

**CHANGING IN THAI ELDERLY'S BEHAVIOR IN FOOD
CONSUMPTION IN THE 21ST CENTURY: CHALLENGING IN
FOOD BUSINESS FOR ELDERLY**



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Onjira Tienggad

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ABSTRACT

The consequence of increasing of Thai elderly and the trend of health consciousness associated to the relevant industries that service the elderly such as the Food and Hospitality sector, and Healthcare and Wellness sector would adjust and adapt the business to provide the best benefit and profit to the elderly. Therefore, to understand the intense behaviour and the perspective of food consumption among the present elderly in Thailand lead this research to study more of the factors that consequence to change in food consumption and health awareness of older people in Thailand, the trend of consumer behaviour due to health conscious and nutritious of Thai elderly including forecasting the business opportunity in innovative food business toward the senior market for Thai startup and entrepreneur by studying from existing product in market.

This research applied both quantitative and qualitative approaches. The questionnaires were collected from 112 participant. Also interviewed 25 elderly people, who live in Bangkok, Ratchaburi and Nakhonpathom.

From studying this research, it shows attitude and belief, health condition and convenience determinants were indicated as the main determinants that influence the elderly's food behaviour the most. In terms of the trend of food consumption among the elderly, the supplement food as the form of herbal products was accepted such as fruits and vegetables for the main healthy food sources. Moreover, strong perspectives of cooking at home were indicated in the trend of their food behaviour. In order to forecast the opportunity for food business, the research revealed the relevant fields which are the agriculture sector to develop new forms of product based on vegetables and fruits, the entrepreneurs to provide food shop mobility and the manufacturer of spice and powder to produce more food ingredients for cooking.

This understanding of the factor that impacts the change in food consumption among Thai elderly could be the potential strength to all relevant business sectors regarding the extension and improvement.

KEY WORDS: Food behaviour/ Nutrition food/ Thai elderly/ Food trends

90 pages

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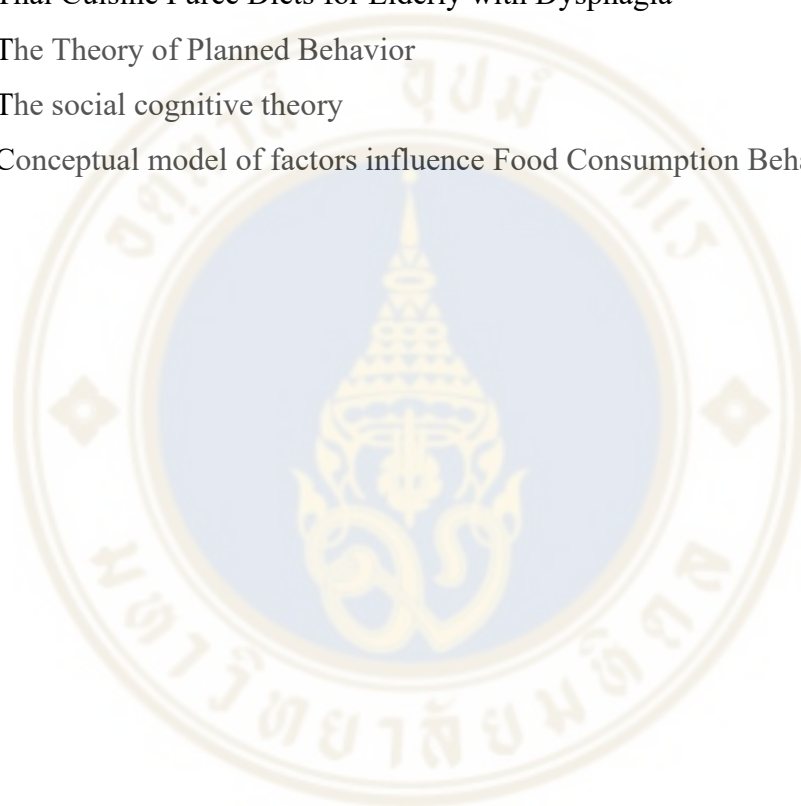
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CHAPTER I

INTRODUCTION

1.1 Introduction

There is a statistical figure of population growth rate all over the world from the UN: United Nations indicates the big amount of population gradual increase every year from 1950 and be forecasted to expand until 2050 (Statista, 2019). It is the huge change in global demographic phenomenon among that growth rate, ageing population is the larger number of rapidly increased in each year, especially in Asia, Europe, and Northern America due to reports from the UN: United Nations (Department of Economic and Social Affairs: Population Division, 2019).

The world population of elderly people has increased the most in Asia and will be double in the next future (United Nations: Department of Economic and Social Affairs: Population Division, 2019). Thailand also faces the fast growth of the elderly population. Over the past 2 decades, Thailand has become an Ageing society because the elderly population increase rapidly refer to NSO: National Statistical Office, 2017 indicates the number of seniors rise every year since 1994. In 2002 the ratio of older people was at 9.4 percent and reached 10.7 percent in the next five years. The figure keeps growing to 14.9 percent, 16.7 percent in 2014 and 2017, respectively (National Statistical Office: Population Statistics Group, 2017). While the amount of youth and mature slightly decrease causes by the low ratio of the birthrate in Thailand, the survey result from NSO (National Statistical Office, 2008) shows a decline rate from the year 1985 at approximately 23.87 to 17.90 in 1995 and 10.85 in 2005 which created the huge gap between the working-age and elderly people. According to the fast increase of older people in Thailand and it is predicted to grow rapidly in the next future refer to the research from United Nations (2019) Thai elderly is approximately 1.28 million people and in 2030 is expected to reach about 19 million and 23.6 million people in 2050 (Department of Economic and Social Affairs: Population Division, 2019).

Research from World Bank implies one of the factors that affect the life expansion of the ageing population is longevity. Older people in Asia have better health because of decreasing mortality and the number of chronic diseases among older people. (World Bank. Live Long and Prosper: Aging in East Asia and Pacific, World Bank Publications, 2015; Gruenberg 1977; Olshansky et al. 1991; Verbrugge 1984). Tontisirin, K., & Bhattacharjee (2001) stated the development of food nutrition and malnourishment in Thai elderly have been improved in over the three decades (Tontisirin, K., & Bhattacharjee, L., 2001) which lead to the study of factors that changed their consumption behavior and to foresight the new trend in near future in more details deeply. A balanced diet is also crucial for elderly people because they have a special need for food which is an appropriate quantity (Satusap, et al., 2014). Nevertheless, it also depends on personal health problems with a limitation of consuming foods as well.

There are several factors that affect the swift increase in elderly people in Thailand. Apart from the development in advanced medical technology, better nutrition, and innovative approach, one of the most significant factors is dietary transition; the better of food and nutritious development. Because of food impact on human well-being, and also the better knowledge in food nutrition would lead to proper consumption behavior and health, especially among older people. In the senior population is the ages who need strongly concern and take care of the healthiness, receive appropriate nutrition food according to many factors such as the physical changes which make difficulty in many activities including, movement, eating activity(Dysphagia), health problems such as having Noncommunicable Diseases (NCDs) which should be considered as a serious problem because NCDs kill approximately 71 percent of the global population each year refer to the key facts from WHO (World Health Organization, 2018) the most critical factors cause to NCDs include, insufficient physical activities, consumption of alcoholic drink, smoking and inappropriate in food consumption (Artsanthia, J., & Pomthong, R., 2018). World Health Organization (2011) revealed the main NCDs Noncommunicable Diseases as global death consists of Cardiovascular Diseases, Diabetes, Cancers, and Respiratory diseases (G. Ares et al., 2014).

In recent years, many older people have become more concerned about their health in terms of nutrition requirements and well-being. Moreover, in a fast change of

demographic transition, an increase of elderly people in each year influences business sectors in many industries, for instance, Hospital, Adult daycare, the insurance company, and food business. In addition, nowadays there are many food products and functional food that are launched in the market among seniors who have a special need for food to reduce some eating difficulty conditions such as chewing problems, swallowing disorders, etc. Moreover, Thailand is one of the largest food exports as the leading agriculture supplier to many countries in the world and the second in Asia with a food trade balance of approximately 16.7 billion in 2016 (Thailand Board of Investment, n.d.) which the major product exports including rice, sugar, cassava, and natural rubber. Board of Investment: BOI also indicates the GDP of Thailand food industry in 2016 at 23 percent. In addition, Thailand has approximately nine thousand processing companies which apart from agriculture products, mainly export products also consist of cassava products, canned tuna, canned pineapple, frozen seafood, and chicken (USDA Foreign Agricultural service, 2018). Most Food Processors in Thailand are medium to large size that adopt high technology in production to support local agriculture products by developing in the processing of canning, freeze and drying, and preservation products. For instance canned tuna and canned pineapple which profit from exported at over 2 billion us dollars and 611 billion us dollars respectively (Thailand Board of Investment, n.d.). Some few elderly food products have already been invented in the Thailand market such as Supplementary products, Smart soup, Porridge with 5 nutrients needed for the elderly who lose teeth, Thickened food products, Stevia glycoside (sweetener extract), and pudding substitute meal food.



Figure 1.1 Smart Soup from CPF collaborates with Mahidol [Portable Network Graphic]. (n.d.)

Retrieved from <https://www.cpfworldwide.com/th/sustainability/food/quality/cpf-food-research-and-development-center>



Figure 1.2 RESOURCE® THICKENUP® CLEAR [Joint Photographic Experts Group]. (n.d.)

Retrieved from <https://www.nestlehealthscience-th.com/brands/resource-thickenup-clear>



Figure 1.3 Stevia glycoside extract product from the various brand in the supermarket, Ratchaburi. April 16, 2020

There is research on the elderly food with dysphagia from Mahidol University that invent the modified texture food to manage malnutrition and pneumonia in dysphagia such as, Rice berry Jelly with High protein, Sweet Sticky rice pureed food and riceberry rice with Tom-Kha-Gai pureed diet (Promluck et al., 2018)



Figure 1.4 Thai Cuisine Puree Diets for Elderly with Dysphagia [Joint Photographic Experts Group]. (2017)

Retrieved from <https://op.mahidol.ac.th/ra/2017/10/11/ph-03/>

In terms of the business section in the fast global's changing, there are great opportunities for the concern of healthcare in the Ageing population. Besides, this phenomenon is also the most affected socioeconomically in Thailand. The demand for nutritious food is expected to rise gradually despite many retailers and manufacturers of innovative food products for seniors seems to be less than the dramatic change of elderly people (Kantamaturapoj, K., 2012). As known as Thai elderly in the past have faced malnutrition and been living by consuming more legumes, cereals, vegetables, fruits, and low-fat animals such as fish compared to nowadays which are rich in livestock products (Kosulwat, 2002). According to the research from DHUMMAKUPT (2016) showed that the behavior of the elderly has changed following the result from the research that the elderly has been divided into 2 groups between 'easy style' and 'health concerns'. As a result, some of the elderly who face health problems as having NCDs disease impact their living the most which totally influence their eating behavior, they have changed their behavior and select choices when shopping for food by focusing more on quality and freshness without hesitation in price. Which compare this group to 'Easy style' group is totally different which is less concerned, focus on the appearance and taste more than nutrition dish, promotion attracts the most when making decision shopping on food and focus on convenience both time and location. The difference in living style among the elderly would indicate the change of the food pattern in Thai seniors in ageing society which was forecasted to grow faster and will be completely full of the elderly population in 2024-2025 (DHUMMAKUPT, 2016).

The decrease in odor and taste ability is also associated with a change in food consumption among the elderly who confront the difficulty of having meal experience. Because distasteful dishes make them turn to have intense taste, especially in very sweet taste because they feel more of the taste of food (Wangcharoen, W., 2015 as cited in Thongsuk, 2020). This change might be related to a negative to health problem as long term among elderly that consume insufficient nutrition daily the body needs.

From Kosulwat (2002) research indicates the change about two decades ago, the Thai population has been changed their food consumption pattern according to westernized and more globally trend impacts such as eating a high proportion of animal meat and fat instead of having Thai staple with side dishes, Thai traditional diets being

replaced by convenience as reducing time so, there is an increase in huge food expenditure on ready-to-eat, ready-to-cook, especially in Bangkok and the quantity of consume on rice decrease while animal-based, is increasing. Either way, Sriugsorn (2008) pointed out that the health belief is the most influential variable to change in food consumption of the elderly. Some elderly believe having supplementary instead of a big meal is better while it conflicts with the fact that this engages in inappropriate behavior. This could be implicated in negative aspects of food consumption behavior among the Thai elderly. However, the results from the past research above are just case studies from a small number of respondents. The change of behavior among the elderly depends on the age which responds differently to the individual consumer. Moreover, there is limited research that provides the fact that the food patterns in the elderly has been changed. There are only studies and researches on the change in food pattern in a general context nationwide but rarely research of the changing pattern of food among ageing is provided in the Thailand context. The research would expand more on studying the change in behavior of Thai seniors in modernization.

This change phenomenon attracts many food business sectors in terms of product development, food quality improvement and sustainability including the government sector which supports Thai manufacturers to invest heavily in research and development and Laboratory to enhance the production process regarding being highly processed food producers (Thailand Board of Investment, n.d.). This potential includes the big key players of food processing companies in Thailand, Charoen Pokphand Foods (CPF), Thai Union Group and Kingfishers (USDA Foreign Agricultural service, 2018).

Thailand is a country which assembles plenty of prosperous lands, agriculture systems, the fertility of the land, exotic food, marvelous tradition, and culture. Nevertheless, the problem of water security, food production and unhealthy production in some areas still occur because of the need for intervention from any private or government sector. Moreover, it makes consumers feel insecure and untrustworthy of some food products. On the other hand, those natural resources are used for different purposes, it would be better to enhance as an innovative food challenge due to opportunity in ageing target groups to develop sustainability of the food business in Thailand.

Therefore, to improve in food security in Thailand for older, studying in old age group and external factor as the intervention of environment such as economic situation, cultural and living situation are also essential to get an efficiency way to be sustainable food development in the 21st century (Bernstein, M., & Munoz, N., 2012) lead this research paper to study elaborate factors intensely and also further emphasize in terms of sustainable development in Thailand's food industry.

1.2 Problem Statement

Although there is research studying the factors of change in food consumption of the nation's population, most of them do not focus on the ageing population. Furthermore, there is no research which predicts the change of the trend in the near future which are a group of mature adults today and will be a senior in the near future.

Even though Thailand is one of the largest processed food producers and agriculture food exporters, There are not many innovative food products for the elderly who have health problems, difficulty swallowing and chewing. For the seniors market, most of the enterprise invented as supplementary food products, medical foods, and ready meal which the leading processed producer in Thailand as CP (Charoen Pokphand Foods) and include from international's subsidiary in Thailand such as Mead Johnson Nutrition and Thai Otsuka Thailand Board of Investment, n.d.). Yet, Thai consumers have a preference for eating behavior that needs strong flavor food, texture-modified and palatable (USDA Foreign Agricultural service, 2018). Moreover, the nutrition diets which developed for older people seem to be in the liquid appearance, pureed food, and thicken appearance which may consequence to the mental health of the consumer in terms of undelightful with the texture of food because pureed food lack of vibrancy of appearance, make a messy appearance to tablemates and could lead to isolate and avoid from people (Keller, 2012).

Therefore, studying and a better understanding of the factors that lead to change in the food consumption of the elderly's behavior and more details of preference nutrition food in the future that they wish to purchase could create appropriate

development to improve the quality of elderly's life and also would benefit the most to Thai startups in the food business and associated organizations in Thailand.

1.3 Research Questions

What are the key factors in change of the elderly people in food consumption and health awareness of older people in Thailand?

What are the new trends for the food business in Thailand in the near future?

What are business opportunities in innovative food business toward the senior market for Thai startup and entrepreneur by studying existing products in the Thai market?

1.4 Research objectives

To identify the factors that consequence to change in food consumption and health awareness of older people in Thailand

To study the trend of consumer behavior due to health-conscious and nutritious of Thai elderly in the 21st century

To forecast the business opportunity in innovative food business toward the senior market for Thai startup and entrepreneur by study from the existing product in Thai market

1.5 Scope of the study

The elderly in this paper mainly focuses on the people who are able to help themselves or/and having non-communicable diseases(NCD). Seniors are classified as the age of 60 and over.

The respondent group starts to investigate people in ages of 60 and over, which is determined as baby boomers and Builders Generation in Bangkok and the proximity of 2 provinces which are Ratchaburi and Nakhonpathom province.

In terms of studying existing innovative food products in the market will focus only on the product from MNCs: Multinational Corporation.

1.6 Definitions

The Elderly

The Oxford dictionary defines meaning of the elderly as (n.) old people considered as a group.

The United Nations (UN) (as cited in TGRI, 2017) does not have a fixed age to classify the elderly but practically, using the age for the elderly starts from 60 years when presenting the statistical data.

World Health Organization (WHO) also stated the definition of ageing as a change in the biological level. The physical body has changed over time by damage in molecular and cellular which leads to a decrease in physiological reserves and the capacity of individuals including an increase in the risk of many diseases.

Senior citizens, The Oxford dictionary defines as “older people, especially those who have retired from work”. In this paper also use synonyms as older people, seniors.

Food consumption

Consumption is defined as the act or process of consuming by the Merriam-Webster Dictionary. Also mean that “the act of using, eating, or drinking something” by Cambridge Dictionary

Bellisle (2019) defined “Food consumption is a periodic behavior, As eating progress, inhibitory influences of many origins (sensory, gastric, hormonal, neural, as well as cognitive) develop and finally bring the meal to an end”

In this research, Eating behavior is also involved and used in the research as similar as Food consumption in some contexts.

Osorio et al. (2002) defined eating behavior as “normal behavior related to eating habits, selecting foods that you eat; culinary preparations and quantities of ingestion”. (as cited in HERNANDEZ et al., 2016)

Alternative food

The Merriam-Webster Dictionary defines the meaning of Alternative food as “a food that is regarded as a healthier alternative to food that is prepared or produced by conventional methods”

Functional food

The Merriam-Webster Dictionary defines the meaning of Functional food as same as Nutraceutical mean that “a foodstuff (such as a fortified food or dietary supplement) that provides health benefits in addition to its basic nutritional value”

Nutrition Food

The Oxford dictionary defines as “The process of providing or obtaining the food necessary for health and growth”

Plant-based food

Plant-based food is the food that focuses on foods primarily from plants. This includes not only fruits and vegetables, but also nuts, seeds, oils, whole grains, legumes, and beans.

Dysphagia

The Merriam-Webster Dictionary gives the meaning of dysphagia is difficulty in swallowing. The National Dysphagia Diet (NDD) (as cited in SANPORKHA, 2018) is classified into 4 categories.

CHAPTER II

LITERATURE REVIEW

2.1 Background

According to the dramatic growth in the Ageing population all over the world, it shows the increase of the Thai elderly also became larger for 2 decades (United Nations: Department of Economic and Social Affairs: Population Division, 2019). This phenomenon has a big impact to change in many sectors such as cultural, socioeconomic, and related business especially in healthcare, food service, and nutrition services (Karger AG, Basel, 2008). Wellbeing as a holistic concept should be more concerned in order to control the decrease in sickness among older people (Ares et al., 2013; McMahon et al., 2010). Therefore, if there are many functional foods, nutrition food products provided a lot in the market for seniors would enhance the quality of life for them in order to get better food and change in consumer behavior with high concern (Karger AG, Basel, 2008).

2.1.1 Physical Change in Age

As known as degeneration, the physical body of people in old age will change into lower health conditions such as easy to get fainting, joint pain, arthritis (T. Choowattanapakorn, 1999; Mahidol University. Social Support in the Elderly. The Research Report. Bangkok: LT Press, 1997). Including, Neural changes which are taste, smell, appearance, texture (Bernstein, M., & Munoz, N., 2012). Prukha (2016) also mentioned oral health which impacts digestibility because of the decline in the ability to chew and swallow food which is difficult to transit from the mouth through the esophagus into the stomach, loss in odor and taste that consequence to less enjoyable in food. Those risk factors could lead to health problem issues and diseases as well (Christensen et al., 2009). The same discussion from Aschenbrenner et al., 2008; Murphy, 2008; Schiffman & Graham, 2000 (as cited in E.L. Doets, S. Kremer, 2016) mentioned to changing of the sensory perception in older people such as gustatory,

olfactory, oral somatosensory and vision may contribute to declining in appreciation of food intake which also consequences to high risk in the monotonous diet. In addition, Bernstein, M., & Munoz, N. (2012) and Prukpa (2016) mentioned that changing in the aging process also affects directly to mental health, depression, and emotion in older people and social status. Public health statistics report from the National statistical office in 2007-2014 revealed the popular Noncommunicable Diseases (NCDs) that are found among Thais elderly the most consist of, Cardiovascular Diseases, Hypertension, Stroke, Diabetes, and Respiratory Diseases (Artsanthia, J., & Pomthong, R., 2018). Moreover, older people need to balance food consumption due to awareness in macronutrients such as healthy fatty acid ratio, carbohydrates of low glycemic index, proper protein, avoidance from saturated fat, vitamins and minerals for example (Satusap et al., 2014; World Health Organization, 2002).

2.1.2 The Role of food and nutrition in Thailand

Thailand is known as the largest producer of rice and other agriculture products such as rubber, raw silks as an exporter (Kantamaturapoj, K., 2012: 28; Wong 1978; Thai Rice Exporters Association, 2010). Moreover, the food industry is the largest player in the manufacturing sector National Economic and Social Development Board (NESDB) 2016 (as cited in P. Chaoniruthisai et al., 2018) indicates that it made out Gross Domestic Product (GDP) in Thailand approximately 23 percent.

According to Thailand in the past almost three decades, it experienced the crisis of malnourishment and undernutrition which the percentage of it declined gradually. Moreover, development in food production of rural farming was enhanced by integration between government, industry and academic partnership in order to expand the quality of food and confidence from consumers (Tontisirin, K., & Bhattacharjee, 2001).

Most Thai people consume rice for the main dish with a variety of side dishes the most all three meals each day as carbohydrates (Kantamaturapoj, K., 2012; Aprilia, 2005). The people who live in rural areas are able to consume a variety of food and sufficient diet because most of the food production is located around that area meanwhile, urban people rely on food purchased such as food service, hypermarket, and restaurant (Tontisirin, K., & Bhattacharjee, L., 2001). However, the other functional

food ingredients are also needed among older people which include plants based proteins, nuts, dried fruits, vitamins, omega-3, prebiotics, probiotics, essential oils and also organic ingredients, and gluten-free based on the rapid increase of older population in Thailand (USDA Foreign Agricultural service, 2018).

2.2 Related Theory

To study factors that associate to change in human behavior and also understand clearly along with this research which concentrates on studying various factors may be relevant to change and to contribute foresight as being sustainable nutrition food for Thai seniors. This paper will take The Theory of Planned Behavior (TPB) into account. Ajzen 1985 (as cited in Ajzen, 2015) explained TPB as the most popular social-psychological model to understand the factors of consumer behavior and decision making regarding the social framework. Moreover, this theory specifies “intention” as the empirical model to understand human behavior by performing from 3 types of beliefs compose of behavioral, normative, and control respectively. The first belief is the people's attitude about how they perceive whether positive and negative. Secondly, normative beliefs as social pressure from specific people or groups (Wei-Ta Fang, 2017; Ajzen, 2006). The third is the present perspective in each person that beliefs in the ability to control relevant things that lead to performing the behavior may be in the form of comfort or opposition (Aiedah and Sharifah, 2015).

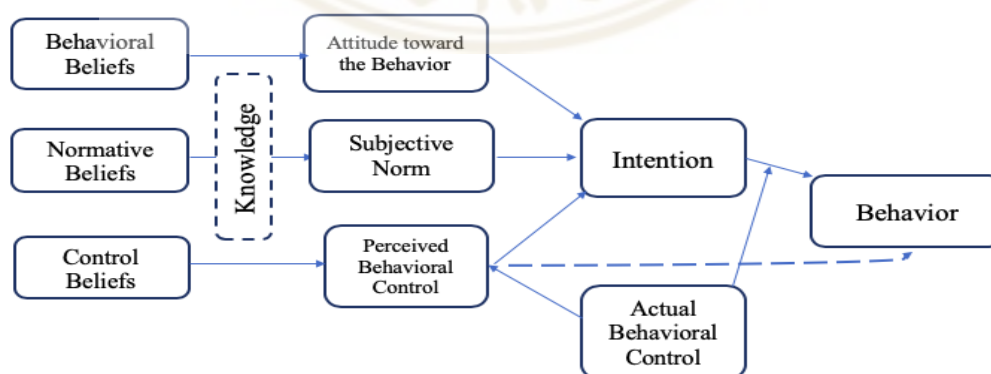


Figure 2.1 The Theory of Planned Behavior (TPB) (Source: Ajzen, 2015)

There are more theories which support the social practice approach in terms of studying the causes of changes in people's behavior. This paper will present social-cognitive theory from Bandura (as cited in Oppong, 2014) supported the main idea of this structure which operate interactively relationship between human agency (a capacity to make a difference in person), behavior and environmental influences (family, schools, social systems and a host of others). Both personal factors and environmental influences can determine human behavior and also occur in recursive relationships among agency(personal), environment(structure), and behavior(outcome) which behavior also influence human agency and environment (Oppong, 2014) vice versa as shown in figure 2-2 below.

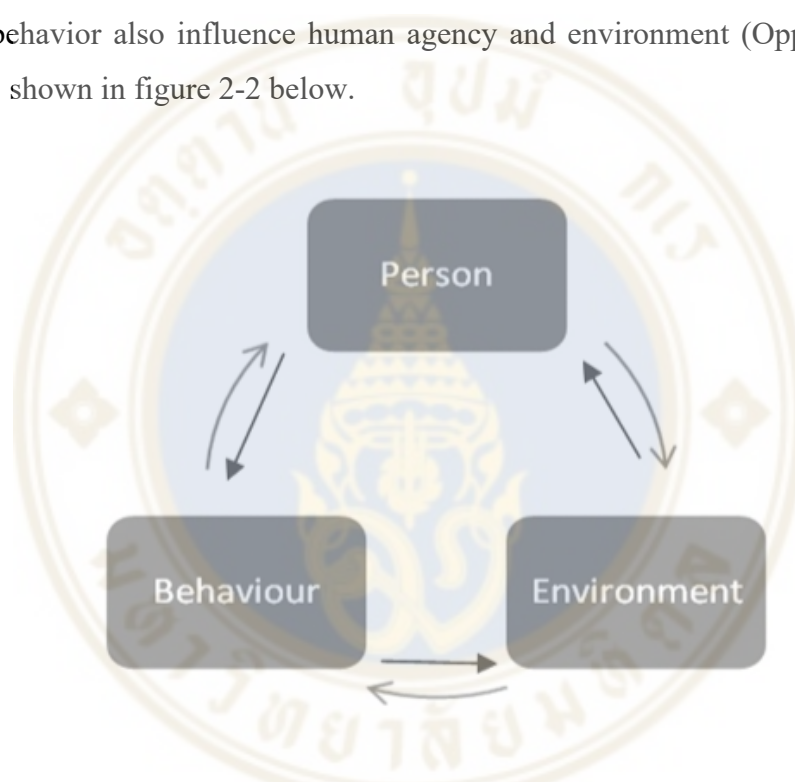


Figure 2.2 The social cognitive theory, Triadic relationship among agency, structure and behavior (Source: Oppong, 2014)

2.3 Thai senior's behavior in Food consumption

Behavior in Food consumption is a complicated individual preference that comes from the habit and relevant other factors such as, cultural, environmental influence, psychological, and sociological which can change upon the personal condition, time, and knowledge (Koehler&Leonhaeuser, 2008; Falk L et al.,

1996). Furthermore, Behavior in food consumption impacts directly to health performance from eating habits by reducing the high risk of many chronic diseases. (Guthrie, Mancino & Lin, 2015; Champion & Skinner, 2008).

Koehler and Leonhaeuser (2008) also mentioned an essentials of intense understanding in consumer behavior because it indicates the wealthy in better nutrition knowledge of health and wellbeing among the elderly which means that the country has developed, high knowledge in selected food choices. Meaning that the population has a better quality of life.

According to the tradition of the family structure of Thai people live in a nuclear family. Therefore, Thais seniors are taken care of by their child or grandchild. The wellbeing would be great for mental health and meet the necessary nutritious food. Thus, most big families prepare food at home. In 2014, there is a report from FFTC Agricultural Policy Platform (2018) revealing averages of purchased food in various living styles such as Prepare food at home, take-home food and eat out. For cooking at home was 54.46 percent, taking home food at 20.41 percent and eating out at 25.13 percent which cooking at home declined from 58.53% in 2010 but both take home and eat out increased from 17.56 and 23.91 percent respectively in 2010. This implies that people tend to be concerned about time, faster and more convenient especially in urban areas (Kantaturapoj, K., 2012; Kosulwat, 2002). On the other hand, it is hard to change their eating behavior in old age, they select the food choices by following the familiar food (Koehler and Leonhaeuser, 2008). Furthermore, the research indicated that the elderly seem to be concerned about healthy food yet they consume only specific functional food that meets their needs and wants (Van der Zanden et al., 2014). Urala N & Lähtenmäki L, (2004) as cited in (Van der Zanden et al., 2014) asserted alternative food choices could occur nonalignment sometimes, people consume unhealthy food even though they know the importance of carefully consuming their nutrition food choices. Van der Zanden et al. (2014) declared from many previous researches for the conflict of unsatisfied nutritious food among the elderly because they have a negative perception of this kind of food which may be a bad taste, unnatural, unfamiliar and expensive. Including, the appearance of food appeals to the intention of the consumer.

2.4 Determinant of elderly consumption behavior in Thailand

The factors influencing food consumption in elderly people are divided into main 5 ideas follow the existing studies from Mak et al. (2012).

2.4.1 Socio-demographic factors

Demographic status

This structure includes age, gender, marital status, educational background, occupation, and household income. Many research found that gender is associate with select choices of eating consumption in decision making by male seniors, tend to prefer meats, deli meats and legumes while female selects fruits and vegetables (H.-J. Song et al., 2014; Hunt MK et al., 1997; Marino M et al., 2011). Van der Zanden et al. (2014) pointed out the tendency of accepting functional food in women elderly more than men and younger adults.

Economic Structure

The economic health shows how well within the country the most. The high GDP in the country and having a good economy has more ability to find and access to the hygienic food, food characteristic, and control the quality and quantity of food in the country (Pruksa, 2016; Jintana, n.d.). M Dean et al. (2009) found that low income restricts the ability to purchase high-cost healthy food and leads to inadequate in meeting nutrition food, especially in rural areas. For those who have better welfare, including belonging to a private car to access a variety of food. The past research stated that people in lower education have a higher concern of functional food consumption than higher education (Van der Zanden et al., 2014; Niva M & Mäkelä J, 2007) which causes lower income. Besides, F. Chiara et al. (2019) asserted the low retirement pension also affects access to food and leads to loss of the health.

Moreover, Thailand is the leading rice producer and exporter Thai Rice Exporters Association 2010 (as cited in Kantamaturapoj, K., 2012) which can make GDP for a country as well. In addition, it also includes export processed food such as canned tuna and canned fruits which gained over 2 billion us dollars and 611 billion us dollars respectively in 2016 (Thailand Board of Investment, n.d.). Thailand has an experienced producer like Charoen Pokphand Food (CPF) and involves many local organic farms in order to expand and gain revenue into the Thai agriculture

industry(Kantamaturapoj, K. 2012). These can relate to the food consumption of Thai elderly positive impact on Thai people because Higher income could impact positively to ability to consume animal-based food and functional food (Phil. Trans. R. Soc. B, 2010).

2.4.2 Cultural and religious influences

This structure includes cultural, religious, attitude and political issues. In terms of family, it is about supporting the family member, the ability to find and serve a nutrition diet to seniors in the house depends on the family size, single or large. Especially in Thai society which is identified as a hierarchical tradition in the family in order to Thai culture as ‘parent payment’ by taking care of the senior in a house (Choowattanapakorn, 1999; Caffrey, 1992; Mulder, 1994). Most families in Thailand reject letting elderly people live in another institution like a nursing home. However, some seniors live alone in their house and isolate places which affect the appetite of food and consume insufficient nutrients (Koehler&Leonhaeuser, 2008). Moreover, this also includes the loneliness from losing a spouse that causes to refuse food and get depression (M Dean et al., 2009). Another reason for loneliness in older people includes the household size which is decreasing from the nuclear family to single and the reports in 2010 indicate the estimated averages of members in family reduce to 3 members (Foundation of Thai Gerontology Research and Development Institute: TGRI, 2014).

Attitude

Attitude is about how people perceive themselves by affecting individual factors which come from biological, psychological and social aging which everyone has different aspects. (Van der Zanden et al., 2014) On one hand, Goodenough (1971) (as cited in Ajzen, 2015) mentioned that attitude is the main idea to help people decide in terms of characterizing their behavior and culture. On the other hand, Sherman and Fazio (1983) (as cited in Ajzen, 2015) asserted that attitude and personality are similar. Hence, to extend these, the attitude of personal is associated with cultural and food-related personality traits which also impact elderly attitude to select their food choices.

The research from Conner, Norman and Bell (2002) (as cited in Ajzen, 2015) indicated the high intention from changing in elderly’s attitude in food preference that gives priority to eating a healthy diet such as fruits and vegetables. And mentioned

a willingness to change food preference based on health conditions and realization of long term perspective for their health. This also positively impacts the food consumption of eating healthy food (Phil. Trans. R. Soc. B, 2010; Vermeir & Verbeke 2006). Moreover, the research from Ajzen (2015) found that there are a number of elderly who gave priority to consuming fish as the highest number and followed by daily products.

As known as rice in Thailand is the most consumed by Thai as a traditional food for a long time it is also suggested as Thai dietary guidelines because it contains a variety of energy, protein, and carbohydrates (Sirichakwal, Sranacharoenpong and Tontisirin, 2011). Therefore, Thai people prefer to consume a rice-based diet.

Religious beliefs

Based on religion, Prukha (2016) mentioned that there is a Muslim population in Thailand which are prohibited from eating pork and also fasting during the Ramadan period. Moreover, there is the report shows the growth of Halal Food in Thailand playing a big role as an exporter of emerging Halal food business to Muslim countries which made the profit of about 8.36 billion Thai baht in 2009 (KuroKawa, 2011) and in 2018 the profit from exported Halal food approximately US 5 billion (USDA Foreign Agricultural service, 2018).

Knowledge

People who have knowledge in nutrition food and food-based will benefit from the ability to cook with appropriate ingredients, shopping ingredients and vegetables, and meet nutritional requirements because having the advantage to consuming various food wider perception in food intake (M Dean et al., 2009). Phil. Trans. R. Soc. B, 2010 asserted that knowledge related to food consumption as people has a high ability to adapt to a healthy lifestyle. Moreover, past research asserted that having knowledge is very crucial in the consumption of food hygiene based on food safety and security (Prukha, 2016; Brown, 2004). There is the research on health literacy revealed another limitation that makes inconvenience to seniors in terms of lower skills to understand the label and portion size of each product (Guthrie, Mancino & Lin, 2015; Carbone & Zoellner, 2012)

Besides, referring to an aspect, labeling on the packaging is found that affect consumer decision making when purchasing products. There are many consumers who

revealed the main focus of food selection is the fact label such as “Low Fat”, “High Fiber” (Guthrie, Mancino & Lin, 2015; Choinie`re & Lando, 2008).

2.4.3 Food-related personality identity

There are a variety of food choices in Thailand. The past report stated that food characteristics changed especially in Bangkok and Suburb, people prefer to eat outside rather than homemade cook which is easily found ready to eat food in supermarkets, local markets and big department stores (Kantamaturapoj, K., 2012; Kosulwat, 2002). Because there is research pointed out of food-related to lifestyle and food selection (Van der Zanden et al., 2014). Research from Dean et al. (2009) asserted that social and environmental related to food-related goal among older people which also impact to eating habit in a better way in order to consume more a variety of food which depends on how they perceive their resources such as level of appetite, food knowledge, the perception to the distance of the food shops, access to the quality products, access to good services, wanting to cook and wanting to control their weights and calories, etc. The research shows that people also consume the selected choice by their preference, needs and wants (Van der Zanden et al., 2014; Van Der Zanden LDT, Van Kleef E, De Wijk RA et al. (2014).

Food neophobia would be one of the factors that influence change in food consumption because of the nature of habit or behavior in older people which are formed since a young age is hard to change in a short time (Koehler&Leonhaeuser, 2008). Furthermore, some older people have consumed rice porridge in order to help digest easily (Jackson DA, Imong SM, Wongsawasdii L et al., 1992) but Muraro A, Halken S, Arshad SH et al. (2014) (as cited in KITTISAKMONTRI, 2019) asserted that Thailand’s complimentary food provide insufficient calcium, iron, and zinc which effect to food consumption in Thailand in a negative consequence. Because people believe that having rice porridge is good for seniors because it can help to improve blood glucose control in diabetes as well (Ching Jung Hsieh, 2010).

2.4.4 Past-experienced

Pruksa (2016) mentioned the belief, attitude and preference of individuals that influence consumer behavior as an aspect of food that has been consumed and

experienced it for a long time since being a child. This is also composed of observing and absorbing the behavior from parent's eating habits of elderly people which is difficult to change their attitude easily among older age because of remaining consumed for their whole life (Koehler&Leonhaeuser, 2008; Fjellstroem et al., 2001). On the other hand, the elderly could change their food preference if it is about health issues and change in attitude based on the benefit in healthcare as a long term (H.-J. Song et al, 2014). Furthermore, (Lesáková, 2018) mentioned the elderly who has strong in health belief not focus only on selecting the food which helps them be physically healthier but also concentrate on the familiar food from the past.

WONGWANIT, B. (2019) mentioned to the word of mouth from who are satisfied with the food product is also the positive impact and high intention to other perception including effect to people who accept the suggestion from health action would influence their decision in food choices. Van der Zanden et al. (2014) stated that the past purchases of elderly people could be the best predictor for future food for older adults because they have stable lives based on the beliefs and motivation which well relative to the pattern of food consumption in the future. Hence, the past experience related to food consumption in order to select the food choices which is also associated with motivation and personal belief.

2.4.5 Motivational factors

Worsley (2002) mentioned motivation is also included in social influencers from the environmental force, biological needs, psychogenic needs and personal and cultural. Moreover, hermeneutics associate social and status, eating selection and foods could also imply the status and test of people.

Health Status (Change in physical condition)

As known as Elderly people is the age group that has a high demand for nutrient need and confronts high hazard to have chronic diseases and susceptible to physical deterioration. In case of having diseases and medical problems, the effect to limit food choices and a special diet, for example, having diabetes should avoid sugary foods and sweet to control the increase in blood sugar level. For Hypertension, should restrict sodium and salt intake (Pruksa, 2016; Rujira, 2010). Furthermore, the ability to taste and smell decrease would be one of the most effective in changing food preferences

(M Dean et al., 2009). Besides, the lower speed of chewing and difficulty to swallow of older people are highly concerned also, Cichero (2013) affirm that dysphagia in seniors related to malnutrition, Dehydration, chest infection and possibly lead to death. The research revealed the argument of dietary guidelines for sustainable food supported that people should consume more plant-based products (fruits, vegetables, etc.) and take less of animal-based products which are meats and dairy (M.C.D. Verain et al, 2015; Gezondheidsraad, 2011).

Health problems would affect food consumption in the elderly according to the research of H.-J. Song et al. (2014) show the variety of food preference from the older people who have different health problems such as, the chronic diseases tend to prefer food which are soups, vegetables, legumes, canned fruit, pasta, potatoes, deli meat and meat while the participant who confronts heart disease would prefer vegetables and canned fruit and the elderly with diabetes prefer fresh fruits and sandwiches for example.

Time cost

Ben, Iain and Diogo (2015) mentioned, Time cost is one of the most important factors which change Thais' behavior. Research shows that many people avoid spending time on meal planning, shopping for fresh food and examination of labels (Guthrie, Mancino & Lin, 2015). Van der Zanden (2014) also mentioned that when people have feasible and open-ended time, healthy food is more appealing when compared to limited time, the tasty food will be more consumed especially in older people living in nursing homes. These can cause an increase in the figure of eating out and a decline in the number of cooks at home by themselves (Kantamaturapoj, K., 2012). Time cost also has both positive and negative consequence to food consumption because people do not have time to cook and prepare which change their consumption into fast-food, convenience, frozen food and also ready to heat food in the supermarket and (Kantamaturapoj, K., 2012) which could attract to many people who have limited time and lower-income buying the processed food as their meal.

Convenience/ Transportation

In addition, living areas is one of the most influence to eating habit as well, for instance, dwell in rural and suburb area where is isolated from the shopping center

and retailers, also including difficulty in having convenience transportation (M Dean et al., 2009; Hendy HM et al., 1998; Lee CJ et al., 1998; Wallace DC et al., 1997).

Thailand has a long story of traditional agriculture and farming about a century (Kantamaturapoj, K., 2012). Along with the experience in agriculture and organic farming among Thais farmers consequence to the new entry of small and local business as a producer have their own brand of organic food in the healthy market (Kantamaturapoj, K., 2012; Panyakul, 2003).

The ability to access to food in Thailand become more convenience because the fresh markets in Bangkok shut down as a large number, the Food & Water Sanitation Division revealed a decrease in number from 153 between 2006 to 2008 and dropped to 145 in 2009 (Kantamaturapoj, K., 2012; Food & Water Sanitation Division, 2009). Moreover, in modernization, there is noticeably change in food shopping selection from traditional market to modern retail in Thailand which includes new food choices such as Fast Food, Drive-through and delivery service that there are many shops in Thailand use this strategy offer their customer (Kantamaturapoj, K., 2012).

Thailand is famous for street food which provides convenience to people to get food easily apart from restaurants and food courts. The survey from ABAC poll in 2009 found that 70 percent of the participant in total 1325 people prefer to have food from street stalls (Kantamaturapoj, K., 2012).

Environmental influences

Food consumption in Thailand has been changed into greener, organic and sustain with nutrition. G. Ares et al. (2014) pointed out that people turn to consume natural food without the content of additives. Thai citizen's aspect has changed their eating habits to consume organic food. The increase of the pesticide residues and chemicals used by farmers in agriculture production led Thai citizens to be more aware of health-conscious (Kantamaturapoj, K., 2012; Nelson, 1991). Kantamaturapoj, K. (2012) also pointed out the most concern point of having conventional for a long time will damage their health because of enlargement from toxins in the body. Later, Thai farming developed organic products in the market without being contaminated from synthetic pesticides which totally change their consumption behavior to consider nature food (Kantamaturapoj, K., 2012; Roitner-Schobesberger 2006).

However, according to a busy lifestyle nowadays, people inquire about inadequate nutrition food requirements. Therefore, there are new innovations in technology to invent new kinds of food such as functional foods and Genetically-Modified food (Phil. Trans. R. Soc. B, 2010). This positive impact on food consumption among Thai people that despite they cannot meet food requirements in the traditional way but they can take the supplementary food as it contains all basic nutrition values. Meaning that people have more alternative choices for their lives longer.

2.5 The trend toward the change of elderly in food consumption behavior in Thailand

Referring to a new entry in the food retail market, there are many modern retails which provide both local and international products. Besides, alternative retail as a healthy shop that includes local products both certified and non-certified sustainable products (Kantamaturapoj, K., 2012). Meaning that Older people have wider choices of product brands and international products which are related to the coming of foreign retails. This data supports the hypothesis of the foresight food business which might include Functional food, Organic food product, and various food existing in the world today.

Regarding having a high knowledge of dietary causes people to be aware and insecure in the food process from outside and also be more confident to cook by themselves with plenty of nutrients needed based on individual physical and health issues. However, there are many people prefer to eat out rather than cook because of limited time especially in Bangkok which is easy to find the restaurants, supermarkets, hypermarkets and also street stalls (Kantamaturapoj, K., 2012; Tokirsna, 2005)

Changing in attitude and belief from having a higher education is still a big influence. For example, being able to avoid fruits and vegetables that have high levels of pesticide residues and chemical contamination Roitner-Schobesberger, 2008 (as cited in Kanag, 2012) pointed out the growing safety concern among consumers. Moreover, BlockG et al., 1992; Steinmetz KA et al., 1991; Cannon G, ed., 1997 (as cited in Am J Clin Nutr, 1991) mentioned the experimental research found that plant-based food helps to avoid hazard from chronic diseases. Likewise, Satusap et al. (2014) pointed out the

benefit of plant-based food which is qualified for every elderly person from a different background.

Apart from vegetarianism, people become environmentally eco-friendly behavior which concerns more on environmental Torjusen, Sangstad et al. 2004 (as cited in Kantamaturapoj, K., 2012). Moreover, this is affecting the increase of plant-based food regarding the eco-friendly behavior perspective which Horrigan, Lawrence et al. 2002 (as cited in Kantamaturapoj, K., 2012) pointed out people believe that biodiversity leads to waste of consuming water, high rate of air pollution, and pollute soil as well. Oosterveer, Guivant et al. 2007 (as cited in Kantamaturapoj, K., 2012) mentioned that these are also a big influence both the food producers and farming sectors, making them adaptable to the ecosystem in production terms. To make this more clear, Research of Roitner-Schobesberger, Darnhofer et al. 2008 (as cited in Kantamaturapoj, K., 2012) shows that most consumers who purchased the organic products and plant-based food are elderly, higher knowledge and high-income people.

There is the scientific research of innovative development in food products which is related to Biotechnology in terms of developing individual food by tailormaking from DNA. It is a combination of DNA and polymerase chain reaction (PCR) to better service quality and safe food. This is an interesting and exploitative issue to present to the world food industry market. (Magnus, Ingegerd, Anders and Jacob from *The Dynamics of Innovation Clusters*, 2003: p.6)

The larger Megatrend of sustainable food in Thailand which includes vegan food, plant-based food, functional food, and alternative food associate as big player because of diverse in retailers both from local and international which the research from Kantamaturapoj, K. (2012) provided the information of retailers in Thailand. These lead this paper to explore thoroughly in Thailand's elderly food products and the opportunity for a new startup.

2.6 Conceptual Model

This paper will focus on the factors that influence to elderly people in Thailand which explore the main 5 factors that influence the food consumption of Thai

elderly and also consequence to their behavior by adopting the framework from the previous research of ‘Factors Influencing Tourist Food Consumption’, Mak et al., 2012).

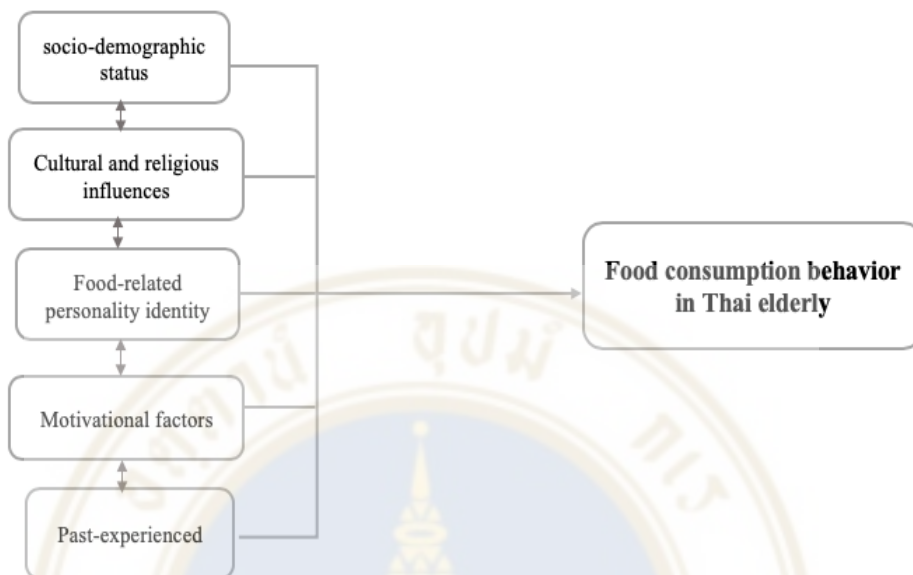


Figure 2.3 Conceptual model of factors influence Food Consumption Behavior

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Methodology

This research conducts both qualitative and quantitative research methods to answer research questions in terms of studying the factors in the change of elderly people in food consumption and health awareness. Including, the trends of elderly behavior in food consumption in next to 10 years in the 21st century that is expected to consume innovative food-specific solely for Thai seniors. Quantitative research is conducted to study the relationship between the factors influencing to Thai elderly in food consumption and the tendency to change which is expected to discover new and unnoticed factors that impact the elderly's consumption behavior from an interview to the respondents. The qualitative research aims to study the new trends for food business in Thailand in the near future and business opportunities in innovative food business toward the senior market for Thai startup and entrepreneur by studying existing products in the Thai market and analyze deeply of possibility for the relevant food organizations and startups in terms of nutrition development and multi-functional food and trend of health and nutritious diet in the near future.

3.2 Population and Sample size

This paper will emphasize on Thai elderly who are aged from 60 and over for all genders. According to the objective to study the trend that consequence to change in food consumption behavior among older people by using convenience sampling. Thus, the sample size takes place by older people in Thailand who are aged over 60 with healthy conditions about 100 people as a quantitative method.

N = The total number of Population size, N is 1,069,129 as an elderly in Bangkok who have ability to perform the activity of eating by themselves, the number was taken from the NSO: National Statistical Office (2017).

$n = 100$ as a sample size by the level of precision (e) is 10 % whereas the confidence level is 90 %.

The sample size uses Yamane's formula to determine the size of the respondent for this methodology.

$$n = \frac{N}{1+N(e)^2}$$

So, in this case, the respondent of the quantitative method will be 100 people according to the sample size of Yamane's formula. The result came up as following the calculated sample size below:

$$n = \frac{1,069,129}{1+(1,069,129)(0.1)^2}$$

$$n = 99.99 = 100$$

The sample size of participants will be 100 people.

The qualitative research will be conducted as an interview from the screened elderly group with purposive sampling in Bangkok and the proximity of 2 provinces which are Ratchaburi and Nakhonpathom province. According to the use of Grounded Theory in this research, The size of the interview takes approximately 25 people of Thai elderly who are over 60 years old of any gender. Following the instruction of Charmaz (2014) (as cited in Gentles et al., 2015), the participant might be at least 25 people in terms of a small project and would be sufficient by saturating before a study of 25 interviews. Thus, to collect overall understanding as a qualitative method in this research will interview 25 older adults.

3.3 Instrument Development

Based on the literature and framework of behavior in food consumption of elderly people in Thailand, the questionnaire question and interview form were developed from the framework. The questions comprise 4 mains sections as shown below (H.-J. Song et al., 2014).

Section I: Demographic data (21 questions)

The general demographic question including, age, gender, education level, occupation, etc.

This part also includes the question related to the behavior. This aims to gather information about older people's behavior such as frequency questions of having food, length of being healthy or health awareness, the preference of food type, and the idea to make decisions of food choices

Section II: Factors that influence the elderly's behavior (38 questions)

The question that was designed to determine the factors that influence their behavior and also change if relevant. There are the main key ideas of determinants that were divided into 5 criteria.

For measurement in the questionnaire, using 5 points Likert-type scale which rate by number 1 to 5, the meaning of 1 is strongly disagree to 5 means strongly agree respectively (Aiedah and Sharifah, 2015) to see how factors choices affect the perspective of an individual.

1. Socio-demographic factors consist of the association of socio-demographic and economic structures.
2. Cultural and religious influences: this factor is to identify the culture which includes the size of the household to understand the living, the religious and beliefs, attitude, and knowledge.
3. Food-related personality identity consists of individual attitudes relevant to food and diet that how a person defines and gives priority to it and also food neophobia studies if relevant.
4. Past-experienced means to understand the aspect and belief of elderly people in Thailand which is related to cultural influences.
5. Motivational factors compose of all the motivators such as, the social framework which related to social status, changed in physical condition, the limited time in globalization, the supporter as transportation and store available, and environmental influences.

Section III: Food consumption (7 questions)

This part, the questions are supposed to obtain information on food choices that people prefer and select for their living.

For measurement in the questionnaire, using 5 points Likert-type scale which rate by number 1 to 5, the meaning of 1 is strongly disagree to 5 means strongly

agree (Aiedah and Sharifah, 2015). Including multiple choice questions which are also associated in terms of determining the behavior of the elderly.

Section IV: Trend and Challenging issues in the 21st century (7 questions)

This part, the question asked about the individual aspect of the likelihood to consume the innovative food that is expected to be invented for elderly people and be existing in the near future.

This section also used the same measurement as 5 points Likert-type scale. In addition, the respondents were asked to answer the question based on the measure tool as a Dichotomous scale which is a pattern of Yes and No answer (M.C.D. Verain et al, 2015).

For qualitative, the questions guideline are the general question which asks for determination of elderly perspective of their food habit, for instance, eating out or having food at home and do they still consume meat which expected to introduce and ask for elaborate questions of innovative food consumption such as what do they think about modified texture food, processed food, plant-based food, and instant food product and even tailor-made DNA food product for example.

The interview questions following below were created to inquire about aspects from the elderly people in Thailand to see the possibility regarding the coming of challenging innovation in food and also acceptability from people in old age.

General questions

1. Do you have limited food from health conditions? Such as, avoid eating high sodium, reduce sweet, reduce in odor/gustatory system, etc.
2. Nowadays, do you normally consume meat in your meal? If not, what kind of food do you have? Plant-based/vegan food/?
3. Do you prefer to consume cooked food at home or eat out? Why?
4. What do you think about eating canned food? Do you still have it sometimes?
5. Please describe your eating routine?
6. Have you ever taken any supplementary food products or pureed food that help you eat easily?

7. Have you ever heard about pureed food or instant cooked food products for the elderly's diet? If you have heard, would you try it to fulfill the nutrition need? Why/Why not?

8. How do you get access to the news and trend?

9. How do you select the dish when you eat outside/ restaurant? What influences you the most when you select the food choices in your daily life?

Innovative Product

10. If there is a special food product that is customized from your DNA to find the best fit for Food-based, nutrition need from body needed, would you like to try? Why/ why not?

11. Have you participated in the meal program? Any kinds of programs (loss weight, nutrition elderly food, etc.)

12. How much do you know about plant-based food?

13. How do you plan to be healthy in the near Future? Eating only vegetables, no meats/ consume food in form of drinking and pudding/ normal that I have (hope to see the food perspective and food neophobia from older people)

3.4 Data Collection

After form and layout of the survey, the pretesting was performed before starting to collect the survey with a small sample group to acquire the accuracy reliability and present valid tools to meet the objective of this research. Moreover, to ensure that the error will not occur during data collection.

The questionnaire will be distributed to older people 2 options, online and offline. The first option is an online platform. The respondents are asked to fill the questionnaire via Google form that the link was distributed to electronic routes such as post the website link on Facebook and popular websites among older people in Thailand for example, Awuso Society's website. The second option was collected by distributing a paper-based questionnaire to seniors in the village in Bangkok. The respondents via the online form will be asked with the screening question if their age reaches 60 to acquire the right target to participate. However, the questionnaire will be filled when the respondent is ready and comfortable to complete, it depends on the participant's

decision whether to complete all the questions or not with respect. Moreover, all the answers and information will be kept in an encrypt sensitive file and a locked file.

For qualitative research, the data collection method will be examined by in-depth interviews by using random respondents from Thai citizens due to purposive sampling. The interviews will be conducted with 25 people aged from 60 and over for all genders in Bangkok and 2 nearby provinces which are Ratchaburi and Nakhonpathom province. The respondents will be invited directly by researchers from selected locations which easily found the seniors community such as, park, organic markets in urban Thailand. Both quantitative and qualitative questions were translated from English to Thai before transfer to participants and started collecting from May to June in 2020.

As researcher concern of the right and the harm that might involve in research execution, to acknowledge that this research could bring some potential risk to participants in both ways: emotional/mental could be anxiety (in case of a very thoughtful person) from the uncertainty that will be able to help and give as much as useful information and put more pressure feeling in case of getting new information and data from the interview's information during a conversation and feel unsure of some questions which might be related to something further than knowledge. For the physical could be tiredness from an interview in case of an old person and talking for a long time. Hence, the participant will be asked to sign the participant form before starting the interview and informed that there is no data that can be used to identify the specific respondents will be collected. Moreover, the participants have the right to refuse or withdraw from answering anytime when they feel stress, discomfort, or embarrassment. Also assuring the participant of safety procedures to protect the confidentiality of the data which are participants' answer questionnaire and answer from the interview will be kept in encryption sensitive files and use file passwords in order to protect the respondents from being read by those who are not permitted. In order to secure the hard documents, they will be kept in a briefcase with passwords.

3.5 Data Analysis

After collecting quantitative data, the raw data will be transferred into the format and analyzed by using the Statistical Package for Social Sciences (SPSS)

program to acquire both descriptive and inferential statistics. Firstly, descriptive statistics including, mean & standard deviation. According to the questions that were divided into 5 main factors, the first part is demographic data which are investigated from the number as frequency by using descriptive statistics. Pearson correlation is used to study the behavior of elderly people from all relevant factors. Inferential statistical analysis is used to predict the outcome of the factors which include correlation analysis.

For the qualitative method, the data collected from the interview will be coded as a process of definitive finding from data for each segment according to focused factors then, start the analytic interpretation procedures in the next stage (Hennie Boeije, 2010). The final is finding the result from each factor will associate between the data, interpretations, and findings.



CHAPTER IV

FINDING AND ANALYSIS

In this chapter will show the finding and analysis of conducting both quantitative and qualitative for this research. Qualitative method adopt in-dept interview from 25 participants to obtain the majority perspective in order to forecast the trend of food consumption among elderly people.

In terms of quantitative method, there were 112 respondents of elderly responded the questionnaires via both online platform and paper-based. This chapter presents the research finding and result that compose of the majority determinants following the divided elements below.

- 4.1 Socio-demographic factors
- 4.2 Cultural and religious influences
- 4.3 Food-related personality identity
- 4.4 Past-experienced
- 4.5 Motivational factors
- 4.6 Trend and Challenging issues in the 21st century
- 4.7 The association between the elderly behavior and food trend development

4.1 Socio-Demographic status

Table 4.1 represents the variables of the demographic status of respondents, the data were collected from female 72 respondents as 64.3% and 40 respondents or 35.7% were responded by male. The ranged age of respondents was classified as 7 groups, the majority range age of respondents obviously seen in the range age of 60-65 years old as 61.6% followed by 65-70 years old and 70-75 years old at 12.5% and 10.7% respectively with a small number of people in range age of older than 95 years old as 2.7% only 3 people. In the range age of 80-85 years old responded as the same figures

as 95 years old whereas there are only 2 respondents in 85-90 years old group responded. The educational background of respondents was found that graduated from various levels, most of them have a Bachelor's degree as 39.3% follow by 25.9% of Primary school. Some of the respondents graduated High school as 12.5%, 9.8% of Vocational School, there were 7.1% of them have a Master's degree, 3.6% for lower secondary school and only 1.8% have no education background. Most respondents have approximately monthly income 10,000 to 49,999 THB as 46.4%, 21.4% have earned lower than 10,000 THB, followed by 50K-99K THB, 150K-199K THB and more than 250K THB as 17.9%, 2.7% and 1.8% respectively.

Table 4.1 Summary of personal characteristic of respondents

Gender		
N=112	Qty.	Percentage (%)
Male	40	35.7
Female	72	64.3
Total	112	100
Age		
60-65 years	69	61.6
65-70 years	14	12.5
70-75 years	12	10.7
75-80 years	9	8
80-85 years	3	2.7
85-90 years	2	1.8
> 95 years	3	2.7
Education		
No education	2	1.8
Primary school	29	25.9
Lower secondary School	4	3.6
High School	14	12.5
Vocational School	11	9.8
Bachelor	44	39.3
Master	8	7.1

Table 4.1 Summary of personal characteristic of respondents (cont.)

Monthly Income			
Lower than 10,000 THB		24	21.4
10K-49K		52	46.4
50K-99K		20	17.9
100K-149K		11	9.8
150K-199K		3	2.7
250K-299K		1	0.9
More than 350K		1	0.9

Table 4.2 The relationships between age and main priority foods by ANOVA

What kinds of food do you give priority to?		Sum of Squares	df	Mean Square	F	Sig.
Fruit Juices	Between Groups	3.379	6	0.563	2.683	0.018
	Within Groups	22.040	105	0.210		
	Total	25.420	111			
Vegetables	Between Groups	1.843	6	0.307	2.037	0.067
	Within Groups	15.835	105	0.151		
	Total	17.679	111			
Fruits	Between Groups	2.492	6	0.415	2.871	0.012
	Within Groups	15.187	105	0.145		
	Total	17.679	111			
Milk	Between Groups	0.942	6	0.157	0.802	0.570
	Within Groups	20.549	105	0.196		
	Total	21.491	111			
Meat	Between Groups	2.065	6	0.344	1.494	0.187
	Within Groups	24.185	105	0.230		
	Total	26.250	111			
Fish	Between Groups	1.155	6	0.192	1.271	0.277
	Within Groups	15.908	105	0.152		
	Total	17.063	111			
Eggs	Between Groups	3.343	6	0.557	2.775	0.015
	Within Groups	21.086	105	0.201		
	Total	24.429	111			

Table 4.2 The relationships between age and main priority foods by ANOVA (cont.)

Plant-based food	Between Groups	0.006	6	0.001	0.099	0.996
	Within Groups	0.986	105	0.009		
	Total	0.991	111			
Seafood	Between Groups	1.500	6	0.250	1.051	0.397
	Within Groups	24.991	105	0.238		
	Total	26.491	111			
Legumes	Between Groups	2.548	6	0.425	1.862	0.094
	Within Groups	23.943	105	0.228		
	Total	26.491	111			
Rice	Between Groups	1.719	6	0.287	1.305	0.261
	Within Groups	23.058	105	0.220		
	Total	24.777	111			
Coffee	Between Groups	2.271	6	0.379	1.857	0.095
	Within Groups	21.408	105	0.204		
	Total	23.679	111			
Yogurt	Between Groups	0.428	6	0.071	0.510	0.800
	Within Groups	14.679	105	0.140		
	Total	15.107	111			

From table 4.2 shows the result from using an ANOVA analysis. There are statistical differences between food priorities among age groups. There are 3 main food priority's P-value is less than 0.05 which are Fruit Juices (Sig.=0.018), Fruits (Sig.=0.012) and Eggs (Sig.=0.015). Therefore, these 3 food priorities; Fruit Juices, Fruits and Eggs. There is a statistically significant difference in the food priority between the different age groups. This implies different age groups have differences in deciding to select these three food types.

4.2 Cultural and religious influences

Table 4.3 Cultural and religious influences

Religion		
N=112	Qty.	Percentage (%)
Buddhist	110	98.2
Christian	2	1.8
Marital status		
Single	22	19.6
Married	63	56.3
Divorced	26	23.2
Living status		
	Qty.	Percentage (%)
Living alone	22	19.6
Living with family/relatives	89	79.5
Others	1	0.9

From the table 4.3 shows the influenced factors from cultural and religious. In terms of religion factor, 98.2% are Buddhist with only 1.8% were collected as Christian. The marital status of most respondents are various consists of 56.3% (63) of respondents are married, 23.2% are divorced and only 19.6% single. 79.5% shows the living status with family or relatives while 19.6% live alone.

Table 4.4 The cultural and religious influences (N = 112)

	Strongly agree (5)	Somewhat agree (4)	Neutral (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
I normally have meal with family and share food together as Thai tradition and culture.	43.8%	24.1%	25.9%	3.6%	2.7%	4.03	1.04
I prefer to consume fruits and vegetables rather than animal-based food.	24.1%	33.9%	37.5%	2.7%	1.8%	3.76	0.91
I would give priority to consume fish rather than pork and beef.	37.5%	37.5%	21.4%	1.8%	1.8%	4.07	0.91
I believe that eat meat (pork, beef) will be difficult to digest.	42.0%	32.1%	19.6%	5.4%	0.9%	4.09	0.95
I believe that eating rice as a main dish with other course dish (as Thai style) gives me full nutrition that my body need.	27.7%	42.0%	26.8%	3.6%	0.0%	3.94	0.83
I believe that processed food is unhealthy.	37.5%	30.4%	19.6%	8.9%	3.6%	3.89	1.12
I prefer boiled and steamed food rather than fried and grilled.	39.3%	32.1%	24.1%	2.7%	1.8%	4.04	0.95
I often take vitamins or minerals supplementation.	8.9%	18.8%	30.4%	23.2%	18.8%	2.76	1.22
Eating organic products from local farming is clean and safe from chemical contaminant and insecticide.	18.8%	38.4%	25.0%	10.7%	7.1%	3.51	1.13
Eating out in organic restaurant that serve seniors menu provide me a special food that my body needs.	10.7%	33.0%	36.6%	8.9%	10.7%	3.24	1.11

From table 4.4 shows the level of agreement among 112 respondents according to cultural determinants which also include attitude, religious belief and knowledge. This factor indicates the average mean at 3.73 which most people have a higher mean value in culture and attitude. In the cultural and religious aspect, the majority of people's beliefs were implied by the highest mean at 4.09 indicates their belief of eating pork and beef makes it difficult to digest at 42% strongly agree. Moreover, at the mean of 4.07, people would rather consume fish more than pork and beef. There are some elements that show less mean value, for instance, minerals supplement and eating out in organic restaurants (Mean = 3.24) and agreement in taking vitamins (Mean = 2.76).

4.3 Food-related personality identity

Table 4.5 The reason for cooking

What is the reason that you cook?		Responses	
		N	Percent
reason ^a	Confident	32	17.9%
	Save cost	34	19.0%
	The taste (the food outside has a bad taste)	38	21.2%
	Hygiene/Quality of food (afraid of MSG used in cooking processing)	42	23.5%
	Health conditions (special need)	16	8.9%
	Enjoyment	17	9.5%
Total		179	100.0%

Table 4.6 The number of people who prefer cooking at home

Do you take responsibility for cooking in your house?		
	Frequency	Percentage (%)
Yes, I cook.	58	51.8
No, I don't cook	54	48.2
Total	112	100.0

From 4.5 shows the reason for cooking, 51.8 % of 112 people who take responsibility for cooking. Table 4.5 shows that there are 179 frequency were answered from 58 people. 23.5% is the highest that indicates the reason for cooking at home which is the majority reason is being afraid of MSG used in cooking processing, it means that they concern about Hygiene and quality of food as the most important. Follow by preferring their own food because of concern of the taste, having food outside has an unimpressed taste at 21.2%.

Table 4.7 represent getting access to the food-sources, 33% of respondents get the food from the market followed by Supermarket as 22.6%. Whereas, only 2.3% get food from online.

Table 4.7 The main popular food sources among elderly

How do you get access to the sources of food?		Responses	
		N	Percent
food-sources ^a	Supermarket	59	22.6%
	Department store	43	16.5%
	Local grocery shop	52	19.9%
	Market	86	33.0%
	Organic supermarket	12	4.6%
	Online platform	6	2.3%
	Others	3	1.1%
Total		261	100.0%

Table 4.8 The preference food that senior people concern the most

What kinds of food do you give priority to?		Responses	
		N	Percent
preference food ^a	Fruits juice	39	5.8%
	Vegetables	90	13.4%
	Fruits	90	13.4%
	Daily product (Milk)	29	4.3%
	Meat	42	6.3%
	Fish	91	13.6%
	Eggs	76	11.3%
	Plant-based food product	1	0.1%
	Seafood	43	6.4%
	Legumes	43	6.4%
	Rices	75	11.2%
	Coffee/Tea	34	5.1%
	Yogurt	18	2.7%
	Total	671	100.0%

From the table 4.8 indicates that most of the respondents focus on consuming Fish, vegetables, fruits, eggs and rice. According to the food choices that are presented to the respondent, 13.6 % of them tend to give priority to fish. For vegetables and fruits was selected at the same level as 13.4%. Followed by eggs and rice at 11.3% and 11.2% respectively.

Table 4.9 Agreement on food-related personality identity (N=112)

	Strongly agree (5)	Somewhat agree (4)	Neutral (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
I have a good appetite. I normally have need in food (both vegetables, fruits, meats, enriched food and even desserts, fats and oils, etc.) per day.	24.1%	40.2%	33.9%	0.9%	0.9%	3.86	0.83
I have convenience accessibility to food shops, some place is short distance from my place where I can reach to easily.	42.0%	44.6%	10.7%	2.7%	0.0%	4.26	0.76
The place where I buy the food ingredients offers the high quality of the products such as fresh, safe and reliability by having nutrition label guarantee.	30.4%	39.3%	24.1%	5.4%	0.9%	3.93	0.92
*the price and location of restaurant has an impact the most.	6.3%	17.0%	33.0%	27.7%	16.1%	2.70	1.12
Eating out is the place where I can meet people or friends.	17.9%	20.5%	30.4%	24.1%	7.1%	3.18	1.19
I select food from the pleasant appearance.	6.3%	16.1%	31.3%	32.1%	14.3%	2.68	1.10
I consume organic food because I have modern lifestyle and fashionable.	7.1%	13.4%	32.1%	36.6%	10.7%	2.70	1.06
I do care so much on control the calories or weight from my intake food.	22.3%	21.4%	29.5%	14.3%	12.5%	3.27	1.30
I would like to cook at home because I would like to control calories and food nutrition.	22.3%	24.1%	29.5%	17.9%	6.3%	3.38	1.19

Table 4.9 indicates the mean of the food-related personality identity determinants values with an average mean value at 3.33. Mostly, people who have a good appetite for ordinary food and the high-quality food that is provided in the food sources have a high level of an agreement. Besides, the convenience of getting to food sources is at the highest level of an agreement.

The highest mean level in this factor refers to the convenience of food access by 4.26. Followed by the high level at mean 3.93 which is the access to food ingredients that offer high-quality products. While the rest indicates in the lower range among the average mean value.

4.4 Past-experienced

Table 4.10 Agreement on the experience in their past (N=112)

	Strongly agree (5)	Somewhat agree (4)	Neutral (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
I would like to have food that similar to the food when I consume as younger.	17.9%	33.0%	37.5%	11.6%	0.0%	3.57	0.92
People can influence me to have organic food as long as they have experienced it before.	8.9%	22.3%	37.5%	25.0%	6.3%	3.03	1.04
I decide to buy the familiar food because I like the taste, I do not concern much on the health and nutrition from my food meal.	17.9%	23.2%	31.3%	17.9%	9.8%	3.21	1.22

Table 4.10 indicates an agreement in experience from elderly people in order to consume organic food and repurchase of preference food. In the mean of 3.57 as a high level which compares to the average of mean values of 3.27, people agree on having food that is similar to the food that they consume at a younger age.

4.5 Motivational factors

Table 4.11 Agreement of elderly related to motivational determinants (N=112)

	Strongly agree (5)	Somewhat agree (4)	Neutra l (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
I have changed my kind and amount of food regarding my health condition (in case of there is some limited food intake).	26.8%	45.5%	18.8%	7.1%	1.8%	3.88	0.95
* I have gained or lost 5 Kg. in the past six months without attempt.	4.5%	10.7%	31.3%	25.0%	28.6%	2.38	1.14
I have oral problems that make my eating become more difficult. Including, difficulty in swallow and chewing.	11.6%	17.9%	31.3%	28.6%	10.7%	2.91	1.17
I have lost odor control.	7.1%	12.5%	22.3%	26.8%	31.3%	2.38	1.25

**Table 4.11 Agreement of elderly related to motivational determinants (N=112)
(cont.)**

	Strongly agree (5)	Somewhat agree (4)	Neutral (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
My gustatory function decrease time often time.	9.8%	15.2%	19.6%	26.8%	28.6%	2.51	1.32
My self-care activities such as walking have changed, I need care giver or children to help me.	8.0%	13.4%	14.3%	27.7%	36.6%	2.29	1.30
Eating out is safe time to cook, preparing food and clean the kitchen.	17.0%	18.8%	27.7%	19.6%	17.0%	2.99	1.33
I feel more confident to having the meal from the restaurant that is well cooked by very expertise chef and having higher knowledge of food science than my food.	9.8%	19.6%	31.3%	23.2%	16.1%	2.84	1.20
I try to avoid eating meat from an animal because I believe that the process to get meat is destroy the environment including, air pollution from farming and slaughterhouse factory.	9.8%	22.3%	36.6%	22.3%	8.9%	3.02	1.10
It is easy to access to organic food in my living area.	12.5%	23.2%	33.0%	23.2%	8.0%	3.09	1.14
A small food and nutrition label make me annoyed.	27.7%	22.3%	28.6%	11.6%	9.8%	3.46	1.28
I would rather to order food ingredients and food product online and use delivery service.	1.8%	4.5%	17.0%	32.1%	44.6%	1.87	0.97
The food shopping place I normally take service is approached easily only by personal car.	35.7%	33.0%	13.4%	12.5%	5.4%	3.81	1.20
The location of restaurant is the main consideration to me because I have a limited movement and action when I go outside?	12.5%	25.0%	28.6%	18.8%	15.2%	3.01	1.25

According to the table 4.11 indicates an agreement level in motivational determinants which include physical changing, time cost factor, convenience and transportation factor, and environmental influences factor. The average mean value in this context is at 2.89.

In accordance with the health condition factor, table 4.11 shows changes in physical conditions also change their kind of food which has the mean of the agreement level in the highest mean as 3.88 by 45.5% of them agree with this message. Following the admission of participants about facing oral problems which make it difficult to eat,

swallow, and chew. Whilst, the difficulty in physical activities, gaining-losing the weight without attempting and odor control, and decrease in the gustatory system and shows in a lower mean of 2.29, 2.38, and 2.51 respectively.

In terms of an environmental factor, the mean of 3.02 implies a neutral level of respondent's agreement to avoid eating meat from an animal because the belief of the process to get meat is to destroy the environment including air pollution from farming and slaughterhouse factories.

In order to time cost factor, in the mean of 2.99 indicates an agreement of the elderly which are identified from the survey question of "Eating out is a safe time to cook, prepare food and clean the kitchen". Also, 27.7% of selection, which is the highest percentage, chose the Neutral level of an agreement in this factor.

For convenience and transportation factors, table 4.11 indicates the high mean level at 3.81 which mentioned the convenience of approachable by personal vehicles in order to get access to the food shopping place. Furthermore, the mean level at 3.09 shows the ease of access to organic food from the living area. Whereas, only 1.87 of means shows the least result of using online and delivery service to order food ingredients.

Table 4.12 The reason of shopping food ingredients for cooking

What is the main reason in decision making when shopping for food ingredients?		Responses	
		N	Percent
reason1 ^a	Price (discount)	29	16.4%
	The quality of product (Fresh and safe)	47	26.6%
	Convenience (get access easily, proximity to living place)	38	21.5%
	Healthiness	31	17.5%
	Organic/Hydroponics	17	9.6%
	Local produce	14	7.9%
	Vegan food (no any related to animal-based food)	1	0.6%
Total		177	100.0%

Referring to shopping for food ingredients, from table 4.12, in a group of elderly who prefer to cook at home, there are 47 elderly (26.6%) admitted that the

quality of products such as freshness and safety is the main reason to make the decision of shopping for food ingredients. Including the convenience of getting access easily and proximity to living places that were also accepted by 38 of them (21.5%).

4.6 Trend and Challenging issues in the 21st century

The quantitative analysis would provide some of the results of using descriptive statistics as a tool to measure the agreement regarding the new trend of food innovation that the elderly would be interested in.

Table 4.13 Agreement of elderly related to acceptability of food innovative products (N=112)

	Strongly agree (5)	Somewhat agree (4)	Neutral (3)	Somewhat disagree (2)	Strongly disagree (1)	Mean	Std. Deviation
I prefer soup and liquid food rather than having Thai traditional that I have eaten in the past.	13.4%	15.2%	33.9%	20.5%	17.0%	2.88	1.25
I would like to try plant-based food in occasional meal or/and some times.	8.0%	14.3%	29.5%	31.3%	17.0%	2.65	1.16
I would take the pureed or pudding food in any Thai flavor, if my oral health decrease.	7.1%	24.1%	46.4%	14.3%	8.0%	3.08	1.00
I would try the special food product that customize from DNA to find the best fit of Food based, nutrition need from body needed, if it available in Thailand.	7.1%	16.1%	48.2%	16.1%	12.5%	2.89	1.05
Any kind of food will be in the future, I would definitely consume it as long as it contains all natural ingredients and nutrition need.	13.4%	24.1%	43.8%	16.1%	2.7%	3.29	0.98
Any new kind of elderly's food product in the future, I would like to try it as long as it has a good appearance, taste and easy to swallow.	9.8%	21.4%	42.0%	19.6%	7.1%	3.07	1.05
Any new kind of elderly's food product in the future, I would like to try it as long as it provide me a convenience such as unpack, reduce time to prepare meal, and etc.	14.3%	18.8%	42.9%	17.9%	6.3%	3.17	1.08

The result shows the neutral level of an agreement and acceptance to try new food products especially for unfamiliar food regarding table 4.13.

Refer to business opportunities in innovative food business toward the senior market in Thailand, using qualitative analysis by conducting in-dept interview from 25 respondents would be an effective tool that could gather the information of their perspective of an innovative product.

Table 4.14 The demographic data of in-dept interviewees

Gender		
	Qty.	Frequency Percent(%)
Male	10	40%
Female	15	60%
Total	25	100%
Age range group		
60-65 years	15	60%
66-70 years	5	20%
71-75 years	4	16%
Above 75	1	4%
Total	25	100%

Table 4.15 Informant profile

No.	Age	Gender	Living place	Health condition	Consuming supplement product	Code
1	73	Male	Ratchaburi	Hypertension	No supplement intake	N1
2	63	Male	Bangkok	-	No supplement intake	N2
3	63	Female	Ratchaburi	Hypertension	No supplement intake	N3
4	75	Female	Bangkok	Hypertension	No supplement intake	N4
5	61	Female	Bangkok	Hypertension	No supplement intake	N5
6	72	Male	Bangkok	Hypertension	No supplement intake	N6
7	64	Male	Bangkok	-	No supplement intake	N7
8	60	Female	Bangkok	-	No supplement intake	N8
9	73	Female	Ratchaburi	Thyroid disease	No supplement intake	N9

Table 4.15 Informant profile (cont.)

No.	Age	Gender	Living place	Health condition	Consuming supplement product	Code
10	60	Male	Ratchaburi	-	No supplement intake	N10
11	66	Male	Ratchaburi	Hypertension	No supplement intake	N11
12	60	Female	Ratchaburi	Thyroid disease	No supplement intake	N12
13	70	Female	Ratchaburi	Hypertension, Diabetes	No supplement intake	N13
14	64	Female	Ratchaburi	Thyroid disease	Daily intake	D1
15	64	Female	Ratchaburi	Gastrointestinal disease	No supplement intake	N14
16	63	Female	Ratchaburi	Rheumatoid Arthritis	No supplement intake	N15
17	68	Female	Ratchaburi	Heart disease	No supplement intake	N16
18	60	Female	Ratchaburi	Diabetes, Heart disease	Daily intake	D2
19	66	Male	Ratchaburi	Diabetes, Cardiovascular, Hypertension and Gout	Daily intake	D3
20	62	Male	Bangkok	Hypertension	Daily intake	D4
21	61	Female	Bangkok	Osteoarthritis of the knee	Daily intake	D5
22	77	Male	Ratchaburi	-	No supplement intake	N17
23	73	Female	Ratchaburi	Hypertension	Daily intake	D6
24	64	Male	Ratchaburi	Hypertension, Diabetes, Stroke	No supplement intake	N18
25	64	Female	Ratchaburi	Hypertension, Diabetes	Daily intake	D7

Finding the trend of consumer behavior consequence from health conscious and nutritious

24% of the elderly admitted that they would accept the fresh herb as their supplement. A few people mentioned that having herbs gives a lot of health benefits to them. In this group of people seem more comfortable when they are asked about

supplement food that they would take. Moreover, many herbal species both well-known and unfamiliar names came up from the conversation as shown in the statement below.

“I usually squeeze fresh juice from fresh herbs that I grow in the house such as Carissa carandas, Curcuma longa, Green Chiretta, etc.” (N3)

“I always drink mixed fruit smoothies with special added herb names that ‘Artemisia Lactiflora’ or ‘Jing Ju Chai’ blend every day. There is research showing that Artemisia Lactiflora helps to control blood circulation” (N11)

“I normally use my own home-grown vegetable which is ‘Cnidocolus aconitifolius or Chaya’ instead of MSG powder used when cooking.” (N15)

“I take Gymnanthemum extensum or Nan Chao Woei every day, both fresh and mixed with smoothies or water to boost my body’s health.” (D4)

“I drink lemongrass with water every day and I have heard that it would help to decrease the high blood pressure.” (D5)

On the other hand, ready to eat herbal products are less popular among senior people. A few people mentioned that having herbs has a benefit to their health. Only 8% mentioned consuming ready-to-eat products which are in a form of capsule or powder.

“I recently order Tibetan Caterpillar fungus from advertisement to handle my symptoms from having diabetes, and Cardiovascular. I have been tried many herbal products that see advertising on television and this time just try this one only a week.” (D3)

Refer to health-conscious and awareness among the elderly both who have Non-Communicable Diseases and without any diseases, the internet and social media also play a big role in their communication channels especially for YouTube. From the interview, 25% of the participants mentioned consuming the news, the shows and variety of programs from YouTube channels.

“I have known all good benefit from having Gynostemium extensum from TV program by YouTube channels.” (D4)

“I watched the TV program about Doctor and healthy from YouTube, it says that there is the research claim that having lemongrass would help to decrease the high blood pressure.” (D5)

Finding about the participant’s Interested of consuming in an innovative nutritious product

This research mentioned a few examples of food innovative to analyze in order to forecast the trend and food business in Thailand such as Pureed food product, Smart-soup, DNA-personalized, Plant-based food and other ordinary substitute products.

The interest of participants would be associate with the decision making of intake of innovative food and new kinds of things. Therefore, according to the interview 25 elderly, the researcher found that there is only a few people of the elderly are interested in an example of products that the interviewer showed and mentioned in every person. Smart soup, Pureed food, DNA-Personalized, etc. were mentioned to all 25 participants. For DNA nutrigenomics, 3 participants (12%) are interested if it is not so expensive. In terms of pureed food, there is only one person (N15) who would like to try if it helps to consume their meal easily.

Moreover, from interview researchers found that 84% of the respondents avoid having a big portion of meat but intend to have more vegetables. They tend to have a higher interest in having fresh fruits and smoothies compared to select other choices that the researcher has mentioned. In other words, it could say that 100% of the elderly consume fresh fruits and vegetables every day as their priority regarding food appetite. Moreover, most of them mentioned a poor appetite for eating pork, beef and chicken for various reasons. Yet, 99% of them would rather choose fish than other meats while only one person (N2) ignores fish because of personal preference that does not like the smell.

The following reason indicates the preference and associated smell.

“I barely eat chicken because I don’t like the texture and the smell, I can feel some smell of soaking.” (D5)

The following phrase below can reflect the reason that is relevant to physical problems.

“Apart from boring, I don’t want to have any meat because it is so hard to chew every single bite. It might be because of my health condition that I have a stroke that makes me chew and swallow more difficulty, and cause me to choke.” (N18)

The following statement implied the perspective of the benefits of having vegetables and fruits.

“I believe that blending the vegetables and fruits is fully beneficial to the body, there are plenty of nutrients because I can put a variety of big portion of vegetables each time. Besides, I prefer blending compared to cold-press juice because it still includes plenty of pulp and fiber.” (N6)

Finding of the participant’s perspective of consuming an innovative nutritious product

Most elderly from the interview have similar food behavior regarding being aware of health and food selection. 92% of them would prefer to have food that is the home-cooked meal while only 2 people eating out because of limited time. Nevertheless, those 2 people still carefully select their best choice.

“ Mostly, I always buy the salad for dinner and choose fish and vegetables every meal with rice berry mixed jasmine rice.” (D4)

“According to work-life remains, I do not have time to cook, so I always buy food outside but focus on having fish and eggs as the main menu each meal and consume fruits every day.” (N10)

From the interview, the researcher found that among those five main innovative nutritious products which compose of Pureed food product, Smart-soup, DNA-personalized, Plant-based food and General Substitute products, more than 50% would prefer Substitute product in form of supplement food product than others. There are a few people who have the same aspect of food intake for the fulfillment of their bodies. Among their age, they have high needs and wants for extra nutrition which compares to the ability to consume each meal, meaning that the portion per meal might not be enough to fulfill the body needs. Few people admitted that they are taking supplements because they think their meals could not provide adequate dietary.

Regarding Processed food, all of them have a negative perspective on processed food. Mostly mentioned to the processing procedure, cleanliness and freshness.

“I don’t like it, it could add expired food in the processing or whatever we don’t know.” (N1)

Which is similar to the opinion of informant N3.

“I do not know the procedure and processing, what kind of ingredients used and does it contain any contaminant which might affect directly to health.” (N3)

Few people mentioned about the same as canned food containing contaminants and chemicals added.

In addition, it is also associated with preference, N2 pointed out that *“talking about tuna canned, the smell of fish is bad because I don’t like eating fish.” (N2)*

One of the informants mentioned the role of processed food does not influence her attention.

“I prefer real food and I believe that Thailand has plenty of natural products and various species of fruits and herbs which I also prefer cooking in the

house. Even the smoothies or any juices, I would rather not but I consume real fruits.” (N13)

Moreover, both N13 and D1 expressed their personal perspective regarding to Plant-based food and DNA personalized compared to Thai herbs and natural.

“There are many types of natural herbs and vegetable freedom plants and pick in Thailand, I do not need to obtain any new innovative food.”

“Why still need those appearances of the product to be the same as real meat while you want to consume vegetarian food.”

To be more specific on herbs, there are a few seniors that tend to give more priority to herbs, herb capsules and natural products which are taken instead of some supplement products that exist in the market but trust only the product that accepted FDA approval and International Standardization and Organization certification.

In terms of consuming fruits, she would not be interested in eating any kind of processing food as seen as some examples from the following statement.

“I would rather have the fruits, not for a blend and smoothies because I believe that blending fruits will lose the taste and nutrients.” (N9)

“I always drink lemongrass tea which I brew it myself every day because I believe that it can lower my blood pressure.” (D5)

Finding the trend of consuming food innovative among elderly

Refer to the percentage of taking daily supplement food in respondents from the interview, there is 24% of them currently have it. Whereas among those who do not take supplement diet also have high intention in Plant-based food stated that;

“If there is a chance to have or someone buys it for me, I would try it.” (N1)

From the interview, 12% have opened mind to take plant-based meat instead of real meat such as pork, beef, chicken. 40% of them stated that they are getting bored of consuming pork, chicken and beef.

In contrast, 80% of them are not interested in it. Also, the number of taking processed food or canned food or instant noodles are still low, there is only 8% that consume it in case of the Covid-19 situation.

There are only 3 people (12 %) that would like to take plant-based food products instead of meat. One of them said that

“I have swallowing problems because of Stroke disease and I lost tooth to gum, even fish, it is so hard to chew and swallow.” (N18)

“I really like it, I have tried it once many years ago at the Buddhist Meditation Center near my home. Besides, I do not like the smell of meat nowadays, and I usually eat more boiled vegetables in every meal because I would prefer very soft food.” (N9)

“Nowadays, I have it in some meals and I eat vegetarian food every year during the vegetarian festival.” (N15)

4.7 The association between elderly behavior and food trend development

Referring to the result from qualitative methodology determined the main idea of food consumption behavior among Thai elderly affects the food industry. The classification of these research participants divided the elderly into 3 main types from their living style. The result could help the research find the development in the food business for the elderly appropriately.

4.7.1 The elderly behavior

Thai elderly has more time compared to working age. So, cooking is the main activities in the house that they prefer to do in order to achieve their goal of being health conscious and awareness that was shown the result of the reason to cook comes from the concern of hygiene food and quality of food (avoid having MSG contaminant in food meal).

4.7.2 Food trend development

Regarding the food trend development of the elderly which highly consumes more natural products compared to the new invent product as they pointed out that Thailand still has plenty of plants and fruits to serve Thais. So, the popularity of consuming fruits and vegetables is higher than supplement food products. However, the number of older people who take the supplement product and enriched food can still be seen. According to the result from the interview, the Thai elderly seems the herbals, fruits and natural products play a big role in the food trend among Thai elderly. There are various opportunities for food business, convenience is one of the most potential consequence to the elderly for food behavior refer to the result of the main factors that impact to change in food consumption, many full services at home, for example, fresh fruits and plants ready to deliver at home by calling would be popular in the near future.

4.7.3 Association between behavior and food trend development

From an interview of 25 participants identified the 3 main groups of the elderly regarding their lifestyle which are Stable job and salary receive, Free-time from retirement and Self-health care. According to the participants who are in good health conditions which prefer to take care of themselves, the identification would show in these 3 main groups. The stable job and salary received identifies the one who still works as a full-time worker and has the ability to get access to food sources and buying power. From the interview, there are only 12% (3 people) who still work full-time. But it does not mean that others retired elderly have lower food access. Secondly, Free-time from retirement would certify the meaning from its names that refer to the elderly who spend all their time at home with full functions for their activities. In addition, these would let them create their preferred hobby and routine freely. These would support the main idea that none of them feel that cooking is complicated and boring. Lastly, Self-health care would refer to both retirees and workers but have high intensive personal health awareness and concern. The main respondents group lives in a tight-knit community that does not affect and influence their lifestyle to be stressful and live in a limited time which makes the result appear in the same result of the similarity in living style. Moreover, the result of studying the influences factors from this research that identifies

the impact of the change in health conditions directly influence the elderly's food choice. They are more careful in order to have meals outside so they would rather cook at home.

The food trend among the elderly also refers to consuming the plant-based product as they mentioned getting bored with meat. Some elderly could not eat meat because of health conditions and changes in their physical body such as slowly digesting some specific food. This could indicate the linkage between the health condition and change in food trend in the near future, the fake meat would increase the popularity in the food market even currently this product is developed under many Thai brands in the Thai market.



CHAPTER V

CONCLUSIONS

This chapter provides the result and conclusion from studying the change in food consumption among Thai elderly in the 21st century and the challenge to the elderly's food business. The descriptive statistical and other appropriate statistical tools were used as a tool to identify the factors that consequence to change in food consumption and health awareness of older people in Thailand. Moreover, to study the trend of consumer behavior due to health consciousness and nutrition of Thai elderly in the 21st century use both quantitative through survey and qualitative through interview results as the main tool. Conducting in-depth interviews of 25 Thai elderly both in Bangkok and in Ratchaburi province were used as the main tool to forecast the business opportunity in innovative food business toward the senior market for Thai startups and entrepreneurs by studying existing products in the Thai market.

5.1 Conclusion and Discussion

5.1.1 The majority factors consequence to consumer behavior changing

From collecting the quantitative data of 112 elderly in Thailand, the result shows the majority gender was female (64.3%), the age range was in 60-65 years (61.6%), the education background was Bachelor degree (39.3%), and marital status was married (56.3%). The research found the factor influences that change their food preference and behavior which accordance from the literature review identified the 5 main factors of elderly people in food consumption which compose of Socio-Demographic factors, Cultural and religious influence, Food-related personality identity, Past-experienced and Motivational factors. The first factor is Socio-demographic which includes demographic status and economic structure. In terms of demographic status, the result shows that there is a difference between age groups and

consequences to food choices that the elderly mainly focus to consume including Fruit Juices, Fruits and Eggs.

Secondly, cultural and religious factors show the result of cultural influences to changed reason regarding food choices for their consumption. This factor also includes the attitude and belief of the elderly in cultural factors, from the result, it shows the influence among them such as belief in having fish is better than pork and beef according to difficulty in digesting. In terms of religious factors, the result shows the respondent's religion was Buddhist (98.2%). This indicates a lower influence on the elderly's food consumption.

Third, Food-related personality identity was one of the major factors that impacted the change of elderly food consumption. The result from collecting 112 respondents indicates health concern among elderly people, from 23.5% home cooking because of hygiene and food quality concern. Furthermore, refer to the food list that the elderly give priority more on fish, vegetables and fruits.

Forth, in this study implied the past-experience for the elderly has no consequence on their change in food consumption. The result found that only neutral levels agree that the assumption of the food experience in the past has a consequence on their change.

The fifth factor, in terms of motivational factors which compose of 4 related factors which are physical changing, time cost factor, convenience and transportation factor, and environmental influences, only convenience and health condition factors that consequence to food changing the most. As shown in 45.5% of agreement in the relationship between the health condition and food choices.

In summary, from the above factors, there are 3 main determinants which are attitude and belief, health condition and convenience determinants that consequence to change in food consumption among the Thai elderly.

This result can support the previous research of studying the use of modified texture foods among the elderly by Keller et al. (2011) that mentioned the changes from physiological variables such as poor dentition is also the main factor consequence to changes in food consumption. However, the contrast of convenience is also indicated from the result. Refer to the previous research in a European context by Koehler & Leonhaeuser (2008) which reviewed the increase in food services of packaging, ready-

to-heat, ready-to-serve and meal delivery to home while Thai seniors tend to prefer home-cooking.

5.1.2 The trend of consumer behavior due to health-conscious and nutritious

Referring to the influence of health-conscious on food consumption, the trend of change in the food behavior of the elderly has been found. The result shows that there is a high tendency of accepting plant-based food intake instead of consuming meat. From an interview, 84% of the elderly avoid having a big portion of meat but intend to have more vegetables. In 100% of the seniors prefer to have fresh fruits and vegetables every day at least. Based on the interview shows that the seniors are ready and accepting fruits and vegetables rather than meat in some meals which can occur to many older people's appetites have been changed.

The higher cooking people at home could show the trend of personal beliefs and health-conscious. 51.8% of the elderly still cook at home and they are pleased to cook every day.

In addition, 50% would consume supplement food products to boost their health and also gain more nutritious body needs. In addition, using fresh herbs in their cooking recipes and fresh eat were accepted among seniors about 24% from the interview.

The study can be supported by the previous research from the result of Dean et al. (2009): the factor influencer eating a varied diet in old age that reviewed the accessibility of food sources effect to the quality of their food variety choices. Moreover, these are also related to the result that the elderly has wide choices to find the food and lead them to feel more comfortable to cook by themselves.

Moreover, this is support by the economic structure from the research of M Dean et al. in 2009 that mentioned restricting the ability of lower-income effect to purchase costly health food products.

5.1.3 Forecasting the business opportunity in the innovative food business

According to variety, elderly food products exist in the market. This study was conducted regarding forecasting the business opportunity for Thai startups and entrepreneurs by studying existing products in the Thai market. This study shows the result that can identify the majority of sectors that would gain benefit from service to elderly target from related specified identified elderly groups.

Table 5.1 The suggestion and development of the food business for the elderly

Target group	Initial nutritious products and services	Suggest product and service development
Free-time from retirement (in House-Cooking, upper-middle class)	Spice and herbals Extract, Dried spice and herbs	Instant exotic Thai spice (extract, dried and powder, etc.) that provide more varieties of species, from various regions in the country, longer shelf life, etc.
Free-time from retirement (in hose-Cooking, preferring stay at home, Self-health care)	Food delivery	Food ingredient trucks (locally fresh vegetables and fruits providers) that schedule to service the product out of the shop, get around the villages.
Self-health care, Still working and receive the salary	Smart-blender	The IoT smart blender and mixer that shortens the time and more enjoyable cooking with specialty function of cooking with recommended recipes from history cooking style.

The summary table above would enhance a better generation and development of the relevant sectors. The idea of suggesting product and services development were gathered from the interview and also analyzed from the finding result.

Based on the elderly lifestyle that was divided into 3 main groups which are Stable job and salary receive, Free-time from retirement and Self-health care, the following forecasted ideas would refer to all these main target groups which are

classified for better matching and analyzing easily due to business forecast. From the result of innovative food, there is less acceptance of the elderly from consuming the suggested innovative nutritious products such as Pureed food products, Smart-soup, DNA-personalized, Plant-based food. The interview can affirm the assumption to the personal attitude and neophobia trait which is also related to the past research of KITTISAKMONTRI (2019) of resistance to having complimentary food is not sufficient for the body's need per day. Therefore, from this statement would develop Thai agriculture business higher popularity. This includes fresh fruit providers, dried fruits products, and processed fruits.

Most elderly affirm that cooking is not that difficult and complicated due to cleaning and time consuming for those who cook at home. The only important thing would be the freshness of food ingredients per cooking time. Moreover, they enjoy shopping in the market by themselves. Therefore, the farmer and agriculture who normally sell the product at the market would be able to gain the revenue and benefit to the business by setting the food ingredient truck and calling delivery especially served for the elderly and those who have to stay at home. This idea also gives back the benefit to people who have limited time and movement to go outside. Moreover, the Covid-19 pandemic also impacted to many food producers and consumers. This solution would be one of the interesting ideas for SME entrepreneurs.

Furthermore, the spice producer would increase the profit and expand the product from the elderly market by providing various choices of spices and herbs instant products. For the Spice and Herbals product is related to the main focus behavior of elderly who prefer to cook at home. This kind of business would be expected to enhance the popularity among the elderly in the near future from the researcher and will confront the high ability to extend the more innovative product. These products would be popularly used as substitute nutrition use instead of this modern medical. The instant exotic Thai spice in the form of powder and dried ingredients would be attractive to the elderly. To elaborate on the support reasons, firstly, they cook at home, longer shelf life is better to keep for many meals. Secondly, there are varieties of herbs in Thailand that are best for cooking as the main ingredient, for instance, Garlic, Coriander Root, Ginger, Basil, chilies, etc. Additionally, in terms of people who live in Bangkok have a limited choice to find those fresh herbs and also some herbals species are rare which exist only

in a limited area (special in some region). Therefore, extending the production line for distribution to many regions in Thailand and providing the description of use and creative recipes would be more interesting.

In order to innovative challenge development, among the group of self-health care who prefer in house-cooking and consume the exotic and originally nutritious food that they can assure from the ingredients used till the process of cooking each time by themselves. Moreover, providing many options depends on users, some elderly prefer the hard texture of fruits that tend to be the most natural while some people like to mix it. Smart blender and mixer assistant (for both fruits, vegetables, and meat). This smart blender would help as an assistant to those who prefer to cook and still need to save their energy and power, safe themselves from any injury would occur in cooking time, and shorten cooking cycle time because it provides all in one; blender, mixer, juicer, grinder and food processor. The specialty function, apart from blend the fruits, chop raw ingredients, mince the meat with customized order input through the touch screen monitor would be interesting. Besides, creative personal menus and drinks function with automatic recording for next use which can share the recipes into the cloud communities and suggest from others by IoT support would be great for the next generation of cookers that help to reduce time and save brawn.

5.2 Recommendations

From the research result, I would recommend some interesting ideas from the research results to the relevant sectors.

In the restaurant sector, for the special restaurant which focuses on serving seniors as the main target customer, building the strong story and content of ingredient sources especially for locally-sourced to boost their confidence in the trust and reliability of the restaurant. Because most of the elderly focus on fresh vegetables to refine the quality of nutritious foods, the more processed food and unknown sources or the processing are difficult to accept.

In terms of the innovative challenge, for the inventors and producers, inventing the special blender machine to help the elderly make their special beverages, Juices and Smoothies menu by themselves. According to the result of consuming a big

amount of fruits and vegetables per day mix to the different preferences of the elderly; Juice, Smoothies and Cold press juice. Make it special by adding a smart function assistant for the users with appropriate functions.

The food delivery sector could increase the new platform to only deliver fresh fruits and vegetables by calling to order. Because online order is not popular and convenient among seniors. Besides, the delivery could offer the menu each week both distributing the catalog at home or via an online platform.

The locally-sourced ingredients are the priority things that are related to the food consumption behavior among the elderly the most. Therefore, intervene in the relevant sectors such as the Government, the Sub-district Administrative Organization, health administration and, etc. should provide the appropriate quantity and high-quality service to the consumer. Moreover, support the local farms both livestock and plants to achieve sustainable goal development by collecting the most food sources as much as adequate to the higher number of older people rapidly each year.

5.3 Limitations

This research was conducted both quantitative and qualitative in order to study of Thai elderly's food behavior. There are some limitations to studying which include the limit of sample sizes and sample areas. Small sample group which most of the respondents were in a group of healthy thus, the result could show only a similar perspective in food choices. The sample size would be extended to many areas in the country. This research was limited to the sample areas only in Bangkok, Nakhon Pathom and Ratchaburi. It is limited for another insight of older people who live in different areas with various socio-cultural and environment. Moreover, there is only one theoretical approach adopted in this study which also indicates the simple framework of studying. Lastly, the respondents are various, the elderly who live in Bangkok and rural areas (Ratchaburi and Nakhon Pathom) have different perspectives and living conditions. So, clearly discriminate the sample size by independent area, the result would be more constant.

To recommend to the future research, it would be better, if the research is distributed to many regions in Thailand. Furthermore, the research could be expanded

to the sample size of more than 100 people for quantitative analysis and 25 people for qualitative analysis. Moreover, developing new attractive frameworks to include the sophisticated relationship among factors influences food consumption of the elderly would enhance the more practical works.



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APPENDICES



Appendix A: Certificate of Ethical Approval (COA)



Institutional Review Board, Institute for Population and Social Research, Mahidol University (IPSR-IRB)

Established 1985

COA. No. 2020/03-147

Certificate of Ethical Approval

This is to certify that the Institutional Review Board, Institute for Population and Social Research, Mahidol University, has granted an Ethical Approval to the research project entitled *“Changing in Thai Elderly's Behavior in Food Consumption in the 21st Century: Challenging in Food Business for Elderly”* submitted by Ms. Onjira Tienggad from the College of Management. The duration of this project is from January to August 2020.

By this approval, the Principal Investigator of this project is obliged to:

- 1) Provide progress report to IPSR-IRB every twelve months from the start of the project;
- 2) Report to IPSR-IRB any changes in the project plan, especially those changes that may put research participants at risks;
- 3) Promptly notify IPSR-IRB any adverse events that occur during the project execution; and
- 4) Provide research completion report at the end of the project.

This COA is given on 5 May 2020 and valid through 6 May 2021.

Signature

(Professor Emeritus Pramote Prasartkul)

Chairman, IPSR-IRB



IORG Number: IORG0002101; FWA Number: FWA00002882; IRB Number: IRB0001007

Office of the Institutional Review Board, Institute for Population and Social Research, Mahidol University (IPSR-IRB),
Phuttamonthon 4 Rd., Salaya, Phuttamonthon district, Nakhon Pathom 73170. Tel (662) 441-0201-4 ext. 223

Appendix B: The Questionnaire in English

Questionnaire for the study on “Changing in Thai elderly’s behavior in food consumption in the 21st century: Challenging in food for elderly”

The questionnaire is the part of an independent study of Master of Management (International program in General Management), College of Management, Mahidol University. This questionnaire would take about 10-15 minutes to answer the questions.

This research aims to explore factors that would influence among elderly people from the age of 60 years and over in Bangkok, Thailand. Moreover, to measure the opportunities’ possibility of innovative food products specially for nutrition diet in seniors in Thailand in the near future.

This questionnaire is divided into 4 sections, each section contains a direction for completing the questionnaire. Please provide the most accurate answer. Your provided answer and information will be kept anonymous and confidential.

Section I: Demographic data

Section II: Factors that influence the elderly’s behavior

Section III: Food consumption

Section IV: Trend and Challenging issues in the 21st century

The participant has the right to withdraw from the project anytime without prior informing needed. No participation or withdrawal will not affect you and your family at all.

Clicking this button indicates that I have read the description of the study and I agree to participate in this study.

Section I: Demographic data

Part 1: Characteristic of respondents

Direction: Please check ✓ in the box based on what extend do you think it is match to yourself the most.

1. Gender

- Male Female Alternative

2. Age

- 60-65 years 65-70 years 70-75 years
 75-80 years 80-85 years 85-90 years
 90-95 years > 95 years

3. What is your religion?

- Buddhist Christian Islam Other.....

4. Marital status

- Single Married Divorced/ widowed

5. Education level

- No education Primary School Lower secondary School
 High School Vocational School Bachelor
 Master PhD Others, please

specify_____

6. Occupation

Do you still work?

- Yes No (Retired)

If yes, please go to A1.

A1: If you are still working, please select one of this choice below.

- Self-employed
 Government officer
 Private and state employee
 Farming and Agriculture
 Housewife
 Others, please specify_____

7. Income in a household (Baht per Month)

- | | |
|--|------------------------------------|
| <input type="checkbox"/> Lower than 10,000 THB | <input type="checkbox"/> 10K-49K |
| <input type="checkbox"/> 50K-99K | <input type="checkbox"/> 100K-149K |
| <input type="checkbox"/> 150-199K | <input type="checkbox"/> 200K-249K |
| <input type="checkbox"/> 250K-299K | <input type="checkbox"/> 300K-349K |
| <input type="checkbox"/> More than 350K | |

8. Which of the extent below match to the source of income in your household the most?

- | | |
|---|---|
| <input type="checkbox"/> Retire pension | <input type="checkbox"/> Saving |
| <input type="checkbox"/> Children | <input type="checkbox"/> Dividend |
| <input type="checkbox"/> Reverse mortgage | <input type="checkbox"/> Others, please specify _____ |

9. Do you have health problems as chronic diseases?

- | | |
|--|------------------------------|
| <input type="checkbox"/> No | <input type="checkbox"/> Yes |
| <input type="checkbox"/> Hypertension | |
| <input type="checkbox"/> Cardiovascular Disease | |
| <input type="checkbox"/> Diabetes | |
| <input type="checkbox"/> Prostatic Disease | |
| <input type="checkbox"/> Other, (Please specify _____) | |

10. Living status

- | | |
|--|--|
| <input type="checkbox"/> Living alone | |
| <input type="checkbox"/> Living with family/relatives | |
| a. Number of children..... persons (≤ 15 years old) | |
| b. Number of adults.....persons | |
| c. Number of elders.....persons (≥ 60 years old, including yourself) | |
| <input type="checkbox"/> Living with nursing home, home care, sanitarium | |
| <input type="checkbox"/> Others, please specify _____ | |

11. Where do you live?

- | | |
|---|--|
| <input type="checkbox"/> Bangkok | <input type="checkbox"/> Outside Bangkok |
| <input type="checkbox"/> Others, please specify _____ | |

Part 2: Health behavior

This part is asking about the respondent's behavior. Please select one box that it would define yourself/ the most fit to you.

12. Do you smoke?
- No, never Yes, in the past
- current smoker recently quit (≤ 6 months)
13. Do you drink alcohol?
- No, never
- 1 or 2 times a week
- Often, more than 3 times a week
- Seldom
14. How many meals do you have per day?
- 1 meal
- 2 meals
- 3 meals
- More than 3 meals (Please fill the number of meals)
15. How often do you work out?
- 2 or 3 days a week
- 5 days a week
- everyday
- No, I do not work out
16. What kind of exercise do you normally do? (you can select more than 1 choice)
- Jogging
- Walking
- Swimming
- Yoga/Pilates
- Taiichi
- Aerobic exercise
- Others, please specify _____
17. Have you taken a health examination test in recent years?
- I have health checked every year
- I have health checked often times in a year
- I have not taken it for a long time (more than one year)
18. Do you normally consume vegetables and fruits in your meal? (Per Day)

- I normally consume vegetables and fruits every meal.
- I normally consume vegetables and fruits at least one meal.
- I don't eat vegetables, but I eat fruits.
- I don't eat both vegetables and fruits.

19. Do you take responsibility for cooking in your house?

- Yes, I cook
- No, I don't cook

If yes, please go to B1:

B1: Cooking

- a. Do you take responsibility for shopping for food?
 - Yes, I buy the ingredients by myself.
 - No, someone takes this responsibility.
- b. How often do you cook?
 - Everyday
 - 1 to 2 days a week
 - At least 3 days a week
- d. What is the main reason in decision making when shopping for food ingredients? (you can select more than 1 choice)
 - Price (discount)
 - The quality of products (Fresh and safe)
 - Convenience (get access easily, proximity to living place)
 - Healthiness
 - Organic/ Hydroponics
 - Local produce
 - Vegan

food (no any related to animal-based food)
- e. What is the reason that you cook (you can select more than 1 choice)
 - Confident
 - Save cost
 - The taste (the food outside has a bad taste)
 - Hygiene/Quality of food (afraid of MSG used in cooking processing)
 - Health conditions (special need)
 - Enjoyment

20. Which one is the choice that normally chooses to have meal?

- Buying food from outside
- Eating out
- Cooking in house
- Ordering delivery food
- Others, please specify _____

21. Which of the messages below, you think it could signify yourself?

- Doing exercise often Yes
- No
- Eating clean (only vegan food, no meat) Yes
- No
- Eating organic food product (Product from local farm and food standard approval product) Yes
- No
- Avoid intense flavor, too sweet, too salty, too sourly and too spicy Yes
- No

22. How would you consume the new trend and launch of food products? (You can select more than 1 choice.)

- Advertisements from TV Newspaper
- Highway Board Friends, children
- Line Hospital
- Doctors/Nurses Others, please specify _____

23. How do you get access to the sources of food? (You can select more than 1 choice.)

- Supermarket Department store
- Local grocery shop Market
- Organic supermarket
- Online platform
- Others, please specify _____

Section II: Factors that influence elderly's food consumption behavior

Direction: Please select one from five following extent which you agree with the most.

The following statement using 5 scales by 5 = Strongly agree, 4 = Somewhat agree, 3 = Neutral, 2 = Somewhat disagree and 1 = Strongly disagree.

No.	Subjects	Scale report				
		5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly disagree
Part 1: Cultural and religious influences						
1	I normally have meal with family and share food together as Thai tradition and culture.					
2	I prefer to consume fruits and vegetables rather than animal-based food.					
3	I would give priority to consume fish rather than pork and beef.					
4	I believe that eat meat (pork, beef) will be difficult to digest.					
5	I believe that eating rice as a main dish with other course dish (as Thai style) gives me full nutrition that my body need.					
6	I believe that processed food is unhealthy.					
7	I prefer boiled and steamed food rather than fried and grilled.					
8	I often take vitamins or minerals supplementation.					
9	Eating organic products from local farming is clean and safe from chemical contaminant and insecticide.					
10	Eating out in organic restaurant that serve seniors menu provide me a special food that my body needs.					

No.	Subjects	Scale report				
		5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly disagree
Part 2: Food-related personality identity						
11	I have a good appetite. I normally have need in food (both vegetables, fruits, meats, enriched food and even desserts, fats and oils, etc.) per day.					
12	I have convenience accessibility to food shops, some place is short distance from my place where I can reach to easily.					
13	The place where I buy the food ingredients offers the high quality of the products such as fresh, safe and reliability by having nutrition label guarantee.					
14	Eating restaurant is more expensive but I don't care so much about the price and the place of that meal.					
15	Eating out is the place where I can meet people or friends.					
16	I select food from the pleasant appearance.					
17	I consume organic food because I have modern lifestyle and fashionable.					
18	I do care so much on control the calories or weight from my intake food.					
19	I would like to cook at home because I would like to control calories and food nutrition.					
Part 3: Past-experienced						
20	I would like to have food that similar to the food when I consume as younger.					

No.	Subjects	Scale report				
		5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly disagree
21	People can influence me to have organic food as long as they have experienced it before.					
22	I decide to buy the familiar food because I like the taste, I do not concern much on the health and nutrition from my food meal.					
Part 4: Motivational factors						
23	I have changed my kind and amount of food regarding my health condition (in case of there is some limited food intake).					
24	I have not gained or lost 5 Kg. in the past six months without attempt.					
25	I have oral problems that make my eating become more difficult. Including, difficulty in swallow and chewing.					
26	I have lost odor control.					
27	My gustatory function decrease time often time.					
28	My self-care activities such as walking have changed, I need care giver or children to help me.					
29	Eating out is safe time to cook, preparing food and clean the kitchen.					
30	I feel more confident to having the meal from the restaurant that is well cooked by very expertise chef and having higher knowledge of food science than my food.					

No.	Subjects	Scale report				
		5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly disagree
31	I try to avoid eating meat from an animal because I believe that the process to get meat is destroy the environment including, air pollution from farming and slaughterhouse factory.					
32	It is easy to access to organic food in my living area.					
33	A small food and nutrition label make me annoyed.					
34	I would rather to order food ingredients and food product online and use delivery service.					
35	The food shopping place I normally take service is approached easily only by personal car.					
36	The location of restaurant is the main consideration to me because I have a limited movement and action when I go outside?					

Section III: Food consumption

Direction: Please select one from five following extent which you agree with the most. The following statement using 5 scales by 5 = Strongly agree, 4 = Somewhat agree, 3 = Neutral, 2 = Somewhat disagree and 1 = Strongly disagree.

No.	Subjects	Scale report				
		5	4	3	2	1
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
37	When I eat out, I always order salad or vegetarian dish.					
38	I would prefer to consume healthy foods which mean low fat foods, high-fiber product such as, fruits and vegetables.					
39	I would rather to drink fruits juice or cold press juice than soft drink.					
40	I normally use coconut oil as an ingredient when cooking.					
41	I would rather to consume boil-rice, any kind of noodles and porridge because it is easy to chew.					
42	I prefer soup and liquid food rather than having Thai traditional that I have eaten in the past.					

43. What kinds of food do you give priority to? (you can select more than 1 choice)

- Fruits juice
- Vegetables
- Fruits
- Daily product (Milk)

- Meat
- Fish
- Eggs
- Plant-based food product
- Seafood
- Legumes
- Rice
- Coffee/Tea
- Yogurt

Section IV: Trend and Challenging issues in the 21st century

44. In terms of consuming the specially invented nutrition and innovative food in the future. Please select one of the most you think you would consume from the nutritious products below. (You can select more than one choice)



- Sweet sticky rice pureed food (The product that is developed for the elderly who have dysphagia.



- Smart Soup Porridge with 5 nutrients needed for elderly who lose teeth and face chewing difficulty.



- Instant food and drink thickener product from Nestlé
- None of these.

45. Is it easy to find the pureed food in Bangkok?

- Yes No

Direction: Please select one from five following extent which you agree with the most. The following statement using 5 scales by 5 = Strongly agree, 4 = Somewhat agree, 3 = Neutral, 2 = Somewhat disagree and 1 = Strongly disagree.

No.	Subjects	Scale report				
		5	4	3	2	1
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
46	I would like to try plant-based food in occasional meal or/and some times.					
47	I would take the pureed or pudding food in any Thai flavor, if my oral health decrease.					

No.	Subjects	Scale report				
		5	4	3	2	1
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
48	I would try the special food product that customize from DNA to find the best fit of Food based, nutrition need from body needed, if it available in Thailand.					
49	Any kind of food will be in the future, I would definitely consume it as long as it contains all natural ingredients and nutrition need.					
50	Any new kind of elderly's food product in the future, I would like to try it as long as it has a good appearance, taste and easy to swallow.					
51	Any new kind of elderly's food product in the future, I would like to try it as long as it provide me a convenience such as unpack, reduce time to prepare meal, and etc.					