



STEM PATHWAYS: HOW THAI CULTURE AND GENDER
STEREOTYPES AFFECT FEMALE CAREER EXPERIENCES
IN STEM OCCUPATIONS

BY

MISS NICHIA JITKAEW

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ARTS (ASIA PACIFIC STUDIES)
THAMMASAT INSTITUTE OF AREA STUDIES
THAMMASAT UNIVERSITY
ACADEMIC YEAR 2019
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THESIS

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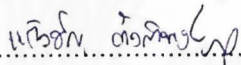
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STEM PATHWAYS: HOW THAI CULTURE AND GENDER STEREOTYPES AFFECT
FEMALE CAREER EXPERIENCES IN STEM OCCUPATIONS

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ABSTRACT

Despite Thailand ranking first in Asia for the highest proportion of females working in the STEM industry — the number of females working in STEM occupations still remain low in comparison to other occupational fields. This paper aims to examine the impacts of Thai culture and gender stereotypes on female career experiences in Thailand as well as the factors that encourage and discourage them to pursue a career in STEM. The study will also fill in the gap in previous researches by providing more insights into the experiences of Thai women working in STEM occupations within various career levels. The paper also incorporates the Self-affirmation Theory and Social Cognitive Career Theory to examine the career development of the participants. Based on the gathered data, the paper argues that Thai culture have influenced the constructed gender stereotypes in Thailand through the passed down beliefs and societal norms, which in turn have an impact on female career experiences. Comparatively, the extent of the impact also depends on the individual's degree of positive self-affirmation, with individuals who depicted higher positive self-affirmation being less affected by the influence of Thai culture and gender stereotypes. Family and supportive parental guidance also plays a crucial role in helping participants develop positive self-affirmation and career aspirations in

STEM. Thus, the boy's culture network in the workplace and the nature of the STEM work that contradicts with the societal expectation in turn creates a work-life balance problem for females working in STEM.

Keywords: Thai culture, gender stereotype, STEM, Thailand



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CHAPTER 1

INTRODUCTION

1.1 Introduction

The topic of gender has long been an issue in Thailand that can be traced back to the historically conservative social norms and beliefs women are expected to conformed to. Despite the access to better education and the protection from the Thailand Gender Equality Act B.E. 2558 (2015), women in Thailand still often face discrimination in the workplace (Sodha, Özbilgin & Connolly, 2010). In the established Thailand Gender equality Act B.E. 2558, the Minister of Social Development and Human Security is in charge of the execution of the bylaws of the issue within the Department of Women's Affairs and Family Development as the main objective of this Act is to promote gender equality and eliminate unfair gender discrimination within the Kingdom of Thailand. Hence, one area that has consistently been linked to female's barriers in workplace is the effect of gender stereotyping. For instance, women in Thailand are often associated with the image of grace, beauty, and neatness, which usually set the guidelines for the 'ideal' careers women are expected to participate in (Remya & Arasu, 2017). Therefore, one might contribute the factor of gender stereotypes to the problem of lack of female representations in top management levels and male dominated occupations. One major occupational field that is considered to be male-dominated is STEM — an occupational field that includes careers in science, technology, engineer, and mathematic (STEM). The acronym STEM has been adopted by worldwide institution and organisations, however, there is no standard definition to what career is accounted for as a STEM job. Despite that, this study focus on every careers that is considered to be STEM related such as scientific researchers, financial analyst, every type of engineer works and computer support works. However, career such as that of doctors and psychologist will not be counted as a STEM occupation within this study as these careers are categorised under a secondary STEM domain due to its health-related aspects (Breiner & Harkness, 2012).

On the other hand, Thailand's Ministry of Education and The Institute for the Promotion of Teaching Science and Technology (IPST) has also recently been making effort to push the education of STEM into the school curriculum in order to increase school autonomy to improve and prepare students for the future digital economy. Additionally, this further shine light on the importance of STEM field as IPST aim to follow the global trends of creating skills development, change of mindset, free-choice learning and cooperative collaboration within the education system (IPST, 2018). To boost, Thailand Partnership Initiative — Chevron's Enjoy Science Project had expanded the development of STEM education across Thailand by creating 12 technical training hubs nation-wide, in order to build 21st century workforce skills for people in STEM related industries; partnering with both private and public organisational sectors. To date, Chevron's Enjoy Science had help improved STEM engagement of more than 600 schools and benefitting over 500,000 students as these programs encourage creative, unique approach and inquisitive thinking to answer complex real-world problems (enjoyscience.org, 2019). At the same time, Thailand seems to revealed a reverse trend when it comes to proportion of men and women working in STEM. According to UNESCO's recent study, only three countries in Asia have an equal or above proportion of male and female working in the STEM industry with Thailand ranking as number one for the highest percentage of female workers in STEM (53 percent), follow by the Philippines (51 percent), and Kazakhstan (50 percent).

This phenomenon of the unbalance of gender representation in the workplace were also shown in countries such as Japan and Korea, where it was found that only 14 to 17 percent of female are working in the field of science and technology (Royal Thai Embassy, 2018). Moreover, an interview with Aware Technology Solutions for Business's HR Director suggested that the ratio of female and male applicants have shifted over the last 12 years from no more than 20 per cent female applicants to a astonishing ratio of 54 percent to 46 percent of women to men applicants (Allan, 2019). Additionally, Thailand's Ministry of Education had also adopted the U.N policy toolkit to promote STEM education among Thai girls, with 53 percent of the students in sciences higher education being female, but less

than 24 percent are majoring in engineering, construction or manufacturing studies (Bangkok UNESCO Organisation, 2017). This newly adopted policy toolkit is also known as STEM and Gender Advancement (SAGA), which aims to reduce the gender disparity in STEM fields as well as improve the policy-making in all countries by developing indicators for an evidence-based policy making (UNESCO, 2016).

Therefore, this study will examine what inspire women to pursue a career in STEM, as well as examine how gender stereotyping and culture affect their decision and experience within the STEM fields. Additionally, this study will fill the gaps of previous literatures by taking into account two main factors: (1) the influence of Thai culture and (2) gender stereotype for the purpose of examining the factors involved in contributing to Thai women's STEM pathway choices and experiences. Hence, the importance of this study is that it will contribute to the existing researches on the issues of gender in Thailand as well as fill in the research gap by providing more insights into the specific field of Thai women within the STEM occupations, covering women from various career levels as previous researches mostly focused on Thai women within the upper management levels and other career fields.

1.2 Rationale of study

Despite women in Thailand now ranking number one in the world for female enrolment in higher education and first in Asia-Pacific for increasing number in female leadership roles in corporate companies (Bloomberg.com, 2019), the number of females in STEM occupations remain low in compare to other occupational fields. Hence, Maltese & Cooper (2017) research revealed that females interest in STEM relies heavily on influence from interpersonal relationships. In addition, women are expected to conform to the expected gender stereotype and the Thai 'ideal' occupations for women to participate in (Remya & Arasu, 2017).

1.3 Research questions

1. How does Thai culture have an impact on female experiences working in STEM occupations?
2. What are the factors that encourage and discourage females in pursuing a career in STEM?
3. How does gender stereotyping in Thailand play a role in STEM industries?

1.4 Research objectives

The purpose of this research is to evaluate the impact of Thai culture and gender stereotyping have on women in STEM occupations. Additionally, the objective is to improve the understanding of gender stereotyping effects on women in male-dominated STEM occupations in order to pave way for future program developments to eliminate any gender barriers or gender bias culture that may limit female career options. This study will also examine factors that encourage and discourage Thai women in pursuing a career in STEM.

1.5 Scope of research

This study is scope down on studying the females experiences working in the STEM careers by focusing mainly on the three sectors of 1) engineering, 2) computer-related sciences (IT), and 3) chemistry. The paper focus on Thailand's cultural aspect and it's influence on how gender role expectation and gender stereotype are constructed and ascribed within the Thai society. Hence, it will further examine how the constructed ideas of gender affects the career experiences of women that are currently working in the STEM occupations and the factors that contributes to encouraging or discouraging them to pursue a career in STEM.

1.6 Significance of study

The significance of this study is to raise awareness of the factors contributing to the barriers that make it difficult for Thai women to pursue a successful career in STEM fields. Furthermore, it will contribute to the existing researches on the issue of gender in Thailand as well as fill in the research gaps by providing more insights into the specific field of Thai women within STEM occupations. The study will cover women from various career position levels as majority of previous researches are focused on Thai women within the upper management levels and other career fields. This issue of underrepresentation of female in STEM is an important topic to address as Thailand Ministry of Education had recently become the first country in Asia-Pacific to adopt a policy toolkit UNESCO's global STEM and Advancement (SAGA) project that aimed at analysing the impact of policies on gender discrimination in STEM occupations (Bangkok UNESCO Organisation, 2017). Hence, this study also take into account specifically the influence of Thai culture and Thai women's experiences of gender stereotyping as previous researches regarding gender and STEM careers were mostly conducted by western researchers. Therefore, this study could be use a guideline for future policymakers when designing policy compensation and benefits for females in the context of Thailand's STEM industry.

1.7 Operational definition

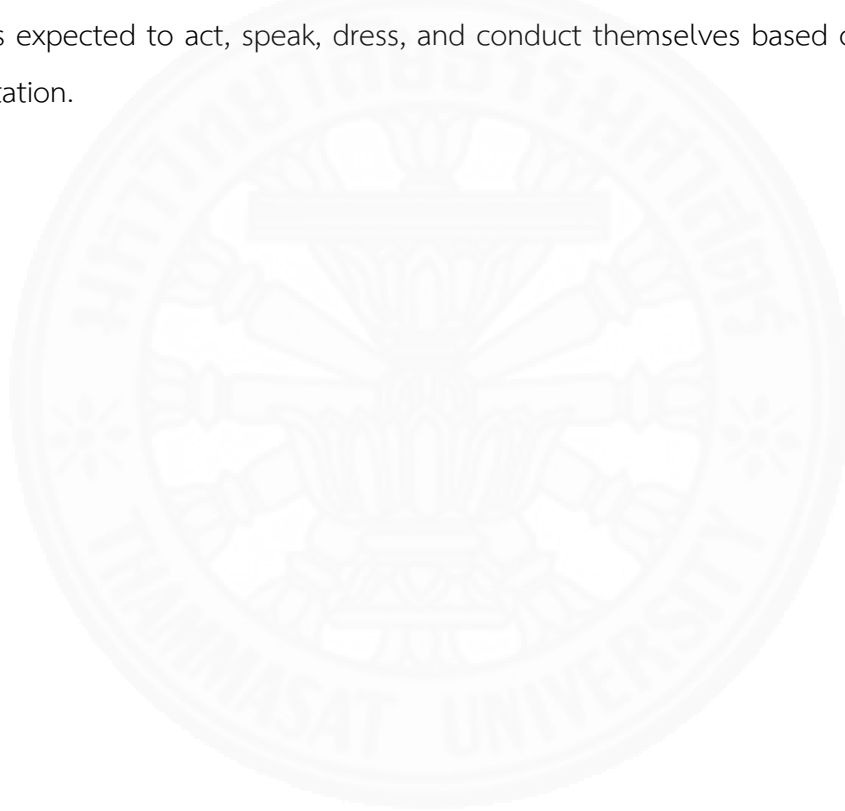
STEM means an occupational field that includes careers in science, technology, engineer, and mathematic (STEM). This study refers to every careers that is considered to be STEM related such as scientific researchers, financial analyst, every type of engineer works and computer support works. However, doctors and psychologist or other health-related occupations will not be included as STEM careers for this study.

Gender stereotype means gender stereotypes are the qualities ascribed to men and women based on their gender, beliefs that hold to make assumptions

about members of a particular gender group that can be both positive and negative as the stereotype can often lead to bias assumption about an individual based on their gender.

Thai culture means culture is the collective programming of the mind, values, beliefs, languages, and traditions which distinguishes the members of one group from another. Hence, culture in this study refers to the Thai language, beliefs, traditions and values.

Gender roles means gender roles refers to the societal norms of how one is expected to act, speak, dress, and conduct themselves based on their sexual orientation.



CHAPTER 2

REVIEW OF LITERATURES

According to Adam Maltese and Christina Cooper (2017), there are different various crucial factors in sparking an interest in STEM (science, technology, engineering, and mathematic) careers within each gender such as self-driven interest and more importantly; the support from significant others. Hence, previous studies on gender inequality have found a shift in labour market trends from ‘homemaking versus careers’ to ‘traditional versus non-traditional career patterns’, suggesting that currently men are not expected to be the only bread-winner of the house (Dimovski et al., 2010). However, there is still a significant absence of female in high management positions and male-dominant occupations. According to UCL Institute of Education (IOE), gender stereotypes influence children career aspirations with boys choosing ‘masculine’ careers and girls choosing ‘feminine, care-taking’ career such as teaching. This finding is supported by another study on career preferences, which revealed a larger difference in women’s implicit and explicit report of career preferences in compare to men — suggesting that the impact of gender stereotyping is more asserted in females (Gadassi & Gati, 2009).

Another study was conducted on Thai female executives in order to study the barriers of career advancement. Thus, the study focused on women that were in the position of business director, general manager, chief executive personnels, and president of various organizations (Napasr & Yukongdi, 2015). The findings revealed that career barriers are divided into three categories: (1) individual factors, (2) organisational factors, and (3) interpersonal factors. Individual factors included issue such as emotions, being overly sensitive, and issue concerning work-life balance, whereas interpersonal factors included issues such as adapting to the male-culture networks and organisational factors such as discriminatory human resources policies, bias gender stereotypes, and discriminatory requirements of the work. Additionally, these factors are influenced by the traditional values and religious beliefs toward Thai women that resulted in a ideology of female need to conform to gender role stereotyping. Moreover, as higher management level requires maturity

and emotional stability, men are perceived to have better ability to assert power and endure high tension in compare to women (Dovidio et al., 1988). However, the study found that individual factors often arise from the expectation placed on women to balance between their responsibility within the workplace as well as taking care of the household. Therefore, the main barriers that prevents women to move up the career ladders were classified into 3 levels; individual levels that arises from the gender role expectation and other personal factors, follow by organization levels and societal levels. Conversely, the obstacle Thai women faces from organisational and society mostly arises from gender stereotyping as the discriminatory promotional practices, male-cultured network makes it harder for women to insert themselves into the culture.

Another study conducted on female science majors undergraduates found that women were also less likely to pursue a science major in the first year of college and were less likely to continue in that path after the third year of college in compared to male undergraduates (Gayles & Ampaw, 2016). In addition, it was also found that women from all demographic backgrounds that pursue a career in STEM have a much higher chance to end up leaving the field after a few years in compare to men within the same field (Duran, 2015). In the bargain, a study was conducted to examine the relationship between STEM career choices and gendered beliefs, identity and values. It aimed to study how altruism and femininity group a sense of membership within the STEM working fields, where the study was conducted on adolescents from grade 7 to age of 26 years old. The result revealed a relationship between femininity and career STEM choices, with altruism as a mediator. Moreover, the data obtained also revealed a correlation between gendered beliefs and identity on STEM careers than STEM careers with self-concept of ability (Wegemer & Eccles, 2018). Therefore, building on previous literatures — it is likely that the deep-rooted gender stereotypes, social expectations and gender beliefs are the crucial factors in determining women's career experiences in STEM fields.

2.1 Definition of gender stereotyping

Gender stereotypes are the qualities ascribed to men and women based on their gender, beliefs that hold to make assumptions about members of a particular gender group that can be both positive and negative as the stereotype can often lead to bias assumption about an individual based on their gender (Prentice, D. A. & Carranza, E. (2002). For instance, the belief that women are feminine is matched with the societal expectation that they should be caring and sensitive whereas men are associated with the belief of having masculine characteristics that are associated with leadership skills, insensitivity and strength. These traits are the general social desirability that men and women are supposed to have according to the virtue of their gender (Prentice & Carranza, 2002). Additionally, both genders are expected to conform to these social norms as told by society through traditions and passed down beliefs, therefore, those who possess the traits of the opposite sex are often scolded upon as having an undesirable feminine or masculine personalities. Hence, gender stereotyping then becomes harmful when it is use as a tool for discrimination and stereotypical expectations for how each gender should behave and think. Nevertheless, these gender stereotypes that are often given and deep rooted within a society sets a certain expectation for the different roles each gender should contribute to the society, hence, pressuring individuals to conform to their gender roles (Ickes, 1993).

2.1.1 Definition of gender roles

Gender roles refers to the societal norms of how one is expected to act, speak, dress, and conduct themselves based on their sexual orientation. This idea of gender roles are constructed through culture and socialising agents such as parents, peers, and religion. For instance, fathers often teach boys how to fix and build things, while mothers teach girls how to cook and take care of the household. These conventional gender roles are often passed down and adopted from generations to generations, with further reinforcement from the media and culture (Hardin & Greer, 2009). Therefore, with Thailand being a conventional country along

with the deep-rooted traditions and beliefs in how female should behave according to the culture — this often create barriers for women to perform certain roles or say certain things that is deemed as an inappropriate for Thai women to exhibit. Additionally, most women have the desire to balance their work and family life that leave them having two full-time careers due to societal expectations and according to Tamra Lashcyk, a Wall Street executive, author and business coach, “the burden of running a household still falls on the woman’s shoulders as men get more of a pass when it comes to these duties, especially those that involve children.” (SK-II, 2017).

2.2 Stereotype threat and sexism

Similarly, another study examined the linkage of stereotype threat effect of mindfulness on Thai women psychological and behavioural responses in the work setting also shed light on how social supports can effect female career experiences (Jaruntanakul & Jinchang, 2018). The study focuses on the issue of sexism; which is defined as a prejudicial discrimination based solely on gender identity that can lead to unequal treatment of a certain gender in form of gender pay gaps, hiring and firing process, and sexual harassments. However, this inequality of treatment are suggested to go unnoticed due to the cultural and social norms that have made those treatment s seems acceptable. Consequently, Chulalongkorn University aimed to examine this effect of sexism on Thai women in Thailand from a psychological approach — looking at the stereotype threats and its affect on women psychological and behavioural response. Stereotype threat is a form of social identity theory where an individual feel pressure to conform to a certain behaviour or try to avoid being judged out of the fear that they could confirm the negative stereotype. Additionally, this fear of performing actions that could confirm the stereotype have long been the obstacle for women in term of career advancement as it directly impact their performance.

According to Shapiro and Neuberg (2007), stereotype threat can increase anxiety, create negative thoughts, reduce memory capacity and task confidence.

Hence, it is one of the factor that stand in the way of women moving up the ladder within their respective career fields. However, the study argued that practicing mindfulness can increase attentional flexibility and situational awareness, and therefore — can be an important element in protecting an individual from negative exposure to sexism. The research were divided into 2 studies, where the first study explored the stereotype threat experience of sexism in a male-dominated work setting, which was hypothesised to lead to lower career motivation. Consequently, study 2 focuses on the effect of mindfulness practice on female cognitive ability through using experimental design to manipulate the negative effect of sexism and state-mindfulness. Hence, the data obtained from Study 1 was concurred with the hypothesis; suggesting that exposure to sexist environment can have direct effect on women career aspirations.

Similarly, it was also found in Study 2 that female participants who went through mindfulness practice prior to being exposed to sexist environment also performed better on the reasoning test in compare to the group that didn't. This study add to the existing literatures on the impact on sexism by confirming that exposure to sexist stereotype can have direct negative impact on females career experience. However, the study also revealed that encouraging anti-sexist norms and incorporation of mindfulness practice can be use a a protective factor for females within the male-dominated working environment. Nevertheless, there were only a small correlation between mindfulness and sexism despite the prediction of a strong relationship between the two. Another gap in this research is that after the results were revealed, no further suggestions have been made about approaches to making the male-dominated working environment more welcoming for women. Moreover, the study did not take into consideration outside factors such as the participants past experience with the certain career field and personal level of self-determination. In order to fill this gap, future study should focus on more assessing participants' self-aspiration level along with finding other strategies to overcome stereotype threats.

Previous researchers also conducted a study to examine the relations between gender difference and the advancement in Thai academic careers. The particular study pointed out two possible causes of the persistent gender disparities;

the traditional role in family that distract women from career devotions and the deep-rooted male-dominant culture that discourage women in academic and career advancement (Sodha, Özbilgin, and Connolly, 2010). Additionally, due this deep-rooted male-dominated and bias gender stereotypes ideology, gender discrimination awareness is relatively low within the Thai society (Yukongdi, 2005). According to the Office of Women's Affairs and Family Development (2008), Thai women in the top managerial positions still faces the problem of gender wage gap as supported by the statistical data collected. The study revealed an evidence of a glass ceiling phenomenon of women accounting for over 50 per cent of workers in academic fields, but on the other hand only 30 per cent were reported to be in a higher career level in the workplace. However, the most important finding from this study is that the participants did not perceive gender discrimination in the workplace, despite the supporting datas collected which revealed that women received less jobs incentives in compare to men — depicting the degree of Thai individuals awareness of gender discrimination within the Thai society.

Subsequently, Ontario Institute for Studies in Education of the University of Toronto also conducted a study on the effect of gender stereotype for the purpose to minimize the effect of gender stereotype threat in females within the context of learning maths in an academic setting (Vijayakumaran, 2017). The study was conducted on three elementary school teachers from Toronto District School Board and York Region District School Board using a semi-structured interviews. The interpreted datas revealed that female students tend to conform to gender stereotypes, however, teachers attitude towards math can have a direct impact on female students. For instance, a positive attitude of teachers can positively impacted female student aspiration in studying math. Furthermore, the finding also suggested that whole-group teaching strategies in a classroom environment can also increase female students' performance in mathematics; and similar with previous literatures, it was found that mindfulness practice can improve working memory capacity in females. Therefore, the findings from this literature further supports the importance of having a positive role model as a key element in being both the protective and motivative factor for females in creating a positive perspective towards a male-

dominated stereotype. Similarly, a survey was conducted on seven countries in the Asia-Pacific region through distribution of questionnaires to study the level of anxiety of female students in mathematics and sciences subjects. The results revealed that even though the students excelled in the subject, female students reported higher rates of anxiety compare to male students. For instance in Cambodia, it was revealed that female students showed more anxiety, reluctance and even wait until the class finished to answer or approach the teacher (Bangkok UNESCO, 2017).

2.3 STEM pathways men vs women

According to previous literatures, attitudes, interests and engagement have been associated with an individual decision to pursue a certain career. Adam Maltese and Christina Cooper (2017) had further investigate this in the particular field of STEM careers. The goal of their research were to understand the disparity between sexes in STEM industry as to different reasons to why men and women decided to enter and exit STEM fields, in specifically the factors that has initiates and maintain their interest in STEM. The researchers incorporated the four-phase model of interest development as a underlying framework to investigate the reasons behind both sexes decision to pursue or exit STEM; this model comprised of (a) triggered situational interest of particular content, (b) maintained situational interest, (c) emerging individual interest, and (d) well-developed interests (Renninger, 2016). Additionally, they also applied theories such as the Social Cognitive Career Theory (SCCT) and the Expectancy-value Theory to emphasis on the idea that career choices are based on both intrapersonal and interpersonal relationships such as self-efficacy, environmental support, individual persistence, and other behavioural factors (Lent metal., 2000). According to previous studies (Fouad et at, 2010; Maltest & Cooper, 2017), it was found that there were slight differences in the barrier factors that discourage both sexes to pursue a study in STEM. While female experience more barriers that stem from lack of teachers support and lack of support from parents — males' barriers comes mainly from lack of peer interests in STEM and minimal support from close family members. Despite the similarities in the barriers, the study

showed that females' decision to pursue a certain career are more heavily influenced by their teachers in compare to males'.

Therefore, Maltese and Cooper (2017) aim to fill this gap in the previous literature to further understanding the factors that not only initiate, but also maintain STEM interest overtime within the different gender by administering a 125 questions survey that included items such as positive or negative experiences with STEM, reasons for considering leaving a pathway toward STEM degree or career, and sources of support to almost 8,000 individuals both inside and outside of STEM fields. After the analysis of the survey data, it revealed that there is no single pathway that sparks the interest to pursue STEM fields for each sexes. However, the result was concurrent with the previous literatures of which stated that females interest in STEM rely more heavily on the support from interpersonal relationships such as family, peers, and teachers in compare to males, whose interest in STEM depends more on self-motivation and persistence. However, the limitations to this particular study was in term of the depth of the interview. This is because due to the large quantity of participants, only certain real-time questions were able to be administered. Hence, performance in STEM prior to the research such as experience within the field during middle school and high school was not taken into consideration, which could in fact be another crucial factor in initiating and maintaining interests in STEM. Hence, future research should aim to fill in this gap of whether the male-dominated working environment in STEM occupations is likely to be the barrier to women in the industry as it may cause lack of outside support from working peers. Hence, create a self-fulfilling prophecy effect and contributes to sustaining the glass ceiling effect. Along with having a semi-structured interview in order to be able to go into depth of the reasons and past experiences in STEM with the interviewees.

Likewise, another study was conducted in Thailand focusing on female engineers in the Thai construction industry in relation to the female attributes and its impact on their challenges in their career (Kaewsri & Tongthong, 2014). The information was obtained through in-depth interviews with Thai female civil engineers; the interviews revealed that there were significant differences between male and female engineer in term of their roles in the construction industry. The main responsibilities

of a civil engineer are such as coordinating with land owners, contractors, subcontractors, and material suppliers. Hence, this part of the job often becomes the barrier for women engineers to advance in their career. This is because often times, the job requires long working hours and late nights construction site visits, which becomes an issue for women with household responsibilities. To boost, the gender stereotype of women as a feminine gender also contributed the chance of male civil engineers to be entrusted with these type of 'masculine' responsibilities more due to the perceptions of women being unsuitable for machinery and construction supervision (Kaewsri, 2014).

On top of that, Thailand's Department of Labor Protection and Welfare (2012) had also contributed to being another barrier for women in engineering occupations as the Labour Protection Act forbids women employees from working with vibrate machinery, underground work, and working on heights that are over 10 meters high — creating a inevitable limitation for female civil engineer roles within the workplace and fewer chance for promotion opportunities in compare to male engineers. Therefore, this study further supports the crucial need for research to be conduct to raise awareness for the inequality of opportunity for female in the STEM industry as women working in STEM career tends to face more career challenges due to the nature of the bias gender stereotypes in the workplace.

2.4 Definition of culture

According to Hofstede (1994) and Spencer-Oatey (2008), culture is the collective programming of the mind, values, beliefs, languages, and traditions which distinguishes the members of one group from another — it is the foundation of how ones form behaviour and express ideas and identity.

Hence, to associate one self with a particular culture is in a way to fulfil ones need to develop the sense of belonging. However, this study focus on particular aspects of the Thai culture that may contribute to females experiences working in STEM industry. Therefore, culture in this study refers to the environmental factors that play a role in shaping ones self such as traditions, beliefs, languages, and values.

2.5 Thai cultural beliefs, norms, and gender roles expectation

Thai culture is heavily influenced by Thailand's dominant religion, Theravada Buddhism. Traditionally, women in Thailand are expected to conform to the gender role expectation of being the 'good wife', this refers to the traditional expectation for women to stay home and take care of the children and household duties while the men is the only bread winner of the family (Remya & Arasu, 2017). However, the shift to modernity in Thailand have changed this gender role expectation due to the demand for higher living standard, encouraging more women to earn supplement income to support the family as well. Nevertheless, the particular culture of Thai society still create a particular guideline for female within the career prospect. For instance, most employers in blue collar careers still prefer unmarried women as they perceives married women as less committed to their jobs due to the expectation of women putting responsibilities toward family and household over jobs responsibilities.

Thai culture and norms still expects women to conform to a certain behaviour of motherhood or as Thais refer to as 'phayt mae', including characteristic of nurturance, respectful and obedience to older authorities. This in term had become one of the barriers for women in workplace setting as female employees are expected to obey higher ranking male authorities without question as it is perceived as being disrespectful and rebellious in Thai culture, whereas speaking up in Western culture are considered as smart and making useful contributions to the firm (Remya & Arasu, 2017). Another important factor of the this culture is the hierarchical concept of "thii tam thii soong", this refers to the Thai hierarchical system of people being is a high or low status according to their age, occupation, or family background. Hence, the importance of status can be seen in the Thai pronominal system as the choice of pronoun are employed to identify the sex, status, degree of intimacy in the relationship and the overall identification of oneself. For instance, "dichan" and "than" will be used for individuals who have the desire to keep distance or is trying to create a new formal relationship, where as the pronoun "chan" and "kae" are can be used between individuals who are very close or on the other hand, "kae"

may be employed toward an individual that one decided to be rude toward depending on the specific situations. Another example of Thai culture is 'wai', which is a respectful act of greeting towards someone older or in a higher status. There, status is given an important role in Thai culture as can be seen in the Thai language of identifying a person's ranking such as 'pee', which are use to refer to refer to an older individual before calling out their names to show respect (Vongvipanond, 1994). To boot, despite Thailand being known for being the land of smiles — one must also understand that this is part of the Thai culture that despite wanting to reject a person or say no, one must save face of the other individual by smiling (Punjaroje & Morrison, 2007).

According to previous literature, Thai women often internalize the society's stereotype of themselves as a emotional and dependent on men. Additionally, the socio-cultural structure of Thailand is argued to be the main factor that tied Thai women with the image of wives and mother; leading to a certain degree of self-fulfilling prophecy (Yukongdi, 2005). This particular self-perception of Thai women can be attributed to the both the given traditional cultural norms and the constructed values and beliefs formed through social interactions from a young age. This self-perception had in turn became another barrier for women in this male-led culture as previous study shown that women tend to belief that the female sex have higher tolerance under pressure and is better with human communication in compare to men. However, an interview study conducted on 12 women in higher management level revealed that women in top managements described female employees as having less capability to handle crisis than male employees (Pancharoen et al., 2016). The study discovered 61 themes, with 10 key characteristics and 5 clusters theme, which the participants reported to be important in working in senior management position. The researchers classes these experiences into 10 categories: (1) Business Acumen, (2) Experiences (3) Characters, (4) Sentimentalities, (5) Competency, (6) Human Resource Management (HRM) and Development (HRD), (7) Career Growth, (8) Education, (9) Remuneration and (10) Network. These categories can be argue to be influenced by culture and beliefs of female being expected to have higher scores on 'feminine characteristics' such as sentimentality, competency,

and better human connection skills. The authors concluded that the combination of the 10 aspects is necessary in order for women to be able to break through the glass ceiling barrier in Thailand, however, acquiring all these aspects does not guarantee that they will not face gender discrimination as the situation also depend heavily on one's corporate culture and self-aspirations. Nonetheless, the gap in this study is that the researchers only examine the participants' current experience on glass ceiling. Hence, it could be a data obtained is prone to bias as all participants already breakthrough the glass ceiling barrier and therefore, could have bias response due to their current position and leave out experiences from prior to reaching the senior management level. Therefore, future research could focus more on female leaders' prior to breaking through the glass ceiling on their experience with Thai's corporate culture and how gender role expectation may have effected these experiences.

On that account, gender role expectation is heavily influenced by interpersonal relationships and interpersonal skills. Researchers have found that children abilities and personalities are influenced heavily by significant authorities such as parents and teachers. However, when mothers do not endorse gender norms and gender stereotypes — the ability and personality of their daughters were not affected (Tomasetto, et al., 2011). Similarly, it was found that teacher's perceptions are equally as important as parental perceptions in influencing their children's performances. A study by Upadyaya and Eccles (2015) revealed that students' math preference and performance were heavily influenced by home environment and teachers expectations. Hence, teachers tend to perceive boys at better in maths than girls; affecting female students performance in mathematic class. Therefore, teachers positive reinforcements or positive reward can also result in being the inspiration for female students to engage in male-dominated fields such as STEM.

2.6 Glass ceiling phenomenon

According to Merriam Webster Online Dictionary (2012), glass ceiling is defined as “the intangible barrier within a hierarchy that prevents women or minorities from obtaining upper level positions”. This refers not only to the

interpersonal relationships, but also the interpersonal skills of the women and minorities as well. Brenda J. Wrigley (2002) conducted a qualitative research to investigate how women view glass ceiling within the context of communication management careers through using in-depth interviews and focus groups. The study had identified five main factors that contributes to the glass ceiling phenomenon for women: (1) denial, (2) gender role socialization, (3) historical precedence, (4) women turning against other women, and (5) corporate culture. Similarly, glass ceiling study have also been performed within the Kingdom of Thailand in the context of women leaders in Thai education sector. A qualitative research was conducted on successful women in higher education career paths — exploring the strategies they used to overcome the glass ceiling barriers within their workplace setting for the purpose of helping Thai women breakthrough barriers in their career advancement pathways (Cheaupalakit, 2014). The information obtained suggested that even though it is hard for female to break through the glass ceiling in the society — it is even difficult to shift from the image of an obedience employee to a decision-making position within an organization due to the norms of a male-led culture. The factors found to be the underlying causes of glass ceiling in Thai educational settings were the long-term result from lack of access to mentoring, the work-life balance burden that the society often put more pressure on female and the legacy of male domination. However, the limitation of this study is that it is restricted to only the education fields, hence, could be bias as employees within the educational sectors does not represent the whole population of women working in the male-dominated career.

Bloomberg's news recently published an article on why women in Thailand now rank number one in the world for female enrolment in higher education and why it ranked number one in Asia-Pacific for increasing number in female leadership roles in corporate companies (bloomberg.com, 2019). The article further discusses how family enterprises that has been passed down from generation to generations also helped in allowing more women to remain in the labor force as the interviewee reported that these networks understand the family obligations of female workers that come from a certain socioeconomic group. Additionally, one of the successful female corporate leader that were interviewed reported that she has

never been in a situation that she felt there is a limitation due to her gender, “I’ve never felt like they would choose a male executive over me”. Hence, this could be question whether her success is the result of her positive self-affirmation and her perspective on the world by not seeing gender as a barrier or is this view given through interpersonal relationships with positive influence and encouragement from family and peer?

2.7 Gender wage gap and STEM careers in Asia-Pacific Region

Gender wage gap is another issue that is closely related to the glass ceiling phenomenon. Studies have shown that the average Thai female workers are revealed to be more productive in compare to male workers, but instead receive lower wages with stronger wage gap in younger labor forces due to gender discrimination (Khorpetch & Kulkolkarn, 2011; Mutsalklisana, 2011). Additionally, a study on gender wage inequality conducted in Thailand using Blinder-Oaxaca decomposition technique shown that the wage gap between gender had declined in the past decades from 14 percent in 1996 to 1 percent in 2013. Nonetheless, results shown that women were still earning less than men when comparing the human capital characteristic, which women have shown to have better characteristic including factors such as education and working experience. However, there are multiple unexplained elements to the pay gap that have risen over the years, suggesting that there are no correlation between narrowing of gender pay gap and decline in gender discrimination within the workplace. Still, the study only took a look at the overall profession within Thailand and did not take into account element of gender norms. For instance, looking into the male-dominated careers separately from the female-dominated careers in order to examine the degree of gender discrimination and its impact on the wage gap within the two different working environment.

On the other hand, according to Sambhav Rakyam, the data service practice leader of Asia-Pacific and Head of Talent and Rewards, India and Kar Ning Ho, the data services practice leader of Singapore — gender pay gap are also

determined by many life events such as marriage and parenthood. Thus, these family-related issues are mostly taken care of by women throughout history. According to Sambhav Rakyen and Kar Ning Ho data on Workout Analytics in Asia Pacific, it revealed that the pay gap between both gender are 4 percent at age 25 and later increases to approximately 16 to 86 percent between the age of 40 and 60 years old. However, the factor that remained stable is the domain in which each gender dominates. The data revealed that across the Asia-Pacific Region men made up 72 percent of the IT-related careers, whereas women made up to 79 percent of the employments in human resources and finance careers (Rakyen & Ho, 2018). As stated earlier that gender pay gap can arise from many factors with the main factor coming from family-related issues. This is also the extent of the impact from the passed down gender role and beliefs that expect women to put their family duties before their work life. The issue of gender, learning achievement and transition into the labour market have also been addressed by UNESCO through their three-year research project conducted by UNESCO Asia and Pacific Regional Bureau for Education (UNESCO Bangkok) with Korean Women's Development Institute (KWDI). The research focused on seven countries: Cambodia, Indonesia, Malaysia, Mongolia, Nepal, South Korea and Vietnam — consequently, a pattern was found in the Asia-Pacific region in that there are concentrated number of women within the science-related STEM fields in comparison to the math-related STEM fields. Similarly, wage inequality is also another main contributor to the glass ceiling phenomenon. Hence, only 19 percent of women were found to have permanent job contracts in the field of sciences and technology in comparison to the male percentage with permanent contracts of 81 percent within the Republic of Korea (UNESCO, 2015).

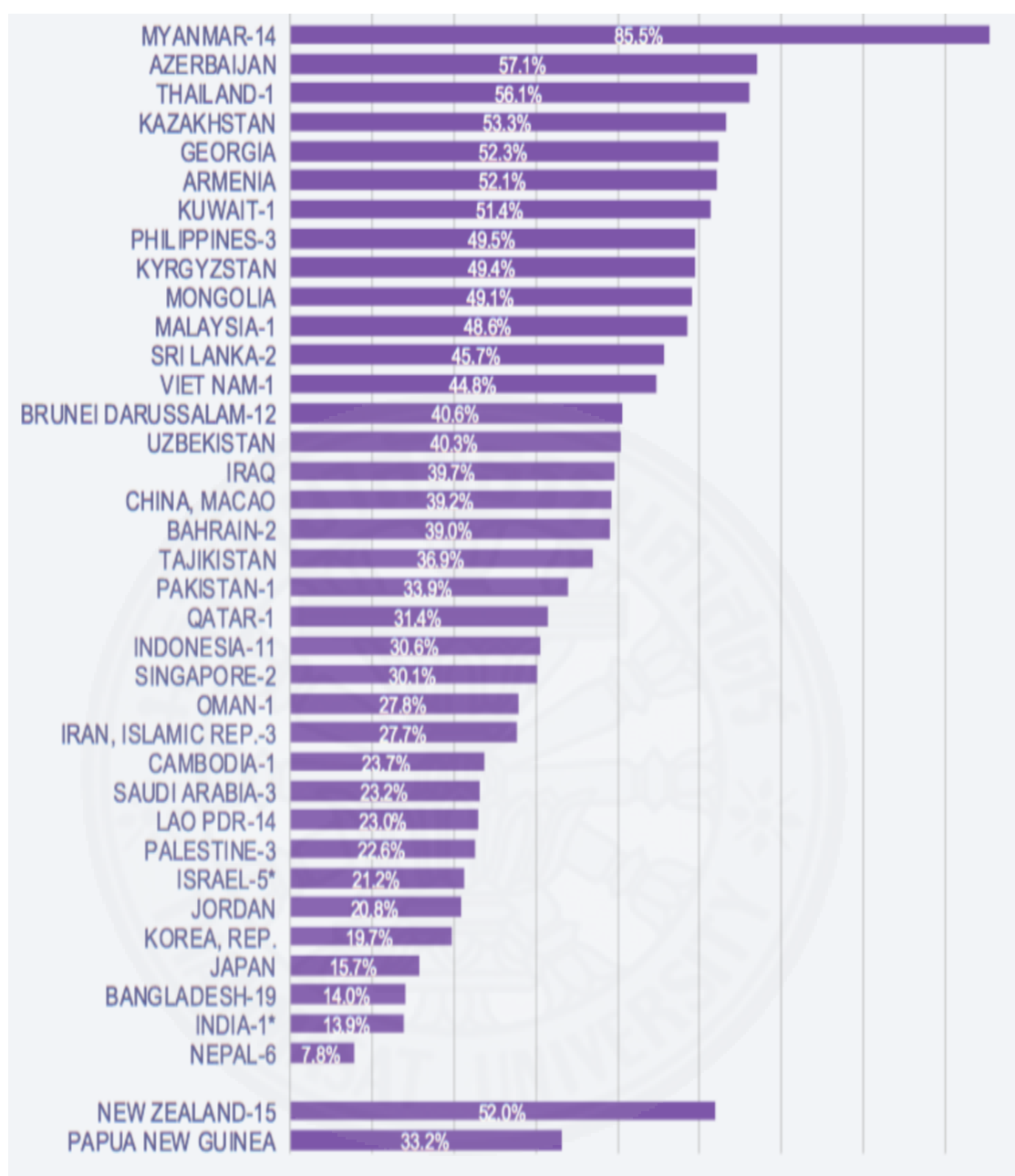


Figure 2.1 Percentage of female researchers in Africa, Asia and the Pacific

Note: -1 = 2015, -2 = 2014, -3 = 2013, -4 = 2012, -5 = 2011, -6 = 2010, -7 = 2009, -8 = 2008, -9 = 2007, -11 = 2005, -12 = 2004, -14 = 2002, -15 = 2001, -16 = 2000, -19 = 1997.

Source: UNESCO Institute for Statistics, June 2018.

On the other hand, a 17 years study from 1996 to 2013 on gender wage gap conducted in Thailand revealed that despite the increasing number of women being employed in the work sectors that used to be male-dominated there are still unexplained elements of the wage gap as it was discovered that women should be earning more than men due to their higher human capital characteristics such as education and working experiences. Hence, this unexplained components

have only increased over the years, which suggests that even though there are improvement to women educations, their efforts have been overruled by the discrimination in the workplace that resulted in their lower wage (Tam Thi Bui & Permpoowiat, 2015). Nonetheless, a study within the context of Thailand conducted by Lusi Liao and Sasiwimon Paweenawat (2019) revealed that there is a continuous decrease in the wage gap from the year 1985-2017, which indicated that females on average, have more favourable observed characteristics. However, it was revealed that men on average still receives higher earning in comparison to women.

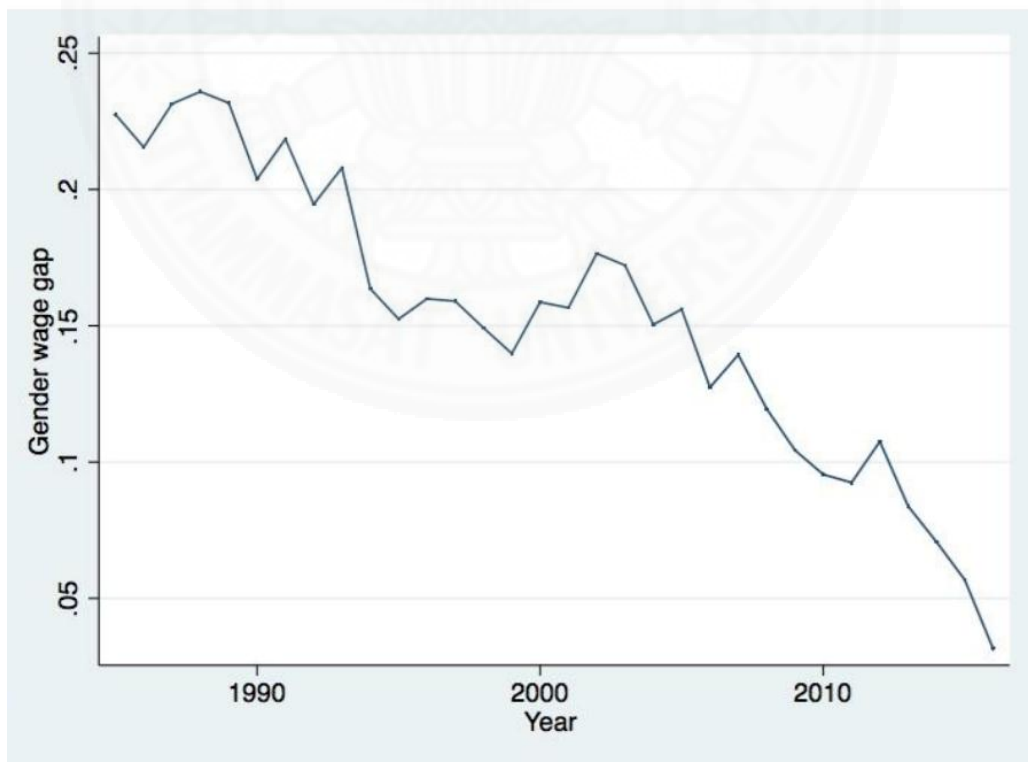


Figure 2.2 Gender wage gap in Thailand 1985-2017

Source: Lusi Liao & Sasiwimon Paweenawat (2019)

2.8 Social Cognitive Career Theory & Self-affirmation Theory as a theoretical framework

Two theoretical frameworks are applied to this study to examine the influence of culture and gender stereotype on Thai females working in STEM fields: (1) Self-affirmation theory and (2) social cognitive career theory. Firstly, the self-affirmation theory is a psychological theory that was popularised by Claude Steele (1988), which that focus on the way individuals incorporate experiences that are threatening to their self-concept into their sense of self. The theory proposed that people are fundamentally driven to maintain self-integrity and a good perception of themselves. Hence, if the individual reflect on the values that they perceive as relevant to them, they are less likely to become distress and more defensive when faced with information that threatens their sense of self (Steele, 1988). However, as female working in STEM is contradicting to the traditional Thai work culture, one might assume that these individuals are to have a certain level of self-motivation and strong desire to maintain a positive self-confidence and integrity despite various social pressures. Nonetheless, self-affirmation can be constructed as a child through positive support from close relationships. Similarly, Steele posits that the self is constructed through difference domains such as, roles, values, and beliefs system. Therefore, it can be argue that beliefs system influenced by close relations can have significant impact on an individual self-affirmation and sense of self.

According to Sherman and Cohen (2006), self-integrity can take the form of intelligence, prized skills, independence, or being a value member of a group. Thus, self-affirmation is to fulfil the need to protect this self-integrity when faced with threatening informations by using defensive response mechanism in order to lessen the effect of the threats to preserve their sense of self. To boot, previous research experiment revealed that self-affirmation was successfully used to reduce negative stereotype on student in a classroom setting. A research conducted by Cohen, Apfel, Garcia, and Master (2006) found that negative racial stereotype can undermine performance of the African American students in an American school setting. A series of experiments then revealed that positive self-affirmation such as

self-reinforcing administered 15 minutes everyday in classroom activities had improved the African American students' grades and reduce effect of racial achievement gap by 40 percent. Therefore, this theory could be use to examine female working in STEM fields on an individual level as to the degree of their sense of self-affirmation role in their career aspirations.

Another theory is the Social Cognitive Career Theory that was developed by Robert W. Lent, Steven D. Brown, and Gail Hackett in 1994 that was based on Albert Bandura's Social Cognitive Theory (SCCT, 1986) that was used to study areas such as performing behaviour, academic performance and organisational development. In the same way, the SCCT focus on human performance and development as well by emphasising on three aspects of career development (1) what influence basic academic and career interests, (2) what determine educational and career choices, and (3) how academic and career success are obtained. Similar to the Self-affirmation theory, SCCT examine factors such as abilities, values, and environmental factors that with are linked with the main variables of this theory, which are divided into three models: 1) Interest model, 2) Choice model and Performance model in which all three models explore self-efficacy, outcome expectations and goals (Lent et al., 2002). Firstly, self-efficacy is the individual's beliefs about their abilities — hence, SCCT is based on the assumption that people tend to pursue careers that they believe they are better that as long as they have environmental support from close relationships. Following is outcome expectations, which refers to the individual's beliefs about the consequences of the choices they make in executing particular actions. For instance, people tends to participate and be more persistent in activities that will lead to positive future outcomes or will add value to to their self-value (Hackett & Betz, 1981). Therefore, personal goals refers to an individual's intention in participating in certain activities to achieve the outcome expectation by setting specific goals for themselves.

According to SCCT, goals are connected to outcome expectations and self-efficacy as people often set goals that are consistent with their capabilities and beliefs. Hence, these three factors are the building blocks of the SCCT's models in influencing an individual's interest development, decision making, and performance.

Furthermore, SCCT proposed that choice goals are sometime determined more directly by self-efficacy, beliefs and background environmental influences where interests are sometime restrained by the environmental factors, which refers to factors such as family, cultural values and economic pressures. However, the SCCT theorised that ‘interests’ is the prominent factor in shaping a person’s choice when they are in a supportive environment, whereas under restrictive environment influences one’s interests may need to be compromised for a more pragmatic option (Lent, Brown, Hackett, 2000). Therefore, this theory is crucial in examining how women career path in Thai’s STEM field develop as there are many factors involve in shaping a person’s career choice, academic decisions, and life goals. Thus, this theory will allow a deeper insight into the social developmental level of what influence their experiences, what motivates them to pursue a career in STEM and the emerging themes that encourage Thai women to pursue this career path.

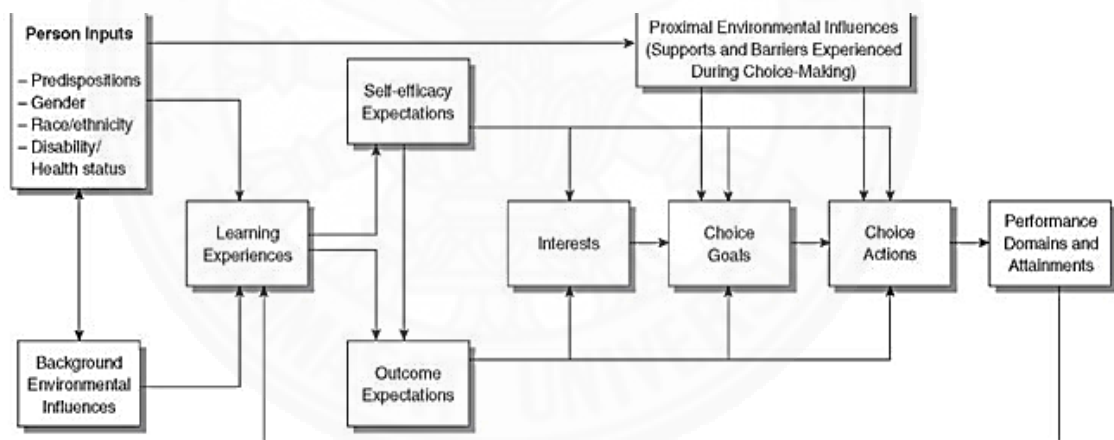


Figure 2.3 A simplified view of how career-related interests and choices develop

CHAPTER 3

METHODOLOGY

3.1 Introduction

This study is a qualitative research using both primary and secondary sources. A semi-structured interviews was conducted on volunteered female participants working in a career within the STEM fields such as; industrial engineers, IT personnels, and scientific researchers. The number of participants was limited to 15 participants due to time limitations and requirements. Moreover, the participants must belong to the age group of 25-60 years old, and is required to have at least 3 years of experience in STEM careers. One reason for this restriction on age and job experiences is because 3 years of experiences working in STEM would give a more reliable information compare to someone who only have 1 or 2 years experience, in which that experience could be unreliable, unstable, or bias. Moreover, the restriction on age is to narrow down the sample size and focus on those who is still currently working and is not retired as well as those who have already graduated, but also have sufficient previous experiences working in STEM. Subsequently, there were no restriction on provinces or area of Thailand in which the participants were recruited. Following, secondary data are collected and reviewed from reports published by previous researchers within Thailand as well as western, Japanese and Korean literatures. First with the study conducted by Nuanthip Kaewsri and Tanit Tongthong (2014) on Thai female civil engineers career developments, followed with a study by Napsari & Yukongdi (2015), which focused on Thai female executives experiences of barriers to career advancement in their respective fields. In addition, the study also required previous literatures on the SCCT and Self-affirmation Theory for the inspection of the career developments of the participants. The interview was then recorded using voice recordings and conducted via telephone calls interview in English or Thai depending on the preference of the participants with an informal approach in order to make process more comfortable for the participants. The

recordings was then transcribed into written form, which was then analysed using thematic analysis approach.

3.2 Science, Technology, Engineering and Mathematics (STEM) careers

In this study, careers that are categorised as belonging to the field of STEM are careers within the dimension of science, technology, engineering and mathematics. For instance, lab chemist, financial analyst, every segment of engineering work and computer sciences related fields. However, science related careers that also belongs to the health domains such as doctors, nurses, and psychologist will not be categorize as STEM careers in this study as these careers are categorised under a secondary STEM domain due to its health-related aspects (Breiner & Harkness, 2012).

Semi-structured Interview Questions:

Main Questions:

1. Biographical informations
2. Educational Background and family upbringing
3. Encouraging and discouraging factors in pursuing STEM careers
4. Influence of Thai culture on their career choices
5. Experiences of gender stereotypes

3.3 Sample for study

Through purposive sampling, the author interviewed a total of fifth-teen volunteered participants. Majority of the participants were enrolled in a Thai curriculum school, in which high school students are required to choose a specific field they are interested in which are divided into two programs; the Languages-Arts Program and the Sciences and Maths Program. This is for the purpose of focusing on the courses that the student are interested in to prepare them for college and future careers. On the other hand, three participants were enrolled in International schools which do not follow this curriculum, instead the school allow students to study

every subjects proportionately. In addition, there was a wide range of working experiences ranging from 3 years to up to 30 years. There were 6 participants in their 20s, 5 in their 30s, 2 in their 40s, and 2 in their 50s. Subsequently, 2 participants work in the field of chemistry, 6 participants in the field of Internet Technology, and 7 participants work in the field of engineering. Since the field of STEM is divided into sciences, technology, engineering, and maths; the careers within this field is often crossed — the author had attempted to include jobs that required skills in all areas equally. Thus, every participants are still currently working in their respective fields.

Table 1.1

Profile of participants

Name	Age	Work Position	Years of experience in STEM
1. Mild	Early 20s	Master Scheduler	4 years
2. Fasai	Early 20s	Consulting Engineer	3 years
3. Kaew	Early 20s	Vehicle Performance Engineer	3 years
4. Baitoey	Late 20s	Aero Engineering Maintenance Planner	4 years
5. Tam	Early 30s	Process Improvement Engineer	7 years
6. Noi	Early 40s	R&D Engineering Supervisor	15 years
7. Pond	Late 40s	Product Supervisor	17 years
8. Mile	Early 20s	IT Analyst	30 years
9. Jibb	Early 20s	Network specialist	5 years
10. Nar	Early 30s	Technical Consultant	8 years
11. Nut	Late 30s	Director of IT	11 years
12. Pear	Early 30s	Network architect	7 years
13. Nok	Early 50s	IT company owner and managing director	30 years
14. Gade	Early 30s	Lab Chemist	8 years
15. Tiw	Late 50s	Laboratory Manager	30 years

3.4 Outcome

The results obtained will contribute to the existing study of gender inequality in the workplace as well as fill in the gap of Thai research on glass ceiling by conducting a study focusing on women from various level of job positions within the STEM occupations. Thus, it will raise the awareness of the issue of gender barrier for female in male-dominated occupations. Additionally, a sociological theory and social cognitive career theory will be use to examine the underlining factors that contributes to the various career experiences and decisions made by Thai women working in STEM fields.

3.5 Data

3.5.1 Primary data

Description of Interview Methodology

In order to obtain in-depth data from each participants, the author used qualitative method in conducting the interviews on women working in Thailand's STEM fields. Thus, interview is the best method for this study as the details of the experience should be explain by the participants and collected first-hand. One reason for this is because the environmental factors of every participants play a key role in shaping up their experiences as well as have an affect on their life decisions. Therefore, details such as work-life balance, family relationships, academic and career decisions should be further elaborate by each participants. Subsequently, these underlying factors influence how an individual perceive themselves and others, which could result in the differences of experiences of each participants. The author used one set of open-ended questionnaires, which was specifically designed to cover the aspects of Thai culture, experiences of gender stereotypes, academic and career choices by using the two theoretical frameworks as the base for forming the interview questions for better organisation of datas.

3.5.2 Secondary data

The study also required previous studies on women in Thailand STEM fields. However, as not many researches have been conducted in Thailand on women in STEM fields, the researcher had found similar researches that studied the issue of Thai women in STEM and address the impacts of gender stereotypes such as Nuanthip Kaewsri and Tanit Tongthong (2014) on Thai female civil engineers career developments, and a study by Napasr & Yukongdi (2015), which focused on Thai female executives experiences of barriers to career advancement in their respective fields. Consequently, previous Western literatures on STEM such as a work by Shulamit Kahn and Donna Ginther called “Women and STEM” as well as other researches from other Asia-Pacific countries such as Japan and Korea will also be adopted as a secondary data to compare the previous findings with the result obtained.

3.6 Ethical considerations

In order to minimise ethical issues, the researcher asked for the participants permission to conduct the interview and use voice recording device to secure the data. Every participants was informed that if they felt any way uncomfortable during the interview and being a part of the study, they had the right to stop the interview at anytime. The interviews were confidential in that no first or last names shall be mention to protect the individual’s identity. Prior to the interview, the researcher provided explanation on the scope and purpose of the study to the respondents to avoid issue of misunderstanding or deception.

3.7 Data analysis

3.7.1 Analyzing qualitative data

The researcher collected interview datas and transcribed the raw data from the interviews for easy organisation. The researcher then interpreted key findings and analysed the transcripts by grouping emerging themes within gender

stereotype, Thai culture and female career experiences by using Self-affirmation Theory (1988) and SCCT (1994) as the underlying theoretical frameworks.

The research then examine the information obtained by examining interview questions specifically designed based on SCCT (1994) in order to look at each participants academic and career backgrounds, close relationships, factors that determine education and career choices and how academic and career success were obtained. Also, the researched had examine each participants level of self-affirmation and self-confidence to see the relationship it have with decision makings and their experiences of gender stereotypes by forming interview questions designed specifically based on Self-Affirmation Theory. Additionally, interview questions specifically designed to examine impacts of Thai culture on each individual were also implemented to group similar themes that shape up participant experiences in STEM. Finally, the researched had drawn conclusions on the ways gender stereotyping and Thai culture affects female career experiences in STEM fields based on the gathered key findings.

3.8 Limitations

This study is only limited to the context within Thailand. Additionally, the study may not cover the whole population of the target group due to time constraints and since every participants were raised in different parts of Thailand and majority of the companies are based in Bangkok, which may have different work norms compare to companies located outside of Bangkok. Thus, this could have an impact on the reliability of the result obtained. Furthermore, since majority of the participants were interview through phone calls, it is impossible look for facial cues in order to analyse how the participants actually felt about each answers and questions. Hence, this study cannot be generalised to female in other occupational fields as every career paths differ in experiences according to the things that shape their environment.

CHAPTER 4

FINDINGS

4.1 Introduction

This part of the chapter will focus on capturing the career experiences of women working in Thailand's STEM field, the factors that encourage and discourage them to persuade a career in STEM, and the effects from Thai culture and gender stereotypes that shape their decisions and experiences. This chapter is the result of the data obtained in which the information are grouped into categories based on the emerging themes. Discussion and analysis on the findings in this chapter will then be further discussed in Chapter 5. Additionally, the analysis are divided into four categories: 1) Impact of Thai culture, 2) encouraging and discouraging factors, 3) experiences of gender stereotype, and 4) other observations. This categorisation is for the purpose to fully evaluate the emerging factors as well as answer the three research questions: (1) How does Thai culture have an impact on female experiences working in STEM occupations? (2) What are the factors that encourage and discourage female to pursue a career in STEM? and (3) How does gender stereotyping in Thailand play a role in STEM industries?

4.2 Impact of Thai culture on women working experiences

As mentioned earlier that Thai culture is heavily influenced by Thailand's dominant religion, Theravada Buddhism — individuals who belongs to a certain society must adapt and conform to the norms of that social group (Remya & Arasu, 2017). Subsequently, Hofstede and Spencer-Oatey defined the meaning of culture as a collective programming of the mind, values, beliefs, languages, and traditions (Hofstede, 1994; Oatey, 2008). Therefore, the analysis in term of culture are focused on the environmental factors that play a role in shaping ones self such as traditions, beliefs, languages, and values. Consequently, the elements that stood out to be impacted by culture were family values, social status, and how Thai culture itself

influenced the concept of ‘boys’ culture’ in the STEM industry as well as the constructed idea of gender in Thailand. According to the majority of the participants, they believe that traditions and values still have a big impact on the working environment across Thailand and not only in STEM. Hence, values that were mentioned among many participants were the Thai values of showing respect toward others especially toward those who are older. Also, the value of giving emphasis on the role of the family, gender role, and importance of self-control and manners.

4.2.1 Family values

Firstly, family values refers to the importance the participants give to the roles they have within their family. For instance, the role of a daughter, a wife, or a mother. A participant stated that Thai culture had enhanced the importance of family values as Thai traditions such as ‘wai’ or paying respect to elders on special occasion or festival throughout the Thai calendar had emphasised on receiving blessing from elders and showing ‘boon koon’ or gratitude towards them. Tam stated that in the Thai culture, people are expected to put family first as Thai values emphasize on displaying manners, respects, and gratitude toward those who raise them. Hence, this is one of the reason why family’s opinion have an big influence over education and career choices in Thailand. Thus, two participants have mentioned the importance of family institution as a big part of Thai culture as Tam stated

“Most Thais are mixed race between Thai-Chinese and with the Chinese tradition of living together in a big extended family, it further enhances the importance of family’s opinion when choosing your careers” (Tam, Process Improvement Engineer)

Another statement was made by Kaew as she expressed that she felt that Thai culture have had a significant impact on shaping her family dynamic as they are individuals with traditional beliefs that in turn affected her career choices. Likewise, Mile expressed that she value her family opinion as she was taught to respect the opinions of the elders in her family despite some of the advice were a product of gender role expectations. For instance, even though Mile’s aunt and

parents supported her career choice in IT — they still put pressures on her to find jobs that will allow her time to start her own family. Therefore, Mile’s aunt had encouraged her to choose jobs that will allow her to work from home without having to travel or not work during the night as her parents perceive it as being too risky for her own safety. Thus, these pattern about the importance of listening to elders can be traced back to the Thai culture as it is considered a form of respect and expected manners for Thai individuals.

4.2.2 Importance of hierarchy and social status

Subsequently, the importance of status in the Thai culture also play a role in women working experiences. Hence, status in this case refers to age, job levels, and education. For instance, one concept that kept coming up during the interviews were the concept of face saving and respect. This concept of face saving were found to be intertwined with the importance of hierarchy and social status Thai culture had constructed. Noi stated that she believes that the concept of loss of face are much more important to Thai people in comparison to Western cultures or even some Asian culture such as Japan in that they do not give much importance to this particular concept. Consequently, the term ‘loss of face, save face, and to be the face of the family’ were used by many participants. In the case of Baitoey, she expressed that her drive to push herself in her work were to prevent loss of face in front of the male workers who teased her during her working hours.

“I feel that in Thai culture, women in lower or starting working position are still sometime are expected to save face those in the position higher than them by keeping quite” (Fasai, Consultant Engineer)

Thus, this can also be trace back to the concept of respecting the elders and manners in the Thai culture as it is not uncommon for Thais to save face of others in order to show respect, especially to those older than them by hiding behind a smile. One reason for this could be that there are repercussions for causing others face loss especially within the workplace (Punjaroje & Morrison, 2007). As a consequently, women are stuck in their careers due to societal expected manners and values that one must up hold as a Thai individual. Likewise, the importance of hierarchy in the workplace are more visible in small Thai-owned companies

according to interviews with participants who had experiences working for both Western and Thai-led companies.

“I know what I am doing, you are a girl as well as a new employee here — trust me I have been doing this for a long time” (Mild, Master Scheduler)

This is a direct quote that Mild reported she received from another male employee when she tried to suggest an idea for a project they were working on as a team. However, she got shut down by him and felt that because she had pointed out his mistake and had made him in lose face — she was intentionally discredited from the project. Moreover, she stated that due to the Thai’s societal expectation of keeping your cool and polite manners; aggressively expressing opinions or yelling would not be acceptable under any circumstance.

4.2.3 Thai culture’s influence on the constructed idea of gender in Thailand

In addition, majority of the participants also made their own connection between Thai culture and its affects on forming the idea of gender and what are expected from a women in the modern day Thai society. Gade stated that these ideas are passed down through traditions, values, and even languages and then it is enforced and enhanced by the media through Thai soap dramas. Hence, Thai traditions and values that were ascribed on to females in the past had play a role in influencing the idea of how female should behave. Consequently, traditions in this case refers to the traditional teachings that were mentioned by participants in relation to Thai culture and females can be categorised into three groups: 1) teachings on how Thai female should dress, 2) teachings on how to walk, listen and talk, and 3) teachings on the gender role responsibilities. Thus, teachings are passed down through generations from idioms, popular phrases, and beliefs. For instance, Pond recalled that she was told by her grandmother that back in the days, her great grandmother would teach her grandmother the qualities the proper Thai women should attain. Some of the examples she gave were; proper Thai women must not make loud noises when they walk, should not swear or shout, and women must put their responsibility toward their husband and children before other duties. However, Pond stated that her grandmother did not support all of the values and tradition

taught by her great grandmother as she felt that it is unfair towards women. Subsequently, these teachings of the traditional expectations had determined that Thai female should possess more 'sum ruam' or polite manners in comparison to males.

Furthermore, Kaew expressed that Thai culture are have its own unique and beautiful traditions and values, but it also have a negative affect for women working in engineering fields such as that Thai culture still find it unacceptable for males and females employees to share rooms. Therefore, when engineers go on work trips — her company will tend to choose male engineers due to less 'complications', which according to Kaew is one of the barrier that is influenced by Thai culture in that of which her parents had warn her before she chose to pursue this career path. Similarly, when asked about the details of the term 'complications' Kaew stated that she refers to the Thai culture in which she believe that it still have a big hold onto the beliefs that women should not travel far from home late at night alone because they are more prone to danger and that women should be more polite and not as outgoing as men. Likewise, Baitoey also believe that Thai culture play a big role for women working in STEM as people still treat men and women differently.

"I noticed that the companies I had experience with doesn't see that female engineers are capable of being a good leader in compare to male engineers" (Baitoey, Aero Engineering Maintenance Planner)

Hence, in the case of Nok, she perceive that Thai traditions and culture have less impact on women in any type of jobs now as time passed. She further stated that the beliefs of

"The idea of women beneath the man is now old-fashioned and non-existent" (Nok, IT company owner and Managing Director)

However, she also stated that despite the non-existent of these values, gender inequality will still prolong in the workplace no matter what type of jobs women are in. Whereas, Nut stated that she do not believe that Thai culture have anything to do with female working experiences, but rather it is the company's culture that have the most impact on an individual's working experiences.

Nonetheless, these participants tend to have similar traits, in that they all depicted a sense of self-confidence and have strong feelings that women can do any jobs as good as long as they have the drive and set their mind to it. To add, this also correlate with the Self-affirmation Theory as the theory proposed that those who incorporate only information that are only relevant to them and their sense of self will be less distress when faced with information that contradict with their sense of self. Thus, participants who reported that they do not see how Thai culture can have an impact on women working experiences showed signs of high self-affirmation as their tone and voice became more defensive in order to protect their sense of self and beliefs. Hence, the participants with high self-affirmation all depicted a certain degree of self-integrity, self-confidence and a firm sense of self despite pressures from cultural norms.

4.3 Encouraging and discouraging factors

There are various different factors in sparking an interest in STEM for each individuals. According to Adam Maltese and Christina Cooper (2017), support from significant others and self-driven interest are some of the important factor in motivating an individual to pursue a career in STEM. In addition, a study on children's performance and preferences suggested that teachers' perception and home environment also play a major role in influencing children interests (Upadyaya and Eccles, 2015). Still, despite the increasing number of women joining the STEM occupations in Thailand, it was found that less than 24 percent of women in higher education are majoring in engineering, construction or manufacturing studies (Allan, 2019; Bangkok UNESCO Organisation, 2017). Therefore, this section will examines the encouraging factors that play a role in motivating female to pursue a career in STEM as well as the discouraging factors that they experienced working in the STEM occupations. In consequence, during the conducted interviews the researcher observed that there were three factors that stood out during the section of the interview that questioned about each participants' motivation in pursuing STEM: 1) Job stability and wages, 2) personal interests and 3) family support. On the other side,

there are up to four factors that were found when the participants addresses the factors that discouraged them from continuing to pursue a career in STEM: 1) Work environment, 2) company culture, 3) barriers due to gender and 4) work-life balance. In consequence, the encouraging factors reported by the participants were found to be aligned with the Social Cognitive Career Theory which focuses on three aspects of career development: 1) How basic academic and career interests develop, 2) how educational and career choices are form, and 3) how academic and career success are obtain. To boost, this theory also look at interests, abilities, values, and environmental factors such as influence of family and friends in children interests in academic and career choices.

4.3.1 Encouraging factors

4.3.1.1 Stable jobs and wages

Every single participants that were interviewed had mentioned that the factor of wages have played a role in their decision to pursue a career in STEM. For individuals who came from a Thai curriculum school background, majority stated that it was their parents as well as their own choice to pursue an academic path in Maths and Sciences rather than Languages Arts Program due to the wider range of future job opportunities. However, for individuals who came from an International school background, they also gave similar answer but all three of the participants' motivation leaned more toward personal interests and job stability. Nevertheless, participants expressed that both of them and their parents believed that pursuing a path in STEM will allow them better opportunity in attaining a stable job in the near future. This is because Thailand is moving toward the age of technology and there will be constant increase in the demand for STEM workers. For instance, other than Mile's own interests in computer programming, she and her family saw that computer and technology are currently booming. Therefore, she decided to pursue a degree in computer sciences as the starting wages and benefits of careers in this field are relatively high compare to other office jobs.

When asked about the participants current salary, some participants were reluctant in sharing their wages, but others who shared showed

that there are not a huge wage gap between STEM careers in comparison to other careers such as human resources or marketing. However, Mile, Baitoey, Nut and Nok are four individuals whose salary was found to be exceedingly high compared to other participants within the same age range as them. Hence, Nok has her own IT company, Nut is the only woman in the position of Director of IT in Asia-Pacific region, whereas Mile is earning a six-figure salary despite just starting, while Baitoey's decision in pursuing a study in Aero Space Engineering had opened the path for her to a highly demanded career position. Therefore, it can be suggested that every participant who enters the field of STEM seeks job stability as the world is shifting toward sciences and technological era. However, from the data obtained, it suggested that not all career positions in STEM are rewarded with exceedingly high wages. Subsequently, stable job and wages as a motivating factor in pursuing a career in STEM can be examined using the Social Cognitive Career Theory (SCCT). Firstly, the data obtained fits into the SCCT's Choice Model that suggested that choices of an individual are constrained by personal experiences such as economic need and family pressures. Likewise, SCCT's Interest Model also suggested that outcome expectation also plays a role in people's career and academic choices in a sense that in order for an individual to perform certain actions, one must have the belief about the outcome of that action. Hence, the theory also suggests that an individual's will to persist in the activity also depends on the attractive work conditions and rewards. This is consistent with the majority of the participants' statement in that their academic and career decisions were influenced by the consideration of the expected outcome of having stable jobs and high wages. Also, by setting goals this helps drive their behaviour despite receiving no immediate positive outcome and facing negative setbacks.

4.3.1.2 Personal interests

Subsequently, factors of personal interests also arise when talking about what encouraged the participants to pursue a career in STEM. Hence, almost half of the participants expressed strong personal interests in STEM, while the other half reported a neutral feeling on STEM but rather would continue in the field due to its monetary benefits. Consequently, personal interests can also be

influenced by environmental supports such as supports from parents, teachers, or role models. It was revealed that individuals who expressed interest in STEM from an early age and have parental support are much more driven in their line of job.

“There were courses in the degree that I did not like, but I still find it enjoyable as there are subjects such as statistics that I still excelled in” (Mild, Master Scheduler)

Subsequently, Mile and Mild interest in STEM also developed very early in life as Mild interest started as her dad found her self being interest in assembling toy parts and Mile found herself being interested in computers and ITs when she was in grade 6. Additionally, her dad also supported her interest by finding various computer programs for her to try out at home. Subsequently, her dad was also her main supporter when she decided to pursue a degree in computer sciences. Similarly, Nar and Gade personal interests in STEM was kick-started by their older peer at church who was striving in her job, working as a chemist.

Likewise, Nut personal interest in IT was created by her neighbour who was working as an software engineer at the time. She stated that she was particularly interested in the innovative and creative aspect of the field, plus she also had good grades in math and science subjects during her academic years. Also, Fasai stated that her father was the main influencer in introducing her to the field of sciences as he is also an engineer himself and she often find his work intriguing. Comparatively, in Fasai’s case who is currently working in the engineering field — she did not have a direct education in engineering, but rather a degree in chemistry. However, her early exposure to engineering works through her father had sparked her interest and pave way for her to pursue a different field of work in STEM. Nevertheless, despite some participants reported being guided by school advisors on their future careers, no participant reported that their interest in STEM was sparked through schools or by any academic figure. Therefore, it can be suggest that personal interests in STEM can be create with the right exposure to the right people or the right environment in order to trigger the interest. Subsequently, according to the Interest model of SCCT, personal interests will more likely to develop in people who possess the talent in that particular area. However, their environment must allow

them to have the persuasive experiences that can boost their belief in their self-efficacy and enhance their outcome expectations.

According to the data obtained majority of the participants who reported having personal interests in sciences, IT, and maths all have relatively good grades or was excelling in the area during their academic years. This is also consistent with the SCCT's Performance model that posits that performance involves both performance and ability in a sense that positive outcome will lead to higher performance goals. Hence, it can be suggested that with this positive reinforcement of receiving good grades, they had developed an interest in STEM and are more likely to increase their involvement in the area in order to reach their goals. On the other side, every participants who reported interests in STEM also depicted high self-affirmation. According to the Self-affirmation Theory, it posits that self-affirmation can occur when the individual engage in an activity that is consistent with their personal values and interests, which will in turn enhance their sense of self. Thus, participants who found themselves having personal interests in STEM gave more defensive response when they were ask questions that threat their sense of self and self-confidence such as 'Do you feel that there are any male oriented activities that made you feel excluded as a female working in STEM?'. Therefore, it was found that participants who have personal interests also showed more self-efficacy and self-confidence in working towards their goals due to positive feedback.

4.3.1.3 Family support

The final encouragement factor that was found was that of family support. This refers to the motivation that are driven by family. This is because more than half of the participants reported that they had their family support in choosing an academic path in STEM as their parents encourage them to pursue a career in this field due to its potential in creating a stable future for their children. Consequently, family play a massive role in influencing the child motivation in entering a career path in STEM. For instance, in the case of Mile and Fasai, their parents were involved from the start when they realised their daughter were interests in the field of sciences and had seek out opportunities and equipments to help their child pursue their interests. On the other hand, motivation from family can

also be link back to the earlier mention about Thai culture and the concept of saving face. The researcher asked those participants who mentioned about the concept of saving face that whether some of the motivation in continuing in STEM fields had anything to do with the concept of face saving. As a result, majority of the participants who mentioned about the concept agreed that since their parents had shown support for them by investing in their personal interests as well as supported them in attaining university degree in STEM. For instance, Tam, Pond and Kaew reported that they feel that they should continue to work in this field and would not change their line of work as not only the wages are relatively good compare to other office works, but it would be their parents pride if they succeed in their job since their parents already supported them throughout their education to prepare them for this line of work. Another example of supportive family is in the case of Nok. She stated that during the start of building her company, she was pregnant with a child. However, she expressed that her husband had been very supportive as after had her baby, her husband quit his job as a banker to help her with the baby and software works in her company, which was a major part in helping her focus and kick-start her company. Therefore, it can be seen that family is an important motivation and encouraging factor for individuals to succeed and work hard in their jobs.

Likewise, a good supportive family foundation can further motivate a child to work hard to achieve their goals. Consequently, the Self-affirmation theory suggested that an individual's sense of self can be constructed as a child through positive support from close relationships. Hence, from the data obtained it suggests that participants who have strong relationship and positive support and encouragement from the family depicted higher degree of self-confidence, self-efficacy, stronger sense of self and are less prone to be effected by negative comments from others in comparison to participants who reported that their family did not have much involvement in their life choices. On the other hand, the datas obtained was also consistent with the SCCT as the Interest model suggests that people are expected to excel in their academic and career choices if they have supportive environments that allow them to pursue their goals and interests.

4.3.2 Discouraging factors

4.3.2.1 Work condition

Working condition was the most referred to factor when participants were asked about what discourage them in continuing to work in STEM. Working conditions in this case refers to the long working hours, nature of the co-workers, and job requirement itself. For instance, participants who working in the field of engineer jobs often gave the example of site visits and customer service as the factor that discourage them in work. In the case of Fasai, she reported that her work require her to be on the road half of the time, driving to visit customers up to 3 or 4 days a week. She stated that this part of the job tired her out a lot and she is still not use to it as she only just started. However, she stated that she is pushing through due to relatively high salary her company is offering for this position. Similarly, Mile working hour as an IT analyst are harsh in comparison to other standard 9am to 5pm office work. She reported that some days her work starts at 11am and ends at 2am. However, same as Fasai — she stated that the wage are worth the long working hours. Likewise, both participants working in the chemistry area also reported that they often feel less motivated in their line of work when they are constantly experiencing significantly longer than normal working hours and dangerous working environment. Tiw, a laboratory manager reported that she had always worked in STEM occupations. However, she had changed her job multiple times due to hazardous working environment in the lab as well as the late working hours. Hence, a theme can be seen in this factor that every participants who reported harsh and dangerous working environments are those who work in the engineering and chemistry area. Nevertheless, one participants who work in IT reported that she had also felt discouraged from work in general, but not specifically from working in STEM as the factor that discouraged her was her co-workers attitude, which she stated that she does not correlate it with working in the STEM industry.

4.3.2.2 Company culture

Similarly, company culture can also be consider as a working environment, but as majority of the participants have raised this issue, the researcher had decided to put it into a category of itself. A portion of the participants had

previous experience working for a Thai-owned company, while more than half of the participants have always worked for a Western-owned company. However, it was revealed that participants who reported company culture as one of the discouraging factor in their work life all were found to have had previous experiences working for an Asian-owned company or is currently working for a Thai-owned company. For instance, the case of Fasai and Pear who both work in a Thai-owned company had reported that they sometime dislike to nature of the company culture and its policy.

“I feel like the company policy is somewhat discriminating”

(Fasai, Consulting Engineer)

Fasai who have always been surrounded by a mixture of both Thai and western culture since she was young. This is because she have attended international school from the start of her academic life and throughout university. She expressed that she have been taught about the idea of discrimination and company policy that should not discriminate against sexes, disability or physical appearance. However, she reported that she often see that her company and other Thai-owned company often specify the gender required for a job position. For instance, a position of Administrator will have a requirement written as ‘*must be a women*’. Hence, she expressed that she sometime feel strongly offended by the subtle discrimination in her company. Similarly, Pear, network architect also feel that she is considering to change to work for a western-owned company as she feel that Thai company culture require too much formality and ‘favouritism’ involved in order to get ahead. Additionally, despite her position as the leader of test engineers, she still feel that male employees are promoted quicker compare to female employees.

“I quit because I felt that I was always under appreciated and underestimated for my abilities in IT compare to other male employees” (Tam, Process Improvement Engineer)

Tam reported that she quit her previous position at a Thai start-up company because of the company culture as she felt that the nature of the policy and promotions were unfair. However, she persisted in working in STEM-related career and is currently working for a Western-owned company where she stated that the policies and compensations are more considerate and fair compare

to her previous job. On the other hand, Kaew who is currently working for a Japanese company stated that she doesn't feel discourage by the company culture, but often time feel uncomfortable by the nature of the company especially when senior employees from Japan visits the workplace.

“There are so much hierarchy in the Japanese company workplace” (Kaew, Vehicle Performance Engineer)

4.3.2.3 Barriers due to gender

The discouraging factors were also found to be linked to effects of gender stereotype and Thai culture. Every participants were subjected to an open-ended question on whether the factor of gender had played a role in either encouraging or discouraging them in pursuing a career in STEM. It was revealed that majority of the participants who reported belief or previous personal experiences of career barriers that stemmed from gender were observed to belong to the low self-affirmation group. In a sense that they stated that they cannot do anything to change the facts and beliefs that are already set in the society, however, they would still continue to work on their job as best as they can but also accepts that it is how it is. Thus, this correspond with the Self-affirmation Theory that people who internalise the negative comments about being a women or negative gender stereotypes felt more dependent and limited in their careers.

“Sometime I still feel as if I am an outsider working in the file of engineering” (Noi, R&D Engineering Supervisor)

Noi stated that sometime the negative beliefs and doubts that her employees and colleagues still have on her is an issue that she dislike about working in engineering despite being in the industry for over a decade. She further stated that when she first started she almost pursue another career path as she felt that she didn't belong, but she overcame it when she started to understand and to the nature of there work. On the other hand, those participants who reported that gender is not a factor in discouraging them to continue working in STEM despite previous experiences with negative comments and gender stereotype had depicted strong drive to succeed in their line of job as well as high self-intrjgity and a stable sense of self. Nonetheless, Nok's perspective revealed that despite being a self-

affirmed individual, she still believe that there are barriers for women in term of gender. However, the barriers are only limited on the physical works such as climbing, lifting or other man-power jobs. Hence, she stated that she decided to work around this issue by assigning male employees to do the physical tasks while she operate as the brain behind the job.

“Being a women is biologically limiting since women still have to carry children and therefore need to take time off work, which could result in losing promotional opportunities” (Tam, Process Improvement Engineer)

Therefore, it can be interpreted that majority of the participants believe that gender is one of the barrier for working women by either interrupting or limiting the work life of female.

4.3.2.4 Work-life balance

Work-life balance have long been an issue raised by many working women across different professions. According to the obtained datas, the issue of work-life balance was found in high ranking or high demanded profession in STEM. For instance, Tiw who is a laboratory manager, Nok who is an IT company owner and Mile whose current position is highly demanded in her field. Nevertheless, each participants who report work-life balance as an discouraging factor in continuing working in STEM had their own experiences and ways in dealing with this issue. Firstly, Nok reported that despite her husband helping her out with family responsibilities, she still feel the need to be involve as much as she can in raising her child. Hence, when she first started her IT company she was extremely busy with work. Therefore she resolved this by sending her daughter to study the abroad in Singapore as she often travels there for work. She try to balance her work, family life, and personal life by spending time with her daughter every chance she get and sometime brought her daughter along on work trips aboard to learn the job as well as spend time to travel together as a family. Subsequently, because of her current position, she have much more freedom in investing time and money on both herself and her family.

“We just need to find what is right for us and work for it”
(Nok, IT company owner and Managing Director)

However others that do not have children such as Tiw expressed that because of her age she often feel tired after work, as she have been working long hours for many years due to her job characteristics. Still, she reported that she have her own personal time to relax on the weekends and as a devoted Christian, God is her main motivator in lifting her up from the impact work-life balance. However, participants who have been working in the STEM occupations for a shorter period of time were found to still struggle to adapt to the work load of the job. For instance, Fasai who works in the engineering field reported that she rarely have time to herself nowadays because she is always on the road for her job. Similarly to Mile, as she stated that her working hours are unlike that of her friends as sometime her work finishes at 2a.m. and she rarely have time to meet her friends except for the weekend in which she then find herself exhausted from the late night shifts.

“Women need to start a family and men can do that as well as work but women actually have to take time off work and carry the child as well as taking care of the household or else they are subject to comments such as ‘you are a bad mother’” (Pear, Network Architect)

Pear stated as she reported that she hope to have a child sometime in the future, but because she is striving in her career at the moment, she is not ready to put a pause to it. She stated that she believes that women are still expected to be the caretaker of the family along with the lingering expectation of women taking care of the majority of the household duties. Therefore, it can be suggest that balancing work life, family life, and personal life is still a particularly harder task for those who are in a higher ranking job position or those in a highly demanded careers. Likewise, it is a struggle for women who feel the social pressure on gender role expectations to start a family as well as hold a good job.

4.4 Experiences of gender stereotype

According to UCL Institute of Education (IOE), gender stereotypes influence children career aspirations with boys choosing 'masculine' careers and girls choosing 'feminine, care-taking' career such as teaching. This finding is supported by another study on career preferences, which revealed a larger difference in women's implicit and explicit report of career preferences in compare to men — suggesting that the impact of gender stereotyping is more asserted in females (Gadassi & Gati, 2009). Gender stereotypes are the qualities ascribed to men and women based on their gender and beliefs that hold to make assumptions about members of a particular gender group that can be both positive and negative as the stereotype can often lead to bias assumption about an individual based on their gender. These traits are the general social desirability traits or behaviour that men and women are supposed to have according to the virtue of their gender (Prentice & Carranza, 2002). Every participants reported previous experiences of gender stereotype. However, positive gender stereotypes are often linked with a persons' happiness in their career and higher career advancement. This can be seen in cases such as Nut who is currently the only women in the Director of IT position across the Asia-Pacific branches of the company.

On the other hand, negative gender stereotype patterns that were found among many participants were in a form of beliefs or mindset that think that men are inferior in subjects such as maths and sciences, which negative gender stereotypes were found to be particularly stronger in the field of engineering compare to other STEM fields such as IT and lab works. The theme that stood out the most was the differences in how the participants internalise the stereotypes they previously experienced as a child and its impact on their current job. For participants who experienced negative gender stereotype but do internalise those negative comments, it was found that the participants felt proud and more confident in their line of work and did not felt discouraged, but rather challenged to prove themselves strong. However, for participants who previously experienced negative stereotype and internalise and did not disagree with the negative comments — it was found

that they felt excluded and stuck in their careers. Each participants have their own concept of 'gender stereotype'. For instance, a big portion of the participants associated idea of gender and gender stereotype to the Thai culture.

“What we say and know about women were create and embedded into our culture since the olden days” (Pond, Product Supervisor)

Nevertheless, every participants had similar concepts about gender stereotype in a sense that assumptions no matter bias or unbiased made about a person based on their gender or passed down beliefs are considered as 'gender stereotyping'.

4.4.1 Negative gender stereotype

Participants who reported experiences of negative gender stereotypes can be categorize into two groups 1) participants who internalize the stereotypes and 2) participants who does not internalize the stereotypes in order to examine how gender stereotyping have an effect on the STEM occupations. Hence, this aspect will be further discussed using the Self-affirmation Theory approach. Subsequently, the stereotype that was most talked about was on the issue of women biological aspects have an influence their job performance. Similarly, gender stereotypes from others about women mindsets and ability also in turn create a glass ceiling for some women to advance in their careers. For instance, Nok reported the she had experienced negative gender stereotype when she first started her own IT company. She stated that there were mixed opinion about a women owning an IT company back in the early 2000s as the IT industry is mostly male dominated. Additionally, she said that she had experienced customers questioning her ability in IT as a women. For instance, people doubted her ability to control all male employees and handling 'technological' work, but she never see this as a barrier as she always overcame it by believing in her self-ability and self-value, along with showing the people who doubted her based on her gender that a women is as capable in doing any task that a man can.

“I have encounter some old-fashioned mens who still believe that women are not fit to be leaders and cannot control male employees because she doesn’t have leadership skills” (Nok, IT company owner and Managing Director)

Therefore, by depicting her ability and worthiness— the last 20 years of her time working in this field; she has never experienced anymore barriers that stems from the issue of gender. Similarly, Kaew reported that she have previously experienced negative gender stereotype that was focuses on the biological assumption and beliefs of what women careers should be like. “Can you handle it?”, “It is a job for men not women”, and “Women are not as strong as men” was some of the feedback she received when she told others that she is pursuing a career in vehicle performance engineering. Likewise, Mild’s grandmother expressed concern for her as she felt that it is sometime unsafe for girls since the engineering faculty in Thailand are famous for the inappropriate behavior of the male students. Hence, this is also consider as affect of gender stereotype despite the stereotype was targeted toward the male gender — its still have an impact on women life decisions. Furthermore, she have encounter many negative experience with gender stereotypes in both professional and social situations. Mild explained that during the maintenance training, she was one of the few females in the department and the male employees often tease her to the point that it can be categorized as bullying.

“They treated me like an object with no feelings — they teased me and did not take into consideration how I would feel about their comments” (Mild, Master scheduler)

This is a direct quote from Mild when she was asked about her experience on gender stereotype in the workplace. Nevertheless, she had her own strategy in battling these negative comments similarly to other participants which will be further discussed using the Self-affirmation Theory. In addition, more than half of the participants had similar comments that the extent of the effect of gender stereotypes mainly depend on the department of the company and company culture. For instance, Western company and Thai-owner company will have different working environment. Likewise, Human Resources Department that is dominated by

female and Maintenance Department, which is male dominated will have different working environment as well as different extent of gender stereotype. Nonetheless, almost every negative stereotype the participants reported came up in the theme that was expressed through expressions or phrases that are passed down through generations. For example, “you run like a girl” and “you walk like a preppy horse”, which is a Thai idiom typically use to describe girls who play like a boy. On the other hand, these negative comments and stereotypes can be examine from a psychological approach by using Claude Steele’s Self-affirmation Theory. As the Self-affirmation Theory focus on the different way individuals incorporate experiences that are threatening to their self-concept into their sense of self. From the data obtained it suggested that majority of the participants who reported previous encounters with negative gender stereotype had chose to overcome and protect their sense of self by ignoring those negative comments and chose to focus on doing their job as best as they can.

“In the end we need to work together anyway and since it is hard to change other people mindsets I decided to just focus on doing my job as best as I can” (Fasai, Consultant Engineer)

“If we set our mind to doing no matter what tasks as best as we can, at the end of the day our work will speak for us” (Nok, IT company owner and Managing Director)

Additionally, the Self-affirmation theory proposed that people are fundamentally driven to maintain self-integrity and good perception of themselves. Therefore, participants such as Nok, Tam and Nut who only chose to reflected on the values that are aligned with their perception of self are more defensive when they are faced with informations that threats their sense of self as they do not believe in the negative informations which threats their sense of self. Hence, participants who do not internalize negative gender stereotypes depicted a strong sense of self as they are driven to create a positive self-confidence and self-integrity despite changing social pressures. Therefore, participants with positive self-affirmation were revealed to not internalize the negative comments and did not seem to be stressed when faced with negative comments. On the other hand, a small portion of

participants who showed signs of internalization of negative stereotypes depicted similar traits to each other such as that they do not feel passionate about their current jobs and stated that they do not mind the negative gender stereotypes as much as they see it as just words that are typically said in Thai society.

“I don’t think that men even think anything when they say that just because it have been said by so many people already — it is just a negative expression” (Pear, Network Architect)

4.4.2 Positive gender stereotype

On the other hand, people who reported experiences of positive gender stereotype revealed to have similar traits to each other. In that they tend to expressed confidence and strong sense of self when they explain about their experiences working in the STEM fields. Another theme that emerges was that most of the positive experiences gender stereotype was reported by women working in the IT and chemistry area of STEM fields in comparison to those who work in the field of engineering who experienced mostly negative gender stereotypes. For instance, Mile who is currently an IT analyst reported that she have never experience harsh negative gender stereotype except for when she was younger where she received comments from her cousins and teachers about behaving like a boy. Thus, currently Mile only receive positive reactions from others when she inform them that she is pursuing a path in IT as others find it impressive and praised her for being a women who pursue a career in technology. Similarly, during Gade college years as she pursued a science degree in Applied Chemistry, she reported that did not experience negative gender stereotypes and felt that girls in this specific field are less serious about ‘traditional girls norms’. Therefore they got along with the ‘boys culture’ of late night hangouts pretty well. Despite not struggling with having to fight against gender stereotypes she still feel that throughout her working years, the people in her workplace put less pressure and are less harsh on female employees due to their gender. Likewise, Tiw, a longtime lab chemist herself also agree that from her personal experiences working in labs and with other chemists, she had only received positive stereotypes and is often praised for working in the field of sciences.

“Women have steadier hands and more patience than men” (Tiw, Laboratory Manager)

Hence, both Tiw and Gade reported that in their line of work there are more female employees compare to male employees. To add, Nut, a Director of IT reported that she have never experienced any negative gender stereotype but just the opposite. She stated that because she is the only women in the role of Director of IT in the Asia-Pacific branch, other men always treat her positively and respectfully.

“They always let me express my opinion first during the meetings in a ‘lady first’ manner” (Nut, Director of IT)

Thus, this is not an effect nor an experience of positive gender stereotype, but rather an example of a privilege of being a women. Nevertheless, gender stereotypes about the mindset and biological aspects are still an issue that cause doubts about the women ability in doing the job as good as men.

“When something goes wrong and the women lead the team they sometime say in a positive tone, ‘oh its ok she’s a women’” (Nar, Technical Consultant)

Despite this act of kindness in not asserting any harsh criticism, the meaning behind the words are not encouraging nor uplifting towards the targeted individual.

4.5 Other observations

Other minor themes were found from the gathered datas as it was revealed that the number of men are extensively high than women in engineering and computer-related field in comparison to the chemistry area where participants reported that the ratio of women in the field outweigh the ratio of men both academic and career wise. Moreover, it was revealed that experiences of negative gender stereotypes was found to be more prominent in the field of engineer compare to those in the chemistry and computer-related careers. It was also found that age does play a role to a certain extent in term of how participants perceived

the impact of Thai culture on their personal and career life. Participants in their 50s and 40s were found to have experienced more impact of Thai culture that contributed to their life experiences. They stated that most of what they considered impact of Thai culture was asserted through their parents and society. According to these participants, Thailand was not as open-minded as it is nowadays, which is one of the reasons why Thai culture was more strict and traditional back in their times. Therefore, the role of a woman and the idea of how a woman should carry herself was very strong when they were younger. On the other side, majority of the participants in their 20s and 30s reported that they do not feel that Thai culture had much impact on their life and career decisions as majority of them also work in a western-led company culture. Furthermore, economic status also plays a role in the participants' life experiences and career choices. It was revealed that majority of the participants who reported to have developed an early interest in STEM at the same time had support from their family all came from a middle to high income family. Thus, Mile stated that because of her specific degree in computer sciences, it allowed her to pursue her desired career. Therefore, it can be suggested that in order for an individual to pursue a career in STEM one must have the family support and decent financial resources to obtain the degree needed in pursuing their intended career. It was found that despite many participants reporting that their personal interest in STEM was inspired by exposure to other people who work in STEM. However, despite pursuing a path in STEM, majority of the participants were not found to be inspired to pursue STEM by schools or teachers.

4.6 Summary of findings

The interviews with women working in Thailand's STEM occupations have revealed significant factors that influenced their academic and career path. Consequently, the interview also sheds light on the three research questions. Firstly, Thai culture was found to have impacted female career experiences in STEM occupations as majority of the participants reported that they perceived Thai culture has played a role mostly in terms of manners and courtesy that is the societal

expectation for Thai women. The most reported factors was the culture of saving face of others and the importance of respecting the elders. For instance, respect the opinion's of the elders in the family when choosing academic and career paths. Consequently, it was revealed that Thai culture highlights the importance of hierarchy in status, age and gender, which was expressed through Thai languages and taught through passed down Thai beliefs. In addition, culture also effects women career experiences as it is the foundation for the societal expectation of how one should behave in the society, which was found to be more prominent in Thai-led company culture. Nevertheless, these impacts of Thai culture was not seen to have major influences on the participants main life choices, but it was revealed to have contributed to the negative life experiences.

Secondly, it was revealed that there are both encouraging and discouraging factors for female to pursue a career in STEM. The main three encouraging factors that was found were 1) stable job and wages, 2) personal interests and 3) family support. Hence, all of the three encouraging factors were found to be consistent with the SCCT as it was found that outcome expectations such as having stable jobs and high wages were also linked to personal interests and family support as participants who reported having good feedbacks such as good grades and support from family were reveal to have more drive and aspiration in comparison to those who are only pursuing STEM careers because of the job stability. On the other hand, the discouraging factors that were reported were that of the nature of the 1) work environment such as the long-working hours, hazardous working environment, and disagreement with co-workers. Following, 2) company culture and barriers due to being a women itself is also another discouraging factors. Subsequently, the next factor is 3) barriers due to gender, which can be separated into the form in that barriers due to gender which are perceived barriers enforced on to the individual by others and with individuals with low positive self-affirmation accepting that enforced perception. Whereas, there are barriers due to gender that is perceived as barrier due to the biological aspects of being a female such as women are not as physically strong as men when it comes to man-power job and that women still have the duty of carrying a child which might interfere with the work life.

The last discouraging factor that was reported by many participants is 4) work-life balance such that many participants still feel that family responsibilities still fall heavily on the women. This then create a glass ceiling for women to advance in jobs that require long working hours or jobs that require the person to be on the road as this issue was raised by many participants working in the engineering field.

Lastly, gender stereotyping was found to have played major role in female career experiences in STEM as it was revealed that gender stereotyping started early on in life and had influenced how Thai women are expected to carry themselves in the social settings. However, experiences of positive gender stereotypes were found to be lesser compare to experiences of negative gender stereotypes with negative gender stereotypes revealed to be influenced by Thai culture such as Thai idioms that was used to teach female how to behave with the degree of negative gender stereotypes in the workplace revealed to be more prominent in the engineering field.

To sum, it can be suggest from the gathered data that family institution and supportive parental guidance plays a crucial role in helping participants develop positive self-affirmation and self-efficacy as it was seen to have impacts on their career aspirations. On the other side, gender stereotype were found to be experienced in the form of passed down beliefs and gender role expectation which is influenced by the Thai culture. Hence, encouraging factors for them to pursue a career in STEM stemmed from the outcome expectation on the monetary and job security rewards, personal interests, and family support. On the other hand, factors that discourage them mostly arises from the workplace environment and nature of the STEM work that contradicts with the societal expectation as majority of the participants reported that they see being a women is still limiting in term of work as women still have more part to play in the parental role as they will need to invest more time to the child and family, which might in turn create a work-life balance problem.

CHAPTER 5

DISCUSSION

5.1 Introduction

This research was constructed with the aim to examine women's career experiences as well as the encouraging and discouraging factors for them in pursuing a career in STEM. This study looked into Thai culture, experiences of gender stereotype, and factors that encourage or discourage female working in STEM occupations. Based on the interviews it was revealed that Thai females working in STEM occupations are affected by many environmental factors that could be explained using the theoretical frameworks of the study. Subsequently, females who have high positive self-affirmation were found to have high aspiration to continuously seek for advancement in their career. Whereas the Social Cognitive Career Theory also incorporate influences from culture and gender stereotype into explaining the career development of the individuals. Therefore, in this chapter will discuss how environmental and societal factors influenced females' career experiences and their pathway in STEM. In addition, the Self-affirmation Theory (Steele, 1988) and SCCT (Lent et al., 2002) will also be included to explain the different career paths of the individuals.

5.2 The Influence of self-affirmation

Self-affirmation is an act that demonstrate one's efficacy (Steele, 1988). Thus, the Self-affirmation Theory suggests that people are driven to protect their self-integrity. In this case, self-integrity refers to ones' concept of self such as their morals and how they portray themselves in accordance with cultural and social norms (Sherman & Cohen, 2006). Hence, threats against one's self-integrity can create negative feelings that they are not adequate. Similar to previous studies, it was revealed in the study that participants with high positive self-affirmation are highly driven to protect their sense of self when faced with information that

contradicts with their beliefs. Hence, self-integrity is not fixed — this refers Self-affirmation Theory's claims that the self is flexible and one can shift between the different roles they hold to in order to adapt or protect their sense of self from the perceived threats. This can be seen in the findings as one of the participant shifted highlighting their role of a mother to their role as a female working in STEM when she was faced with questions about her work effecting her family duty as a mother. Therefore, by holding multiple roles it also helps people to create a flexible self-concept that will assist in coping with threats to their self-integrity (Sherman & Cohen, 2006). Likewise, family support is also an important factor in shaping females' career experiences in STEM as most of the self-affirmed participants were found to have supportive parental guidance as child and were found to have illustrated self-confidence and aspirations to pursue advancement in their chosen careers. However, participants who did not report any parental influence in their career choices illustrated low confidence in their chosen career path and showed minor to no career aspirations in their respective career fields. Therefore, it can be suggest from the findings that family institution play a major role in shaping women's career aspirations.

Moreover, positive self-affirmation constructed through supportive parenting and beliefs system during childhood can later influence how individuals cope with stress and negative stereotypes in life. Subsequently, a study conducted by Master et al. (2009) on social relationships and stress also support this finding as the result from the study revealed that pain from mild electric shocks were reduced for the group of participants who felt that they had social support in their lives and had the chance to see a picture of a loved one prior to emitting the shocks. Hence, this further highlights the importance of family supports or support from close relationships, which can affect female's choices in choosing a career in STEM or when faced with negative gender stereotypes. To boost, all of the self-affirmed participants also had supportive close relationships as a child and did not experience any constructed negative beliefs about gender or assertion of gender roles expectation by close family members. Thus, because of this it may have assisted them in constructing their positive self-affirmation as a child, which later became a

strong defence mechanism against negative gender stereotype they faced during their career paths as most of them reported that they choose to ignore those negative comments and beliefs — hence, chose not internalize those negativities and only focus on their goals. Consequently, strong sense of self and constructed positive self-affirmation allow them to not fear stereotype threats as growing up they never have the fear in conforming to gender stereotypes. Therefore, there are lesser chance for self-fulfilling prophecy in comparison to other females who have been exposed to gender role expectations and gender stereotypes ascribed by close relationships.

Furthermore, participants with positive self-affirmations and support from close relationships are more likely to have confidence that they can achieve their goals in spite of the obstacles they are facing. For instance, Nok who had strong support from her husband as he quit his job to support her decision in pursuing a career path in STEM. Nok is one of the self-affirmed participant who depicted high self-confidence in herself and because of this high positive self-affirmation she felt that she and herself alone is in control of her career paths. As a consequence, it can be suggested that participants who are highly self-affirmed perceived gender stereotypes and culture as not as importance factors in determining or influencing their career experiences in STEM. Subsequently, Thai culture and gender stereotypes are the external factors that impact both individuals with positive self-affirmation as well as those individuals who does not have positive self-affirmation. Nevertheless, impact of Thai culture and gender stereotypes are stronger in those individuals who are not self-affirmed.

In addition, Steele (1988) also proposed that the self is made up of three main domains: 1) beliefs system, 2) roles, and 3) values. First, the beliefs system refers to the things an individual believe in such as religion, whereas roles are the roles that they hold in their life such as the role of being a mother, employee, or wife and values are the things an individual hold as of importance to their life in the collective culture. This theory of the self fits into the study as it explores both aspects relating to culture and gender by looking into the roles one have or are expected to have as well as the beliefs systems and values ascribed by society.

From the findings it can be suggested that the extent of impacts culture and gender stereotypes have on female career experiences in STEM also depend on the self-affirmation of an individual. Nevertheless, consistent with the Self-affirmation Theory — roles, values, and beliefs system are what shape their choices and experiences. This is because people will choose a career that is consistent with their self-concept, needs, and values. For instance, Noi's grandmother who wishes for her to have a more traditional work so that she could spend more time at home with her son. Hence, Noi is currently burdened with three roles: 1) the role of being a mother, 2) the role of being a respectful granddaughter, and 3) the role of R&D supervisor. Moreover, the findings also suggest that beliefs system and values are shaped by close relationships as well as culture. Therefore, in Noi's case — her career experiences are shaped by her roles and responsibilities as well as the constructed beliefs system and values ascribed by societal norms. Another study conducted by Miyake et al. (2010) on gender stereotypes and self-affirmation also suggested that affirmation of the self can remove barriers that prevent one to perform their full potential. The study was focused on female university students who enrolled in basic physics courses where group of participants were randomly exposed to in class values affirmation exercises. The result revealed that females who were subjected to values affirmation exercises performed better in their exams and earned higher grades, whereas females who were not exposed to values affirmation exercises received worst grades and were more prone to gender stereotype threats of women performing worst in the course compared to male students (Miyake et al. 2010). Thus, supporting the findings that self-affirmation can have an effect on female career experiences working in STEM as self-affirmation allows one to have the confidence in the task they are doing as well as shape their attitude and beliefs to battle external factors that may interfere with their career experiences.

Additionally, female participants who do not internalize negative gender stereotypes tend to depict a strong sense of self as they are driven to create a positive self-confidence and self-integrity despite changing social pressures. Therefore, the females with high and positive self-affirmation were found to be less

stressed when faced with negative information in comparison to un-affirmed females who internalize negative gender stereotypes. As a consequence, it can be suggested that self-affirmation is an important trait females working in a male-dominated field should have that can be constructed early on in life either by close relationships or through academic institution practices since many previous studies also revealed that it can help boost one's performance and is an effective self-defence mechanism when one is faced with gender stereotype threats or external factors that threaten their sense of self.

5.3 Social Cognitive Career Theory: The Influences of Thai Culture and Gender Stereotypes

The Social Cognitive Career Theory (1994) directly explores three aspects of career development: 1) what influences basic academic and career interests, 2) what determine educational and career choices, and 3) how academic and career success are obtained. Similarly to the Self-affirmation theory, SCCT also examines factors such as abilities, values, and environmental factors that are linked with the main variables of this theory, which are self-efficacy, outcome expectations and personal goals (Lent et al., 1994). Hence, self-efficacy is proposed by the theory to derive from performance accomplishments, social persuasions, second-hand experiences, and emotional states. For instance, achieving personal success on certain subjects can increase one's self-efficacy as it offers a sense of accomplishment. Following, outcome expectations refer to the beliefs about the consequences of certain actions and according to SCCT, people tend to engage in actions that will lead to self or social approvals. Lastly, personal goals refer to the intentions of engaging in a particular activity. This third variable of SCCT ties both self-efficacy and outcome expectation together because by setting goals, it helps people perform certain behaviour and encourages them to continue on the path despite facing setbacks or not receiving immediate positive outcomes.

The interviews with the female participants working in STEM careers revealed that their basic academic and career interests were influenced mainly by

either family members or close relationships who have prior experience working in the STEM industry. Subsequently, it was revealed from the findings that despite being taught and guided about learning STEM in schools, no participants' interests in STEM were actually influenced by school institutions.

Jong-Tae Youn and Song-Ah Choi (2015) had conducted a study on the factors that caused female engineering students to dropouts in South Korea. The study focused on analysing the patterns and reasons to why female engineering students are dropping out, in which the result indicated three main factors that is causing the dropping out phenomena: 1) the male-dominant atmosphere of the college of engineering, 2) negative gender cognition, and 3) mixture of other socio-cultural factors. However, similarly it was found that parents and teachers play a crucial role in influencing the decision of the female students. This is because absence of mentors and support is the most prominent factor that lead female engineering students to dropout as they had no guidance or support in continuing to pursue the engineering field. On top of that, South Korea's negative perception against women engineering students and the male-dominant atmosphere within the university also further pushes females to pursue the decision in dropping out of the field.

Referring back to the study on the effect of gender stereotype threat in females within the academic setting of math classrooms (Vijayakumaran, 2017). The result from the study revealed that female students tend to conform to gender stereotypes, however, teachers attitude towards math can have a direct impact on female students. For instance, a positive attitude of teachers can positively impacted female student aspiration in studying math. Therefore, the findings from this literature further supports the importance of having a positive role model as a key element in being both the protective and motivative factor for females in creating a positive perspective towards a male-dominated stereotype. Hence, academic institutions can also play a role in constructing self-affirmations that will help female students battle gender stereotype threats and negative cultural norms, especially since previous literatures suggests that teachers' attitude have more impact on female students compare to male students. Consequently, positive reinforcements

or positive attitudes in classroom settings especially in maths and sciences classes from teachers can also help build the aspirations for female students to engage in male-dominated fields such as STEM.

Consequently, educational and career choices were found to be influenced by three factors: culture, family, and economic stability. First, Thai culture have had an impact on female education and career choices directly through the form of family and societal values. This is because respecting the elders' opinion especially elders in the family are very important in the Thai culture as it is a form of respect. Consequently, a case study on Thai family therapy also pointed out that there are total of six cultural influences that have an impact on Thai families: 1) religious beliefs, 2) rural and urban considerations, 3) family relationships, 4) societal values, 5) sexuality and lastly, 6) masculine and feminine roles (Pinyuchon & Gray, 1997). The study indicated that societal values are what shape Thai families. For instance, children are always children in the eyes of their parents and they cannot do anything without their parents' permission due to the status of the family's hierarchy. This pattern was also revealed in the findings as every participants' decisions in their educational and career paths were guided by their family members. For instance, both cases of the self-affirmed and non-affirmed participants consulted with their parents about their decision prior to choosing the path in STEM, which shows the importance of family values and support in the Thai culture. Moreover, traditional Thai beliefs and gender role expectations still have a hold on women working experiences.

This can be seen in many interviews with example of older generations such as grandmas still wanting their granddaughters to work indoor and not outdoor or on the road because women need to create a family and according to them; outdoor physical work are no place for a girl. This traditional beliefs then have an influence over females decision when it comes to choosing between work-life and home-life. This is because one — they have the desire to be successful in their line of work, but at the same time, they are burdened with the role of building a family to fulfil the expectations asserted by the family. Hofstede (1994) also observed the contextual nature of the Thai culture that everyone in the family are expected to

conform to certain roles. Hence, the nature of Thai families are that the parents are never wrong and the role of the mother is to be a good follower and supporter for the father where she must put her family's needs before her own. Thus, this claim also supports the findings that women are still burdened with the gender roles expectations ascribed on them by societal norms. Especially in the Thai culture as women are still tied with the images of their main roles being wives and mothers. As a consequence, Thai culture itself has created gender stereotypes that are passed down through Thai idioms that in the past were used for the purpose of teaching women how to behave. Consequently, women who do not conform to these teachings and stereotypes are considered 'unfit' or 'not a wife material' (Yukongdi, 2005). Therefore, Thai culture still plays an important role in influencing the career choices and experience of females working in STEM because no matter the degree of self-affirmation — people still need to conform to the values of the society they are living in. Thus, the Thai culture still expects women to conform to certain values and beliefs ascribed through the family institutions, which in turn affect their career experiences. On the other hand, economic status is also another important factor that influences educational and career choices. This is because every participant was found to have pursued a career in STEM with the expectation of having a stable job and good salary. Nevertheless, despite some STEM fields such as AERO engineering that was reported by a participant to be in higher demand than others — it was revealed that there are still less female to male ratios in these high salary areas. For instance, Mile, a computer sciences graduate reported that during her university years there were more males than females in her faculty, likewise, in her company at the moment she is one of the few females in her department. Is this the same effect of gender stereotypes that have been associated with specific areas of STEM work that was seen in the engineering field? A previous study by Cheryan, Ziegler, and Jiang (2017) also investigated this underrepresentation of women in certain STEM fields. The result from the study revealed that there are three factors that contribute to the unequal distribution of females in STEM: 1) masculine cultures that give out a lower sense of belonging to females than males, 2) not enough exposure to STEM related subjects such as computer science and physics, and 3) gender gap in

self-efficacy. Hence, it was revealed that female had lower self-efficacy in STEM-related fields compare to male. Therefore, it can be suggested by using evidence from the previous study that females' choices to participate in certain STEM careers can be encouraged by changing the image that people associates masculine cultures with certain STEM work. Likewise, educational and career choices can also be influence from early experiences with STEM that will dissolve the gender stereotypes that have been associated with the fields as well as stem their personal interest from an early age.

Thirdly, the details of how academic and career success are obtained will be further discussion using the Performance model. Hence, it was revealed that participants who showed self-confidence, have strong family support and expressed early interests in STEM are more aspired to success in their line of work. Additionally, despite exposure to gender stereotypes participants who have personal interests and personal goals were seen to persist more. Comparatively, culture and gender stereotype in the workplace also affect female career experiences by creating barriers in the work setting. Hence, barrier arises from gender stereotypes were found to be more prominent in the engineering field, especially in the sector that require physical works. This is consistent with previous studies in the context of Thailand as it was revealed that the number of women in civil engineers have been on the rise for the last decade. However, male domination is still associated with this particular STEM occupation since the nature of engineering work is associated with physical strength, abusive language and outdoor working conditions (Kaewsri & Tongthong, 2014). Moreover, the gender stereotypes that was passed down along with beliefs of the Thai culture that women are fragile and must act proper were also found to affected career experiences of female engineers. This can be seen in the case of Fasai, Mild and Kaew whom career choices were all affected by this gender stereotype. Thus, Kaew's family believe that there are more barriers for female engineers compare to males, whereas Fasai and Kaew both received direct negative gender stereotype comments from male colleagues. Furthermore, the finding also suggests that females working in STEM are mainly discouraged in their job from the work environment such as long working hours and issue of work-life balance.

Subsequently, this finding is consistent with previous studies of on barriers to career development of females in the engineering fields.

A study by Lingered and Francis (2005) supports the findings that women are more obstructed with work-life balance problems more than men, especially female engineers. Likewise, result from previous studies also revealed that female who works on construction sites scored higher on work-life conflict in comparison to male engineers. In addition, Dainty and Lingered (2006) also found that women working in construction industry usually face more diverse problems than men; with the top three barriers to their career development being discrimination, sexual harassment and work-life conflict. However, a study on Thai female civil engineer also suggested that barriers to career advancement may also stem from the the lack of opportunities to engage in site-based work or female's own refusal to engage in site-based work. Nonetheless, another barrier that arises from culture is the Thai culture of saving face of others as well as oneself. To boot, the importance of hierarchy in Thai culture also enhances this impact on female career experiences. This is because in certain situation women are expected to act proper to not break face of older authorities and speaking out is considered a rude behaviour despite them being correct. This in turn create a glass ceiling for women to obtain career success or move up in their respective line of work as speaking your mind can be consider rude in certain situations. Nonetheless, degree of self-affirmation of females in battling negative gender stereotype still have an impact in determining their success or persistence in the job.

In addition to the three aspects of career development that are self-efficacy, outcome expectations, and personal goals SCCT also consists of 3 models: 1) Interest model, 2) Choice model, and 3) Performance model. Thus, the purpose of these three models are to explain the three main questions of SCCT as well. To boost, these three models also assisted in providing insights into the influence of Thai culture and gender stereotypes have on females working in STEM. First of all, Interests model posits that growing up, people are exposed to occupational relevant activities that are reinforced through surrounding environments. However, cultural norms will determine the type of activities girls and boys are encouraged to

participate in (Lent et al, 1994). Consequently, people will develop interests in activities that they feel secure or see positive outcomes from. However, interests are unlikely to develop for people who doubt their self-efficacy and expect negative outcomes. The findings supported this theory as in this case, the negative outcomes are the fear of conforming to the gender stereotypes. It was revealed that self-affirmed individuals depicted more interests in their line of work as well as more self-efficacy and always had positive response to stereotype questions, whereas participants who did not expressed interests in STEM reported showed doubts about their ability and had lower career aspirations. Moreover, it was also revealed that females who excelled in maths, sciences, and IT-related courses during educational years also expressed more interests in working in STEM compare to those who reported that they did average in these courses. In accordance with previous study, females who are exposed to education or activities in related to STEM were also more interests in the field, especially when these exposure are through the source of close relationships (Dasgupta & Stout, 2014). Previous studies also revealed that the more parents encourage their children's engagement in STEM related activities, the more the children became interested in STEM (Simpkins, Davis-Kean, & Eccles, 2006). Likewise, parents' beliefs about their children's math ability have more impact on children's self-confidence in math than their actual math grades (Frome & Eccles, 1998). Whereas another study suggested that during adolescent, support and encouragement from mothers can motivate girls to perform in science and math more than encouragement from fathers due to motivation from the same gender (Leaper, Farkas, & Brown, 2012).

Subsequently, the Choice model are more directly influenced by self-efficacy beliefs, outcome expectations and environmental variables. This can be seen mention earlier that educational and career choices were found to be influenced by three factors: culture, family, and economic stability. Hence, economic stability are the outcome expectation that females expect when they choose to pursue a career in STEM, whereas family and culture are the environmental influences that either create opportunities or barriers for them. Hence, family need to be relatively well-off in term of economic status in order to send their children to university in order to

obtain a good and stable job in STEM field. Therefore, the choices are also contained by such economic limitations. For instance, a degree in aero space engineering is higher in comparison other basic engineering. However, due to higher market demand — a career in aero space will also have higher monetary rewards. A study conducted in the context of the Philippines also revealed factors that drive women to pursue a career in STEM. The study was conducted by Ian Llenares and Custer Deocaris (2014) on 34 female engineering and architectural students from the Technological Institute of the Philippines to examine the predictors of women entering the STEM programs. The findings from the study revealed that female students career choice is high value-driven. More specially, it was found that students' decision to pursue a degree in STEM is driven by family, money, and other promotion opportunities. Thus, this finding is coherent with SCCT's outcome expectation theory.

Lastly, Performance model is concerned with explaining the level of success people attain and the degree that they persist in that educational or career path when faced with obstacles. Hence, it was found that females who excel in STEM related classes and have positive self-affirmation persists more in the workplace when they are challenged with doubts from others about their ability or when they are faced with negative gender stereotypes. However, SCCT posits that self-efficacy, outcome expectation, and personal goals can also indirectly influence performance as it can create motivation for the individual to persist in the job as they have self-efficacy and aim to work towards their goals (Lent et al, 1994). This can be seen in the case of Nok — she is considered to be the exceptional, outlying participant of the study as she is the only participant who did not have any previous educational background in STEM. However, she reported to have set goals very early on in life that she will succeed plus, with her ambition and personal interests in telecommunication and positive self-affirmation she was able to reach her goals. Consequently, she also had strong support from her family and did not report any gender stereotype ascribed by her parents. In other words, it can be suggested that performance relies heavily on ability, motivation, and self-efficacy.

5.4 Other factors that affected female career experiences

5.4.1 Individual aspiration

Individual aspirations in STEM were found to be influenced by personal interests and family support. Consequently, culture and gender stereotypes were not found to have any major affect on females' aspiration in STEM careers. Nevertheless, it was found that female who reported that they never experience gender stereotypes from their family as a child were found to have higher career aspiration than those who reported that they have previously experienced gender stereotypes from close family member as a child. Thus, this finding further support the influence of self-affirmation, importance of family support on female career experiences and the effect gender stereotypes can have on female who internalize those stereotypes. Subsequently, participants who reported that they have personal interest in STEM and that their interests are encouraged by a close family member during early to late adolescence also depicted more career aspirations compare to those participants who are only pursuing STEM for job stability. Maltese and Cooper also (2017) studied the different reasons of why men and women enter and exit a path in STEM. Similar to this study, Maltese and Cooper (2017) also employed the SCCT as the framework of the study to investigate the factors that initiate and maintain ones interests in STEM. The result from the study revealed that there are no singular pathway for both genders in entering or exiting STEM. However, it was found that females rely more heavily on support from others, whereas males rely mainly on self-driven interest in pursuing a career in STEM. Moreover, majority of the participants from both genders' interests in STEM was initiated prior to entering middle school with teachers' interactions having more effect in encouraging and discouraging female students' interest in STEM. Therefore, from previous studies it can be suggest that career aspirations in STEM can be create during childhood with the support from close relationships such as family members or teachers. On the other hand, despite wage and job stability being revealed as part of the factors that encourage females to pursue a career in STEM — these two factors does not help in maintaining ones interests in STEM nor have any effect on ones career aspiration.

Nevertheless, despite Thai culture not having a direct impact on females' aspiration in STEM it does have an impact through the effect of gender stereotypes that are influenced by Thai culture and beliefs, which can be experienced in the workplace especially in the field of engineering. Hence, these gender stereotypes have played a role in being one of the factors that demotivate females in working in a male-dominated occupation.

5.4.2 Workplace environment

In accordance with a study by Napasri & Yukongdi (2015) on Thai female executives and barriers to career advancement it revealed that family plays a crucial role since it is the second most reported reason in obstructing female's career development after the first being personality traits of the women themselves. The family variable found in the previous study is consistent with the author's findings as lack of understanding from family members were also found to be a factor that influenced female's choices in their career paths. Moreover, the third reason that was found to be a barrier in female career advancement in Napasri & Yukongdi's (2015) study is also consistent with the author's findings that work-life balance issues and women's own lack of self-motivation and career aspiration were the barriers for career advancement. Furthermore, previous study also mentioned about the 'old boy's network' (Napasri & Yukongdi, 2015).

Consequently, this was also revealed in the author's interviews with the female participants since a small portion of the participants had mentioned about the company values and the boy's culture that had influences over their educational and work experiences. For instance, during university years some female participants reported that they needed to adapt to the boy's culture that have been heightened especially in the engineering and computer sciences faculties. Whereas another participant reported that due to the boy's culture of her company; she sometimes feel like an outsider. Thus, this could explain the inequality of promotion in the workplace reported by participants working in a Thai company culture. To boost, previous studies had explained this phenomenon as the old boys' network that prevent women from moving up the ladder since male employees feel that they have familiar interests and communicate better with the same gender and their

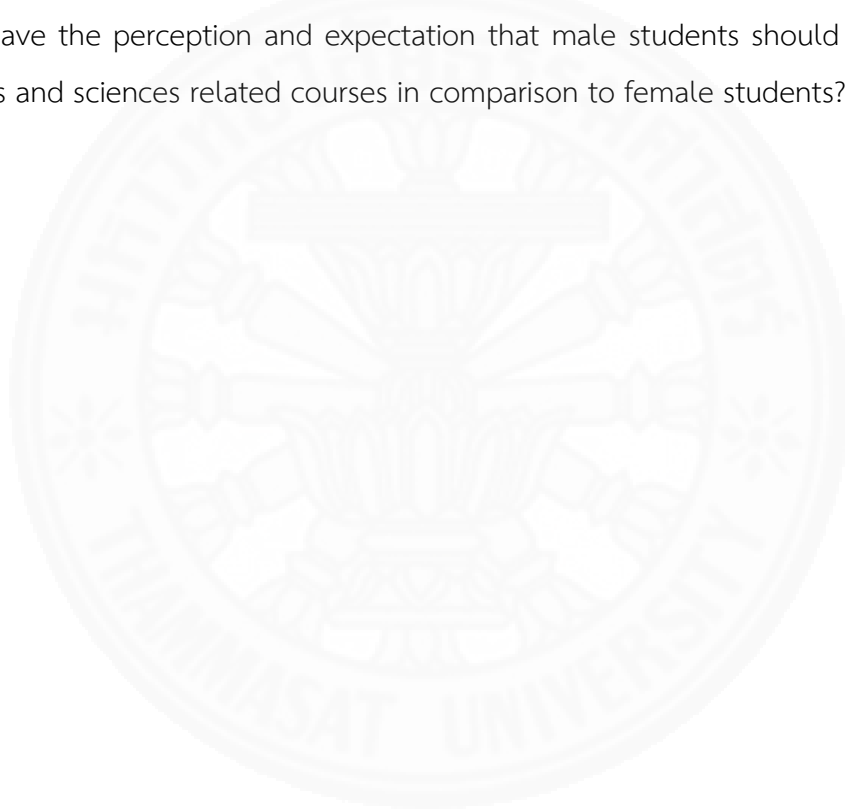
discomfort dealing with women in a male-dominated field had enhanced this inequality in the workplace (Napasfri & Yukongdi, 2015; Wrigley, 2002). Similarly, Napasfri & Yukongdi's (2015) also pointed out that Thai legislation and regulations is one of the factor that contributed to the glass ceiling phenomenon.

Comparatively, the author also found that majority of the participants who are currently working or used to work for a Thai-owned company reported that they have seen inequality in the workplace and company policies that are effective in compare to participants who work in a Western-owned company. This can be seen in the case of one of the participant as she reported that job applications in her company strictly inform the applicants about the gender that will be require for the job. However, this type of inequality and ineffective company policy were only found to be reported by two females working in a small Thai-owned companies whereas others who work for Western-owned companies reported that they have effective company policy in place that protect employees against any type of gender discrimination as well as promote equality in the workplace. Nevertheless, the ineffective company culture and old boys' culture such as these had contributed to being the discouraging factors that dissuade females from continuing to pursue a career in STEM. Comparatively, when participants reported about the discouraging factors that they faced in the workplace; majority of the participants were reluctant to speak about the issue of gender pay gap. However, majority of the participants reported that they do not think that there are pay gap issues in their workplace.

5.4.3 School's impact

Despite the Thai government currently pushing the education of STEM in the school curriculum and classroom settings — schools was not found to be the main influencer for females in Thailand in encouraging them to pursue a career in STEM. Nevertheless, some participants had mentioned that they have had previous discussion about their future careers in STEM with the school's counsellors and advisors, however, the discussion they had did not have an influence on their decision to pursue a career in STEM. Comparatively, there were no report of role models from schools that had inspire them to pursue a path in STEM, but rather it

was the role models from close relationships such as neighbours, peers from leisure activities, or parents who were work in the STEM field at the time that had sparked their aspiration to pursue a career in the field. Hence, this is intriguing especially since Thai schools' curriculum require students to choose an academic path for the purpose of narrowing down and preparing each students for their intended future careers. Likewise, it is also concerning as it shows the gap in the educational system where schools should provide a sense guidance for students' future. Could it be that teachers still put more focus on male students? Or that some teachers in Thailand still have the perception and expectation that male students should excel more in maths and sciences related courses in comparison to female students?



CHAPTER 6

CONCLUSION

6.1 Conclusion

This study was designed to examine the career paths and experiences of females working in STEM in the context of Thailand by taking into account the influences of Thai culture and gender stereotype. The idea of this study stemmed from the lack of previous study on the influence of gender stereotypes and culture on male-dominated careers especially in the STEM sector of Thailand. Hence, majority of the previous researches focused on career fields outside of STEM and even if it was in the context of STEM — previous studies emphasized on studying the effects of gender stereotypes and glass ceilings in the top management levels only. Furthermore, even when Thailand is ranked number one in Asia for the highest proportion of females working in the STEM industry — the number of females working in STEM occupations still remain low in comparison to other occupational fields. Thus, this study focus on studying the various factors that affect female career experiences and look into what encourage or discourage in their pathway in STEM with by taking into consideration the 2 main influence of Thai culture and gender stereotypes.

The research had revealed that despite the increased in number of women pursuing a career in STEM — societal norms and expectations still act as one of the obstacles that impact female career choices and experienced. Hence, societal norms are based on passed down Thai culture and beliefs that in turn shape the gender role expectations. Thai culture still expect women to conform to the traditional concept of the desired ‘female qualities’ that anchored them to the idea that family needs must come before their own needs and wants. Thus, creating the problem of work-life balance where they feel pressure to choose between their career and creating a family. Furthermore, Thai culture emphasis on the importance of hierarchy and culture of saving face further create the obstacles for women in pursuing a career in STEM. This is because it restrain females to speak back to those

in higher ranking as it would only result negatively for them. Subsequently, culture also affect the work environment in STEM as well since it had created the culture of the boys' network where men in certain STEM jobs are expected to follow due to the passed down traditions, beliefs and stereotypes. Hence, this old boys' culture are seen most prominently in the field of engineering. Likewise, company culture can have an impact on the career paths of female as it was revealed that females are more motivated and enjoy their work more when the organization they work for have an effective company policy in place that ensure equal rights between employees and policy that encourage equal opportunity in the workplace. Therefore, it can be suggested that the old boys' culture and ineffective company policy had contributed to the glass ceiling phenomenon in Thailand STEM industry as it is one of the discouraging factors reported by majority of the participants.

Nevertheless, females with positive self-affirmation continuously displayed high aspiration in their careers. Hence, majority of these self-affirmed females also expressed early interests in STEM; and with the support and encouragement from close relationship they had developed a self-defence mechanism when faced with gender stereotypes in the workplace. However, the females whom choices to pursue an education and career in STEM that were mainly influenced by the outcome expectation of having a stable job were found to have lower career aspirations. Additionally, females who internalised gender stereotypes from close relationships when they were younger also internalised gender stereotypes in the workplace and were found to feel discouraged when faced with these gender stereotypes. As a consequence, Thai culture and gender stereotypes in the context of Thailand are intertwined as traditional beliefs, values and languages are the base of the constructed gender stereotypes in the Thai society. Therefore, females desire to succeed in their respective STEM fields did not mean that they have neglected the gender roles expectation ascribed to them through their family and culture. This is because even though the majority of the participants are still in their 20s to 30s; they still mention that their parents or grandparents still expect them to find a job that is close to home or jobs that doesn't require outdoor work so that they can start their family early in life.

Hence, the idea of women being home to take care of responsibilities at home are still the norms in the modern Thai society. However, females who are self-affirmed are less concern with these expectations are tend to be more focused on their work. On the other hand, having family support is another crucial encouraging factor that play a role in helping females develop and maintain an interest in STEM. This is because the interview with the participants are consistent with previous literatures that suggests that support from close relationships can help females maintain an interest in maths and sciences related subjects. However, despite previous studies revealing that teacher's encouragement is important in helping female students develop and interest in STEM — no participants had mention anything about being inspired to pursue a career a STEM from teachers or any academic institution. Comparatively, no concrete information were found on the issue of gender wage gap. Therefore, no conclusion can be made on the topic of gender pay gap since majority of the participants reported that they are not aware of this particular issue in their workplace. However, this finding might not be conclusive as it could be contribute the participants' reluctance to speak up due to other personal factors.

6.2 Recommendation from this research

The Thai society as a whole acknowledge the influences culture and gender stereotypes have in limiting women's participants in the STEM workforce. The gender role expectations and passed down beliefs about the qualities Thai women should possess are still part of the lingering barriers that affect their career experiences in STEM. For instance, the conflict of work-life balance that females still faces and the barrier to perform certain task due to the gender stereotypes and the influence from the old boys' culture network. Likewise, despite the increasing number of females joining the STEM occupations, only few may have been motivated by academic institution. Therefore, to provide women with the sense of security and support academic institutions, private companies and governmental

organization need to encourage improvement in the policies and develop new strategies to support females' aspiration in working in STEM occupations.

1) Company's policies in STEM organizations must not discriminate or stereotype against females's employees. This refers to the first process of the details of job applications to the compensation and benefits policy of the company. Human Resources management must ensure to promote equality within the company and be considerate towards the needs of female employees especially those who have to attend to their children's needs. Subsequently, for engineers, construction sites engineers and other type of STEM careers that require long-working hours — companies should have the option for women with young dependent children to work from home after hours to help them manage their work-life balance. Consequently, this option will also reduce the glass ceiling phenomenon within the industry as females employees will not have to completely choose one of the other responsibility. Moreover, the Human Resource management should encourage company activities that will help employees build a strong network with each others as well as aim to reduce some of the aspect of the dominant old boys' culture that may be the barriers for females in getting ahead in their respective careers. Consequently, this type of policy will also earn the organization more respect and appreciation from the employees as well as improvement in the level of productivity with the right management style.

2) Academic institutions, private organisations and government organisations should develop a specific development program for female students who express interests in STEM. This is because many previous researches have highlighted the importance for teachers' support and encouragement on female students, especially on subjects such as maths and sciences. Therefore, this development program should expose female students to empowering STEM environment both within and outside the classroom that will influence their career aspiration and help develop their self-efficacy. For instance, giving the students first-hand experience with STEM-related organisations. Thus, the development program should provide a platform for females students to discuss their interests with successful experienced females who have worked in the industry as this can allow

students to learn the different career paths in STEM as well as how to overcome certain issues in the industry. As a consequence, this development program can motivate female students to develop a positive self-affirmation and persist in their aspirations.

3) Given that females are more cited to be influenced by close relationships, intervention to increase females involvement in STEM should focus on educating teachers and parents about the importance of their relationships with young girls. Hence, academic institutions should develop a program that can educate parents and guardians about the values of these relationships, which they can utilize to promote the females' interests in STEM. Furthermore, SCCT posits career interests are not stable and can change for some people during their post-adolescent years. Therefore, females who choose to pursue an education or career in STEM should have a strong and supportive relationships that can help them develop their self-efficacy beliefs or and enable them to pursue their goals.

6.3 Recommendation for future researches

There are various ways to expand this research. Since this study was conducted within the context of Thailand, it would be useful to study the effects of different cultures on females' career experiences in STEM and compare the differences and similarities between each countries. Likewise, it could also be useful to compare countries that have similar culture and hold similar values. For instance, Myanmar and Laos as these countries have similar cultural background. Furthermore, this research had revealed insights into the factors that encourage and discourage them in continuing in the path of STEM. However, this study had only focused on the experiences of female from certain sector of STEM mainly IT and engineering. Therefore, future researches could focus more on the career of females working in the more scientific-oriented fields such as chemistry and biology.

Consequently, since this research only focus on females that are currently working in STEM area and only had careers in related to STEM, future studies could focus on studying females who had quit STEM career to pursue other

career fields. Thus, future studies could also look into the influence of gender stereotype, self-affirmation and other factors that could have contributed to females moving out of STEM careers. Subsequently, future studies could as well focus on looking deeper into the economic aspects of the issue such as the wage inequality females experience in their workplace or other economic aspects that have an influence over their choice to pursue a path in STEM.



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APPENDIX

PROFILE OF PARTICIPANTS

1. Mild

Age: Early 20s

Position: Master Scheduler

Years of experience: 4 years

Mild was enrolled in a Thai curriculum, all-girls school in which she chose to pursue Math and Sciences Program in her secondary school years. Her mother told her that she expressed interests in building and assembling things very early in her life, as she was always trying to take apart toys and the components inside. Mild's mother wanted her to pursue a degree in accounting whereas her father who works in a Thai-owned cable company supported her on pursuing a degree in engineering. Nevertheless, Mild stated that she first find herself being highly motivated to pursue an academic path in engineering when she was in grade 9 after she had evaluated every factors in her life such as the subjects she had interests in, the subjects she excelled and her basic interests in life. Subsequently, she decided to pursue a bachelor degree in engineering. During her university years, Mild felt that even though there are courses in the degree that she did not like, she still find it enjoyable as there are subjects such as stats that she still exceeded in. Mild further expressed that she do not regret pursuing engineering despite having an average GPA as she stated that it is better to pursue something ones have a passion in rather than having to study something that they are not interested in. Mild graduated with a degree in Industrial Engineering and is currently working as a Master Scheduler or a planner where she is responsible for planning, coordinating, and monitoring of Printed Circuit Designs (PCD) throughout its production cycle. Nevertheless, she stated that her goal is to become an engineer, not production planner.

2. Fasai

Age: Early 20s

Position: Consulting Engineer

Years of experience: 3 years

Fasai was enrolled in an International, mixed boys-girls school since primary schools. Thus, she decided to take an IGCSE examination at age 16 years old, which she passed and used the certificate to apply into a Thai university in which she chose to pursue a path in applied chemistry. Her decision in pursuing this particular academic path was influenced by her dad since her dad also works in STEM fields as an engineer and had suggested to her that there are more and more demand each day for people who hold a degree in STEM fields. Furthermore, her father also expressed that a degree in STEM will likely give her job security in the future. However, in her last year she discovered that she had more interests in engineering; she further expressed that it could be because of the influence of her father as he is an engineer himself and she always found herself being interested in his works. Still, Fasai later graduated with a Bachelor of Science in Applied Chemistry. However, after graduating her father introduced her to a career position that allowed her to work as a sales engineer, where her job was to assess equipments, determine system requirements and help customers with installed equipments. After working successfully in sales for the first year, she transferred to work in the technical engineering department where her work environment shifted from office and indoor-oriented to on the road and factory environments. For the past two years, she has been working as a consulting engineer for a Thai-owned company where her job requires her to travel in order to plan and design projects, assess equipments, and service clients.

3. Kaew

Age: Early 20s

Position: Vehicle Performance Engineer

Years of experience: 3 years

Kaew was enrolled in an Thai curriculum all-girl public school from kindergarten up to high school, where she decided to choose the academic path of Sciences and Math Program. Kaew stated that her decision in choosing this particular academic path was because her parents suggested that this program will create a wider range of career opportunities in compare to the Language-Arts Program. Subsequently, she decided to apply to the engineering program when it was time for her to choose her study field in university as she stated that she did not find her self to have particular interest in other areas. However, her parents did not support her decision in pursuing a study in engineering as they told her that it will be harder for women to find a job in this particular field of work in compare to men as most engineering companies will tend to choose male applicants over female applicants due to less complications. Nevertheless, she decided to pursue her chosen academic path. As she was accepted into the program, she chose to study the specific area of mechanical engineering as she see that this field has the most job security since engineers are in demand in the developing Thai society. During her academic years, Kaew revealed that she did not find interested or excelling in any specific subjects, but also did relatively well in maths and sciences. Hence, for the past three years she have been working as a vehicle performance engineer for a Japanese-owned vehicle company. Kaew also expressed that she does not have a specific goal for her future, but expects to achieve a stable job in the company as of now.

4. Baitoey

Age: Early 20s

Position: Aero engineering maintenance planner

Years of experiences: 4 years

Baitoey was enrolled in an International mixed boys-girls school where she find herself being interested in maths related subjects. Later, she decided to pursue a major in engineering — particularly, aero space engineering. Baitoey stated that this academic path was mainly her own choice, but she did have family supports as they all agreed that engineering is a field that is currently growing very fast and engineers are always in demand. Moreover, she stated that she had more motivation in pursuing a path in engineering because during university years, she was one of the people in her year that did not struggle with the courses and was exceeding in the study. Thus, she also stated that the main factor that influence her academic and career decision was the monetary benefits as aero space engineers typically earn more in compare to other engineering fields. After graduating, Baitoey first worked as a consultant for a Japanese auto mobile company, but later decided to quit as she still find herself having more interests in airplanes. Currently, she is working for a Thai owned airline company as an maintenance engineer planner where she is responsible for maintaining liaison between operations and maintenance, and also some maintenance fieldworks.

5. Tam**Age: Early 30s****Position: Process Improvement Engineer****Years of experiences: 7 years**

Tam was enrolled in a Thai boys-girls mixed school where she decided to pursue the academic path in Math and Sciences. She expressed that she did not have particular interests in either maths or sciences, but she as well as her family believed that in comparison to Language Arts Program; the Maths and Sciences Program will give her more opportunities in life. Tam stated that her grades was relatively average from high school up to her university years. Nevertheless, she graduate with a degree in Bachelor of Sciences in Mechanical Engineering. After graduating, she worked in an IT department for a Thai-owned start-up company. However, she later quits as she felt that she was always under appreciated and underestimated for her abilities in computer compare to other male employees. For the past 6 years, she have been working at a Western-owned company. Her current responsibilities are to propose and implement improvement activity to optimise production efficiency and analyse manufacturing data to find problems.

6. Noi**Age: Early 40s****Position: R&D Engineering Supervisor****Years of experiences: 15 years**

Noi was enrolled in a mixed boys-girls school where she pursued a path in Math and Sciences. Her parents wanted her to pursue a career working for the Thai government as the compensation and benefits were good and stable. However, Noi felt that being a government official is too restricted for her so she started looking into other career options within the sciences area. Noi graduated university with a degree in Bachelor in Mechanical Engineering. She currently works for an American-owned electrical power management company as a R&D engineering supervisor. Her responsibilities are to develop new products, and perform research and testing on the products for future implementation. She stated that she had previous experiences with both negative and positive gender stereotypes throughout her academic and career years. Noi even stated that she almost pursued another career path as she felt as if she was an outsider working in the field of engineering. Nonetheless, she decided to continue on the path as the benefits and salary was high in comparison to the other career she was offered. She expressed that her main motivation was her son as she wanted him to have a good education and a head start in life — she was willing to push through and continue working in engineering despite the long working hours.

7. Pond**Age: Late 40s****Position: Product Supervisor****Years of experiences: 17 years**

Pond was enrolled in an all-girls Thai school where she decided to pursue an academic path in Maths and Sciences. She stated that this decision was made by herself, but her parents also expressed full support. Pond graduated with a degree in Bachelor of Engineering Program in Industrial Engineering. After graduating she first worked for an American-owned insurance company and changed jobs 3 times. Nevertheless, all of the jobs she was involved in was within the area of STEM fields. She stated that she had previously experienced negative gender stereotype when she first started working as back in the days there were only few women in her line of work and the Thai culture have always believe that men are better in careers that involve maths and management skills. Nevertheless, she proved her self and worked up the rank. Pond is now currently work as a product supervisor for a German-owned company, in which she plan and control automotive circuits production operation. Additionally, she stated that her experiences from her previous positions as management analyst and cost estimators had also given her the skills she needed for her current position. This is because product supervision also requires her to implement cost reduction and facilitate corrections to malfunctions within process control point to create a quality service and good organizational standards.

8. Mile**Age: Early 20s****Position: IT Analyst****Years of experience: 5 years**

Mile is a computer science engineer graduate who enrolled in an all girls school during middle school and later transferred to a mixed boy-girl school. She found herself being interested in computers and ITs when she was in grade 6. Additionally, her dad also supported her interest by finding various computer programs for her to try out at home. Subsequently, her dad was her main supporter when it was time for her to pick her university major and since she already pursued the Sciences and Math curriculum, Mile decided to pursue a degree in computer engineering as she saw that computer and technology are currently booming and the monetary benefits of careers in this field are relatively high. Currently, her responsibility as an IT analyst are overseeing the systems analyst, identify and implement information systems that will optimize the organizational efficiency.

9. Jibb**Age: Early 20s****Position: Network specialist****Years of experiences: 5 years**

Jibb was enrolled in a mixed boys-girls International school where she found herself being interested in computer lessons and doing relatively well in maths related subjects. Thus, with advice from her father she decided to pursue a path in computer science. Jibb graduated university with a degree in Bachelor of Engineering in Computer sciences. She stated that her father had advice her that we are in the era that computer and internet technology is rapidly growing, hence, having a skill in this particular area will push her further in life. Currently, she is work as a network specialist for a European-owned company. Thus, her main duties are to provide technical expertise to internal and external parties and customers, manage network and security infrastructure, implement network changes, and keep the infrastructure security up-to-date. She stated that she never experience any personal negative gender stereotypes during her academic nor working years. However, she recalled some expressions that she consider offensive toward the female gender that was made during her high school years such as when her P.E. teacher called the students out for running slow as “you run like a girl”. Nevertheless, she expressed that she never internalise those comments as she felt that it is an old-school way of addressing things and with the evolving society — gender should not be what defines a person’s value anymore.

10. Nar**Age: Early 30s****Position: Technical Consultant****Years of experience: 8 years**

Nar is a computer engineering graduate. She was enrolled in a mixed boy-girl Thai school and decided to choose the Maths and Sciences program academic path. her decision was influence by an older friend at church who works as an engineer as well. Despite having discouragements from others such as that she was not credited for her hard work and she sometime need to be exceed others in order to prove herself or get recognize. Nar was motivated to pursue a career in STEM as she stated that she already studied in this field and engineer will always be in demand due to the development of technology. To boost, her academic and career decision was influenced mostly by herself with supports and guidance from her older friend at church. Currently, she works for an western-owned company as an technical consultant who provide technical supports and assist employees and clients on any issue in relating with the company products.

11. Nut**Age: Late 30s****Position: Director of IT****Years of experience: 11 years**

Nut was enrolled in a Thai curriculum all-girls school. She chose to pursue the academic path in Maths and Sciences as she stated that this decision was influenced by her closeness with her neighbour who works in computer science and had tell her about the field. Additionally, she further expressed that she always had particular interests in innovative and creative subjects such as computer and sciences. Hence, she also did relatively well on these subjects. Subsequently, Nut graduated bachelor degree with a degree in Information Technology from a university in Australia. Nut first started working in STEM area as a programmer and business analyst, where she later became the program manager and moved up the career ladder, and is currently the Director of IT of the same American-owned company she first started off. As the Director of IT she is responsible for overseeing the vendors and work with software engineer within the company. Moreover, she is the only women in position as Director of IT in Asia-Pacific branches.

12. Pear**Age: Early 30s****Position: Network architect****Years of experiences: 7 years**

Pear was enrolled in an Thai all-girls school up until the end of grade 9, which her mother then decided to transfer her into a mixed boys-girls Thai school. On the contrary to many of the recruited participants, Pear's mother wanted her to pursue an academic path in Languages Arts as her mother herself have a career in teaching and wanted Pear to pursue a career in teaching as well. However, Pear found herself exceeding in subjects such as maths, and found being interested in computers and programming. She expressed that even after she picked to study in the Math and Sciences Program during her high school years, her mother still wanted her to apply for a degree in teaching when it comes the time for her to choose her university course. Pear decided that teaching was not her passion and decided to pursue a path in sciences. She graduated with a degree in Bachelor of Science Program in Computer Sciences, and later started working for a telecommunication network owned by a Thai company. Currently, she works as a network architect for the same company where she is responsible for collaborating closely with vendors and system-wide designers for service and product definition, design reports, blueprints, and lead a team of test engineers to deliver testing activities.

13. Nok**Age: Early 50s****Position: Owner and Managing Director****Years of experience: 30 years**

Nok was as enrolled in a Thai curriculum all-girls school where she chosen the academic path in Maths and Sciences Program. The main influencer in this decision was her parents as they suggested that there will be a wider range of career opportunities if she chose this path rather than the Language-Arts Program. Following into her college years, she earned a bachelor degree in nursing study, but was denied by many hospitals due to her below the standard body weight. Later, she decided to go against her parents advice of working as a government official and enrolled in a short trading course after she received her second degree in management. After, Nok worked as a trading program analysts for a while, but later quit due to bad peers in the workplace. She then joined a Telecom company where she worked as the coordinator of the company; looking after importation of cables, installation of optical fiber and landlines. After 2 years experience in the field, she quit and came out to start her own cable installation company, offering both sales, softwares and hardwares installation services within Thailand. She stated that she also had support from her spouse as her husband had also decided to quit his office job to help her build the new company and along with taking care of their newborn daughter. Currently, she still over see the IT installation, imports, and the expanding cooperation with Singaporean technical companies.

14. Gade**Age: Early 30s****Position: Lab Chemist****Years of experience: 6 years**

Gade was enrolled in an Thai all-girls school where she chose to pursue the Math and Sciences Program and later graduated a university with a degree in Bachelor of Science in Applied Chemistry. She stated that she was inspired to pursue this particular path by her mentor/older friend at church as not only which she saw that her friend was successful in the sciences and chemistry area, but at the same time she found her self being good in subjects such as maths, chemistry, and other sciences as well. Additionally, she believe that Thai culture have a big role in forming the idea of gender stereotypes and what should be the norms and what should not in the modern day Thai society. She further stated that these ideas are passed down through traditions, values, and even languages and then it is enforced and enhanced by the media through Thai soap dramas. Gade then expressed that she had previously experienced subtle negative gender stereotype when she first entered university during the orientation period. She felt confused at first that the environment of the sciences faculty was more 'male-culture oriented' compare to other faculty in the university. However, she accepts that it is the passed down culture and norms of the faculty and decided to be herself — which she then later found herself to be more comfortable after following her own heart.

Thus, she currently works as a lab chemist for a German-owned company, that which she stated that she is very happy that she works in an western company culture as people judge her based on her ability and not on gender. On the other hand, she still feels that women have the physical limitation that men doesn't such as lifting heavy things; which is one of the many things that have restricted women to work in certain field of sciences.

15. Tiw**Age: Late 50s****Position: Laboratory Manager****Years of experience: 30 years**

Tiw was enrolled in a Thai curriculum all-girl school, where she knew early that she was into mathematics and sciences subject. Tiw decided to follow her interest and pursue the part in Maths and Sciences Program. She was particularly interested in chemistry class and she stated that she did very well in her class as the subject does not require much memorising, rather only understanding. Tiw graduated college with Bachelor of Science Degree in Chemistry. After graduating she first worked as a researcher for a University in Thailand as well as some governmental work. Later, she shifted to work more closely with the chemicals department. However, she decided to quit from the job as it is too physically dangerous. Subsequently, Tiw changed her career again the third time as the working hours was very long from 9am until 8pm. Nevertheless, she stated that she made her own decisions and was most influenced by praying to God. Currently, she work as a laboratory manager for a Thai-owned oil company; overseeing the quality of QCQA of fuel and other chemical components. Hence, the current company she is working for is a UK company, thus, they have a Western company culture. Subsequently, the company tries to promote every gender and tries to push people to be treated equally by putting it in the company's some of conduct.

BIOGRAPHY

Name	Miss Nicha Jitkaew
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