mean score allowed easier comparison of ordinal variables such as the use of Likert scale in the questionnaires, where each of the rated points contributes to the final average (Franceschini et al., 2004). The groupings of responses into these categories were treated as ordinal or interval data for statistical analysis (Patton, 1990). The result was being plotted on a bar-chart for easy comparison and was tested to seek if they supported or rejected the hypothesis.

3.4.2 Stage-2: Qualitative – Inductive Approach

In this stage, using inductive approach, the focus is on investigating the factors in depth the context of the responses from an individual. This is to understand how change is perceived and how training can affect their behaviour (Buchana & Badham, 1999; Isabella, 1990).

Semi-structured interviews increase the degree of flexibility in research which avoids a reliance on pre-determined assumptions and focus on the meaning of key issues. It can enable sensitive issues to be addressed and help to appreciate a wider social context of what the employees were experiencing (Burman & Parker, 2016). Similarly, there were also constraints to using semi-structured interviews. Conducting interviews and analysing the material can be time consuming hence it usually involves a relatively small number of participants (Griffin, 2004).

Transcribing of data: The transcribing process was be executed by myself and it enhanced data familiarity as interviews data and transcribing were performed by the same person Due to the fact that interviews were not conducted in English, a longer time was needed for translating before Nivivo software can be used for analysis process. The syntactic structure, term or tense was adjusted to suit the work group's culture to reflect these linguistic and cultural characteristics (Mcgorry, 2000). Singapore Colloquial Language was one of the major challenges encountered for transcribing interview records. Responses by Chinese operators consisted not only Mandarin, but intertwined with phases of English and Malay, as well as interjected with local dialect such as Hokkien, Teo-Chew and Cantonese. English speaking operators also had other Malay and dialect phases combined in their responses. The local informal language "Singlish" have it unique slang and syntax. How each different sentence construct end such as "Lah", "Lor", "Mah", Leh" did influenced the meaning. Therefore, translation software could not be used directly and had to be done manually.

As a bilingual with my knowledge in Hokkien, Teo-Chew and Cantonese, Malay, each of the recordings was noted for the syntactic structure, term or tense as spoken by the participants so as to reflect these linguistic and cultural characteristics (Mcgorry, 2000). To reduce bias and achieving a higher accuracy, I engaged 2 associates who did not have any link with P-Tech to sample check on my interpretation and the coding of themes. They were selected based on their experienced in research work at MBA level. Both were bilingual with a good comprehension of Singapore and Malaysia colloquial dialect. Separately, 5 sample points of different recordings were selected randomly by them and played. By referring to my transcriptions, they were able to check against the recordings to determine if they were accurately interpreted and coded. Their feedback was reviewed, and minor corrections were made.

Data analysis and coding Process: Nivivo software was used for managing the data for the short questions & interview transcripts. Qualitative data were coded and analysed using a Framework Analysis Method. Srivastava & Thomson (2009) noted that a Framework Analysis method adapts well to specific questions for researching focusing on a limited time frame, pre-determined sample, and priori concerns. It provided a good tool to understand what was happening and evaluate procedures and policies affecting the targeted people (Ritchie & Spencer, 2002).

The coding process began by developing a list of codes (Miles & Huberman, 1994). These codes were based on the antecedences characteristics (IV), and responses (DV) that were then categorised to themes and sub-themes to identify various aspect of resistance or acceptance to change (Table 12). The first level of the coding is based on the 3 antecedence identified in this study. The rationale was to ensure that findings were related and focused on the research aim and objectives and data developed can be crosschecked against the quantitative data for findings triangulation. The transcripts were analysed and marked for phases and words describing their perception, thoughts and behaviour pertaining to the theme. Meaningful phases, and words related to the main themes which give context, cause, or example were highlighted and then assigned with a code. The codes were applied again each time a suitable section was encountered. Several of these sub-codes that are related are then grouped together to form sub-themes.

Table 12: Coding Table

	Main Themes			Sub-Themes				
Interviewee	Training	Participation	Communication	Group Dynamic	Work Arrangement	Relationship	Freq of Comm	Etc…
1								
2								
3								
4								

The thematic analysis was performed individually, between and across all transcripts (Figure 19). Responses to the same questions were compared and memo noted down for investigation. To break down and extract the data into codes and meaningful themes, the transcripts were read line by line, sentence by sentence (Strauss and Corbin, 1998).

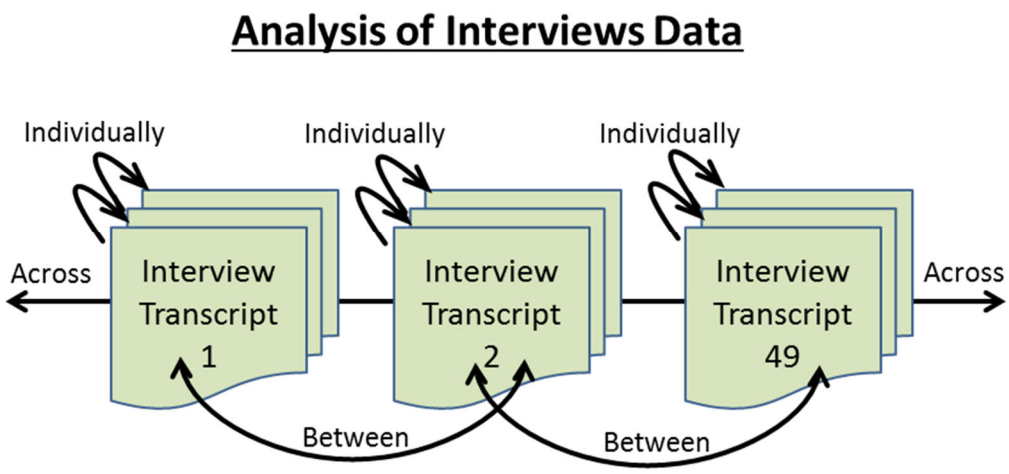


Figure 19: Analysis of Interview Data

As the data were coded, hierarchical groups of themes and sub-themes were formed. The links between codes and themes was restructured as the connections unfolded (Hargie & Tourish, 2009). Examining all the responses, relationships between them were surfaced as I questioned the connection between the experiences of the blue-collar workers with the research aim and objectives. The intention for this analytical process was to seek evidence that the surfaced themes were supported by as many interviewees as possible.

3.4.3 Stage-3: Cyclical Quantitative & Qualitative – Abductive Approach

Abductive analysis is an approach intended at producing novel and creative theoretical understandings by a process of cultivating methodological heuristics and theoretical sensitivity dialectically (Timmermans & Iddo Tavory, 2012). Supported by Van Maanen et al. (2007), this approach can complement Deduction & Induction for testing possible theories thus producing a more robust research. Aliseda (2006) and Ketokivi & Mantere (2010) describe abduction reasoning as an approach that is useful in explaining an unexpected observation or a "surprising fact". A form of reasoning that can be found in various different situations with incomplete data, abductive's thought process flow from evidence to explanation (Aliseda, 2006). Harman (1965) and Timmermans & Iddo Tavory 2012) posit that the analysis process is heavily dependent on the knowledge and experience of the researcher. Hence, using my experience and involvement in the company and industry where the study was conducted, it was

appropriate and could potentially develop a "Best Explanation" from other observed research data (Lipton, 2004; Harman, 1965).

Data Analysis Process: Compared to a Deductive and Inductive approach, an abductive approach is not as clearly established in the literature. However, as suggested by several academics, the analytical process for abduction consists of **De-familiarizing** with the gathered data, **Revisiting the Experience** with an alternative perspective to discover new findings that were missed out earlier (Bachmann, 2017; Marion, 2002; Timmermans & Tavory, 2012). In De-familiarizing, or "Alienation", a method practiced by Brecht (1974), involved the removal of prior assumptions on the data and confronting them as new and unfamiliar (Timmermans & Tavory, 2012). When coupled with revisiting the data by re-experiencing them with a different view at a different time, observations that were taken for granted and relegated to the background could surface and may develop further into more findings and focal points (Burawoy, 2003; Marion 2002). As Kilpinen (2009) noted, revisiting the experiences or data compel a researcher to rethink and re-examine routine experiences and assumptions and break personal habitual perceptions.

To achieve this, the quantitative data from the questionnaires was disaggregated back to its raw form and the qualitative coding and themes were remove from the define boundaries and framework. Although the data were removed from its pre-confined structure, the responses still originated from answering the research aim and objectives. As proposed by Mayring (2002) and Saldana (2009), the qualitative data was re-analysed individually again for patterns and issues that may have been overlooked during coding. The difference between these qualitative processes is that while an inductive approach moves from a sample to develop a set of observation, an abducted approach the analysis from appreciating a single observation to develop its explanation (Aliseda, 2006). The new observations were systematically compared, taking notes of variation over qualitative data, time, and groups (Tavory & Timmermans, 2014). They were rechecked with the raw quantitative data for verification with the aim to establish new trends or findings. Leading from the new findings, the quantitative data were re-organized and re-plotted to validate if there is any significant trends or patterns. The process continued to move back and forth between the different data sets, aimed to establish more findings or to further strengthen findings are already found.

3.5 Pilot Study

A pilot study was conduct in April 2019 to test out the data collection instrument and techniques. Due to the small population, there was a need to preserve and secure as many blue-collar workers as possible for the main study in order to derive statistically significant for the quantitative data analysis. 11 Technicians took part for phase-1 survey and 1 operator was invited for phase-1 semi-structured interview. Due to the small sample size, the pilot study focused mainly on ensuring smooth administration of the data collection methods. A checklist for the questionnaires and interviews was created to review administration process (Table 13).

Table 13: Data Collection Checklist

S/No	Check item	Description
1	Translations accuracy	Does the meaning of the questions in English and Chinese the same.
2	Question difficulty	Are the question too complex and difficult to understand and answer.
3	Double-Barrelled Questions	Are there questions that are addressing two issues.
4	Leading questions	Are there questions that are leading or contain evocative language.
5	Knowledge	Does the participants have the knowledge to answer the questions.
6	Meaning	Are there alternative meaning or different understanding to the questions.
7	Wordings	Are there jargon or words used that are unclear or vague.
8	Answer choice	Are all possible responses included.
9	Time frame	Are reference time frame provided for question addressing specific events or periods.
10	Sequence	Is the sequence of questions appropriate.
11	Number of questions	Is the number of question posted appropriate.
12	Form and Layout	Is the layout and format clear and tidy, visually comfortable.
13	Scale and Ratings	Are the ratings for questionnaires appropriate, balance and easy to apply.
14	Instruction clarity	Is the instruction for the questionnaire and interviews clear and easy to follow.
15	Administrative Time	Is the time taken to complete the questionnaire / interviews appropriate.

The questionnaires result indicated that all the hypotheses were met, indicating that a positive perception of Training Effectiveness, Level of Participation, and Communication would result in a positive response. Nevertheless, statistical testing was limited as the sample size was too small to provide reliable quantitative provisional findings. Statistically, for testing the internal consistency for the response, a sample size of 30 would be ideal (Johanson & Brooks, 2010), but due to the limited population available, 11 participants were obtained and were able to meet the minimum 10 samples needed for Cronbach's Alpha calculation (Hertzog, 2008). Cronbach's Alpha above 0.7 was achieved. Outliers were observed and were found to be created by questions that can hold multidimensional tendencies, and confusion due to reversed-scored questions. Therefore, the final questionnaires were revised, and the numbers of reversed-score questions were reduced confusion.

In phase-2 semi-structured interviews, the analysis of qualitative data was exercised. The recorded interview was transcribed and translated as per the plan for main study. However, as the surveyed sampled group was not from the blue-collar worker population, and with only one interview conducted, abductive analysis was not exercised. Nevertheless, one major theme stood out when analysing the interview. That was for implementing change initiative in the blue-collar work environment, group dynamics need to be taken in to account. This is due to the work arrangement and the close working environment. The performance of a work area is a collective result of many individuals working together. Hence a change in one individual would affect the entire team of blue-collar workers. This finding helped to refine the final interview questions and allowed the opportunity for deeper exploration of the group dynamics involved in their work environment and how it might influence their responses to change. A comparison table between pilot study and actual study can be referred to in Appendix 01. It shows the reasons for the difference in conditions that the study was conducted.

3.6 Ethical Considerations

Many academics have stressed the importance of ethics in the conduct of research (Edwards, 2002; Human-Vogel & Coetzee, 2011; Lategan, 2011, 2012). Johnson (2009) called out to researchers to be honest, accurate and ethical in their work, keeping in mind that the maintenance of the highest ethical standards should be a given. Therefore, is it essential that ethical considerations are also considered in this research from the conception till its completion.

The ethical standards in research adhere to Edinburgh Napier University's Code of Practice on Research Ethics and Governance (Research Study Ethic Form). An approval by the board was given on 17th April 2019, thereafter, the data collection started. In particular, data confidentiality from the questionnaires was ensured so that participants remained anonymous and undistinguishable. The selected participants for interviews were picked randomly using stratified random sampling method to ensure that it covers all the work areas and that no individual is being targeted. To ensure that the participants were totally comfortable, the time and location of the interview were determined by the participants themselves. Consent forms (Appendix-02 & 03) to clarify my position as a researcher and the purpose of this research. It

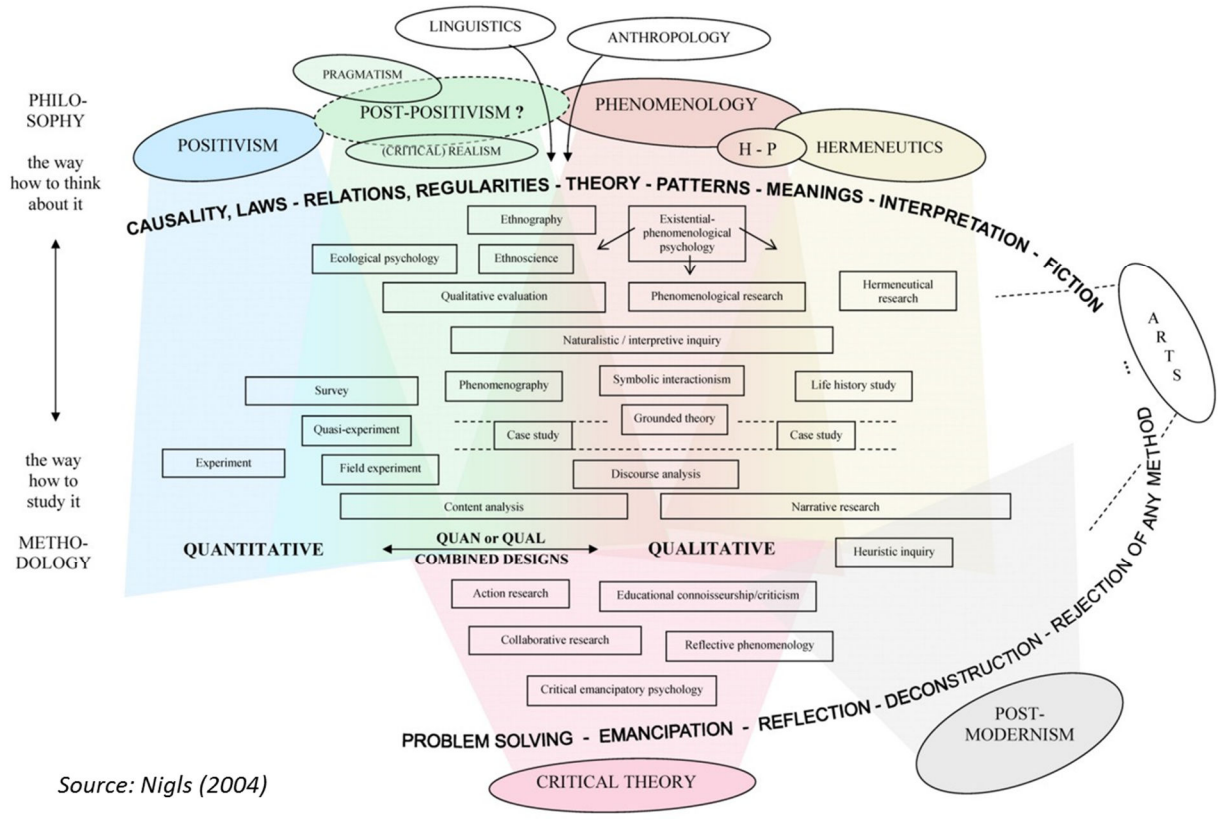
also ensured that all responses were given willingly and that they were not coerced, participants could choose to reject the interview if they felt uncomfortable after my explanation to them.

The Power-Relationship of participants and me was of significant concern. While some may take opportunities to feedback real issues, some data could be inaccurate as participants may be afraid of repercussion affecting participants' response. As Qu & Dumay (2011) noted, Power relations can be a double-edged sword as the interviewee may view it as a gain for sharing information that is deem sensitive, or they may not be willing to share in fear of repercussion. To mitigate this as suggested by the interviewee, who had a close work relationship with operators, interviews was conducted in pairs. Thereby reducing the fear factor and yet keeping the group small for more personal sharing.

As P-Tech is also certified under the Responsible Business Alliance (RBA)® Code of Conduct v6.0. Headed by the Human Resource, RBA covers employee welfare and safety which includes no harm to whistle blower, fair treatment, and welfare. The study was monitored by the HR and I stuck strictly to P-tech's established code of conduct. This was to ensure participants were not receive negatively impacted due to their involvement and information given, thus providing a psychological safety that encourages and support freedom in expressing ideas and feedback.

3.7 Summary

As we have discussed and can see in Figure 20, each philosophical approach and methodology has its strengths & weaknesses and they have overlapping attributes (Niglas, 2004). Connell & Nord 1996 and Hughes & Sharrock (2016) concur with Holloway & Wheeler (1996) that there is no basis for any one of these paradigms be viewed as the unequivocally correct philosophical stances. Rather, Holden & Lynch (2004) caution that inappropriate pairing of research problems methodology may produce in questionable results.



Source: Nigls (2004)

Figure 20: Philosophical & Methodological Approaches

Figure 21 illustrates the framework for the research design, methodological approach and process flow utilized in the study. In summary, this research adopted a Post-Positivistist philosophical paradigm. A cross-sectional mixed-methods design consisting two data collection phases was conducted by implementing quantitative approach in phase-1, followed by a qualitative approach in phase-2. In the search for a more robust & rigorous analysis to arrive at the best result for the investigated subject, this research draws on inference from deduction, induction, and abduction as the foundation for its analytical approach to arrive at the research findings. From the conclusions, recommendations and contribution to knowledge & practice would be made. For other findings that are not related to the research aim and objectives would be proposed for future research.

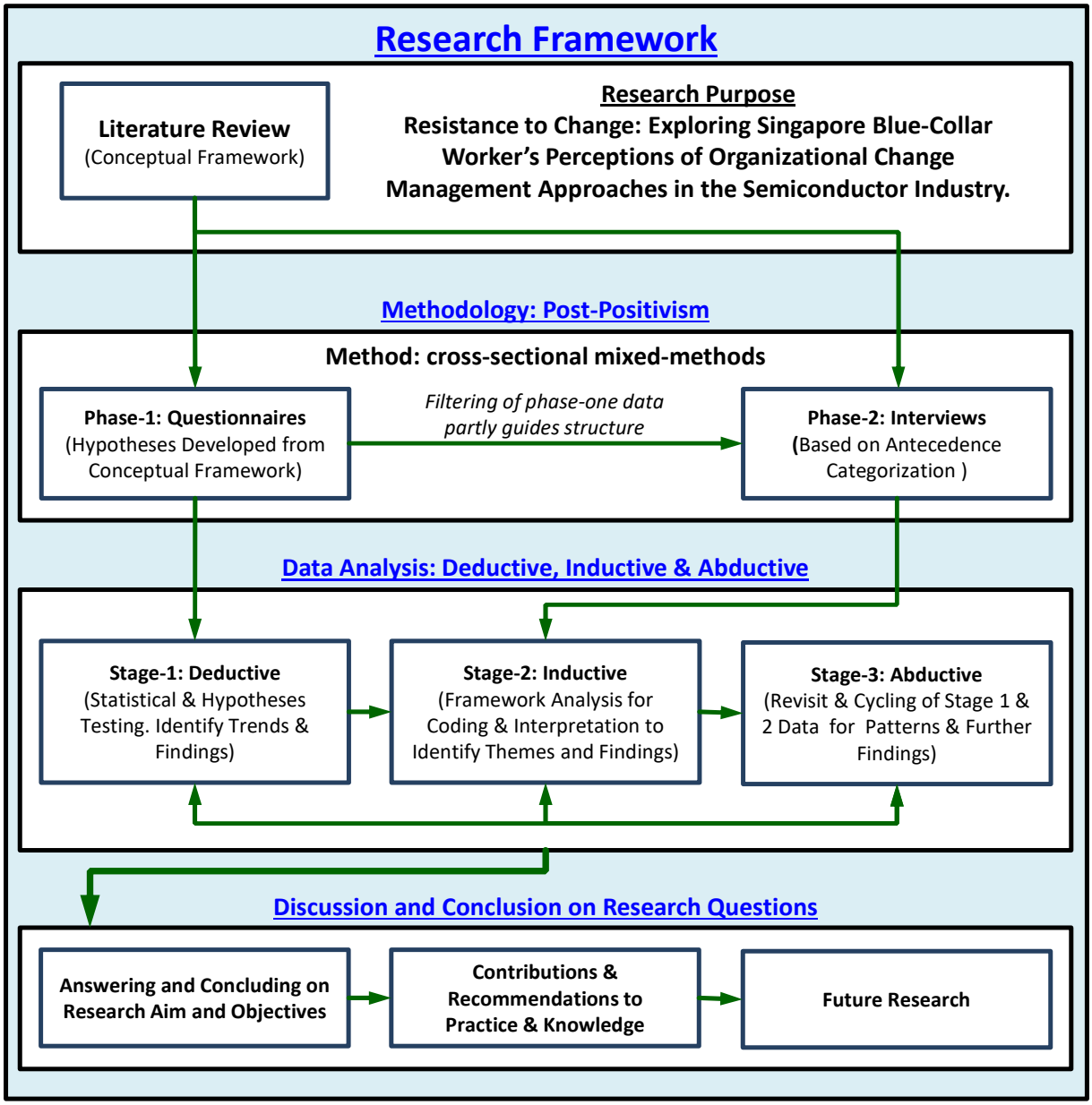


Figure 21: Research Framework

4.0 Findings

This chapter will present the findings from the analysis of the data collected from the questionnaires & the semi- structured interviews. A total of 6 themes emerged after completing three stages of analysis:

1. Quantitative Findings
2. Qualitative Findings
3. Cyclical Quantitative & Qualitative Findings

4.1 Stage-1: Quantitative Findings

The descriptive statistics were produced from the questionnaire data which set out to examine the blue-collar worker's perception and response to the changes in their working environment. This stage achieved a 91.84% participation rate based on the total population of 49 blue-collar workers. The demographic information was tabulated and will be discussed below. To check the internal reliability, their correlations and the significance of the data, Cronbach's Alpha and Pearson's Correlations were calculated. Finally, the inferential results were deduced from the statistical data analysis and testing of the 3 hypotheses developed to provide the findings for this research.

4.1.1 Descriptive Statistics Analysis

Descriptive statistics facilitated the summarization of the sample observations (Babbie, 2010) and enabled easier comparison of data (Saunder et al., 2009a), which allow appreciation of the data before exploring causative connections between variables and testing of the hypotheses (Kumar, 2013).

Demographic Information: 45 out of 49 blue-collar workers volunteered for this phase. 4 blue-collar workers did not participate. 2 workers were on short-term contracts employed from China; hence, they did not meet the sample criteria as stipulated in Chapter 3. One worker did

not want to participate, and another was on medical leave. As the plan was to target the entire blue-collar population in P-Tech, this phase achieved a 91.8% participation rate.

Table 14: Demographic Information

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20yo to 29yo	14	31.1	31.1	31.1
	30yo to 39yo	22	48.9	48.9	80.0
	40yo and Above	9	20.0	20.0	100.0
	Total	45	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	7	15.6	15.6	15.6
	Female	38	84.4	84.4	100.0
	Total	45	100.0	100.0	

Years of Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1 Years	5	11.1	11.1	11.1
	1 to 5 Years	20	44.4	44.4	55.6
	6 to 10 Years	11	24.4	24.4	80.0
	11 to 15 Years	3	6.7	6.7	86.7
	> 15 Years	6	13.3	13.3	100.0
	Total	45	100.0	100.0	

Table 14 contains the demographic information of the participants who took part in the questionnaires. The categorization was done with input from the Human Resource department to reduce the chances of identifying any participants during data collections. None of the categories contain a single count; hence no worker was singled out. The highest numbers of blue-collar workers were female, aged between 30 to 39 years, with between 1 to 5 years of experience; the categories are not evenly distributed. Table 15 shows the list of possible issues that may arise due to demographical factors. Understanding and taking into consideration the differences in demographic characteristic was helpful to inference analysis and other stages of analysis to explain observations (Creswell & Creswell, 2017).

Table 15: Demographic Influencing Factors

Demographical Factors	Remarks	Reference
Gender	Female with young children may treat work stablity differently from others without children. Female still play a major role as care giver for children.	Rosenblatt et al. (1999) Durbin et al. (2017)
	Male workers tends to request for active roles while female have tendency to request for fixed stationary roles.	
Age	Older worker may view job stablity more important while younger operators may view career prospect as priority.	Kunze et al. (2013) Rosen & Jerdee, (1976)
Experience	Length of experience may influence their views and how they respond to changes.	Töremen et al. (2009) Pourrajab et al. (2015)
	Experience may influence their ability to move to other company if they are uncomfortable with the present work situation.	

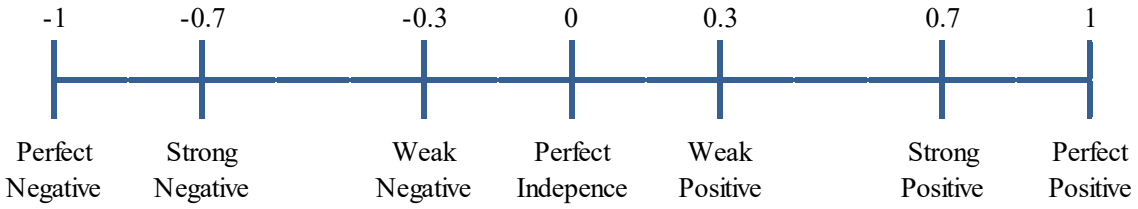
Data Reliability: to determine internal consistency for the questionnaires, SPSS version-23 was used to examine the Cronbach's Alpha. Known as the coefficient of reliability (Gall, Gall, & Borg 2007; Yu, 2001), a value of 0.7 or higher is set as the cut-off value for tests (Christmann & Van Aelst, 2006; Nunnally, 1978; Santos, 1999). Statistically, a sample size of 30 would be ideal (Johanson & Brooks, 2010). Therefore, the 49 participants obtained were able to meet the minimum 10 samples needed for Cronbach's Alpha calculation (Hertzog, 2008). The questionnaires collected were numbered and their results tabulated. The Cronbach's Alpha was then calculated and tabulated (Table 16). The result shows 3 categories that are marginally below 0.7 which is benchmarked as acceptable (Tavakol, & Dennick, 2011). The rest were within the acceptable range of 0.707 to 0.833.

All questionnaires were examined for outliers to prevent statistical analysis bias leading to incorrect assumptions (Liu, et al., 2007, 2010; Zijlstra, van der Ark, & Sijtsma, 2007, 2011). Barnett & Lewis (1978) suggest that the outliers should be identified first and be omitted for analysis, followed by a separate analysis of the outliers as special cases. Outliers were observed in questions for H13 & H14, and extreme responses were observed for questionnaire number 12 and 37. In H32, question 1, which was a reversed scored, may have added confusion to questionnaire number 12, 15 and 37, hence it was removed. As Zhang, Zhiyong, & Yuan (2016) noted, subjective decisions are unavoidable when managing outliers. Hence, the outliers were removed and recalculated, which resulted in the final values falling into the acceptable range (Table 16).

Table 16: Cronbach's Alpha Analysis

Cronbach's Alpha Analysis					Main Survey Results			Main Survey Results (Adjusted for Outliers)			Remarks
Hypothesis	Category	General Response to current changes	Behavioural Response	Code	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	
Hypothesis 1 (H1): If blue-collar worker perceive training program is effective to successful adapt to the new work environment change, then the resistance to change response is likely to be low.	Training	Response to current training program and arrangement		H11	0.765	0.792	6				
			Absenteeism	H12	0.719	0.716	3				
			Resign or Intention to Resign	H13	0.694	0.693	3	0.713	0.707	3	Remove no 4
			Production Restriction	H14	0.624	0.652	3	0.705	0.711	3	Remove no 12,37
			Conformity & Compliance without Commitment	H15	0.756	0.786	3				
Hypothesis 2 (H2): If blue-collar worker perceives greater participation in the change activities, then negative resistance response is likely to be low.	Participation	Response to current level of participation		H21	0.708	0.707	6				
			Absenteeism	H22	0.723	0.723	3				
			Resign or Intention to Resign	H23	0.777	0.787	3				
			Production Restriction	H24	0.705	0.765	3				
			Conformity & Compliance without Commitment	H25	0.706	0.708	3				
Hypothesis 3 (H3): If blue-collar worker understand the communicated reasons & expected result of the change, then negative resistance response is likely to be low.	Communication	Response to current communication received		H31	0.757	0.782	6				
			Absenteeism	H32	0.619	0.642	3	0.747	0.751	3	Remove Qn 1 Remove 12,15,37
			Resign or Intention to Resign	H33	0.776	0.772	3				
			Production Restriction	H34	0.797	0.833	3				
			Conformity & Compliance without Commitment	H35	0.760	0.767	3				

Correlations: Pearson's Coefficient was used to explore the association of variables (McCrum, 2008; Pallant, 2013). Greener (2008) & Saunders et al. (2009a) note that Parson's Coefficient can be used to quantify the strength relationship and direction between variable. A positive value indicates that as one variable increases, the corresponding variable will increase. Vice-versa, a negative value indicates that as one variable increases, the corresponding variable decreases (Tian & Wilding, 2008; Westfall & Young, 1993). The strength of the correlation coefficients was gauged according to Figure 22 (Saunders et al., 2009a).



Source: Saunders et al., (2009)

Figure 22: Correlation Coefficients Reference

The data were organized to test the relationship between Years of Experience & Age versus the categorized responses to produce a correlation for Table 17 and 18 respectively. In examining Table 17, all categories have a Pearson's r value and p-value that shows a moderately strong relationship and significance of r = (0.404 to 0.613), n = 45, p < (0.006). The result showed positive relationship. It demonstrates that as Years of Experience increases, the positive response to change also increases. However, studying Table 18, although all categories show a positive relationship, its strength is noticeably weaker, with a range of r = (0.244 to 0.478). This could suggest that the age of workers may not strongly influence how worker response to changes. This is strongly displayed in the Participation categories that have the bigger range in r value and with p value > 0.05 in H21 & H24, indicating the correlation is insignificant.

Table 17: Pearson's Correlations by Years of Experience Group

Pearson's Correlations			Training					Participation					Communication				
		Years of Experience	H11	H12	H13	H14	H15	H21	H22	H23	H24	H25	H31	H32	H33	H34	H35
Years of Experience	Pearson Correlation	1	.404**	.404**	.409**	.596**	.528**	.456**	.406**	.498**	.469**	.601**	.537**	.443**	.613**	.505**	.586**
	Sig. (2-tailed)		.006	.006	.005	.000	.000	.002	.006	.001	.001	.000	.000	.002	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H11	Pearson Correlation	.404**	1	.709**	.647**	.566**	.663**	.646**	.613**	.681**	.578**	.693**	.650**	.486**	.626**	.478**	.571**
	Sig. (2-tailed)	.006		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.001	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H12	Pearson Correlation	.404**	.709**	1	.759**	.517**	.795**	.509**	.781**	.724**	.570**	.681**	.770**	.696**	.757**	.440**	.602**
	Sig. (2-tailed)	.006	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H13	Pearson Correlation	.409**	.647**	.759**	1	.553**	.714**	.570**	.739**	.735**	.548**	.694**	.738**	.623**	.773**	.632**	.626**
	Sig. (2-tailed)	.005	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H14	Pearson Correlation	.596**	.566**	.517**	.553**	1	.646**	.527**	.621**	.697**	.503**	.631**	.600**	.529**	.615**	.626**	.515**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H15	Pearson Correlation	.528**	.663**	.795**	.714**	.646**	1	.537**	.739**	.814**	.561**	.712**	.739**	.655**	.800**	.584**	.638**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H21	Pearson Correlation	.456**	.646**	.509**	.570**	.527**	.537**	1	.571**	.580**	.415**	.530**	.544**	.354*	.504**	.386**	.474**
	Sig. (2-tailed)	.002	.000	.000	.000	.000	.000		.000	.000	.005	.000	.000	.017	.000	.009	.001
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H22	Pearson Correlation	.406**	.613**	.781**	.739**	.621**	.739**	.571**	1	.808**	.537**	.733**	.741**	.752**	.815**	.575**	.531**
	Sig. (2-tailed)	.006	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H23	Pearson Correlation	.498**	.681**	.724**	.735**	.697**	.814**	.580**	.808**	1	.681**	.811**	.776**	.718**	.855**	.575**	.658**
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H24	Pearson Correlation	.469**	.578**	.570**	.548**	.503**	.561**	.415**	.537**	.681**	1	.802**	.646**	.664**	.701**	.602**	.765**
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.005	.000	.000		.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H25	Pearson Correlation	.601**	.693**	.681**	.694**	.631**	.712**	.530**	.733**	.811**	.802**	1	.766**	.739**	.851**	.623**	.719**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H31	Pearson Correlation	.537**	.650**	.770**	.738**	.600**	.739**	.544**	.741**	.776**	.646**	.766**	1	.690**	.782**	.611**	.636**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H32	Pearson Correlation	.443**	.486**	.696**	.623**	.529**	.655**	.354*	.752**	.718**	.664**	.739**	.690**	1	.827**	.676**	.643**
	Sig. (2-tailed)	.002	.001	.000	.000	.000	.000	.017	.000	.000	.000	.000	.000		.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H33	Pearson Correlation	.613**	.626**	.757**	.773**	.615**	.800**	.504**	.815**	.855**	.701**	.851**	.782**	.827**	1	.691**	.724**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H34	Pearson Correlation	.505**	.478**	.440**	.632**	.626**	.584**	.386**	.575**	.575**	.602**	.623**	.611**	.676**	.691**	1	.682**
	Sig. (2-tailed)	.000	.001	.002	.000	.000	.000	.009	.000	.000	.000	.000	.000	.000	.000		.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H35	Pearson Correlation	.586**	.571**	.602**	.626**	.515**	.638**	.474**	.531**	.658**	.765**	.719**	.636**	.643**	.724**	.682**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

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

*. Correlation is significant at the 0.05 level (2-tailed).

Table 18: Pearson's Correlations by Age Group

Pearson's Correlations			Training					Participation					Communication				
		Age	H11	H12	H13	H14	H15	H21	H22	H23	H24	H25	H31	H32	H33	H34	H35
Age	Pearson Correlation	1	.429**	.314*	.331*	.383**	.364*	.244	.350*	.478**	.156	.412**	.360*	.302*	.499**	.364*	.318*
	Sig. (2-tailed)		.003	.036	.026	.009	.014	.107	.019	.001	.307	.005	.015	.044	.000	.014	.033
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H11	Pearson Correlation	.429**	1	.709**	.647**	.566**	.663**	.646**	.613**	.681**	.578**	.693**	.650**	.486**	.626**	.478**	.571**
	Sig. (2-tailed)	.003		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.001	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H12	Pearson Correlation	.314*	.709**	1	.759**	.517**	.795**	.509**	.781**	.724**	.570**	.681**	.770**	.696**	.757**	.440**	.602**
	Sig. (2-tailed)	.036	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H13	Pearson Correlation	.331*	.647**	.759**	1	.553**	.714**	.570**	.739**	.735**	.548**	.694**	.738**	.623**	.773**	.632**	.626**
	Sig. (2-tailed)	.026	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H14	Pearson Correlation	.383**	.566**	.517**	.553**	1	.646**	.527**	.621**	.697**	.503**	.631**	.600**	.529**	.615**	.626**	.515**
	Sig. (2-tailed)	.009	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H15	Pearson Correlation	.364*	.663**	.795**	.714**	.646**	1	.537**	.739**	.814**	.561**	.712**	.739**	.655**	.800**	.584**	.638**
	Sig. (2-tailed)	.014	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H21	Pearson Correlation	.244	.646**	.509**	.570**	.527**	.537**	1	.571**	.580**	.415**	.530**	.544**	.354*	.504**	.386**	.474**
	Sig. (2-tailed)	.107	.000	.000	.000	.000	.000		.000	.000	.005	.000	.000	.017	.000	.009	.001
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H22	Pearson Correlation	.350*	.613**	.781**	.739**	.621**	.739**	.571**	1	.808**	.537**	.733**	.741**	.752**	.815**	.575**	.531**
	Sig. (2-tailed)	.019	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H23	Pearson Correlation	.478**	.681**	.724**	.735**	.697**	.814**	.580**	.808**	1	.681**	.811**	.776**	.718**	.855**	.575**	.658**
	Sig. (2-tailed)	.001	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H24	Pearson Correlation	.156	.578**	.570**	.548**	.503**	.561**	.415**	.537**	.681**	1	.802**	.646**	.664**	.701**	.602**	.765**
	Sig. (2-tailed)	.307	.000	.000	.000	.000	.000	.005	.000	.000		.000	.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H25	Pearson Correlation	.412**	.693**	.681**	.694**	.631**	.712**	.530**	.733**	.811**	.802**	1	.766**	.739**	.851**	.623**	.719**
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H31	Pearson Correlation	.360*	.650**	.770**	.738**	.600**	.739**	.544**	.741**	.776**	.646**	.766**	1	.690**	.782**	.611**	.636**
	Sig. (2-tailed)	.015	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H32	Pearson Correlation	.302*	.486**	.696**	.623**	.529**	.655**	.354*	.752**	.718**	.664**	.739**	.690**	1	.827**	.676**	.643**
	Sig. (2-tailed)	.044	.001	.000	.000	.000	.000	.017	.000	.000	.000	.000	.000		.000	.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H33	Pearson Correlation	.499**	.626**	.757**	.773**	.615**	.800**	.504**	.815**	.855**	.701**	.851**	.782**	.827**	1	.691**	.724**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H34	Pearson Correlation	.364*	.478**	.440**	.632**	.626**	.584**	.386**	.575**	.575**	.602**	.623**	.611**	.676**	.691**	1	.682**
	Sig. (2-tailed)	.014	.001	.002	.000	.000	.000	.009	.000	.000	.000	.000	.000	.000	.000		.000
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
H35	Pearson Correlation	.318*	.571**	.602**	.626**	.515**	.638**	.474**	.531**	.658**	.765**	.719**	.636**	.643**	.724**	.682**	1
	Sig. (2-tailed)	.033	.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

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

*. Correlation is significant at the 0.05 level (2-tailed).

4.1.2 Hypotheses Results and Analysis

Using a weighted-mean score, the 5-point Likert's scale was regrouped to 3 categories; "Positive", indicating an agreement with the hypothesis or a desirable response; "Neutral", meaning participants were not decisive in their reaction, and "Negative", meaning they disagree with the hypothesis or an undesirably response. Weighted mean score allows for easier comparison of ordinal variables such as the use of the Likert scale in the questionnaires, where each of the rated points contributes to the final average (Franceschini et al., 2004). The responses from all the questionnaires were re-grouped accordingly and were plotted on a bar-chart in Figure 23.

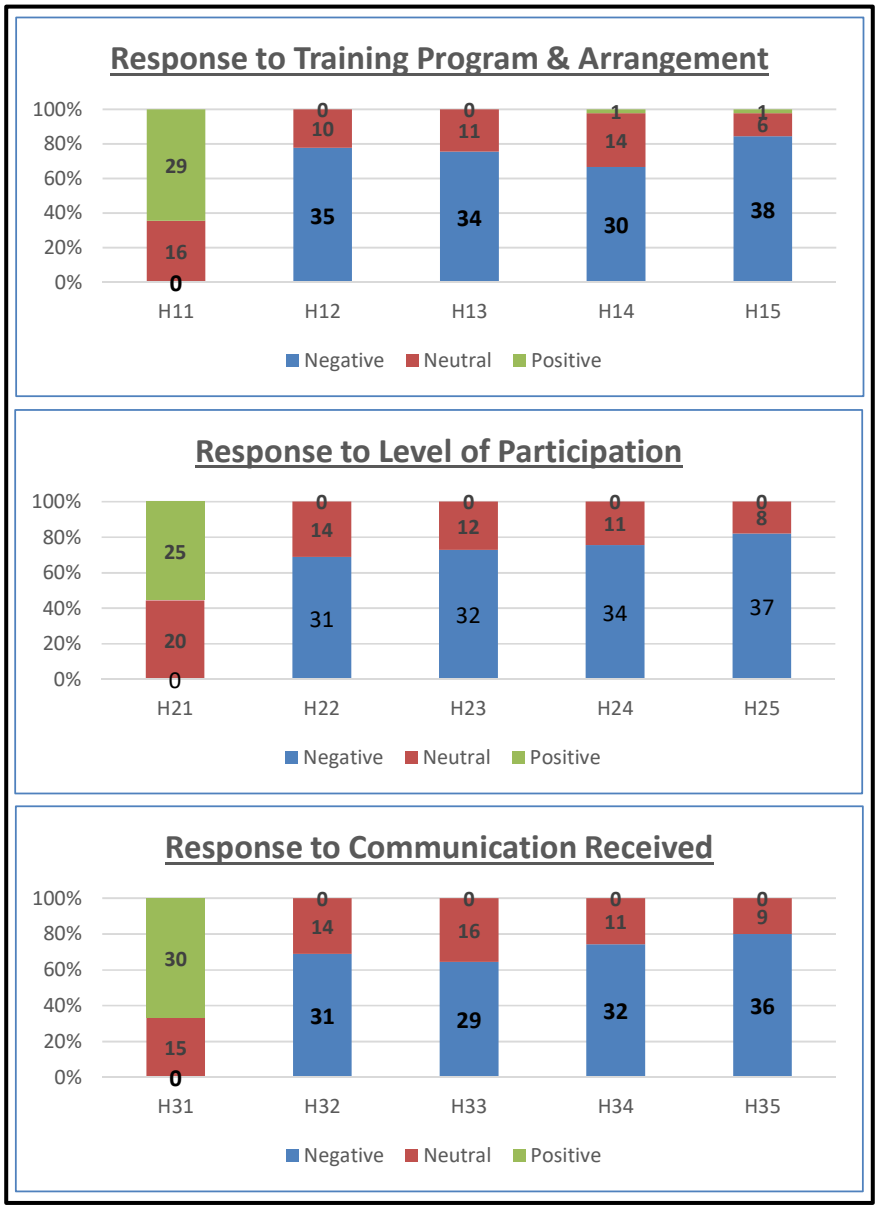


Figure 23: Responses Comparison Chart

The results for each hypothesis were also tabulated and tested according to the hypothesis to see if the statement was true or null (Table 19).

Table 19: Weighted Average for Each Hypothesis

Hypotheses Construct	Sub-category	Code	Positive	Neutral	Negative	Total
Training		**H1**	29 64%	16 36%	0 0%	45 100%
	Absenteeism	H12	0 0%	10 22%	35 78%	45 100%
	Resign or Intention to Resign	H13	0 0%	11 24%	34 76%	45 100%
	Production Restriction	H14	1 2%	14 31%	30 67%	45 100%
	Conformity & Compliance without Commitment	H15	1 2%	6 13%	38 84%	45 100%
Participation		**H2**	25 56%	20 44%	0 0%	45 100%
	Absenteeism	H22	0 0%	14 31%	31 69%	45 100%
	Resign or Intention to Resign	H23	0 0%	12 27%	32 73%	44 100%
	Production Restriction	H24	0 0%	11 24%	34 76%	45 100%
	Conformity & Compliance without Commitment	H25	0 0%	8 18%	37 82%	45 100%
Communication		**H3**	30 67%	15 33%	0 0%	45 100%
	Absenteeism	H32	0 0%	14 31%	31 69%	45 100%
	Resign or Intention to Resign	H33	0 0%	16 36%	29 64%	45 100%
	Production Restriction	H34	0 0%	11 26%	32 74%	43 100%
	Conformity & Compliance without Commitment	H35	0 0%	9 20%	36 80%	45 100%

De Jager (2001) posits that training aimed at getting workers to perform in their new work assignment can handle resistance behaviour among workers. Making changes to the training program can reduce their resistance and improve the workplace moral among workers (Kappelman & Richards, 1996).

In hypothesis 1 (H1):

> *If blue-collar worker perceives the training program as effective to successful adaptation of the new work environment change, then the resistance to change response is likely to be low.*

The hypothesis for Training effectiveness showed 64% positive responses and no negative responses. The sub-categories for the responses also indicated a high negative response to undesirable behaviour. The hypothesis (H1) is true as the result showed the majority of the workers perceived training as effective in helping them adapt to changes and resistance to change is low. In Pearson's Correlations, Training and Age Group were found to be moderately positively correlated, with the worse score at $r(43) = .314$, $p < .005$. Training and Experience Group were also found to be moderately positively correlated, with the worse score at $r(43) = .404$, $p < .001$.

Nevertheless, this is also the only hypothesis that received negative responses for Production Restriction (H14) and Conformity & Compliance without Commitment (H15). Although the number is low, it did show these behaviours existed and thus merited further investigation and understanding during stage-2 interviews.

Reichers et al. (1997) and Waddell & Sohal (1998) have argued that low participation in the lower level of a company tends to result in more negative attitudes about the change.

In hypothesis 2 (H2):

> *If blue-collar workers perceive greater participation in change activities, then negative resistance response are likely to be low.*

With no negative responses, 56% of the respondents indicated a positive perception on the Participation level. It showed that hypothesis (H2) was true with no negative responses. The

sub-categories also did not receive negative responses. In Pearson's Correlations, Participation and Age Group were found mixed with score between low to moderately positive correlated. The worse significant score at $r (43) = .350$, $p < .005$. Two sub-categories registered no significance. Training and Experience Group were also found to be moderately positively correlated, with the worse score at $r (43) = .406$, $p < .001$. The positive response for perceived participation was underwhelming when considered with a high percentage in the neutral group, which may shift the opinion to negative. Therefore, there was a need to understand more about participation as a way to reduce resistance to change by probing more its contexts during interview sessions and to explore ways to try and improve in this area.

Good communication to workers has been stated as an important requisite during change initiatives (Bartlett & Kayser, 1973; Ford & Ford, 2010; Johns (2013), Kotter, 1996).

In hypothesis 3 (H3):

> *If blue-collar worker understands the communicated reasons & expected result of the change, then the negative resistance response is likely to be low.*

The result showed the highest scoring among the 3 hypotheses with 67% perceiving positively on the level of communication and a high score to reject negative responses to disruptive actions. In Pearson's Correlations, Communication and Age Group were found to be moderately positively correlated, with the worse score at $r (43) = .302$, $p < .005$. Communication and Experience Group were also found to be moderately positively correlated, with the worse score at $r (43) = .443$, $p < .001$. Hence, the hypothesis is true. The results show that P-Tech is on the right track in mitigating resistance to change and helped workers to cope with the changing environment.

The responses to the 10 short questions in the questionnaire were encouraging. A total of 45 participants, 342 out of a total of 450 questions or 76% were answered. It provided insights and helped to develop more focus questions for phase-2 interviews.

In summary, for stage-1 analysis, the results indicate that all the hypotheses were met. A positive perception of Training Effectiveness, Level of Participation, and Communication resulted in a positive response towards change. For the 4 sub-categories, the result also

showed negative responses to Absenteeism, Resignation, Production Restriction and Conformity without Commitment, suggesting a low resistance to change. However, as discussed, there were some areas that merit further investigation in the later stages of the analysis. The negative responses in training and the lower scoring in participation was probed further during interviews and will be discussed in Stage-2 Qualitative findings.

4.2 Stage-2: Qualitative Findings

In stage 2, from a target of 12 participants, 11 workers were interviewed. 1 worker withdrew from participating due to medical leave. Due to the rotating shift nature of their work timetable, a rescheduling of another interview for that specific shift will only be possible one week later. As the interview was conducted on specific days, no replacement was arranged to prevent the risk of sharing among the workers the content of the interviews. Using Framework Analysis Method from the coded qualitative data, themes and sub-themes that influence blue-collar worker's perception and influencing factors for resistance or acceptance to change were identified. In this stage, 4 themes emerged from the analysis.

When eliciting blue-collar perceptions towards change initiatives that were currently taking place during the interview, most of them accepted change as part of the transformation in the semiconductor industry and viewed it positively for the company and for themselves.

> *"When company have changes, I felt that changes are always for the good."*
> *(Participant-01)*

> *"I think it a good thing that the company is transforming. It means there is business"*
> *(Participant-05)*

Many felt pressured to learn new skills and feared being unable to meet the new performance expectations but acknowledge that it is an opportunity for new abilities and thus would add value via new learning. Senge (2014) found that learning has been a key factor in organisational adaptability, productivity, and survival.

"Starting will have some pressure and stress, but as time goes, it will get better….. I adapt to it….Let me learn more and increase my value."
(Participant-02)

"There was a lot of pressure. Just felt there a lot I don't know….. But I can learn new things and I am able to expand my experience."
(Participant-09)

The system improvements and new equipment do add more value to their experience and increase their skill level and market value, thus giving them motivations and incentives to accept the changes. This is in line with the result from the questionnaires that reflected that the majority of the workers perceived change positively with lower resistance to change. However, with deeper probing into the context of the 3 antecedence characteristics; Participation, Communication, and Training, revealed that there were other findings that were not captured by statistical data.

4.2.1 Participation

Waddell & Sohal (1998) found that research on employee participation to mitigate resistance to change has been a topic of investigation since the 1940s. They cite classic examples of Coch & French (1948) and Lewin (1991), which conclude that through involvement or participation in the change, resistance appears to be lower. However, it is unclear if the studies were conducted on blue-collar workers that work at an operational level and are therefore not involved in the company developing plans or decisions for transformative change. The concept of participation to blue-collar workers is different compared to most change models, which are directed to levels that could potentially influence the direction of the change plans before execution. The interviews uncovered that participation is welcome, but ability to influence any decisions relating to the change plans or executions is not expected.

"…by participating, there is a better acceptance to the changes because we can understand what is install, the process and we are a bit more prepared… we may know the situation slightly better than them, yet we are not able to change anything." (Participant-02)

"…transfer you to a set position, and you just do. You don't have any opportunity to change anything…. for participation is good but there very little opportunity for operator level to do so."
(Participant-04)

"I think our participation and suggestion don't have any impact or influence." (Participant-06)

The workers felt that most forms of participation to a new set up are just assignments of tasks. They believed that the change plan was pre-determine, and they had very limited control over how much the overall plan can change. Meier et al. (2013) assumed that resistance to change may be lowered if staffs were invited to participate during the planning and execution stage of any change because then the workers would perceive as having some control. Many also supported the notion that workers that experience high level of involvement accept change more readily and demonstrate lower stress yet higher level of support (Oreg et al., 2011). However, in contrast to these observations, blue-collar workers are unlikely to be included in high level planning due to the nature of work and the company. They may, at best, be involved during the implementation phase. Hence, the full effect of reduced resistance to change via participation as noted by Meier et al. (2013) and Oreg et al. (2011) may not be possible. Participation is taken as an opportunity to allow them a "preview" of what is to come, allow them time to be mentally prepared, but do not enable them to influence the outcome.

This finding may explain the lower score for Participation in Stage-1 Quantitative Analysis, which showed lower positive perception compared to Training and Communication. It could suggest that the 44% that responded as neutral in the Participation hypothesis category are not totally convinced that the current level of participation was able to help them cope with change better.

4.2.2 Effective Communication

Wanberg & Banas (2000) and Schweiger & DeNisi (1991) have shown in their works that when workers are clear and satisfied with the information that they receive about the organizational change plan; they are more open to accept changes. Communication is also one of the critical factors in Kotter's (1996) Eight-Step Model, which states that conveying clear & realistic visions, ideas, success, and failures within the organization by management would result in a successful organizational change. The importance of getting information is echoed in the interviews.

> *"This will help. There is more confidence in meeting the expectation."*
> *(Participant-01)*

> *"Yes, so we know the reason for the change and hence can accept it better."*
> *(Participant-06)*

Nevertheless, the interviews reveal that while communication is important, the blue-collar workers were not too keen on hearing big visions or long-term projections & outcomes that they deem not relevant.

> *"There are some items that are not too relevant to us. So, we lose interest."*
> *(Participant-11)*

Many expressed interests only in operational informational and production activities such as loadings, new increase in equipment and manpower. Such information was considered useful to them as they are viewed it as important as high loading implied that there would be higher overtime, thus suggesting P-Tech business are doing well. Increase in equipment and manpower would mean there will be new members that need to be trained or a new process that needs to be learned.

> *"I like to know when we will have loading, what they target for the month. When is the peak and low period etc."*
> *(Participant-04)*

"Quality issue, manpower, equipment increases. Also, on loading will give us confidence."
(Participant-06)

"This information you share is important for us to standby ourselves."
(Participant-08)

The time period of the information was also discussed in the interview. The workers short term view for information relevancy was between 3 to 6 months. Most information beyond that is regarded as not relevant and probably was likely to change.

"One quarter. More than a quarter won't be too relevant for us. Because the change happening is faster than the plan. What happen between that, no one knows."
(Participant-08)

"One quarter would be right. Too long will not be relevant to us."
(Participant-08)

"…we aren't interested in information for later half of the year or next year activities. No one wants to listen."
(Participant-08)

Gill (2002) and Coghlan & Rashford (1990) suggest that communication deficiency leads to misunderstanding of any change purpose, resulting in heightened anxiety and rumours that may affect moral and commitment. While McKay et al. (2013) and Miller et al. (1994) suggest that timely and useful information about the change will result in greater cooperation from workers. Just as observed from the interviews, the information also helped them to be prepared for the coming activities and be mentally ready and reduced their anxiety for any change.

4.2.3 Operator Training

Judson (1996) argues that training should not only prepare workers to be more effective at work, but also relieve them from doubts and fears about their own capabilities to handle new job roles and responsibilities. A few spoke of considering resignation if their performance is going to affect their promotion prospects and salary increment (Caruth et al., 1985).

> *"There will be those that will resign if they can't cope."*
> *(Participant-01)*

> *"They cannot take the pressure they resign."*
> *(Participant-07)*

Most feedbacks suggested that current training programs were effective in preparing them for the work change. However, it was also highlighted that a formalized one-to-one training of the system, procedure and process alone was not enough for an individual to cope with changes in the environment. The blue-collar workers work in teams, each operating a section of the overall manufacturing process. Often, changes would not only involve learning how to operate new equipment, it also entailed a reassignment of the workstation or work team. The interview highlighted that apart from learning how to operate the equipment, it was a critical need to learn how to operate in the team in order to achieve the team target.

> *"Operator work in groups and need teamwork, so when the team cannot work together, the speed or efficiency will be affected."*
> *(Participant-03)*

> *"I plan to process a type of lots, and set a certain target, but a team member affects the speed and disrupts the entire flow. Hence cause lot unable to ship or delay."*
> *(Participant-04)*

> *"…because when we work as a team, so that we can achieve the target."*
> *(Participant-05)*

It was revealed that Standard Operating Procedure (SOP) could change based on various conditions such as device type, equipment alarms and staging time.

"It's because different device will have different step."
(Participant-01)

"The actual execution can also be different from the set procedure."
(Participation-02)

"…they must be aware of the quantity difference because of the die count…"
(Participant-09)

Tacit knowledge, team norms and culture are accumulated by experience and would be too difficult and detailed to be documented down for training. Operations such as defect inspection will take a longer time to train as this involves visual judgement. Such tasks can be subjective and require tacit knowledge & experience before being able to confidently perform the role. While explicit knowledge can be coded and articulated via formal training, tacit knowledge is difficult to transfer or express verbally (Thong, 2018). Tacit knowledge learning is achieved by a socialization process (Choo, 1996; Nonaka 1991). It is learning by observation as colleagues demonstrate to others informally how to work and perform, not only in the workstation, but also in the team. During the process of socialization, the team way of doing work and culture is also being shared. In P-Tech operational training, a large portion of the training time takes place during On-Job-Training. During this period, the process of socialization takes place where a new operator learns from an assigned experienced operator as a mentor and introduced the worker into the team norms and culture (Nonaka, 1991; Hall & Andriani, 2002).

"We will brief the flow, and then ask them to watch me first and do not touch the lots."
(Particpant-03)

"We will let the try when the loading is lower and let them try on engineering lot first. Seniors kept watch beside."
(Particpant-04)

When asked how the on-job-training was carried out, the above responses revealed that the training of a new operator is done collectively by a team, as the word "We" was used consistently use to elaborate how they teach and guide the new member. It is also worth noting that during the training attachment to the team; new members are judged, accepted, or rejected, based on how well they integrate into the group. The relationship building among the team members is important to ensure a smooth operation, as highlighted with inquiring on how relationship between the trainer & trainee and the rest of the team will affect work.

> *"The working relationship of the trainer and trainee is also a factor. Sometimes I just tolerate. No choice, the person is assigned to me and I have to make sure the person can do the job."*
> *(Particpant-03)*

> *"We do encounter some that been taught, couldn't absorb, we just don't want to waste time teaching further. I rather do it myself."*
> *(Participant-04)*

> *"I teach her for 3 months, and she can't do the job, she resigns. Others say that I didn't teach her and force her to resign. So frustrated until I want to vomit blood. Very disappointed."*
> *(Participant-05)*

The matching of the trainer's mentoring style and the trainee's learning style can impact how well the trainee adapts to the change environment. It was evident that **Group Dynamics** are an important consideration factor when implementing change. It can affect blue-collar workers working in team by providing positive influence and reduce negative behaviour and issues. This was a new and emerging theme that was not expected, hence, these finding merits a dedicated discussion in the following section.

4.2.4 Group Dynamics

In addition to adapting to the change in the workstation, new process and system, workers need to learn how to work with the team based on the established group culture and norms. Each work shift/team has its own work arrangements, such as break time, overlapping coverage on workstations, and coordination style to meet the team performance. All the workers expressed fear, helplessness, and doubt about the changes which they have no control over. As they seek stability in their job, they felt resignation is inevitable if they are unable to cope with the changes. These observations were also noted by Kotter & Schlesinger's (1979) findings in resisting changes.

> *"For one that is fearful and is unwilling to change; and you transfer her against her will, would cause stress and pressure, and may result in resignation."*
> *(Participant-01)*

> *"There are cases where an operator that cannot get along with the rest of the member are being left out or discriminated. They ultimately may just resign or just suffer in silence."*
> *(Participant-03)*

While the participants all acknowledged the necessity for change, many expressed frustrations about the change in their social group. There were suggestions that the main concern to exhibit resistance to change is more associated to human relationship.

> *"I think the factor (Human Relationship) is quite big. Actually, I can accept the new job, but it's the change in co-worker is more tough. The work is fixed but co-worker has to be socialising with them daily. If there is good relationship, then no problem, but if not, then is really stressful."*
> *(Participant-11)*

Seniority in the group and the prospect of starting from zero was raised by several participants as a barrier to change.

> *"They will think, they are senior here, now that they transfer to another new area and become junior, and they have to learn from the basic again from the junior operator."*
> *(Participant-02)*

> *"…why I don't want to go, I have to learn, and I have to start from zero. And another thing, there also I have to face another problem…. building relationship because our work is all linked."*
> *(Participant-02)*

Brown & Pehrson (2019) and Lott & Lott (1965) posit that pressure to conform and achieve uniformity is closely related to the cohesiveness of the social unit. As the complete manufacturing process in P-Tech is contributed through a combination of individual effort, the working environment of the blue-collar workers is very closely coupled. In addition to the pressure from tribalism (McPherson et al., 2001) and the value homophilic culture (McFadden & Crowley-Henry, 2018; McGee-Cooper, 2005); there was reluctance to change any team when they have already established a stable working relationship with the incumbent team. The incumbent team would also need to adjust and accommodate the working habits of the new member, affecting the established work arrangement & efficiency. As Self & Schraeder (2009) noted that workers seek stability in their work environment, the interview reveals that most workers would accept a change in workstation for so long they remain working with the same team. They are able to seek support and safety from their colleague and view this as a form of stability that could help relieve some pressure from the change in the workstation.

> *"If there is a change in the team and the team need to be completely broken up, of course there'll be sadness because we'll been working for a length of time. With a common shout-out or a look, they know what I need help in. No need for overly verbal communication at work. If I need to join new team, then I had to be at that the whole group again"*
> *(Participant-11)*

Muo (2013) states that, due to individual propensity to desire stability, certainty and the known instead of instability, uncertainty, and the unknown, there will be a fair amount of resistance by individual or groups (Formal/informal) aimed at slowing the change process, provoking or sabotaging change initiatives.

Resistance to change behaviours of individuals were also found to be an influenced by the workgroup that does not agree with the changes. The tendency of resistance in an individual may increase if there is an affiliation with a workgroup that is against the change (Cohen & Wills, 1985).

> *"Some will tell others, "this target is enough, don't do more. Leave some otherwise there is not overtime."*
> *(Participant-03)*

> *"…yes, they will ask people around, tell them to don't do so much. Do so much also won't get any returns. That worker may actually be hard working at first but will follow the suggestion to slow down."*
> *(Participant-09)*

When asked about the types of responses that would be displayed for resistance to change, absenteeism was discouraged. One of the reasons was that it would cause other workers further inconveniences, added workload or changing of workstation to fill their vacant stations. Restricting production covertly such as slowing down is the most common reaction when change is not accepted. Consistent with Vardi & Wiener (1996) and Janis (1982) analysis on Group-Think phenomenon, they concluded that the normative pressure exerted on members to maintain uniformity in a cohesive group may result in dysfunctional actions and eventually lead to unethical decision and detrimental behaviours.

4.3 Stage-3: Cyclical Quantitative & Qualitative Findings

In this final stage of analysis, an abductive approach was used to surface and explain unexpected observation or a "surprising fact" (Aliseda, 2006; Ketokivi & Mantere, 2010). Starting with qualitative data from phase 2, the transcripts were examined again without the confine of its predetermined structure, to re-experience the interviews again in a fresh perceptive. The purpose was to identify any patterns in the responses that were not observed before. These patterns are cross reference using the quantitative data to establish possible links. The qualitative data are again examined in accordance to the new discoveries to explore possible explanations. Utilizing the knowledge & work experiences in the Semiconductor industry; and familiarity with the participants in P-Tech, 2 themes emerged.

4.3.1 Years of Experienced Group.

When inquiring how workers perceive change due to training program effectiveness to help adapt to the new work environment change, a pattern on some responses was noticed. While in general, all responded supportively to how change is managed for Training, a different response was noted among a particular demographic group when elaborating on their feelings and reactions. It was noted that one participant in "1-5 years Experienced" Group voice a sentiment that she would resign and seek other job opportunity if the change is too stressful. The definition for years of experience in this study is treated as a proxy for work tenure (Ng & Feldman, 2013, Quinones et al., 1995), as it measured the length of time the blue-collar workers have been in the semiconductor industry and did not confine to the time in P-Tech.

> *"For now, I not too concern…. If really, I cannot take it, I can seek other job."*
> *(Participant-04, 1-5 years Experienced Group)*

A transcript comparison was done on other participants' when posting the same topic. It found that other "Experienced" group responded more open and positive to changes if there is a good training program.

> *"I feel, when company have change, personally, maybe there be more optimism and more job opportunities"*
> *(Participant-01, 10-15 years Experienced Group)*

> *"I support the change is better for us, I can learn more things"*
> *(Participant-05, Above 15 years Experienced Group)*

Re-investigate with Quantitative Data: Noticing this disparity in response, an action of referencing back to phase-1 data collection was made. Raw non-aggregated data from the questionnaires were examined to see if there is any indication of such differences. When data from Training (H11- General Perception) were plotted against "Years of Experience", patterns emerged that got new insights to the relationship of experience and the response to change. The investigation was expanded to all categories and found to be consistent a display of a dip in score was observed for 1-5 years experienced group (Figure 24). The pattern remains even after controlling the effect of Age Group.

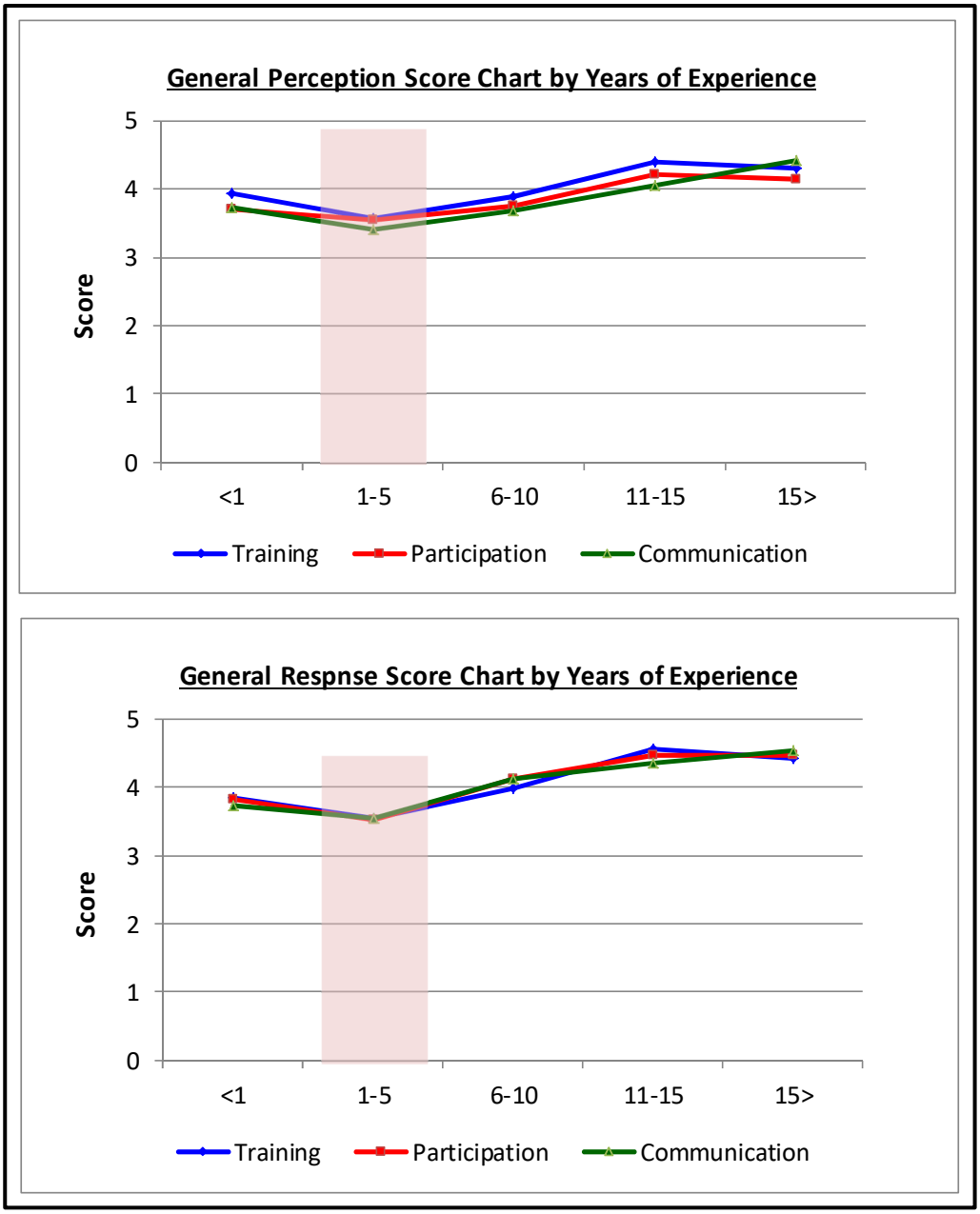


Figure 24: Comparison Chart on Years of Experience Vs Scoring

In order to confirm that this occurrence is not due to chance, One-way Analysis of Variance (ANOVA) was used to investigate statistically significant differences for Years of Experience and Age Group. There was a statistically significant difference between the Years of Experience groups. The highest variation or F ratio being in H14; $F(4, 40) = 8.9507$, $p<0.05$. This implies that it is less likely that the difference will occur due to chance. As determine, the rest of the data categories are significant with *p-value* of <0.05 (Table 20). Correlating ANOVA result from Age group did not show consistent significance in all categories (Table 21).

Table 20: One-way Anova on Years of Experience

Oneway Anova : Years of Experience Group

Training	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H11	Exp	4	3.772158	0.943039	3.7751	0.0107*
	Error	40	9.992207	0.249805		
	C. Total	44	13.764364			
H12	Exp	4	3.832178	0.958044	4.1141	0.0069*
	Error	40	9.31468	0.232867		
	C. Total	44	13.146858			
H13	Exp	4	5.438152	1.35954	4.2992	0.0055*
	Error	40	12.649213	0.31623		
	C. Total	44	18.087364			
H14	Exp	4	9.185901	2.29648	8.9507	<.0001*
	Error	40	10.262797	0.25657		
	C. Total	44	19.448698			
H15	Exp	4	5.314651	1.32866	5.505	0.0013*
	Error	40	9.65414	0.24135		
	C. Total	44	14.968791			

Participation	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H21	Exp	4	2.2082908	0.552073	4.0563	0.0075*
	Error	40	5.4440736	0.136102		
	C. Total	44	7.6523644			
H22	Exp	4	4.82676	1.20669	4.5266	0.0041*
	Error	40	10.663071	0.26658		
	C. Total	44	15.489831			
H23	Exp	4	9.799589	2.4499	8.2272	<.0001*
	Error	40	11.911136	0.29778		
	C. Total	44	21.710724			
H24	Exp	4	6.28746	1.57187	3.8964	0.0092*
	Error	40	16.13674	0.40342		
	C. Total	44	22.4242			
H25	Exp	4	5.937756	1.48444	6.665	0.0003*
	Error	40	8.908809	0.22272		
	C. Total	44	14.846564			

Communicaiton	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H31	Exp	4	5.263036	1.31576	7.0231	0.0002*
	Error	40	7.493884	0.18735		
	C. Total	44	12.75692			
H32	Exp	4	3.715841	0.92896	3.6562	0.0125*
	Error	40	10.163039	0.254076		
	C. Total	44	13.87888			
H33	Exp	4	8.322683	2.08067	8.488	<.0001*
	Error	40	9.805237	0.24513		
	C. Total	44	18.12792			
H34	Exp	4	7.130604	1.78265	4.6025	0.0038*
	Error	40	15.493054	0.38733		
	C. Total	44	22.623658			
H35	Exp	4	7.531223	1.88281	7.9948	<.0001*
	Error	40	9.420155	0.2355		
	C. Total	44	16.951378			

Table 21: One-way Anova on Age Group

Oneway Anova : Age Group

Training	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H11	Age	2	2.531314	1.26566	4.7322	0.0140*
	Error	42	11.23305	0.26745		
	C. Total	44	13.764364			
H12	Age	2	1.460858	0.730429	2.6252	0.0843
	Error	42	11.686	0.278238		
	C. Total	44	13.146858			
H13	Age	2	2.049837	1.02492	2.6841	0.08
	Error	42	16.037527	0.38185		
	C. Total	44	18.087364			
H14	Age	2	3.066542	1.53327	3.9309	0.0272*
	Error	42	16.382156	0.39005		
	C. Total	44	19.448698			
H15	Age	2	1.991985	0.995993	3.2236	0.0498*
	Error	42	12.976806	0.308972		
	C. Total	44	14.968791			

Participation	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H21	Age	2	0.4563761	0.228188	1.3318	0.2749
	Error	42	7.1959883	0.171333		
	C. Total	44	7.6523644			
H22	Age	2	1.899255	0.949628	2.9347	0.0641
	Error	42	13.590576	0.323585		
	C. Total	44	15.489831			
H23	Age	2	5.175093	2.58755	6.5723	0.0033*
	Error	42	16.535631	0.39371		
	C. Total	44	21.710724			
H24	Age	2	2.080258	1.04013	2.1473	0.1294
	Error	42	20.343942	0.48438		
	C. Total	44	22.4242			
H25	Age	2	2.640109	1.32005	4.542	0.0164*
	Error	42	12.206456	0.29063		
	C. Total	44	14.846564			

Communicaiton	Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
H31	Age	2	1.671273	0.835637	3.166	0.0524
	Error	42	11.085647	0.263944		
	C. Total	44	12.75692			
H32	Age	2	1.353671	0.676836	2.2696	0.1159
	Error	42	12.525209	0.298219		
	C. Total	44	13.87888			
H33	Age	2	4.608448	2.30422	7.1584	0.0021*
	Error	42	13.519472	0.32189		
	C. Total	44	18.12792			
H34	Age	2	3.106466	1.55323	3.3425	0.0450*
	Error	42	19.517192	0.4647		
	C. Total	44	22.623658			
H35	Age	2	1.78611	0.893055	2.4733	0.0965
	Error	42	15.165268	0.361078		
	C. Total	44	16.951378			

Re-examination with the Qualitative Data: Re-examining specific participants that fall under this experience group reveal similar tone of being less tolerant of changes and likely to resign going beyond a limit.

> *"For any unhappiness, I will feedback first. …I may consider resignation."*
> *(Participant-06, 1-5 years Experienced Group)*

While longer years of experience can be associated with older age, the data showed 45% of the participants were aged between 30 to 39 years old and had at least 10 years of working experience. One possible explanation is that this group (1-5 years experiences) perceive themselves to have more choice than other groups as their experience cover other industries. Hence, they are more confident and have more choice to move to another job or industry. The more experienced workers may have established a comfort zone and familiarity to the industry; hence there is a higher barrier & fear of moving to an unfamiliar industry and starting from zero again.

> *"For me, any job also can do if you want to."*
> *(Participant-06, 1-5 years Experienced Group)*

> *"I work in semiconductor and is like that. Normally half quarter will be stable, and another half quarter will be up and down…. There no job, no choice. Because of no choice."*
> *(Participant-08, 10-15 years Experienced Group)*

From the data gathered in P-Tech, regardless of age group, workers that have between 1-5 years of experience show lower scoring in their perception of current change plans. This may suggest that P-Tech workers with less than 1 year or above 5 years' experiences show higher tolerance for change. The results show that perception to change & response such as counterproductive behaviours (Bennett & Robinson, 2000) are not linearly related to length of experience in the company contrary to studies such as by Assaf & Cvelbar (2011), Ng & Feldman (2010) and Pourrajab et al. (2015). The longer the working experience would also mean an older worker.

Age may also be a moderating factor, reducing the resistance to change in the company they work in, as they felt they had no choice or potential to be employed by another company. The effect of Age on being a moderator is discussed in more detail in the next section (4.3.2).

4.3.2 Age Group

While inquiring on their acceptance to changes in their work environment, most express some anxiety and apprehension in changing of workstation. All participants express understanding that change is inevitable in the semiconductor industry due to the need to keep up with technology advancement. Nevertheless, it was noted that older workers displayed less resistance to change and were more willing to take on new workstations than younger workers.

> *"…let me learn more and increase my value…. the more you learn the more knowledge you gain."*
> *(Participant-02, 29-39 years Age Group)*

> *"I don't recall having that issue. Just take it as learning new things"*
> *(Participant-03, >40 years Age Group)*

There have been many studies with contradicting results investigating the relationship between age and resistance to change. While Rosen & Jerdee (1976) found that older workers are more resistant to change, Kunze et al. (2013) noted that younger workers are more likely to refuse to accept change. Many were non-conclusive in their results when looking for a relationship between age and work performance (McEvoy & Cascio, 1987; Ng & Feldman, 2008; Sturman, 2003; Waldman & Avolio, 1986). However, it would be helpful to investigate these phenomena in P-Tech by examining the responses from phase-1 data collection again.

Re-investigating with the Quantitative Data: To investigate the relationship between age and the change responses; non-aggregated responses from the questionnaires were a plotted (Figure 25). From early statistical calculation of the Pearson's r value (Table 18) and ANOVA (Table 21) shown weak correlations with some of the categories achieving significance, but a

weak positive relationship can be observed from the plot. Due to the small sample size within each group, more statistical analysis cannot be carried out.

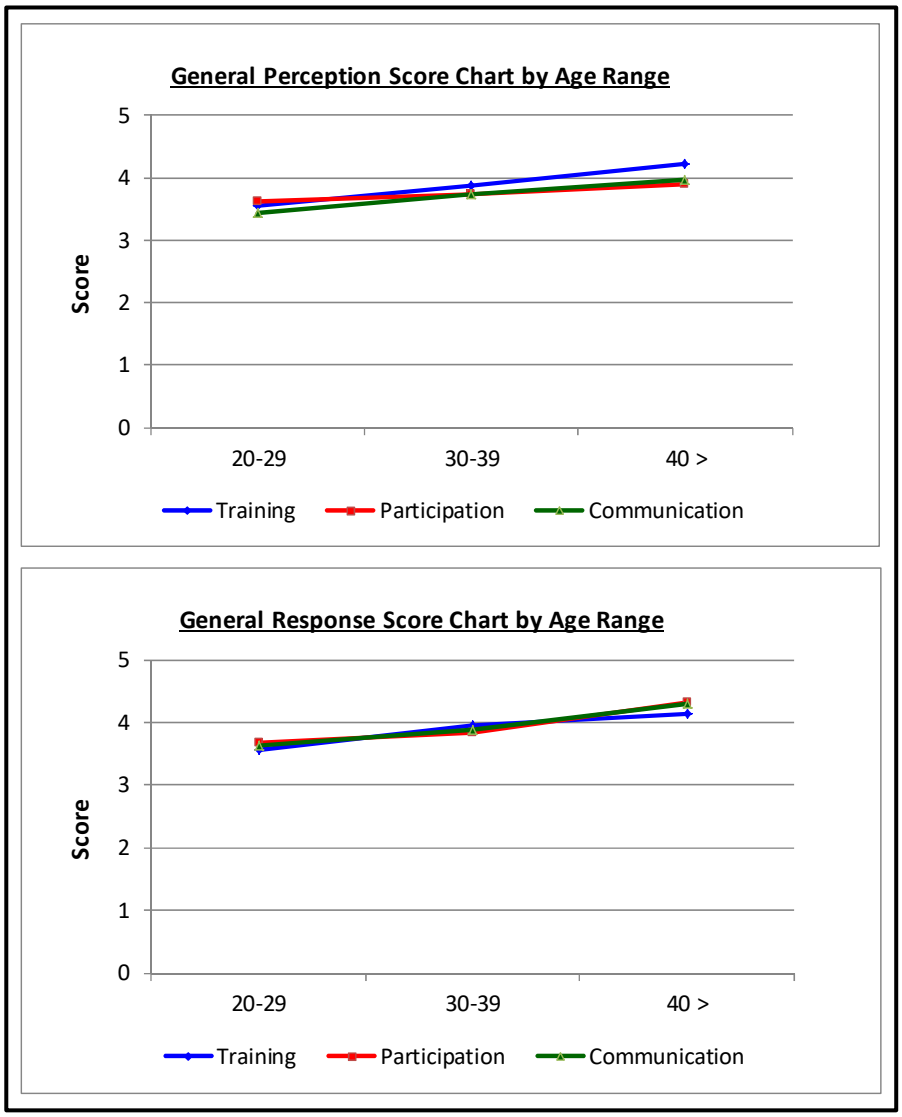


Figure 25: Comparison Chart on Age Vs Scoring

Contrary to many studies that posit older worker having higher resistance to change (Doherty & Horne, 2002; Kanfer & Ackerman, 2004; Ng & Feldman, 2012; Ryder, 1965; Verhaeghen & Salthouse, 1997), from the graph trend, it can be noted that as age increases, the worker in P-Tech responds more positively to change. This could be hypothesised that while all participants voice their concern about the changing work environment/station, older workers are more willing to accommodate the change due to their lack of choice to move to other jobs and industries, hence they are more willing to integrate with the new team in order to keep their

employment. This observation was also noted by (Reardon & Valentine, 2005) in their studies among blue-collar workers that older workers are more "Team Players" whereas younger workers are more "Complainers".

Reardon (2010) in another study on Blue-collar worker adoption to technology found that blue-collar workers seeking avenues to make their task easier, more pleasant, and productive. So, when they find the new change in systems is beneficial to them, they would begin to accept the change to maximise their gain, lowering their resistance to change.

Re-examination with the Qualitative Data: In reviewing the qualitative data, one participant gives evidence that the change in system does make work tasks easier and hence reduce work pressure. When inquired how the change has impact on the operator's work, the participant answered:

> *"You will feel that your work is more relax because you don't need to run in manual. No need to remember recipe. You only need to refer to system and follow."*
> *(Participant-09, 29-39 years Age Group)*

Few other older workers expressed it more as an increase in their value and experiences. There was a realization in them that employment is limited for older workers in Singapore's Semiconductor industry. Many companies still hold the stereotype view of older workers not able to adopt new technology compared to younger workers

> *"Because now job market outside it not easy. One factor is age. If older, it harder to find employment. Like semiconductor, if you are over 35 years old, it hard to get accepted."*
> *(Participant-06)*
> *"Older operators put more emphasis on work, they are more stable in their work…the older one has commitments and care more about the work because of age."*
> *(Participant-09)*

The study of how the change strategy impact on older workers is important due to the aging population in Singapore (Population.sg, 2016, Singapore Department of Statistics, 2019). It would be unavoidable to hire or reskill older workers as the economy progresses. Due to the

limited sample size of the older age group, more in-depth investigation on age as a moderator for change behaviour cannot be performed. A future study maybe conducted to further study this factor.

4.4 Findings Summary

In this chapter, the themes from data collection have been analysed and summarized (Table 22). Findings from Stage 1 analysis indicate that all hypotheses are supported when workers perceive effective training, opportunity to participate and clear communication; they will view change more positively and reduce resistance to change. However, there was negative scoring in the category in **Training** suggesting some individual dissatisfaction with the current training arrangement. A high 44% neutral scoring in the **Participation** category was investigated as it shows a large population may not have positive buy-in on these categories and response could turn negative when unacceptable changes are implemented.

In Stage 2 analysis, 4 themes emerged. Negative behaviour could evolve by how **Trainings** are conducted and how the socialization process is needed to gain tacit knowledge. It was found that workers who participated in the change plans did not have any influence over the execution and saw it as an assigned task; hence the perception was mixed for effectiveness to reduce resistance to change. In **Communication**, workers have less interest in the macro view of the company plans and are more concern in more immediate information between 3-6 months that affects them. A major finding was that **Group Dynamic** need to be a critical consideration in change strategy among blue-collar level. Their work nature and close working relationship needs to be addressed to ensure smooth implementation.

2 themes emerged in Stage 3 through an abductive process using both data from Phase 1 & 2. Contrary to some studies, response to changes was not linear to the Years of **Experience**, showing a more negative response from the 1-5 years group; and **Age** was negatively related to resistance to change. It was hypothesized that 1-5 years experienced group view that they have other job options, therefore would resign if the change activities are not acceptable, while older worker view their job mobility in the Singapore Semiconductor Industry limited, hence they are more committed and open to accept changes.

Table 22: Findings Summary Table

Analysis Stage	Topics	Findings /Themes	Observation and Analysis
Stage-1 Deductive Approach	Training	Hypothesis testing is **True**	1) Training program is effective to successful adapt to the new work environment can reduce resistance to change. 2) Negative responses suggest some individual do not have complete buy in or other factor may influence their response.
	Participation		1) Participation in the change activities can reduce resistance to change. 2) High percentage (44%) in the neutral group which may shift the opinion to negative.
	Communication		1) Communicating on reasons & expected result of the change can reduce resistance to change
Stage-2 Inductive Approach	Participation	No power to Influence	1) Workers do not view their involvement have any effect on influencing the change plans. 2) View is as an assigned task and benefit them because it allow them to have an earlier "Preview" of the change, hence more time to prepare. 3) Transformative plans are made without their involvement, and execution plans are fixed before workers be called to participate. 4) As some do not see any benefit in participation, this could explain Stage-1 results, reflecting high percentage (44%) of Neutral Reponses.
	Communication	Content and time-period dependent	1) Workers have low interest in high level information, 2) Interested in information that will impact them directly, such as quality issue, new tools & process, and new manpower. 3) The time line to sustain their interest is 3-6months. Information beyond 6 month do not interest them as they perceive it will changes.
	Training	Socialization Process	1) All worker express fear and anxiety when there is a change in work environment or station. 2) They view the integration for new members to the incumbent team is more important as their work performance are all linked. 3) Group culture and norms require time of socialization and acceptance for the members in order to achieve a cohesive work environment. 4) High amount of tacit knowledge in the production environment are unable to be covered via formal training. It requires group sharing and guidance. 5) Work pressure can increase as worker do not want to be the person dragging the team behind.
	Group Dynamic	A critical consideration	1) All participants express reluctant to change team or group. 2) A change in team disrupt their establish social network and will require worker to get use to new working style, make compromise & change norm. 3) Failure to achieve good cohesion may result in member being discriminated, causing negative behaviour such as resignation or slowing production. 4) Senior members pride themselves in the knowledge they current posses. This is especially prominent in high proximity working environment. 5) Members can add subtle pressure on the younger workers to slow down production in order to gain group benefit. 6) Resignation is common response when they are not able to meet the group performance or expectation.
Stage-3 Abductive Approach	Experience	Higher resistance to change in 1 to 5 Years Experienced Group.	1) Regardless of age group, worker that is between 1-5 years of experiences show a lower scoring in their perception of current change plans. 2) Worker with <1 year experience are new to the industry without previous experience, hence here is no benchmark to what is acceptable change. 3) Worker > 5 years experience may have got use to the dynamic nature of the industry. 4) Worker with longer experience may have established a comfort zone familiarity to the industry, hence there is a higher tolerance to change.
	Age	Moderating factor in accepting change	1) There is a weak correlations that as P-Tech workers age increase, the response to change exhibit a slightly higher positive trend. 2) Age may also be a moderating factor to change reducing the resistance to change responses. 3) Older worker accept change as they felt they have no choice or potential to be employed by another company.

5.0 Discussion and Recommendations

Much literatures and models on change management has been directed mainly at the top management (Appelbaum, et al., 2012; Heyden et al., 2017; Kotter & Schlesinger, 2008; Kotter, 1996; Michael et al., 2012). For workers at the lower level, feedbacks on organization or management performance are usually gathered using a climate survey using only Likert-type scale was used for rating. It gave only a quantitative result and lack contextual factors which could not provide insights and issues pertaining to organization change initiatives. Studies that primarily focused on blue-collar workers had been very limited, and not enough effort has been made to understand how blue-collar response to change (Reardon & Valentine, 2005). This study aimed to bridge these gaps. It must be stated at the onset that the result from the quantitative result of this study shows that blue-collar workers were perceived positively in terms of Training, Participation and Communication. However, analysis of both quantitative and qualitative data using 3 analytical approaches; deductive, inductive & abductive; yielded 6 interesting themes. This chapter focuses on more in-depth evaluation and discussion on the results considering the research aim & objectives, so that knowledge gained can lead to recommendations on how P-Tech can initiate organizational change better.

5.1 Operator Training: A Socialization Process

Technology advancement and business restructuring due to organizational changes are impacting all levels of workers' day-to-day work routines in their workplace (Fedor et al., 2006; Herold et al., 2007; Judge et al., 1999; Fernandez, 2020). For blue-collar workers in the semiconductor industry to be effective as production requirement changes, they have to surrender to the consequences of change initiatives. It is in such a situation that blue-collar workers in P-Tech are compelled to go through a chain of mandatory trainings in order to stay relevant in the company. This adaptation to changes not only requires the learning of new knowledge and skills, it also demands the unlearning and surrendering of old work habits and environment (LePine et al., 2000). The change in existing teams, introduction to new team members and working in smaller groups as more manual works are automated will be the new norm (Begg, 2020; Bokil, 2020; Fernandez, 2020; Fretty, 2020; Masood, & Hashmi, 2019; Saran, 2020).

In this study, the survey results show that blue-collar workers perceived the current operation training program is effective in helping them to adapt to the work changes. Quantitatively, the resistance to change response is also low. The hypothesis testing showed 64% positive responses and no negative responses. It indicates that the hypothesis (H1) is true, indicating that the majority of the workers perceived training as effective in helping them adapt to changes and resistance to change is low. Many studies on training had shown that workers who received opportunities for training display more positive attitude that had not (Ahmad & Bakar, 2003; Bartlett, 2001; Lowry et al., 2002; McEvory, 1997). Training can help worker build confidences and get ready to handle new job role and responsibilities (Judson, 1996; Tavakoli, 2010) and reduce turnover (Shore et al., 2006; Chow et al., 2007; Dysvik & Kuvaas, 2008; Pfeffer & Sutton, 2006). However, the data gathered from the interviews echoed Caruth et al. (1985) study that shows that formalized training alone was not enough and the fears of not meeting performance expectations still exist. Often, a new hire or transferred worker would be solely trained for a particular workstation and then tested for that job role. The worker worked in a silo with little knowledge on how each station impact each other's performance. Learning preferences and outcomes are not the same for individuals, even when they undergo the same training, or are assigned to the same mentor. Kolb (2014) argue that different learning approaches may be required because individuals have different learning preference and limitation that come from ability, personality, and past encounter (Aslam et al., 2011; Probst & B¨uchel, 1997).

Many academics have noted how culture can impact individuals (Cummings & Worley, 2005; Fuller & Clarke, 1994; Martin, 2002; Meyer, 1982; Schein, 2004; Trice & Beyer, 1993), and how the socialization experience influence the learning of individual (Fuller & Clarke, 1994). However, in the semiconductor industry, especially in most manufacturing plant employing blue-collar workers such as P-Tech, adopts a "Divisional" structure, an organizational structure described by Mintzberg (1980). P-Tech organizational structure features a hierarchical, highly horizontal differentiation and formalization which is typical of high-tech manufacturing firms in Asia. It shows a "Machine Bureaucracy" structure (Mintzberg 1980) that is "Mechanistic" in characteristics (Bangert D & Doktor R 2003, Burns 1990; Burns & Stalker 1994). Researchers have observed that a "Mechanistic" profile does not fare as well as an "Organic" structure in

terms of learning and knowledge formation (Martínez-León & Martínez-García 2011; Morgan, 2016; Dichter 1992) and will encounter greater resistance to change (Giangreco, 2000).

Operation training emphasizes skills and procedures that are needed for the execution on the production floor. This is achieved by a formal classroom lesson followed by an On-Job-Training with an assigned experienced worker from the workstation as a mentor. The responsibility to get the new worker trained solely rest on the assigned mentor.

As outlined by Marsick & Watkins (2015), individual learning takes place in three stages. Firstly, the individual established a pre-set process through a formally structured program. Secondly, daily routine tasks which individual seek clarification. And finally, incidental learning takes place as the individual begins to understand the organizational culture, through interaction among the units in the organization hierarchy. The last 2 forms are significant to learning. Explicit knowledge occurs mainly in the first stage, but to learn successfully, the second and third stages would depend on the effective transmission of "Tacit Knowledge" between a trainer and a trainee. "Tacit Knowledge" is conceptual, unlike the codified "Explicit Knowledge", which is hard to articulate in a logical format (Polanyi ,2009). This is especially true for training P-Tech's visual defect inspector. While some defects are measurable, subjective defects such as shape and colour differences are difficult to document and require time to learn.

As the interview revealed, most of the important training was achieved by observation as team members demonstrate to each other how work is actually arranged and performed, not only in the workstation, but also in the team (Choo, 1996; Nonaka 1991). There was significant mention of tacit knowledge transfer & training as a group, and how individual learning can be affected by how well the new member assimilates into the team culture. The evidences indicate that training at the blue-collar level involved a **Socialization Process** (Choo, 1996; Nonaka 1991; Thong, 2018). As noted by Panteli & Sockalingm (2004) that social processes are involved during learning, knowledge sharing and creation. It is a manner in which an individual learns and understands the social value, norm, knowledge, and accepted behaviour necessary to be accepted and function within the group (Chatman, 1991; Van Maanen & Schein, 1979; Sturman, 2003). This is the crucial phase where new member learns and adapt to the working culture by socializing with the work team. Majority of the learning in P-Tech takes place during

On-Job-Training, where a new operator is attached to another experienced operator or several co-workers. Through socialization, the mentor and the group impart their tacit knowledge, team norms and culture to the new worker (Nonaka, 1991; Hall & Andriani, 2002). Operational training in P-Tech has been task orientated and focuses on filling the gaps where the task could not be performed by equipment. However, the interaction and coordination between each workstation manned by blue-collar workers, impact the efficiency and effectiveness of the entire production line. Therefore, the importance of socialization process during training phase had not been given enough attention in helping blue-collar workers adjustment to the change in work environment.

5.2 Participation: No Empowerment to Change

From the hypothesis testing in this study, the result shows 56% of the respondents indicated a positive perception on the Participation level indicating that hypothesis (H2) was true. It implies that when blue-collar workers perceive change more positively when there are opportunities for participation. Studied by many academics and practitioners for a long time, participation of employee is one of the most oldest principle to achieve management buy-ins and counteract resistance to change (Choi & Ruona, 2011; Coch & French, 1948; Cumming & Huse, 1989; Dunphy, 2000; Foote, 2004; Jimmieson et al., 2008; Labianca et al., 2000; Lewin, 1991; Lines, 2004; Meier et al., 2013; Oreg et al., 2011; Waddell & Sohal 1998). Zander (1950) argued that change initiatives are prone to resistance when there is a strong top-down imposition on individuals who are affected by the change due to lack of participation. Yet there are just as many studies that show the increased effort to empower workers through participation do not ensure a reduction in resistance to change (Griffin, 1988; Labianca et al., 2000; Locke & Schweiger, 1979; Wagner, 1994).

In the context of this research, the organizational change referred to as transformational and not incremental in nature. Such change is in response to the dynamic and immediate change in the business environment that demands quick and swift adjustment or modification for the survival of the business. In practice, initial discussion, planning, and decision are rarely shared with the middle or lower management due to business confidentiality. Especially for a listed company such as P-Tech, major change decision can impact market shares, customers'

confidence, and retaliation from competition if the plans are leaked. Planning and decision making are often made only by the top management. Executions of the decided plans are usually top down. As noted by Dunphy, 2000; Dunphy & Stace, (1988) and Stace & Dunphy, (1991), a top-down approach serves as a quick and clear direction that the organization needs to take for the best control and coordination in relation to the external environment known by the top management. The blue-collar workers have neither the macro view nor the expertise to influence business level decisions. Therefore, it is unrealistic to think that blue-collar workers would have an opportunity to participate in such change plans and be able to influence the decisions.

Lines (2004) found a strong relationship in reducing the negative effect of resistance to change when investigating two forms of participation. First as a consultative participant, also known as a process control; or second, as a decision participant with the rights to veto a decision (Thibaut & Walker, 1975; Early & Lind, 1987). In the case of the blue-collar, their participation neither involves consultation with the feasibility of the overall change plan nor has an opportunity to influence management decision. Coch & French (1948) and Dent & Goldberg (1999) concluded that representation as compared to active participation shows slower adaptation to change than those with active participation. As revealed in the findings, the blue-collar workers do not expect any influence over the change plan. They regard the participation as a pilot task assignment before the rest of the team members are involved. Decision for change in the work environment, process and system has been pre-determined.

Participation has been found to develop better understanding and support (Bartunek et al., 2006) that leads to a reduction of organizational resistance, creating a higher level of psychological commitment to the proposed changes (Cunningham et al., 2002; Lines, 2004). However, P-Tech "Mechanistic" organizational structure embraces rules and regulations as it provided the control necessary for a stable operation. According to Conger & Kanugo (1988), such structure that embraces rules and regulations, limit self-expression that leads to the hindering for participation during strategic changes. Giangreco (2000) argue that mechanistic organization will encounter greater resistance to change. Participation has been found to develop better understanding and support (Bartunek et al, 2006) that leads to a reduction of organizational resistance, creating a higher level of psychological commitment for the proposed changes (Lines, 2004).

It limits self-expression that leads to the hindering of participation without empowerment to make decisions during changes. As such, blue-collar workers' involvements are limited knowing more in-depth the reason for change and having more comprehensively knowledge of the change plans, which is still helpful as individual make sense of the change and share it to their team (Ford et al., 2008; Whelan-Berry & Somerville, 2010).

While many studies show that participation by workers can improve workers' perception to the company's change plans and reduces the negative effect of resistance to change (Coch & French, 1948; Del Val & Fuentes, 2003; Lewin, 1991; Lines, 2004; Meier et al., 2013; Noda & Bower, 1996; Waddell & Sohal, 1998). Nevertheless, in many organizations and Semiconductor companies such as P-Tech, participation of blue-collar workers in the strategic plans relating to external business environment is not possible to achieve. Blue-collar workers need to have the understanding that their participation in many company's strategic technological plans is rarely possible, especially when time factor and strict standardization are required. These situations often occur when new processes introduced have immediate impact on product, productivity, business revenue, deliveries, and work unit structure. Therefore, the challenge for management is to balance the level of involvement of blue-collar workers in their change plans because the degree of control is related to the effectiveness of participation in achieving valued outcomes during strategic organizational changes (Neumann, 1989). P-Tech management would need to look at other areas where blue-collar workers active participation can be included.

5.3 Effective Communication: Content and Time Period Dependent

The findings showed that 67% of the participants' perceived P-Tech current communication about the change positively; indicating that hypothesis (H3) was true. However, the interviews reflect more on what information that blue-collar workers find important. Researchers positioned with a social-constructionist perspective contended that individual actively seek information and meaning when face with organizational change, to make sense of the new work environment, and to elicit conclusion about its probable outcome (Choi & Ruona, 2011; Ford et al., 2008; Gioia et al., 1994; Weick, 1995). These include extracting information from management communications and announcements of activities specific to the change

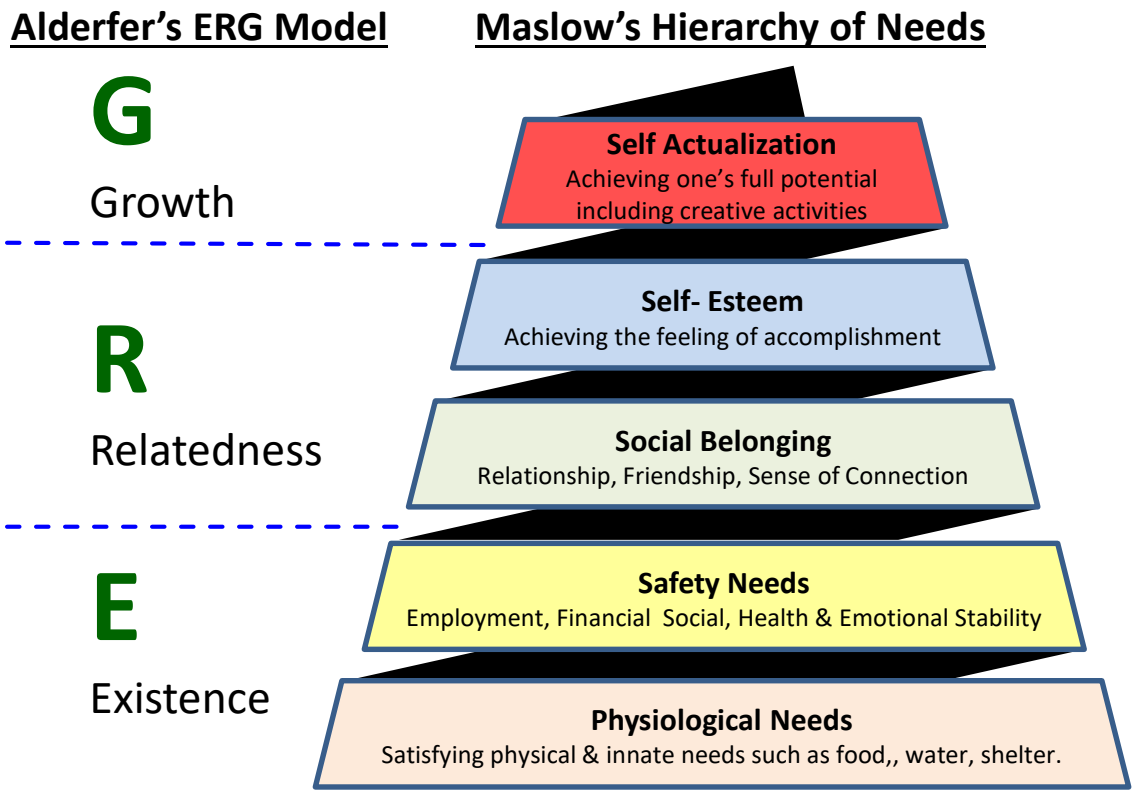
initiatives. Senge (2014) and Alas & Sharifi (2002) noted that employees that do not comprehend the need for change will not be ready for training and will display resistance to change. Hence, many researchers stressed that effective communication is an important factor in many of their studies on organizational change (Bartlett & Kayser, 1973; Ford & Ford, 2010; Kotter 2008; McKay et al., 2013; Miller et al., 1994; Moore, 2002; Wanberg & Banas, 2000; Schweiger & DeNisi, 1991). Kotter (1995) had argued that unless a lot of credible communications are carried out to capture the heart & mind of the staffs, and convincing them that the change is helpful, they will not make sacrifices. Kotter's later work with Schlesinger listed communication as one of the critical approaches developed to deal with resistance to change (Kotter & Schlesinger, 1979, 2008).

Many researches had also found that poor communication about organizational change can result in cynicism (Dean Jr, et al., 1998; Reichers et al., 1997; Wanous et al., 2000), misunderstandings and confusions (Gill, (2002; Coghlan & Rashford, 1990), exaggeration, rumours, and negativity on the change activities (Bordia et al., 2004). The findings from the respondents' feedback in P-Tech supported these studies on the association of ineffective communication during organizational change. While communication is present in P-Tech, the expectation of information exchange and timeline differs between the management and the blue-collar workers. Referring to Kotter (2008) 8-step model, the third step involved developing a vision of what change is about and communicating it to the staff on the reason and how it can be achieved. However, from the findings, P-Tech blue-collar workers do not find this information useful in alleviating their fear and pressure for change. One main reason is they view that some vision and plans are of too high level and they are already being set and not directly relevant to them. Just as Quirk (1995) told about the perspective of what a CEO viewed as important information to be communicated to the organization is different from that of his subordinates.

How useful information will differ accordingly to different organizational areas. How the information affects their roles & responsibilities and impact their work will also be different. Labianca et al., (2000) stressed this point in their research on organizational changes that regardless of how clearly management communications are, information needs to correspond with staffs with relevance to their role and effort in order to adopt the change plans. Timeliness of the information is also important. Highlighted in the interview by most the blue-

collar workers, information beyond 6 months is regarded as being too far away to act, hence irrelevant to meet their more immediate concerns (McKay et al., 2013; Miller et al., 1994). Miller et al. (1994), Wanberg & Banas, (2000) and McKay et al. (2013) have found in their research that employees tends to have lower anxiety, develop more positive perception and exhibit more acceptance for change when timely & adequate information are shared regarding upcoming changes. They further found that adequate & timely communication at the onset of the organizational change may offset the negative effect for the lack of participation in decision making.

The blue-collar workers expressed that they are usually more concern about how the change plans will affect their immediate needs such as earnings, job stability, performance expectation and work environment. Vroom, Porter & Lawler (2005) and Ramlall (2004) proposed that the strength of one's effort is governed by the expectations that an outcome may be achieved, and the amount of value placed on the outcome in the individual's belief. Worker's opinion towards the change and subsequent behavioural response stem from a process by which the perceived consequences of change are evaluated with the worker's values and goals. Reference to Maslow (1954) hierarchy of needs theory's and Alderfer (1989) ERG theory's, the blue-collar workers still concern on the lower level needs and focus their priorities at Maslow's first and second level: physiological and safety need; or Alderfer's model of Existence level as they faces company restructuring that threaten their livelihood (Figure 26) (Argyris & Schon, 2003). This is confirmed in research from Arnolds & Boshoff (2002), Centers & Bugental (1966), Kovach, (1987) and Taormina & Gao (2013) who found that workers' needs at the lower hierarchy respond to lower order needs such as stable pay and job security when compared to those working higher in the organizational level. This is relevant when job security is threatened (McGuire, 2011; McLeod, 2007; Stewart et al., 2018).



Source: Adapted from Alderfer (1972) and Maslow (1954)

Figure 26: Alderfer ERG Theory vs Maslow Needs Theory

The needs will only shift up when these needs are met. As individuals seek information of relevance, Choi & Ruona, 2011; Hassinger, 1959 and Rogers, 2003 posit that even if an individual receives information about the changes, unless it is perceived as relevant to their needs, there will not be any influence in altering their attitude towards the change initiatives. As the lowest level in the organization, the blue-collar in P-Tech acknowledged that there is little that they can change in the overall plan of the organization. For P-Tech, information such as implementation of new operating system, re-assignment to a new workstation, opportunity for overtime, the change of team members and the time that change plans be executed are deem important and helpful for them to be prepared. Therefore, P-Tech management and change agent need to understand how to operationalize the high-level message down to information that blue-collar workers can relate to and work toward.

5.4 Group Dynamics: Critical Consideration in Blue-Collar Workers

The fabric of organizational life is disrupted during most organizational changes in terms of social-boundaries, rank, interpersonal relationships, and their social-identities associated with the work groups and teams (Burnes, 1996; Gowigati & Grenier, 2001; Paulsen et al., 2005; Terry & Jimmieson, 2003). Many researchers claim that social factors of work units are more critical during organizational changes than economic or technical factors (Alvarez & Urla, 2002; Kayas et al., 2008; Nah et al., 2001). By, Kuipers & Procter (2018) contended the importance of studying and analysing the role teams played during organizational changes, as it is an essential means to initiated, successfully create & implement organizational change. Group dynamic and its consideration of blue-collar workers during organizational change is relevant across the findings in training, participation, and communication. How social factor influenced individual learning during training with the group; how participation can be effective or be hindered by groupthink; and how they communicate among themselves, has significant impact on the group's response to change. This is because all these factors occur in a social setting. They happened on a group or team level with regular members working in close proximity for a long time and not as an individual in isolation. While it is good to create a cohesive environment, Rosenhead (1998) challenges the classical view that consensus in organizations as a good thing and suggests that groupthink can develop which prevents the expression of valuable alternate opinions.

In this study, all the blue-collar workers expressed fears, helplessness, and doubt about the changes which they have no control over. As they seek stability in their job, they felt resignation is inevitable if they are unable to cope with the changes. Some blue-collar worker may not react in a detrimental way but may choose to conform or comply with the new processes but without commitment (Petrini & Hultman, 1995). Social Bond could encourage production restriction and compliance without conformance as a means of protest when the entire team does not believe in the changes (Ansoff, et al. 2018; Crino, 1994; Ivancevich & Matteson, 2002). The blue-collar workers in P-Tech work in close proximity daily form a strong social bond that wants to maintain a work harmony. Social Bond could encourage production restriction and compliance without conformance as a means of protest when the entire team does not believe in the changes (Ansoff, et al. 2018; Crino, 1994; Ivancevich & Matteson, 2002). These results support Kotter & Schlesinger (1979) findings in resisting changes. The work

arrangements for blue-collar workers in P-Tech are very structured and closely knitted. Unlike supervisors, or managers higher in the organizational level that could exercise some flexibility to pace and schedule their daily tasks, these blue-collar workers' jobs are rigid due to strict standardization of process and product specifications.

Blue-collar workers' tasks are not only closely interdependent and inter-related; it also follows a sequential flow where the entire line will be affected when one station fails to perform as expected. The social system which the blue-collar workers are in has a substantial role in influencing their responses to change (Bartunek et al., 2006; Gibbons, 2004; Oreg, 2006). Terry & Callan, (1997) noticed that when changes are perceived as threatening, social characteristics may be more salient. Social system does influence workers' attitude (Burkhardt, 1994; Gibbons, 2004) and blue-collar workers may react in terms of work units rather than as individuals (Eby et al., 2000; Martin et al., 2005; Tajfel & Turner, 1986). Tribalism (McPherson et al., 2001) and value homophilic culture (McGee-Cooper, 2005; McFadden & Crowley-Henry, 2018) is evident from the findings as there is pressure to maintain conformity and uniformity to keep the group cohesive (Brown & Pehrson, 2019; Lott & Lott, 1965). Their strong cohesiveness can develop into group-think (Janis, 1982; Vardi & Wiener, 1996), and the group may display resistance to change via dysfunctional actions leading to unethical decision and detrimental behaviours when the group disagree with the changes (Champoux, 2010; Cohen & Wills, 1985; Muo, 2013).

As discussed earlier in the section on training, the major aspect of blue-collar worker's training and assimilation to a new team is carried out in an On-Job-Training phase. Led by another member, tacit knowledge is transferred through socialization as a team in the effort to introduce the new member into the team and align with them on the working style, culture, and norms (Choo, 1996; Nonaka 1991). As Holton (1996) confirms, this is the most common way of training arranged to familiarize new staff. In this phase, members of the station participate in orientating the new member (Nonaka, 1991; Hall & Andriani, 2002). By gaining acceptance and familiarity with the team, the new member established a trusted friendship with co-workers (Feldman, 1976). Understanding their social values, knowledge and expected behaviour is necessary to assume a role in the team (Chatman, 1991; Van Maanen & Schein, 1979; Sturman, 2003).

The finding also showed a low tendency for a worker to be absent from work. This is because missing work will greatly impact attendance record, salary, appraisal, and other benefits. Nevertheless, one important reason for being absent is that their workstation would have to be filled temporarily by someone else in the same work unit, adding burden to the team and affecting the team performance and increasing the chance of conflict and diminishing trust. When conflict and trust issues are not well managed, task performance and knowledge sharing can be impacted Panteli & Sockalingm (2004). In order to maintain a harmonious working relationship and not to put others in distress over work disruption, workers avoid missing work. Hence, it was also indicated in the interviews that workers would rather resign if they were not able to integrate well with the team. They would resign when there is a better opportunity or, when there is a change in their social group, they are not comfortable with is inevitable due to process or work structure changes. Individuals have to passively accept the change or quit if they are not able to cope (Rusaw, 2000). Many of the workers interviewed express the helplessness to conform to the change as their seniority and skills are not fully transferable in the semiconductor industry. This is due to each technology companies having their own set of standard operating procedure, protocol, and proprietary process.

Many researchers found that social support plays an important role in migrating resignation through the reduction of burnout (Moore, 2002), emotional exhaustion & depersonalization (Kalliath & Beck, 2001), and better social support (Hatton & Emerson, 1998; Munn et al., 1996). McFadden & Crowley-Henry (2018) noted that those that do not fit the norm could be disadvantaged. Thus, it may explain the findings from the interviews that blue-collar seek social support and acceptance from their work team as one of the deciding factors on whether to continue working with the company, especially in the time of change. In the blue-collar worker's perceptive, many change models cannot apply as-is without taking into consideration the group dynamics within the group affected by the organizational changes.

5.5 Higher Resistance to Change in 1 to 5 Years Experienced Group

It is worthy to note that the following two findings emerged from an abductive analysis approach. Using both quantitative and qualitative data obtained, the analysis process is heavily dependent on the knowledge and experience of the researcher (Harman, 1965; Timmermans &

Iddo Tavory, 2012) and develops a "Best Explanation" from other observed research data (Lipton, 2004; Harman, 1965). Being familiar with the blue-collar workers' background, a pattern in the responses based on years of experience was noted.

The definition for years of experience in this study is taken as a proxy and is positively related to tenure (Ng & Feldman, 2013; Quinones et al., 1995), as it measured the length of time the blue-collar workers has been in the semiconductor industry and not referring the level of job-related knowledge, which can also influence responses to organizational change (Melo, 2012; Ng & Feldman, 2013). It was noted that blue-collar workers with experience between 1 to 5 years seemed to have mentioned more their intention to seek out other job prospects and resign if the change became too stressful to cope and not able to meet the expected performance (Caruth et al., 1985). These results support Kotter & Schlesinger (1979) findings in resisting changes. Being the biggest group, it represents 44% of the entire blue-collar worker population in P-Tech. Participants from other experienced groups seem to mention more on how they would respond if they cannot cope with the changes with other reactions such as conforming without commitment and slowing down the production. The 1 to 5 years' experienced group also displays more positively to a training program that can help them transit the change than other groups. Kunze et al. (2013) study of blue-collar workers in changing at work condition found that workers with longer tenure show a positive coefficient with resistance to change. Niessen et al. (2010) stated that more experienced workers tend to have more difficulties in learning new processes because they faced a higher barrier to detach themselves from old routine. Studies by Assaf & Cvelbar (2011), Oreg (2003) and Oreg et al. (2011) explain that as one's tenure get longer; one will develop habits and reject innovation which is a characteristic of resisting change.

However, investigating the quantitative data from the questionnaires showed the opposite in this study. Regardless of the age that they enter the semiconductor industry or P-Tech, there is a statistical significance result showing that blue-collar workers achieving longer tenure or experience in the semiconductor industry accept changes more positively. This is contrary to many research findings which indicate a decrease in job performance and increase in resistance to change as work tenure and experience increases (Assaf & Cvelbar, 2011; Bantel, 1994; Finkelstein & Hambrick, 1990; Kunze et al., 2013; Wiersema & Karen, 1992). This contradicting phenomenon could be explained from some interview's responses. Some blue-collar workers,

especially those that have worked for significant length in the semiconductor industry, expect changes to happen. Despite their reluctance to change, they acknowledge that change is synonymous with technological advancement, and they are powerless to resist technological changes but to accept and adapt to it the best they can. They stated that the ever-changing status is the nature of the technological industry. With the longer years of experience in the semiconductor industry, they developed a comfort zone, especially in their social network and the nature of work. Semiconductor industry generally gets paid higher than other low-tech industries; hence they will tend to remain in the job and group.

For blue-collar workers with less than 1-year experience, they do not have a reference to any prior work condition, hence are open to new experiences. For those in the 1 to 5 years' experienced group, one common response was that they are open to other industries or have relatively recent experience in some other occupation, hence had more work mobility in the job market. Resignation is their main response as a resistance to change. The other groups with longer experience stated that they are more open to changes within the industry in order to gain more experience but may still show resistance to change in the form of conforming without commitment or to slowdown production. Oreg (2003) and Saksvik & Hetland (2009) in their studies found that openness to new experience and resistance to change are not strongly linked and should be considered as two different concepts. Their findings are aligned with this study, which shows that despite groups beyond 5 years experiences showing more openness to change, all groups show various forms of resistance to change. Being the biggest group in P-Tech, this information could be useful to Human Resource and stakeholder as they review their recruitment plans and actions to manage their expectation in order to reduce turnover.

5.6 Age: A Moderating Factor for Change Resistances

While I am investigating the effect of Years of Experience on resistance to change discussed in the previous section, the factor of age was also investigated. This is due the effect of Years of Experience can also be related to Age. As individual attain longer experience in the semiconductor industry, it would also mean that the individual has aged accordingly. As aging blue-collar workers, they face challenges in Singapore as many organizations still typecast older workers as being difficult to train for new technology. There are also numerous academics

literature that addresses the presence of this stereotype in many workplace, employers, and colleagues (Chiu et al., 2001; Posthuma & Campion, 2009; Stamov-Roßnagel & Hertel, 2010; Van Dalen et al., 2009; Weiss & Maurer, 2004a). However, as shown in the statistical findings, the resistance to change response due to age is not related to years of experiences but may act as a moderating factor in reducing the resistance to change. It was noted during the interviews that older workers show less resistance to change and are more willing to take on new workstations than younger workers. This is contrary to some studies that indicate older workers display more resistance to change (Doherty & Horne, 2002; Kanfer & Ackerman, 2004; Rosen & Jerdee, 1976; Ng & Feldman, 2012; Ryder, 1965; Verhaeghen & Salthouse, 1997). This result was more aligned with the studies of Reardon & Valentine (2005) among blue-collar workers, where older workers are more willing to accommodate to changes, specifically when there are changes made in their work group. Their maturity and acknowledgement of the difficult task of securing similar work at their age enables them to develop higher tolerance for social issues in their work group. With a pre-requisite of having an effective training arrangement, the research findings also reflect acceptance of learning a new system that would ease their workload. This finding was also echoed in Reardon (2010) study which found greater openness to adopt innovation among blue-collar workers if it could aid their productivity and reduce their work pressure.

Some studies have shown that aging workers' performance deteriorates with age, stating the decline in cognitive ability as one of the factors (Avolio & Waldman, 1994; Ng & Feldman, 2013; Verhaeghen & Salthouse, 1997). Niessen et al. (2010) stated that the more experienced a worker is, the more difficulties in learning new processes because they faced a higher barrier to detach themselves from old routine. Ng & Feldman (2013) further elaborate that even with the increase in knowledge and experiences accumulated over the years; individual is likely accompanied by the reduced capacity to memorize this knowledge. Nevertheless, my counter argument is this; the trend of technological change is moving towards a state where dependencies on human capabilities to operate are reducing. The task of memorizing procedures, improved productivity and various decisions making process are progressively being taken over by automation system and artificial intelligence, detailed in chapter 1's analysis of the semiconductor industry (Almada, 2017; Choudhury, 2017; De Backer, Mancini, &

Sharma, 2017; Deloitte, 2014; Jones, 2015; Xu, Xu, & Li, 2018). Hence the reduction in human capabilities due to age can be made up by technological advancements.

Age discrimination still runs rampant in many organizations. Ageism, a term coined by gerontologist Robert Neil Butler (1969) describe the discrimination and stereotyped attitude toward workers because they are old still existing today. It has been reported that many older workers would be vulnerable to retrenchment due to the existing prevalent ageist mind-set (Ching, 2020). With the current pandemic, many economies are suffering from the reduction of trades activities and the older worker will be more vulnerable during company downsizing. A news release from the Ministry of Manpower Singapore (2020) as recent as 20 March 2020 reported that 5 employers receive hiring penalties from the ministry due to age-related discrimination during recruitments. Ironically, one of the motivations for the Singapore Government's launched of the Electronic Industry Transformation Map (ITM) in their push for Industry 4.0 was also in consideration of the aging population (EDB, 2017a).

New technology should play the role to mitigate these concerns and organizations should remove their mental block of not hiring, retaining, and developing older workers during organizational change. Thus, the concern of reducing capacity for memory and physical ability should not be a barrier for hiring or developing older blue-collar workers as part of their workforce during organizational change. As the population in Singapore ages (Population.sg, 2016; Singapore Department of Statistics, 2019), there is a need for deeper study and development to support this group and help them reap the benefits from technological advancements.

5.7 Strength and Weakness of Research

The strength of this research was the opportunity to explore the perceptions of the blue-collar worker in the semiconductor that is constantly facing changes in the current dynamic environment. Often, these workers' views and potential contribution as neglected in the overall change plans. Corporately, they are viewed as part of the cost structure in the company, and there are currently very limited literatures that are directed in understanding the issue such as resistance to change among this group with may influence the success rate of the

change initiatives. Conducting a research to explore their perceptions of organizational change management approaches in the Semiconductor Industry could provide not only insights on how this group coped with the changes; it could also provide management and stakeholders with information to formulate actions to reduce the negative effect of resisting change.

Adopting a Post-Positivistism paradigm, this study uses cross-sectional mixed methods of quantitative and qualitative as the research strategy. This methodology enables triangulation of data which would enhance understanding of resistance to change phenomenon because it allowed two different data sets from the same target group to draw inferences from each other (Denzin 1978; Yin 2017,). While quantitative data focused on objectivity and improved the theoretical rigor of this study, it also undermined from its relevance. To compensate for this disparity, Qualitative data can provide contextual information (Guba & Lincoln, 1994). Many academics have supported that when used appropriately both methods maybe use in any research paradigm (Guba & Lincoln, 1994; Haq, 2015; Lincoln et al., 2011). This approach is well endorsed in the organizational literature for it offers distinctive improvements in answering research questions (Armenakis et al., 1990; Hitt et al., 1998; Huberman & Miles, 1994; Judge & Zeithami, 1992; Karami et al., 2006; Leedy, 1997). Alexander (2002) asserted that using only a single method of measurement may overlook valuable evidence and risks making inaccurate conclusions. Creswell & Creswell (2017) argue that research results can be better appreciated by incorporating the perspectives of individuals with the quantitative data, hence developing a more complete comprehension of changes required for a marginalized group.

This research used 3-staged analytical approach. In addition to Deductive and Inductive approach, Abductive approach was also used. Abductive approaches can draw inference of underlying patterns from observation to comprehend complex reality and contribute to knowledge (Haig 1999; Raholm 2010a, b; Lawson & Daniel 2011). Denzin (1978), Strauss & Corbin (1998), Yin (2017) noted that advantage of abductive approach denoted as triangulation which would aid converging areas of inquiries. However, there are challenges in using quantitative & qualitative data collection methods; and utilizing deductive, inductive, and abductive approach for analysis. It means that data need to be collected from multiple sources. This demanded more resources and time for the implementation. It required the researcher to develop multiple skills to execute each stage of the analysis systematically and diligently in order to maximise their advantages and strengths.

5.8 Recommendations

From the preceding discussions for each of the emerged themes, the knowledge gained from a better understanding of how blue-collar perceive & cope with change lead to the following recommendations on how P-Tech can manage organizational change better.

5.8.1 Training by Team Members

As discussed, effective training in the blue-collar worker involved a socialization process. Instead of an individually formalized training, followed by a one-to-one On-Job-Training, P-Tech could focus on new member being trained by the team. Billett (2006) examined workplace learning and centred on two factors, he argued that co-participation in the workplace, and its relationship, are significant to the learning outcome.

For blue-collar workers to learn via socialization process, will depend on the training program P-Tech can implement in having a new member attached to several members of the team of different stations. Training programs can be planned to include routine work of the whole team and its overall process flow. This will encourage new members to understand not only the assigned workstation, but also comprehend how each workstation is inter-related to each other and the overall performance of the team. Providing flexibility in training arrangement has the potential to reduce stress or negative outcome in blue-collar workers. Training schedules can be customized to individual need so that they can arrange their work and personal time to better focus on the training program. Considering the language barrier due to different ethnic groups, it is suggested that we match the trainer and trainee that can communicate in the same language to reduce frustration from confusion, misinformation. Their test dates can also be review during the training to determine if they are ready to be tested. Having more training progress reviews could allow earlier intervention to address to the training gaps and reduce fear of failing the test. Consecutively, giving greater control over the pace and conduct of new skills/systems training, can give the blue-collar workers better confidence in achieving the desired performance and job security, and reduces their negative behavioural response to change.

For a transferred member from another team, P-Tech can explore providing some flexibility in the social grouping such as giving the new member some options in pairing with a familiar mentor they can better relate to can encourage social bonding. This flexibility in training potentially caters to many aspects of an individual's motivational and social needs. Training flexibility allows the social bond to be maintained when workers can choose their mentor or partner at the new workstation. As Billet (2006) posited, mutual and group support during the training duration is important to moral and training effectiveness. Such arrangement does reduce the stress of individuals in adapting to the changing environment.

5.8.2 Participation in Tactical Implementations

Martin et al. (2006) recognized that while a **Strategic** change plan is usually developed by top-management; **Tactical** strategies for implementation are best developed from the lower level as they are closer to the ground. P-Tech may consider changing its organizational structure to a more organic profile for tactical implementation. Martínez-León & Martínez-García (2011) contended that organic organizational profile response to change is better than a mechanistically structured profile in terms of innovation. Mintzberg (1980) suggests that organizations that adopted an organically structured are better at tackling a dynamic environment and reducing bureaucracies. Organic structure would require management to empower decision-making functions to the lower levels, which translates to increased participation in organizational change. Such structure encourages feedback and actions from the lower levels and is useful in a dynamic situation.

The knowledge accumulated by blue-collar workers due to their constant contact with the products and the process of the entire process sequence efficiently is a valuable resource to tap on. A cross-functional & cross-hierarchical task force consisting of engineering and blue-collar workers from various areas for change implementation can be set up. This can encourage participation and information sharing and Blue-collar workers that are involved can help bring back information to the rest of the members. Ford et al. (2008) suggest that change resistance observed can be a resource and feedback. By reviewing the information from the critics, managers can surface weaknesses and improve the effectiveness of the change plan. Waddell & Sohal (1998) & Leigh (1988) suggest that resistance to change can be an important source of

feedback that could help to surface hindrances and benefit overall change process (Coetsee, 1999; Kegan & Lahey 2001; Kelman, 2005; Maurer, 1996b).

P-Tech Blue-collar workers may not have the opportunity to participate in high-level strategic decision, but they can participate by contributing ideas for tactical execution improvements in their areas that are undergoing changes. Individuals or a team of workers can provide feedback on issues encountered during the implementation of the new systems and processes, and hence, participate in making changes to the tactical implementation plans, such as training needs, material, and methods. P-Tech can emulate the suggestion scheme from ST-Microelectronics which rewards innovative ideas and feedback for improvements (Caldwell, 2006). In ST-microelectronics, this scheme was incorporated into the workers' annual appraisal system, hence, workers will not only see personal benefits in giving suggestions, they will also see potential issues resolved which will help reduce resistance responses when they see their ideas being adopted. Empowering the blue-collar workers via participating in the change activities can shows management support and consideration for their wellbeing, and not treating them as just a resource to achieve their end results. Meier et al., (2013) concluded in their research that workers exhibited lower resistance to change when they perceived having support from management. This would ensure that the new worker is not only able to perform as an individual, but also as a contributing team member.

5.8.3 Communication: Ensuring Relevance and Setting Expectation

According to Battilana et al. (2010) and Flower (1962), the initial stages of change are often met with confusion and questions; thus, it is important to clarify doubts. Self & Schraeder (2009) reiterated that management can create confidence in their staff by communicating. While they appreciate the overall long-term plans from management, the blue-collar workers felt that it was often given on a macro level with a time frame in which they are not able to see the relevance of the change programs. Therefore, it is recommended that apart from the current quarterly communication by P-Tech top management to all staff about the company's vision and plans, department managers and change agents need to operationalize the information down so that the blue-collar workers can appreciate it.

The company's goals need to be broken down into smaller key performance measurement that blue-collar workers can work on and within a 3 to 6-month timeline. Line managers need to break down the macro information into matters that would directly affect the blue-collar workers, such as change in their salary/pay/benefits, work arrangements, change to their current social group and expected performance indicators. Porter & Lawler (2005) and Ramlall (2004) proposed that the strength of one's effort is governed by the expectations that an outcome may be achieved, and the amount of value placed on the outcome in the individual's belief. Worker's opinion towards the change and subsequent behavioural response stem from a process by which the perceived consequences of change are evaluated with the worker's values and goals. Hence, clear and relevant communication on how they can help the blue-collar workers to increase their value and support their transition during change is crucial to minimise their loss of confidence to perform. Folger & Skarlicki (1999) sympathized with the fact that realistic information may not be possible, therefore management fear to communicate information that may turn out as inaccurate. Nevertheless, management can communicate what they know so that workers will get assurance that they are not being deliberately misled (Schweiger & DeNisi, 1991). For this reason, ensuring efficient communication can increase the moral, commitment and confidence of blue-collar workers (Bartlem & Locke, 1981; Recardo, 1995).

5.8.4 Maintain Group Identity during Organizational Change

It is important to look at organizational change and resistance of individual blue-collar workers within the context of a team setting. This is essential because how work is organized in P-Tech production line can contribute to resistance to change due to social-political factors, as individual's reactions to change are related to their network of relationships (Armenakis et al., 1993; Kim, 2004; Weisweiler et al., 2013). To prevent groupthink, several small work teams or cross functional task force can be formed for different areas of responsibility. It is easier to give individual opinions in a small group with a diverse background. The groups can convene regularly together for coordinating actions.

To prevent damaging silo effect due to negative influence from dominant workers who perceive the change as undesirable (Marcel Côté, 2002; Stone, F. 2004), P-Tech can implement training

initiatives directed at the team level. Other than implementing individual training program, P-Tech can arrange for the entire team to undergo an orientation program together to understand the overall changes, its inter-relatedness among the workstations, and a chance to solicit feedback and ideas. Setting training expectation to the team by providing roadmaps, explaining the purpose, and setting realistic goals can increase commitment and reduce turnover (Tannenbaum et al., 1991). In doing so, the entire team is geared towards the same objectives and share the responsibilities and incentives of training new members, thus shifting the responsibility of training a new member from a single mentor effort into a shared team effort. A practical test and a written test are usually administered to certify that a new worker is ready to perform their work independently at a station. As training becomes a team effort, P-Tech can explore the measuring of training effectiveness of a new member using team performance goal during the On-Job-Training period.

Managers and supervisors should manage and leverage on dissents voices or members that have alternative opinions (Lehman & Linsky, 2012). They can play devil-advocate that provides a viable suggestion by exposing and supporting them for giving ideas. Focus on company objectives and team goals, managers need to invest time to evaluate these ideas in the group and show appreciate for their effort. McFadden & Crowley-Henry (2018) posit organization achieve better staff retention when employees are given more opportunity to voice their concern with intention for change, a failure of this process will result in their dissatisfaction remaining. Therefore, in the process of building a more open work group, fellow blue-collar workers may build confidence and voice their ideas, breaking the chain of group-thinking.

5.8.5 Review Retention & Incentives Program

As discussed, while all groups by Years of Experience display resistance to change, the 1 to 5 years experienced group shows higher negative responses to changes and tends to resign if they are stressed and felt unable to cope. While reducing the turn-over should be a focus for all groups, this group may need more attention because, in terms of training cost, this group would incur a higher training cost for companies as they would begin to be more specialised and trained in more specific areas.

P-Tech can tap into Skillfuture.sg (2020), Singapore training support schemes and programs in their effort to reskill or to improve the skill level of its citizens. Skillsfuture (2020) is a national movement started by Singapore as part of the Industry Transformation Roadmap drive towards getting workers ready for the advance economy and inclusive society. The training programs from the framework are based on the industry sector, job role and skills level that cater for inexperience blue-collar workers. P-Tech can send their blue-collar workers for training that is targeted at the semiconductor industry. Becker (1960) argues that workers' commitment can be increased and turnover reduced because specific training creates an identity with the company. Based on the comprehensive skills information in the framework, P-Tech capitalized on it and designs a progressive Human Resource management and talent development plans to enhance its worker's skills and retention, especially to the 1 to 5 years experienced group.

Arthur (1994) suggests a commitment strategy in training as a form of individual investment by creating a psychological link between company and workers to achieve end-goals. To improve retention rate and motivate workers, P-Tech can also investigate incentive schemes such as Year of Service bonuses, Individual and/or group performance rewards to encourage blue-collar workers for their contributions. Extrinsic & intrinsic rewards, recognition and encouragement from management can help increase commitment; addressing workers' desired benefits associated with the changes (Judson, 1996; Kissler, 1991). Therefore, these recommendations could result in less incentive for blue-collar workers in P-Tech to leave the company when tailored skills obtained are non-transferable & non-portable and are supported by monetary incentives later from newly acquired knowledge.

5.8.6 Review Policy for Aging Workers

OECD (2020) report on social and emotional skills well-being shows that there is little difference in openness to new experience what people are age between 20 to 65 years of age. The report also shows that with training, cognitive ability of older adults (aged from 60 to 94 years old) actual increase and promoted significant and relatively lasting surges in openness to experience. In this study, P-Tech should capitalize on older workers having less resistance to change and more willing to take on new workstations than the younger workers during organizational change. Older workers are also valuable as they have accumulated vast

knowledge and experiences, especially in tacit knowledge, cultural norms and visual quality know-how that cannot be effectively documented. P-Tech can plan a longer training phase and practise for them to be more proficient in the new areas. The trainer needs to exercise more patience to lower the stress by giving more time to acquire the new knowledge and memorize the procedures via practise.

Knowing that tacit knowledge in P-Tech is one of the important aspects in individual team learning, P-Tech can consider creating roles that take advantage of older blue-collar worker's rich knowledge, experiences, and a more stable mentality. P-Tech can implement a Trainer-a-Trainer program, which focuses on teaching mature workers to be a lead-trainer & a mentor to younger or new members. Upon being a lead-trainer, these older workers can be allocated to areas that are more critical with tacit knowledge transfers such as defect and quality inspection. As a trainer, these older workers can also help to document their tacit knowledge into explicit knowledge by creating training materials, so that knowledge is retained and able to be transferred more effectively. In doing so, these lead-trainers can retain their seniority status and achieve colleagues' respect and recognition which gives them a sense of pride to stay on in the company (McNair et al 2006). When management achieved buy-in from them, these trainers with greater access to information, purpose and goals about the change can be a very positive and powerful influence on the rest of the team (Armstrong, 2011; Hollander, 1964).

Regardless of the results from various studies on age impact on work performance, semiconductor companies need to accept that the future workforce average working age in Singapore will get older (Population.sg, 2016; Singapore Department of Statistics, 2019). Hence, management and stakeholder need to remove their prejudice and accept an aging workforce that will usher in new influential social and economic dimensions to the world of work. As define by Mackie & Grant (2017), talent management is a proactive process in identifying and developing individuals, not confine to a few, but to at all level of an organization to achieve their full potential. Therefore, regardless of age, P-Tech blue-collar workers deserve the effort of enabling them to achieve success in their work. A summary of the recommendation corresponding to each theme can be reference to in Table 23.

Table 23: Recommendation Summary

Themes	Recommendation Summary
Operator Training: Socialization Process	1) To include training of new member by the team and encourage learning through socialization. 2) Training program to include overall process flow, work arrangement between stations and norms for better assimilation. 3) Give flexibility in training schedule, training duration, test dates and trainer selections to reduce stress and pressure.
Participation: No Empowerment to Change	1) Involvement in tactical implementation of the change initiatives with empowerment to change work flow. 2) Adopt an organic organizational structure to encourage empowerment and for faster response to dynamic situations. 3) Implement suggestion schemes with benefits to reward constructive feedback and give recognition in their participation.
Effective Communication: Content and Time Period Dependent	1) Summarized vision and goals and operationalized them into relevant and actionable information. 2) Set clear expectation by breaking down company goals to smaller key peformance measurements. 3) Review the time period of the information according to what the blue-collar worker find relevant (3 to 6 months).
Group Dynamics: Critical Consideration in Blue-Collar Workers	1) Prevent group-think by creating smaller work teams. 2) Prevent group-think by forming cross functional task force for different work areas. 3) Implement training initiatives & goals at team level to reduce work silo. 4) Manage members with alternative opinions and leverage them as devil advocate. 5) Focus on company objectives and encourage ideas from group member to promote a more open work group.
Higher Resistance to Change in 1 to 5 Years Experienced Group	1) Develop a talent development plan to enhance blue-collar workers skills. 2) Tap into Singapore's government training support scheme to improve retention. 2) Review incentive schemes to improve retention.
Age: A Moderating Factor for Change Resistances	1) New role creation for older worker aim at tapping their knowledge and skills. 2) Implement train-a-trainer program to teach older workers as mentor to younger/new member. 3) Encourage mature blue-collar workers to document their tacit knowledge so that it can be pass on. 4) Give recognition to older leaders for their contribution.

6.0 Conclusion and Recommendations for Future Research

Mentioned in the introduction chapter at the beginning of this study, the aim of this research was to explore Singapore's blue-collar worker perception on organizational change management approaches in the semiconductor industry. In Singapore's manufacturing sector; the adoption of new technologies; and changes in the job environment is not optional. Compounded by the current Covid-19 pandemic and the US-China Trade war, businesses are rapidly transforming themselves to survive the economic tsunami. One venerable group that is significantly affected are blue-collar workers. Although they occupy the lowest level in a typical hierarchical structure of a manufacturing company in Singapore, they are considered as essential service that was exempted from work restriction during the Covid-19 pandemic as they are a key contributor in semiconductor industry to sustain Singapore's economy (Singapore Ministry of Trade and Information, 2020). Swift transformational change brought about by disruptive innovations and companies wanting to survive from competition can result in opposition among workers expressed as resistance to change (Levine, 1980). Resistance to change is an important factor during organizational change (Grieves, 2010). Hence, the understanding of blue-collar workers' perception and their response to change can aid stakeholders in their planning and execution of change initiatives.

As its objectives, literature and models for organizational change relating to blue-collar workers were reviewed. It is also as part of the research objectives to identify the influencing factors that could be improved the worker's perception and reduces the negative effect of resistance to change in response to a dynamic working environment. In doing so, recommendations to stakeholders can be made to improve change management for blue-collar workers in the semiconductor industry, and contributions can be made to practice and knowledge. With reference to the aim and objectives of this study, this section sums up the research journey taken and provides a summary of the results, implications, and its contribution to knowledge & practice. The limitations of this study would lead to the recommendations for future research and concluding this section.

6.1 Research Overview and Implications

Adopting a post-positive philosophical paradigm, this study has achieved its aim and objectives and generated some unexpected results through a cross-sectional mixed-methods design. Consisting of a quantitative and qualitative approach in 2 sequential data collection phases, it sought to capture both statistical and contextual data. It is an appropriate strategy as it achieved triangulation of the findings with multiple types of data. Two different data sources from the same target group helped draw inferences from each other and enhanced understanding (Charney, 1996; Cooper, 1997). To increase the rigour and robustness of this research, 3 analytical approaches were used to surface the findings and themes. Besides using deductive and inductive approach for the quantitative and qualitative data analysis, abductive method was also used by examining quantitative and qualitative data in a cyclical manner. The adopted research design has shown its effectiveness in developing themes that may otherwise be ignored or overlooked.

Training, **Participation**, and **Communication** were established as antecedents for developing the hypotheses to understand blue-collar workers' perception of organizational change, and how these antecedents influenced their response. The results for the hypotheses testing using the quantitative data obtain from questionnaires show that blue-collar workers have positive perception and low change resistance towards change when there is an effective training program, opportunity to participate and adequate communication by management. However, examining the qualitative data from interviews surfaced deeper contextual and unexpected themes. The research design supports the aim and objectives of this study, where not only objective data was obtained; contextual information was also gathered to understand the subjectivity of individual perception of the change. This helped established a deeper understanding in individual subjective perception of the change they are experiencing and benefited this study in making appropriate recommendations.

Group Dynamics is a major theme that emerges from this study which affects all three antecedents of training, participation, and communication. For organizational change, there is a need to consider the blue-collar workers working in the same group as a single entity. This is because blue-collar workers functions as a single unit in order to achieve their performance. Their roles and responsibilities are inter-dependent, working in close proximity for long hours.

Seamless choreographies of arrangements are needed to ensure the team's goals are met, without putting additional stress and pressures on other members. A member that can integrate well with the new group has a more positive outcome in their training Holton (1996), and the group are more willing to teach a member that is in sync with the group culture (Chatman, 1991; Van Maanen & Schein, 1979; Sturman, 2003). A group that can work well together tends to instil greater commitment in members participation (Ivancevich & Matteson, 2002), and more open sharing of information with a new member (Holton, 1996). Many change models do not adequately address this effect of blue-collar workers at the lowest during organizational change (Appelbaum, et al., 2012). Organizational change model such as Lewin's 3 step model (Kurt, 1951) focus on changing individual behaviour, whole Kotter's 8-Step (Kotter, 1996) lack details application that addresses group resistance at workers on working at the lowest level of the organization (Baloh, 2018; Fernandez & Rainey, 2006; Kanter et al., 1992).

In **Training**, it was discovered that many learnings such as valuable tacit knowledge transfers occur in a social context or socialization process (Fuller & Clarke, 1994). This has a significant influence on how the blue-collar worker determined the effectiveness of the training. As new members intermingle with other members in the team, they learn not only on the system & process of the assigned station, but also how critical the entire must team works together as a single unit. With mutual understanding and without too many verbal cues, harmonized coordination of movements, such as arrangements of breaks, moving of material and products just in time is crucial to achieve expected performance. These activities are not possible to be captured effectively through formal training. How well socialization occurs will also influence the group responses to change. A group that integrated a new member well displayed lower resistance to change. In agreement with many studies, providing training can help worker to cope with changes and reduced resistance to change (Alvesson, 2012). However, this study highlights the approach needed by blue-collar workers for the training to be effective. Therefore, how a new worker assimilates into a new work environment will impact the team cohesiveness, effecting their performance and success of the change plans (Nonaka, 1991; Hall & Andriani, 2002).

The attitude of blue-collar workers towards **Participation** as a form of involvement in the change initiative is different in the aspect mentioned in many change models and literature.

The opportunity for participation does not necessary increase buy-in and reduces resistance to change (Locke & Schweiger, 1979; Wagner, 1994). They see their participation as a form of assignment allowing them opportunity to preview the coming change before others, thus allowing more time for mental preparation and responses when the main change happens. The blue-collar workers accept that change is part of the nature of technological advancement, and strategic decisions are already determined by top management with very little control and change possible at their level. This finding describes the perceptive that blue-collar workers have about the current opportunity for participation which lack empowerment. Management and change agents should investigate areas that can involve significant degree of decision making. It can reap a positive effect where workers are tending to exhibit more support for change when they are given an opportunity to participate Meier et al. (2013).

The blue-collar workers take a pragmatic approach in **Communication**. While they appreciate the sharing of vision and plans by the top management, they are more concern about information that would directly affect them in the immediate future (Labianca et al., 2000). They find information with the time frames of about 3 to 6 months more useful. They would assess how it would affect them in areas such as job stability, salary, and work environment. The result suggests a deficiency on the part of management in understanding what constitute useful information in the perspective of blue-collar workers. Future management communication should be tailored to include the information feedback from the findings.

Using abductive analysis, 2 themes emerged when using both quantitative and qualitative data was analysis in a cyclical process. Firstly, regardless of the age that they enter the semiconductor industry, blue-collar workers with 1 to 5 years of experience in this industry display higher resistance to change than other experienced groups. They expressed higher resistance to change by resigning if they are unable to accept or cope with the change (Kotter & Schlesinger, 1979). Secondly, it was found that age is a moderating factor in P-Tech blue-collar workers in resistance to change. The blue-collar workers display a linearly positive attitude towards change as they age. This was contrary to many studies suggesting that aging workers increase their resistance to change as they age (Doherty & Horne, 2002; Kanfer & Ackerman, 2004).

Recommendations were made in detail for each discussed theme in Chapter 5. In general, management and change agents need to take into consideration the importance of group dynamics of blue-collar workers when implementing changes. The actions that include managing social effect at group level would not only enable a smoother change program but can also help reduce the negative effect of resistance to change. Setting team goals and forming a smaller work team or cross functional task force for various work areas can help reduce Groupthink and maintain cohesiveness.

It was recommended, that in addition to the formalized training, P-Tech to develop a training program that includes socialization by the incumbent team members to understand the overall process flow, work arrangements and group norms. Allowing some training flexibility in training duration, test time and pairing of the trainee with a trainer to help relieving stress and pressure and allow time for social bonding to occur. To capitalize on blue-collar workers' valuable tacit knowledge and ground experiences of the manufacturing line, it was also suggested that P-Tech can consider involving the blue-collar workers to participate in tactical implication for their organizational plans.

P-Tech managers and change agents need to know how to summarize the vision and goals from top management and operationalized them into information that is relevant and of significant importance to blue-collar workers. Knowing the behavioural profile of P-Tech blue-collar workers in terms of "Experience" and "Age" group, it is recommended that Human Resource and stakeholders review their retention and incentive programs & policies to attract, retain and motivate the blue-collar workers for their contributions in the company. Human Resource manager can tap into Singapore's training support scheme, SkillFuture.Sg, which is targeted at getting aging Singapore workers trained and ready for the new economy (Skillfuture.sg, 2020).

6.2 Contribution to Practice and Knowledge

This research has many implications for researchers, HR practitioners and managers. There are noteworthy findings that reveal a lack of literature and studies in understanding resistance to change that is focused on blue-collar workers. They are often helpless and are most impacted during organizational change. The understanding of blue-collar workers' coping mechanism and their response to change need better comprehension, so that better implementation for organizational change can be executed. The contribution of this study provided deeper insights into the issues affecting blue-collar workers as they cope with organizational change which has not been given much attention in both professional practice and academic study. What differ in this study is that it provides more contextual details from the blue-collar workers' perspective, on how the management's actions are interpreted and responded at their level, and how group dynamic can affect the outcome. The understanding of these factors will benefit practitioners and academics in identifying considerations for future change initiatives and studies. Although data was collected only from P-Tech, the findings can be generalized to other companies in Singapore that operate similar in the semiconductor sector. The data gathered from the interviews are not confined only to the changes that are taking place in P-Tech. It reflects the thoughts and feelings of the blue-collar workers experienced during their tenure in the industry. Therefore, the findings, considerations and recommendations of this study can be applicable or used as reference to other semiconductor companies in Singapore as well.

To the Human Resource practitioners, this study provides insights that can help manage the organizational behaviour of Blue-collar workers by knowing their needs and motivation. Hence enable a better development of policies and training plans that can help reduce turnovers and achieve a cohesive work force. Managers can benefit in strategic management during operational planning and implementation of technological change by capitalizing on the tacit and practical knowledge of blue-collar workers for tactical executions.

The findings support and validated many studies with regards to how provision of training, opportunity for participation and communication to workers can help garner support for change and reduce the negative effect of resistance to change. However, this study also highlighted the inadequacy of available literature and the weakness of many change models in

addressing the aspect of group dynamic in blue-collar workers that operate in a close-knit and inter-dependent work environment. The findings reveal the importance in considering the effected group of blue-collar workers as a single unit during change. It provides an added value for researchers in awareness and consideration of the group dynamic in their future study on organizational change.

P-Tech and similar companies in the Singapore Semiconductor Industry need to recognize that its organization is a socio-technical system in order to develop successful change strategies (Trist, 1981). The evidence from this study suggests that a company with the ability to manage and appreciate the phenomenon of the blue-collar workers' perception and responses to change will decrease the probability of their resistance to change (Mealiea, 1978). With only a limited study having researched the influence on change management on blue-collar workers, the practical and theoretical contribution of this research will provide a better understanding of the effect of organisational change in the Singapore semiconductor industry. With better understanding, management and change agents can improve in navigating the current dynamic technological advancement and volatility economic situation with more efficient and effective change plan and actions.

6.3 Research Limitation

The primary limitation of this research is that the data are collected from a single organization undergoing rapid transformational change. Despite the richness of qualitative data, it produces that can be generalized to other semiconductor organizations in Singapore, the small sample size reduces the statistical power and the margin of error increased. More detail statistical calculation between groups cannot be achieved. It should be reminded the blue-collar workers in this study, as defined early in the chapter 2, are focused specifically on the semiconductor organization that operates as a group with inter-dependent functions. To complete a final product requires the combined effort and coordination of everyone in the team in its process flow. Therefore, the result cannot be generalized on the production floor staffed with individual contributors or areas with autonomous working condition such as Integrated Chip Probe Testing, Failure Analysis Lab, or Integrated Chip Repairs stations. This research was a cross-sectional study giving a snapshot in time, in the midst where the change

initiatives had already begun. It is not possible to draw conclusions in terms of directional causality. There is no comparison on the difference in blue-collar workers' perceptive before or after the implementation of various recommendations. It should be noted that human behaviours and reactions are far more complex than the number of categories developed here for its hypotheses' testing. As the change is still on-going, across several actions such as work team reassignment, new process & system training, the analysis could not distinguish the specific types of organizational changes which will cause the behavioural response to vary. Therefore, the recommendation cannot be validated for its effect in this research unless the implementation is put through its course for comparison. This research also did not consider the cultural difference of Singaporean, Malaysian and China workers. Individual interpretations and their inherent response to change may vary across cultures. It is unknown to what extend does national culture affect their perception and responses to change. To view resistance to change as a cultural-level construct will require its own validation process.

6.4 Recommendation for Future Research

This study provides the foundation for future researches on blue-collar workers' perception and responses to organizational change. It is recommended that further research be replicated on multiple organizations to validate the findings. With it, the sample size for quantitative data can increase, thus providing stronger statistical results and trends. For better assessment on cause & effect; and a better effectiveness validation on the recommendations for this study, a longitudinal case study may be more valuable. This would require observation of P-Tech change initiatives for at least 2 time periods to compare various components during its organizational transitions, such as the works of Weber & Weber (2001) and Rafferty & Griffin (2006). Responses to organizational changes are not necessary negative. Hence, more studies can be beneficial on positive behavioural responses to appreciate blue-collar response to organizational changes. Future research might find it useful to identify the type of innovative change involved in relations to their responses. This is because innovation that changes one's work processes and innovation that improves only product quality may result in different responses. One involved a potential change in work area and team, while the later one involved learning new skills at the existing workstation.

Future research recommendations for practice in the three study hypotheses can be carried out with a bigger study population. Training effectiveness between formalized training and learning via socialization can be compared between controlled groups to confirm the research findings. As different employees from different level in the organization may learn differently, they can also be studied to find out what is most effective training arrangement to adopt for different levels and groups. In doing so, Human Resource and Training managers can achieve their training goals more effectively by using more appropriate training methods and approaches. It would be beneficial to further investigate the effect participation level among different level of the organization and their response to change.

Due to the limited population and the cross-sectional approach for this study, the response for change cannot be measured if different level of employees is assigned into team empowered to make tactical changes. In knowing how members participate, contribute, and respond to change are perceive at different level during participation, management can be more aware how effective teams can be formed during change executions. Expanding on understanding different levels and groups responses change initial, future research can investigate the core interest of different employees from different level and groups in the organization communication. By adjusting information accordingly, management can achieve a more relevant and effective communication, which can increase moral, commitment and confidence in their workers (Bartlem & Locke, 1981; Recardo, 1995).

It would also be useful to investigate the relationship between cultural background and the context of resistance since Singapore businesses operate in a very diverse workforce. Alas & Sun (2007) has found that Chinese organization tends to be more accepting to changes passively due to the collective thinking culture. These researches would benefit HR practitioners and managers in their organization planning and implementation for change.

6.5 Concluding Thoughts

In the midst of this research, besides the trade war between countries affecting employment, the world had been thrust further into chaos due to the Covid-19 pandemic that is ravaging the world with no end in sight. In this study, it was found that there is inadequate attention to understand how changes brought about by dynamic technological advancement impact blue-collar workers and understand how they perceive and response to change. Literature dedicated to the study of organizational change impact on this vulnerable group is very limited. It is even more limited to obtain literature or professional journal that focus on the Singapore Semiconductor industry context. Often being marginalized and considered as a cost component in the financial balance sheet, blue-collar workers are usually the first group to be impacted during organizational change. And yet, it is ironic that in the midst of crisis, many blue-collar workers are considered essential and have to continue to work in the factories to keep the economy moving, while many white-collar workers have the means to work from home.

Managing change at any level is often complex, which is why Burnes (1996) argued that there is no best way to manage change. The many change models developed over the years but with high failure rate experienced in many organizations (Jones et al., 2019), suggest that there are no comprehensive methods yet to manage changes. Nevertheless, it is hopeful that this research could make its contribution in giving management, HR practitioners and academics greater awareness and consideration to blue-collar workers when managing organizational changes.

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8.0 Appendices

Appendix 1: Pilot Study versus Actual Study Comparison

S/No	Items	Study	Condition	Remarks
1	Sample Target	Pilot	5 participants not from the targeted group	Only selected staff will be invited for participation. All 5 staff will take part in the questionnaire. 1 of these 5 staff will part take in the interview to test out the questions and administration.
		Actual	Est. 49 blue-collar from target study group	All Blue-collar worker in the production operation will be invited for the study.
2	Sample Size	Pilot	5	Selected personnel only. (5 for Survey, 1 for interview)
		Actual	49	All Blue-collar worker in the production operation will be invited for the study. All will be invited for survey, 12 will be invited for Interview
3	Quantitative Data Collection Strategy	Pilot	Questionnaires & Open Short Questions	Pilot questionnaires to be administered to all participants. Feedback will be gathering using the checklist for improvement for the final questionnaire.
		Actual	Questionnaires & Open Short Questions	Final version revised from the pilot study will be used.
4	Qualitative Data Collection Strategy	Pilot	Interviews	1 of the 5 participants will be involved to test out the administration of the interview. Feedback will be gathering using the checklist for improvement for the final interview questions.
		Actual	Interviews	Final version revised from the pilot study will be used.
5	Quantitative Data Analysis	Pilot	Cronbach's Alpha	10 questionnaires will be administered to the equipment technicians. The result will be tested for internal consistency to improve the questionnaires for the actual study. No other statistical analysis possible due to low sample size.
		Actual	Cronbach's Alpha, Parson's Correlation Coefficient and significant tests	Result will be tested and questions may be disregarded if they do not contribute to achieving desired reliability specification requirements.
6	Qualitative Data Analysis	Pilot	No thematic analysis possible	Due to only 1 interview. The full process of producing the transcript and use of Nvivo will still be trial as practice.
		Actual	Thematic Analysis	Framework Analysis will be use. Nvivo software will be used to aid the recording and analysis of the data and two external inter-coder, not affiliated with P-Tech will be engaged to reduce biasness when analysing the verbatim transcripts.
7	Data Analysis Software	Pilot	SPSS & Nvivo	To practice the use of the software.
		Actual	SPSS & Nvivo	To use the software as main tool for managing the data and to produce visual graphs and charts.
8	Ethical Consideration	Pilot	Full consideration	All ethical aspect equal to actual study will applies
		Actual	Full consideration	All ethical aspect will applies

Appendix 2: Survey Consent Form

Survey Consent Form

Title: Resistance to Change: To Explore Singapore Blue-Collar worker Perception in Organizational Change Management Approaches in the Semiconductor Industry.

My name is **Lum Chee Sheng, Frederick** and I am a research student from the School of Business at Edinburgh Napier University. As part of my DBA course, I am undertaking a research project for my dissertation. The title of my project is: **Resistance to Change: Exploring Singapore Blue-Collar Worker's Perceptions of Organizational Change Management Approaches in the Semiconductor Industry.**

As currently the company is going through expansion and new set up, this study will investigate the issues and challenges of blue-collar workers during a time of organizational change in 3 areas: Communication, Participation and Training.

The findings of the study will be useful for managers to improve how organizational change initiatives can be executed better by understanding organizational change in your perspectives and factors affecting you.

I am looking for volunteers to participate in this study. There are no criteria (e.g. gender, age, or health) for being included or excluded – everyone is welcome to take part.

If you agree to participate in the study, you will be asked to answer a series of questions via a self-administered survey form. The whole procedure should take no longer than 30 minutes. You will be free to withdraw from the study at any stage, you would not have to give a reason, and it will not affect your treatment. This project does not require me to access any other information other than the data collected in the survey.

No names and ID will be recorded, all data will be anonymised and confidential, and it will not be possible for you to be identified in any reporting of the data gathered. All data collected will be kept in a secure place to which only I have access. These will be kept till the end of the examination process, following which any data that could identify you will be destroyed.

The results may be published in a journal or presented at a conference / *or* seminar.

If you would like to contact an independent person, who knows about this project but is not involved in it, you are welcome to email to **Grant MacKerron**: (g.mackerron@napier.ac.uk) or **Helena Lee** (helena.lee@associate.psb.edu.sg).

If you have read and understood this information sheet, any questions you had have been answered, and you would like to be a participant in the study, please now see the consent form.

Edinburgh Napier University Research Consent Form

Edinburgh Napier UNIVERSITY

Title: Resistance to Change: To Explore Singapore Blue-Collar worker Perception in Organizational Change Management Approaches in the Semiconductor Industry

Edinburgh Napier University requires that all persons who participate in research studies give their written consent to do so. Please read the following and sign it if you agree with what it says.

1. I freely and voluntarily consent to be a participant in the research project on the topic of Organizational Change to be conducted by Frederick Lum, who is a postgraduate student at Edinburgh Napier University.
2. The broad goal of this research study is to explore the perspective of blue-collar worker and relevant factors to consider during organizational change. Specifically, I have been asked to participate in a survey, which should take no longer than 45min to complete.
3. I have been told that my responses will be anonymised. My name will not be linked with the research materials, and I will not be identified or identifiable in any report subsequently produced by the researcher.
4. I also understand that if at any time during the survey, if I feel unable or unwilling to continue, I am free to leave. That is, my participation in this study is completely voluntary, and I may withdraw from it without negative consequences. However, after data has been anonymised or after publication of results it will not be possible for my data to be removed as it would be untraceable at this point.
5. In addition, should I not wish to answer any particular question or questions, I am free to decline.
6. I have been given the opportunity to ask questions regarding the survey and my questions have been answered to my satisfaction.
7. I have read and understand the above and consent to participate in this study. My signature is not a waiver of any legal rights. Furthermore, I understand that I will be able to keep a copy of the informed consent form for my records.

Participant's Signature Date

I have explained and defined in detail the research procedure in which the respondent has consented to participate. Furthermore, I will retain one copy of the informed consent form for my records.

Researcher's Signature Date

Appendix 3: Interview Consent Form

Survey Consent Form

Edinburgh Napier UNIVERSITY

Title: Resistance to Change: To Explore Singapore Blue-Collar worker Perception in Organizational Change Management Approaches in the Semiconductor Industry.

My name is **Lum Chee Sheng, Frederick** and I am a research student from the School of Business at Edinburgh Napier University. As part of my DBA course, I am undertaking a research project for my dissertation. The title of my search is: **Resistance to Change: Exploring Singapore Blue-Collar Worker's Perceptions of Organizational Change Management Approaches in the Semiconductor Industry.**

As currently the company is going through expansion and new set up. This study will investigate the issues and challenges viewed from the blue-collar workers perspective during a time of organizational change in 3 main areas: Communication, Participation and Training.

The findings of the study will be useful for managers to improve how organizational change initiatives can be executed better by understanding organizational change in your perspectives and factors affecting you.

I am looking for volunteers to participate in this study. There are no criteria (e.g. gender, age, or health) for being included or excluded – everyone working in the production line is welcome to take part.

If you agree to participate in the study, you will be asked to answer a series of questions via a one-to-one interview form. The whole procedure should take no longer than 60 minutes. You will be free to withdraw from the study at any stage, you would not have to give a reason, and it will not affect your treatment. This project does not require me to access any other information other than the data collected in the interview.

There will be an audit recording of the interview for data analysis, but no names and ID will be recorded, all data will be anonymised and confidential. It will not be possible for you to be identified in the transcript or any reporting of the data gathered. The researcher is not aware of any risks associated with the sharing of feedback information. There is a risk that your voice maybe recognized however, however all data collected will be kept in a secure place to which only I have access. These will be kept till the end of the examination process, following which any data that could identify you will be destroyed.

The results may be published in a journal or presented at a conference / *or* seminar.

If you would like to contact an independent person, who knows about this project but is not involved in it, you are welcome to email to **Grant MacKerron**: (g.mackerron@napier.ac.uk) or **Helena Lee** (helena.lee@associate.psb.edu.sg).

If you have read and understood this information sheet, any questions you had have been answered, and you would like to be a participant in the study, please now see the consent form.

Edinburgh Napier UNIVERSITY

Edinburgh Napier University Research Consent Form

Title: Resistance to Change: To Explore Singapore Blue-Collar worker Perception in Organizational Change Management Approaches in the Semiconductor Industry

Edinburgh Napier University requires that all persons who participate in research studies give their written consent to do so. Please read the following and sign it if you agree with what it says.

1. I freely and voluntarily consent to be a participant in the research project on the topic of Organizational Change to be conducted by Frederick Lum, who is a postgraduate student at Edinburgh Napier University.
2. The broad goal of this research study is to explore the perspective of blue-collar worker & relevant factors to consider during organizational change. Specifically, I have been asked to participate in an interview, which should take no longer than 60min to complete.
3. I have been told that my responses will be anonymised. My name will not be linked with the research materials, and I will not be identified or identifiable in any report subsequently produced by the researcher.
4. I also understand that if at any time during the interview, if I feel unable or unwilling to continue, I am free to leave. That is, my participation in this study is completely voluntary, and I may withdraw from it without negative consequences. However, after data has been anonymised or after publication of results it will not be possible for my data to be removed as it would be untraceable at this point.
5. In addition, should I not wish to answer any particular question or questions, I am free to decline.
6. I have been given the opportunity to ask questions regarding the interview and my questions have been answered to my satisfaction.
7. I have read and understand the above and consent to participate in this study. My signature is not a waiver of any legal rights. Furthermore, I understand that I will be able to keep a copy of the informed consent form for my records.

Participant's Signature Date

I have explained and defined in detail the research procedure in which the respondent has consented to participate. Furthermore, I will retain one copy of the informed consent form for my records.

Researcher's Signature Date

Appendix 4: Main Study Questionnaire

Survey August 2019

Dear Colleague,

Thank you for your cooperation. This survey is used to examine the effect and influence of the following 3 areas they have on you coping with organizational change.

1) Training Effectiveness
2) Participation in Change Activities
3) Communication of Reasons and Expected Outcome

The current operational changes in **P-Tech Pte. Ltd.** are and will significantly affect your working environment and it is important to understand your views in these areas and how it can be improved to help you cope with the change.

All questions in this survey are designed to determine your response and feeling to changes depending on how you perceive the above 3 areas.

It is important that you answer all questions so that we can include your input in the final data analysis. Your information and response to this questionnaire will be kept anonymous and confidential.

Thank you once again for your participation and cooperation.

亲爱的同事,

谢谢您的合作。本调查用于了解以下3个方面对您应对组织变革的影响。

1）培训效果
2）参与变革活动
3）原因和预期结果的沟通

Powertech Technology（ Singapore）Pte. Ltd.
目前的运营变化将对您的工作环境产生重大影响，公司必须了解您在这些领域的观点以及如何对此做出改进以帮助您应对变化。

本调查中的所有问题都旨在根据您对上述3个方面的看法来确定您对变化的反应和感受。
请务必回答所有问题，以便我们将您的意见纳入最终数据分析。您对本调查问卷的信息和回复将保持匿名和保密。

再次感谢您的参与和合作。

	PART 1: **Think of the current training program & arrangement that your are experiencing, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	想想结合您正在经历的当前培训计划和安排，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**强烈不同意**	**不同意**	**中立**	**同意**	**非常同意**
1	Changes to Processes, Systems & Work arrangements are good for company growth. 流程，系统和工作安排的变化有利于公司的发展。					
2	The current training help me to get use to the new work roles and procedures 目前的培训帮助我了解新的工作角色和程序。					
3	The training increases my confidence to take up bigger responsibility for the new job change. 培训增加了我对新工作变化承担更大责任的信心。					
4	Training will not help me cope with the changes in my work environment. 培训不会帮助我应对工作环境的变化。					
5	The training program prepares me for the new work role and responsibilities. 培训计划使我为新的工作角色和职责做好准备。					
6	The training program influences my confidence to perform well at the new work station. 培训计划影响了我在新工作站表现良好的信心。					

	PART 1: **Think of the current training program & arrangement that your are experiencing, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	想想结合您正在经历的当前培训计划和安排，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**强烈不同意**	**不同意**	**中立**	**同意**	**非常同意**
1	After being trained for new work station, I look forward to coming to work each day. 在接受新工作站培训后，我期待每一天的工作。					
2	Calling in sick or taking urgent leave is one way that I avoid dealing with the change. 请病假或紧急假，是我避免处理工作上的变化的方法之一。					
3	I enjoy coming to work. 我喜欢来上班。					
4	I won't resign from this job because of the change 我不会因为工作的变动，辞去这份工作。					
5	I don't see myself suitable and able to perform in this company anymore due to the change. 因为工作的变动，我不认为自己能有良好的表现或适合这这项工作。					
6	I feel that the job in this company suits me well. 我觉得在这家公司工作非常适合我。					
7	I will do the job the old way if I can get away with it. 如果可以避免，我会尽量避免使用新程序。					
8	I try to work in ways to show that the new procedure is better. 我尝试以各种方式证明新的程序更好。					
9	I support the new changes by using what I learn from the training. 我通过使用从培训中学到的知识来支持新的变化。					
10	It doesn't matter what I think because I have no choice about it. 我没有选择，所以我的想法和看法并不重要。					
11	I feel that I am able to do more now than before. 我觉得我现在能够比以前做更多。					
12	I am convinced that the change is good for me. 我相信，改变是为我好。					

	PART 2: **Consider level of participation in the company's change plans, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	考虑参与公司变更计划的程度，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**强烈不同意**	**不同意**	**中立**	**同意**	**非常同意**
1	Changes at work is unvoidable hence we need to adapt to it 工作中的变化是不可避免的，因此我们需要适应它。					
2	My participation has influence on how the changes are being carried out. 我的参与对于改变的实施方式具有影响力。					
3	Decisions concerning work are taken in consultation with those who are affected. 有关工作的决定是与受影响的人协商作出的。					
4	I have better ideas to suggest, but I felt sharing it would not make any difference. 我有更好的想法建议，但我觉得分享它不会有任何区别。					
5	Opportunity to give suggestions will influence my support for the change activities at work. 提出建议的机会将影响我对工作中的变革活动的支持。					
6	My participation in the change activities influences my acceptance of the changes at work. 我参与变革活动会影响我对工作变化的接受程度。					

	PART 2: **Consider level of participation in the company's change plans, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	考虑参与公司变更计划的程度，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**非常同意**	**同意**	**中立**	**不同意**	**强烈不同意**
1	I am more motivated to attend work each day due to the change. 工作在变化，我每天更有动力参加工作。					
2	I do not want to be present for work especially when there is new changes introduce at work. 我不想出席工作，特别是在工作中引入新的变化时。					
3	Having more participation on the change activities motivate me to attend work. 更多地参与变革活动将激励我参加工作。					
4	It gives me new confidence to stay in the company. 实施新的工作变给了我新的信心继续留在公司。					
5	I can see myself working in the company for longer term due to the change. 由于工作变化，我可以看到自己在本公司长远工作的可能性。					
6	Because of the lack of participation in change activities, I thinking of leaving this company. 由于缺乏参与变革活动，我想离开这家公司。					
7	I will try to improve in my work using the new knowledge I gain. 我会尝试使用新的知识来改善我的工作。					
8	I will be more convinced that the change will enable me to perform better at work. 我更相信这种变化因为它使我的工作做得更好。					
9	I discourage my fellow workers by being critical of the new procedures. 我找出新程序中的问题来负面劝阻我的同事。					
10	I am more committed to the new way of working when I can involve in the work arrangement 当我能参与工作安排时，我更加致力于新的工作方式。					
11	Participation in the change activities will not make me care more about my work quality. 参与变革活动，不会让我更关心我的工作质量。					
12	More participation in the change activities will make me more dedicated to my work. 更多参与变革活动将使我更加专注于我的工作。					

	PART 3: **Consider the communication given to you about the company's business plans, aim and objectives, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	考虑给您的关于公司业务计划，目标的沟通，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**强烈不同意**	**不同意**	**中立**	**同意**	**非常同意**
1	I support the current process, system and work changes that is taking place in the company. 我支持当前公司正在进行的流程，系统和工作变更。					
2	I understand company's communication on changes in the production line. 我理解公司关于生产线变化的沟通。					
3	The communication topics and information are not relevant to my job. 沟通主题和信息与我的工作无关。					
4	The communication sessions influences my support for the company change plans and activities. 公司的沟通会议影响了我对公司变革计划和活动的支持。					
5	I will cope well with the changes when I am regularly updated with information on the changes that is taking place. 我很好地应对了这些变化，因为我会定期收到有关正在发生的变化的信息更新。					
6	The communication session make me understand what I need to do in order to be successful in the new job environment. 沟通会议让我了解我需要做些什么才能在新的工作环境中取得成功。					

	PART 3: **Consider the communication given to you about the company's business plans, aim and objectives, then read each question and mark the choice that best reflect your feeling or perception on the changes that is taking place in the company.**	**Strongly Disagree**	**Disagree**	**Neither Agree or Disagree**	**Agree**	**Strongly Agree**
	考虑给您的关于公司业务计划，目标的沟通，然后阅读每个问题并标记最能反映您对公司正在发生的变化的感受或看法的选择。	**强烈不同意**	**不同意**	**中立**	**同意**	**非常同意**
1	Calling in sick or taking urgent leave is one way that I avoid dealing with the change. 请病假或紧急假，是我避免处理工作上的变化的方法之一。					
2	Knowing about the company changes make me enjoy coming to work more. 了解公司变更计划，让我更喜欢上班。					
3	Understanding the reason for change will make me more motivated to attend work each day. 知道改变的原因，我每天更有动力参加工作。					
4	I don't see myself suitable and able to perform in this company anymore due to the change. 因为工作的变动，我不认为自己能有良好的表现或适合这这项工作。					
5	Knowing abou the company change plan, I feel that the job in this company suits me well. 了解公司的变革计划，我觉得在这家公司的工作非常适合我。					
6	Knowing abou the company change plan, gives me new confidence to stay in the company. 实施新的工作给了我新的信心继续留在公司。					
7	I will do the job the old way if I can get away with it. 如果可以，我会尽量避免使用新程序。					
8	Understanding the reason for change, I will follow the new procedures more willingly. 知道改变的原因，我会更自愿地遵循新程序。					
9	I will try to improve in my work using the new knowledge I gain. 我会尝试使用新的知识来改善我的工作。					
10	Understanding about the change will convince me more that they change can be good for me. 了解这一变化将使我更加相信这种变化对我有益。					
11	Understanding about he change, I am more committed to the new way of working. 了解变化后，我更加忠于工作。					
12	I don't care about any communication so long they pay me. 我不在乎任何沟通，只要他们付钱给我。					

PART 4:
This section consist short questions with regards to Training, Participation and Communication on company change initiatives and plans.
It would be very valuable and helpful if you could give input pertaining to the questions.

本节包含有关公司变更计划的培训，参与和沟通方面的简短问题。
如果您能提供与问题相关的反馈，那将是非常有价值和有用的。

1 During the reassignment to your new job role, learning of new system and/or increase job responsibilities, what are some of your personal concerns?
在重新分配到新的工作岗位，学习新系统和/或增加工作职责期间，您有哪些个人顾虑？

2 What were your feelings when your job are no longer relevant and need to be Changed or Reassigned?
当您的工作不再相关且需要更改或重新分配时，您的感受是什么？

3 How would communication sessions on the changes that are happening in the production floor/work station help you to cope with the training and changes.
沟通会议可以如何帮助您应对生产车间/工作站上的变化？

4 Do you understand information from company's communication to you about the company's plans.
If your answer is No, please elaborate why?
您是否了解公司与您沟通的有关公司计划的信息？ 如果您的答案为否，请详细说明原因？

5 Does the current training enable you to do your job effectively and confidently.
If your answer is No, please elaborate why?
目前的培训是否能让您有效和自信地完成工作。 如果您的答案是否定的，请详细说明原因？

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如果您能提供与问题相关的反馈，那将是非常有价值和有用的。

6	Please suggest some methods of improvement to current training program that would help you cope with the changes in the production floor/work station better? 请建议一些改进当前培训计划的方法，以帮助您更好地应对生产车间/工作站的变化？
7	Is the amount of information you get about the changes meet you expectation? If your answer is No, please elaborate why? 您获得的有关更改的信息量是否符合您的预期？ 如果您的答案为否，请详细说明原因？
8	Will having more involvement in the change activities encourage you to accept the job changes better? If your answer is No, please elaborate why? 更多地参与变革活动是否会鼓励您更好地接受工作变化？ 如果您的答案为否，请详细说明原因？
9	In what way do you think you can participate in the change activities that the company is going through. 您认为您可以通过何种方式参与公司正在经历的变革活动。
10	Appreciate if you could input any other feedback with regards to Training, Participation and Communication on company change plans. 感谢您提供有关公司变更计划的培训，参与和沟通的任何其他反馈。

PART 5: Demographic Information / 个人资料	
Gender **性别**	☐ Male / 男 ☐ Female / 女
Age **年龄**	☐ Below 20 year old / 20岁以下 ☐ 20 to 29 years old / 从20到29岁 ☐ 30 to 39 year old / 从30到39岁 ☐ 40 years old and above / 40岁以上
Working Experience **工作经验**	☐ Less than 1 year / 不到1年 ☐ 1 to 5 years / 1到5年 ☐ 6 to 10 years / 6到10年 ☐ 11 to 15 years / 11到15年 ☐ 15 years or more / 15年以上