

Value based segmentation: A study of wild fish versus farmed fish consumption in Nha Trang

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Abstract

The primary purpose of this study was to identify market segments based on personal values, values and lifestyles, environmental concern, fish welfare concern, ethical concern for fish farming and health involvement. A self-administrated questionnaire was conducted on a convenience sample of 209 Vietnamese consumers. It was designed to investigate consumers' concern for issues used as segmentation basis together with variables used in profiling the segments. The measurement scales used in this study were selected or adapted from validated scales found in the literature. Three segments were identified: the Environment and safety concerned (37 per cent), the Unethical (36 per cent) and the Farmed fish concerned (27 per cent). Attitudes toward wild fish, norms to eat wild and farmed fish, willingness to pay and gender were most important in profiling differences between clusters. The findings indicated that from a marketing point-of-view, wild and farmed fish industries may face some ethical problems in this part of the Vietnam market (Nha Trang area). But this concern is not really ethical oriented, aroused due to their health and quality expectations. Environmental issues could also be used to position fish products in Vietnam to some extent. The results may help fish farming companies and marketers to find their target groups among the consumers, based on personal values, lifestyles, health involvement, environmental and fish welfare issues.

Keywords: Values, fish farming, segmentation, fish consumption, Vietnam

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1.0 Introduction

The introduction of term market segmentation by Smith in 1956 leads marketing researchers to recognize differences among groups of consumers to be opportunities in the market (Smith, 1956). It has facilitated to understand the importance of recognizing the consumer needs and heterogeneity of needs for the marketers, otherwise goods can no longer be produced and sold. The segmentation of consumer markets has received considerable attention in the literature, and cover different product and services like, consumer preference on e-banking services (Maenpaa, 2006), vacation activity preference (Madrigal and Kahle, 1994), gift giving behavior (Beatty et al., 1991), consumer relationship with the airline service providers (Long and Schiffman, 2000), labour market segmentation (Blossfeld and Mayer, 1988), and food related studies such as food preference among teenagers (Honkanen et al, 2004), consumer involvement in fresh meat (Verbeke and Vackier, 2004) and consumer preference for ethically labeled coffee (Pelsmacker et al, 2005).

According to Wind (1978) the determining of segment membership or classification is the first step and determining the profiles or discrimination is the second step involved in segmentation research studies. To do so, the identification of suitable category variables and profiling variables need to be practiced (Cardoso and Moutinho, 2003). In order to identify or determine market segments among consumers, several variables such as demographic and socio economic characteristics, personality, values and lifestyle characteristics, product use and purchase pattern, situation, attitudes towards product, behavior responses and benefit sought in a product category have been used in the literature (Honkanen et al., 2004, Beane and Ennis, 1987). Among these variables values have long been considered as an important variable for market segmentation and for example, investigate the role of personal value in tourist segmentation (Madrigal and Kahle, 1994), gift giving behavior (Beatty et al., 1991) identifying the importance of automobile attributes (Vinson et al., 1977) and use of domain specific values such as environmental and animal welfare concern (Honkanen and Olsen, 2009) can be given.

Market segmentation leads to target the market by an evaluation of the attractiveness of the obtained segments and a selection of the target segments. For these target segments, positioning concepts are developed, selected and communicated (Raaij and Verhallen, 1994). This can only be realized by stable segments of which the buying behavior can be reliably predicted. In the literature, some times the same variables used as a basis have been used as profiling variables (Barnes et al, 2007). However, common profiling variables are geographical, demographic, socio economic, behavioral and lifestyle criteria (Mazanec, 1992).

The global consumption of fish has greatly increased during recent decades (Verbeke et al., 2007a) and consumers are being offered farmed fish as a viable alternative to meet the increasing fish demand (Cahu et al., 2004). Recently aquaculture has been identified as the fastest growing food production sector of the world with around 52 million tonnes of production and Vietnam is the third largest aquaculture producing country in the world with 1.7 million tonnes of production in 2006 (FAO 2008). The current evolutions in aquaculture have led consumer to growing interest and debates on the health, safety, ethical and environmental issues related to farmed versus wild fish (Verbeke et al., 2007b; Poli et al., 2005). Therefore study the importance of animal welfare, environmental sustainability and health issues to the consumers regarding the fish consumption is seems to be important for the fish farming companies and marketers. To date, to the best of researcher's knowledge, no studies have examined the consumer concern about the health, environmental and animal welfare issues related to farmed fish in developing world.

1.1 Research issue and questions

The development of segments allows a marketer to optimize the needs of consumers in every cluster (Burnham et al, 2003). It will increase the probability of efficiently addressing consumer needs and then the sales of the particular product (Barnes, 2007). A similar approach has been considered to be highly relevant for fish farming companies and marketers (Honkanen and Olsen, 2009). Therefore the first objective of this study is to examine whether the fish (farmed/wild) consumers are a homogenous target group, or, if it

is in fact possible to identify distinguishable, practice relevant and addressable segments using the personal value, values and lifestyles and domain specific values (Environmental concern, Fish welfare concern, Ethical concern for fish farming and Health involvement) as the basis for the segmentation.

Profiling a segment structure is meant to provide better understanding of segments, finding discriminate characteristics and yield means to classify individuals in to the segments (Cardoso and Moutinho, 2003; Mazanec, 1992). Fish consumption behavior is influenced by various factors and mainly it is driven by health aspects and hedonic expectation of the consumer (Olsen, 2004; Tudoran et al., 2009). Consumers' level of knowledge is also important in fish consumption decisions, especially in selecting farmed versus wild fish (Kole, 2003). Study of Verbeke et al. (2007b) indicated that not to purchasing farmed fish is associated with lower intrinsic quality expectation rather than sustainability and ethical considerations. Social norms and expectation from others (e.g. environmental groups, family members) also influence on fish consumption decision making of the consumer and selection of wild versus farmed fish (Staniford, 2002; Babcock and Weninger, 2004). Honkanen and Olsen (2009) identified that attitudes towards farmed fish, the importance of food naturalness, social class can be considered as important factors when identifying the difference between fish consumers. Further, some studies found in the literature has revealed that consumers' have willingness to pay (WTP) a price premium for the fish products that labeled as wild (Kole et al., 2009).

Therefore the second objective of this study is to find out whether the segments can be profiled by frequency of fish consumption, attitude towards wild and farmed fish, norms and expectations from others, WTP (as an intentional variable), consumers' knowledge about fish and fish farming (as a barrier to consumption) and some basic demographics factors (age, gender, education level, marital status, family size and family income).

The precise research objectives of this thesis are as follows:

- i. To identify market segments of Vietnamese fish consumers based on personal values, values and lifestyles and domain specific values (Environmental concern, Fish welfare concern, Ethical concern for fish farming and Health involvement).
- ii. To find out how the segments can be profiled by frequency of fish consumption, attitude towards wild and farmed fish, norms and expectations from others, WTP, knowledge of the consumer, and some basic demographics factors.

This study also wants to include the descriptive study of variables used in segmentation and profiling (except the demographics factors) as secondary issue. By performing such a study it is expected to understand how important these values are for the respondents in the study and to assess the general pattern of consumer behavior and their characteristics. The importance of the clustering that conducted with the assumption of not all the consumers is likely to have the same opinions, attitudes and behavior can be further understood by observing the descriptive results.

Consumers are consider about both environmental and fish welfare issues related to wild fish harvesting and the production of farmed fish (Honkanen and Olsen, 2009). Over-exploitation of fish stocks (Hentrich and Salomon, 2006) and damage to the seabed are main problems associated with wild fish harvesting. Further, environmental pollution from effluents and genetic contamination by escapees seem to be worrying issues to some consumers (Read and Fernandez, 2003; Kaiser, 1997; Cotter et al., 2000). People may consider fish farming as positive because it satisfy their preferences with different qualities (Morris et al., 2005) while protecting the wild fish stocks from overexploitation. There are also animal welfare issues related to both wild fish harvesting and the fish farming. The consumer concerns about these issues may be related to pain, fear and stressful feeling to the fish at harvesting (wild fish) and in fish farming (Cooke and Sneddon, 2007; Tinarwo, 2006). Since quality can easily controllable in farmed fish than wild fish, consumers have considerable trust about fish farming in term of safety. But

believing the presence of substances such as growth hormones, antibiotics consumers face a perceived trade-off with respect to the healthiness of farmed fish (Verbeke et al., 2007a).

1.2 Method

To identify market segments of Vietnamese fish consumers based on personal values, values and lifestyles and domain specific values, the survey was conducted in Nha Trang, Vietnam in March 2010. A convenience sample of 209 respondents was used to collect data. Items to measure the constructs in the questionnaire were used or adopted from the previous studies. Exploratory factor analysis and reliability test were performed first and then cluster analysis, discriminant analysis, ANOVA procedure and crosstabs procedure were used to analyze the data. The process of data analysis was supported by SPSS 17.0.

1.3 Structure of the thesis

After this introduction chapter, in the Chapter 2, discussed the relevant literature on segmentation, and then discussed the different aspects of the constructs within the framework. In the Chapter 3 Survey design, measurement procedure and method have been described, focusing on the measurement, cluster analysis, and techniques for group mean differences. Chapter 4 presents the results from the empirical survey. Finally, Chapter 5 discusses issues related to the results, practical implications and suggestions for future research.

2.0 Conceptual framework

Market segmentation has originated where the profits can be maximized when pricing levels discriminate between segments (Frank et al., 1972) and to deal with diverse consumer needs in the resource efficient manner (Dibb and Simkin, 1996). Market segmentation can be defined as viewing a heterogeneous market as a number of smaller homogeneous markets, in response to differing preferences, attributable to the desires of consumers for more precise satisfactions of their varying wants (Smith, 1956, p. 5). It presents segmentation as a conceptual model of the way a manager wishes to view a market to identify homogeneous groups, which are not naturally occurring in the marketplace. Therefore the purposes of market segmentation can be summarized as to divide market in to several homogeneous sub markets and to formulate a proper marketing mix strategy for the identified submarkets (McCarthy, 1981). In order to achieve this, different bases have been used during the past few decades of market segmentation research. These include product specific, behavioral attribute segmentations, general, physical attribute segmentations, and general, psychological attribute segmentations (Vyncke, 2002). Present interest is high on the variables such as preferences, attitudes, intentions, personality, values and lifestyle as basis for market segmentation (McCarty and Shrum, 1993).

Values are abstract principles that reflect an individual's self concept (Dickson, 2000) and are enduring beliefs that a given behavior or outcome is desirable or good. Human values are immediately related to motivation, less numerous, more central and more closely related to behavior. As such, values have been considered to be a powerful force in governing the behavior of individuals in all aspects of their lives (Rokeach, 1968). They are assumed to be building blocks of attitudes (Eagly and Chaiken, 1995; Verplanken and Holland, 2002). Therefore use of values as the basis for market segmentation has been increased among the researchers (Kamakura and Novak, 1992).

The interest in sustainability and ethical issues in food production and consumption has increased at all levels of the food chain, including the consumer level. Whilst the impact

of these issues on consumer decision making toward fish consumption is little known (Verbeke et al., 2007b). According to the literature ethical value is one of the best value-predictor of ethical buying behavior of the consumer (Honkanen et al., 2006). On the other hand the emerging interest in the public health system and communicating healthy eating messages in recent years have been reflected in an increasing consumer demand for healthy foods (Maddock et al., 1999). Researchers used health involvement to evaluate the importance of healthy eating to individual (Maddock et al., 1999; Olsen, 2003) and it is one of the best predictor of seafood consumption behavior (Olsen, 2003).

Segments based on general personal values or values and lifestyle do not correlate sufficiently with specific market behaviour (Raaij and Verhallen, 1994). However, values and attitudes with regard to the behavioral domain (e.g. eating, recreation) provide a better explanation for specific behaviour. Therefore segments based on such domain-specific values correlate sufficiently with specific market behaviour and most feasible level for segmenting markets. Moreover, these values are related to the consequences or benefits of using products or services (Raaij and Verhallen, 1994). This section will discuss the segmentation theory in a detail as a viable tool for marketing approach to increase the profitability in a market where the demand is heterogeneous. After that it has been described the definitions and descriptions of the variables used in the study. Under that, the predictor variables which used to identify the segments and criterion variables that help to determine the group membership has been discussed.

2.1.1 Classifying consumers and identifying segments

Even segmentation is a powerful concept, there is an empirical question as to how well it describes the situation for a particular product or service to provide input to managerial decisions (Wedel and Kamakura, 2002). Companies have to exploit various possible levels of aggregation of their markets, in the continuum that ranges from mass marketing to one-to-one marketing. The strategic goal of the firm is to determine the requirements for segmentation bases and segmentation methods in order to assign potential consumers to homogeneous groups when the demand is heterogeneous. The identified segments

would then be profiled following other characteristics – descriptors to highlight the differences between these groups (Wedel and Kamakura, 2000).

Green (1977) has indicated that there are two basic approaches to segmentation such as priori and post hoc, while current approaches used one of these or a hybrid of the two. A priori segmentation is an approach where the numbers of clusters are chosen in advance by the researchers, and then respondents are categorized in to these segments and are further examined regarding their differences in other characteristics. By post hoc segmentation, respondents are grouped according to the similarities of their characteristics called bases and then these segments can be further examined for differences in other characteristics called profiling variables. Here the number of clusters is not being known until the cluster analysis has been completed. In the literature it has argued that in order to be viable, segmentation should meet certain conditions. In order to assess the viability of segmentation such criteria as identifiability, substantiality, accessibility, stability, responsiveness and the actionability are widely accepted tools (Maenpaa, 2006).

2.1.2 Different basis for consumer segmentation

Selecting the appropriate basis which can be used to segment the market is the first step in developing a segmentation strategy. Many of the early market segmentation studies were based upon dividing the consumers on frequency of a product use, as well as geographic and demographic data (Honkanen and Frewer, 2009). But the increasing complexity of modern societies makes it difficult to find market segments based only upon those factors. At present many criteria have been used to assign potential consumers in to homogeneous groups. Meyers (1996) make a distinction between consumer based (e.g. demographics, attitudes, lifestyle) and product based (e.g. frequency of consumption, benefits/feature, loyalty, and price). Wilkie (1994) uses three levels of consumer classification: 1) personal characteristics (demographics, values and lifestyle) 2) benefit sought (aspects with products, services and pricing) and 3) behavioral aspects (attitude, usages, purchase etc.).

Finally, Vyncke (2002) classify segmentation variable in three general categories such as 1) product specific, behavioral attribute segmentations 2) general, physical attribute segmentations, and 3) general, psychological attribute segmentations (Vyncke, 2002). Schiffman and Kanuk (2004) discussed nine major categories of consumer characteristics that provide most popular basis for market segmentation. They include geographic factors, demographic factors, psychological factors, psychographics (lifestyle) characteristics, socio cultural variables, use-related characteristics, use-situation factors, benefits sought, and forms of hybrid segmentation such as demographic psychographic profiles, geodemographic factors, and values and lifestyles.

In geographic segmentation (Kahle, 1986) the market is divided by location. The theory behind this strategy is that people who live in the same area share more similar needs and wants (e.g. certain food products) and these needs and wants differ from those of people live in other areas. For example, people in the West prefer stronger coffee (Kotler, 1983).

Another type of segmentation is demographic segmentation (Lin, 2002) and it has identified as most accessible and cost effective way to identify a target market. It refers to the market segmentation based on such characteristics as age, sex, marital status, income, occupation and education. Demographic factors have also been used as basis for segmentation of food markets (e.g. Verbeke and Lopez, 2005).

Socio-cultural segmentation (Slocum and Mathews, 1970) based on sociological and anthropological variables such as family and lifecycle, social class, core cultural values, sub cultural membership and cross cultural affiliation. Social class has been used as a major segmentation variable in the literature (O'Brien and Ford, 1988). This concept has lost its unique segmentation value, as society has become less vertically organized with more buying power across larger layer of society. Even it is still applicable to the developing societies, when consider about the product with less variability in price, again the social class concept may not applicable. In use related segmentation (Selin et al., 1988) consumer categorized in term of product, service or brand use characteristics such as level of usage, level of awareness, and degree of brand loyalty. Use situation

segmentation (Quester and Smart, 1998) focused on the consumer usage situation (e.g. Valentine's Day) as segmentation variable. Segmentation based on the benefits a group of consumers seek from the product or brand called benefit based segmentation (Loker and Perdue, 1992).

Personality and psychographic factors have become popular as bases for segmentation in the 1980s (Quinn et al., 2007) and widely used as basis for segmentation of food markets. Psychological segmentation is based on intrinsic qualities of individual consumer such as motivations, personality, perceptions, learning and attitudes. Honkanen and Olsen (2009) used attitudes as basis to identify consumer segments according to the concern about environmental and animal welfare issues in food choice. In addition to that some examples include food preferences as basis for segmentation (e.g. Delarue and Loescher, 2004; Honkanen et al., 2004). Food related risk perceptions also considered as segmentation variable in the literature regarding as psychological factor related to food consumption of the individuals (McCarthy and Henson, 2005). There are also evident in the literature to identify segments of consumers based on their use of and trust in information sources about fish (Pieniak et al., 2007).

Psychographic segmentation is referred as lifestyle analysis and help to identify consumer segments that are responsible for specific marketing messages. Lifestyle has been used as the basis of segmentation and it is originally focused on individual activities, interests and opinions (AIO). The validity of the concepts and measures of AIO has been criticised (Lastovicka, 1982). Food-related lifestyle developed as new instrument, which provides life-style based segmentation of food consumers (Kesic and Piri-Rajh, 2003). Honkanen et al. (2004) have mentioned that there are no always clear conceptual borderlines between different facets of segmentation variables.

Thus, the literature refers to several ways to categorize segmentation variables, as well as what variables are used as a basis for segmentation. This study will put a particular focus on value-based segmentation. Raaij and Verhallen et al. (1994) state that since human values considered as relatively stable and permanent characteristics of the consumers,

segments identified based on these characteristics can be applied to many products and services (e.g. vacation activities, mall shopping, e-shopping). Rokeach (1968) has contended that values are the central beliefs of the individual and therefore an examination of values provides an overall picture of the most central cognitive structure. Thus value may be more useful in understanding motives and behavior of the consumer.

2.2 The value systems approach as a segmentation basis

Value concept came to replace the other extensive approaches of market segmentation. Conceptualization of the term “value” reflects the interest of several disciplines such as anthropology, sociology and psychology. Marketing researchers mostly have followed the psychological definitions and in particular Rokeach’s view (Vinson et al., 1977). Role of values and value systems in consumer decision making is an area receiving great attention in the literature (Madrigal and Kahle, 1994).

According to the social adaptation theory, values facilitate adaptation to one’s environment (Kahle, 1983). A considerable number of researchers have suggested that values affect various aspects of consumption behavior and attitudes (Vinson et al, 1977; Jayawardhena, 2004). Further, internalized values become a criterion for guiding action and for developing and maintaining attitudes toward relevant objects and situations (Dreezens, 2005). Therefore values have been shown to be particularly useful in the examination of the consumer’s motives (Munson, 1984) and thus would appear very useful for understanding behavior. On the other hand personal values have been shown to be less numerous, are efficient, more centrally held, and more closely related to the motivation than demographic and psychographic measures (Kumakura and Novak, 1992). With the importance of the personal values in predicting individual’s behavior, many researchers have suggested that they may serve as an effective basis for market segmentation.

In the literature some researchers segmented the consumer markets using different variables and they have observed that each resulted segment possessing a unique personal

value profiles (e.g. Boote, 1981; Pitts and Woodside, 1986; Muller, 1991). According to these finding researchers suggested that the personal values can be fruitfully applied to the segmentation of consumer markets (Muller, 1991). Supporting for these findings, many studies found in the literature that has used personal value as the predictor variable for segmentation (Beatty et al., 1991).

Some studies in the literature have used single values either as criterion or predictor variable, rather than using a value system (Boote, 1981; Pitts and Woodside, 1986; Muller, 1991; Beatty et al., 1991). But Rokearch (1973) has argued that, once internalized, personal values are hierarchically ordered in a value system. In that system differentially ranked single values arranged according to their perceived importance for an individual. This value system is an important tool in individual decision making (Kumakura and Novak, 1992). Most of times in the life there may be conflict between values because more than one value activate simultaneously in most situations. Individuals rely on value system to resolve the conflict by adhering to only one value he or she found most important. This explained by Dreezens (2005) considering situation of people have to construct an attitude about new technologies like genetic modification. He mentioned that they may be guided by the values that they find important and if the attitude object fits with a person's values, s/he will derive a positive attitude toward the object.

Schwartz and Blisky (1987) noted that use of value system or domain as predictor variable of behavior provides a more effective and reliable measure than the use of single values. Rokearch Value Survey (RVS) (Rokearch, 1973), Schwartz Value Inventory (SVI) (Schwartz, 1992), List of Values (LOV) (Kahle, 1983), and Values and Life Style (VALS) (Mitchell, 1983) are some examples for such value system approaches for market segmentation. However it has identified that general personality characteristic are not well suited to explain specific behavioral differences. According to the review by Kassarjian (1971) an only few studies has shown a strong relationship between personality and aspects of consumer behavior while the majority indicates that even correlations do exist they are weak and perhaps meaningless.

The domain specific values, reflects the belief that people acquire values through experiences in specific situations or domains of activity and that behavior cannot be understood or efficiently predicted except in the context of a specific environment. Further, the domain specific values are beliefs relevant to economic, social, and religious activities, and are acquired by individuals through economic exchange and consumption, familial and peer group interaction, and religious instruction respectively (Vinson, 1977). This act as an intermediate value constructs and which create link between the general or personal values and the specific product evaluation or attitude towards product (Raaj and Varhallen, 1994). In the literature it has been demonstrated that even this domain specific value is cognitively separate from global values and attitudes, they are functionally related to those constructs. Specific attitude and opinions are also suggested as variable for segmentation and this may be a low aggregation level resulting distinction between new category users, brand loyals etc. Not like the general level, the market segmented according to domain specific variable, often a limited number of product class resulted while segmentation at brand specific level resulting brand attribute evaluation segments (Raaj and Varhallen, 1994).

By reviewing the existing value literature, Vinson (1977) proposed that values may be arranged in a three mutually dependent level of abstraction referred as global or generalized personal values, domain specific values and attitudes. Further he explained the influence of socio-cultural, economic, and familial environment on this system of beliefs to formation and development of the individual's value system.

Based on this discussion, I want in the following, classify value-based segmentation into three different approaches; General personal values and the value system approach, Values and lifestyle, and Domain specific value approach.

2.2.1 Personal values

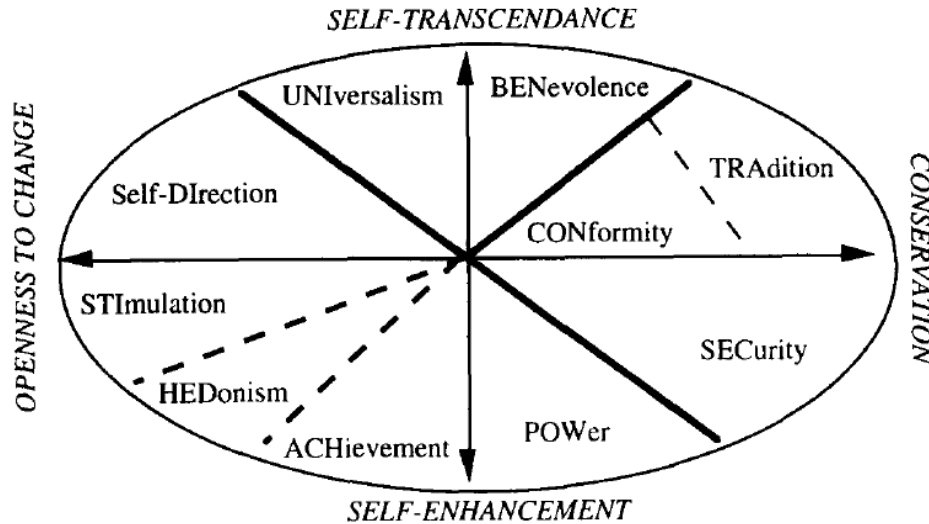
The personal values are related to the terminal values defined by Rokeach and type of values defined by Schwartz. Rokeach (1973, p.5) defined value as enduring belief that a

specific mode of conduct or end state of existence is personally or socially preferable to an opposite or converse mode of conduct or end state of existence along a continuum of relative importance. Personal values have been linked to consumer's motives (Vinson et al., 1977; Madrigal and Kahle, 1994) and behavior in number of different buying situations, including automobile purchases (Vinson et al., 1977) natural food shopping (Homer and Kahle, 1988), gift giving (Beatty et al., 1991) and vacation decisions (Pitts and Woodside, 1986). According to Lee and Worsley (2005) food choice is influenced by personal values in addition to food beliefs. Further these studies support to the identification of personal values as the main evaluative or guiding principles in people's lives. In addition to that Schwartz and Blisky (1990) have identified five factors used to define the personal values. They has described values as concepts or beliefs about desirable end states or behaviors, that transcend specific situations, guide the selection or evaluation of behavior, and are ordered by relative importance. Personal values influenced to one's attitude formation, cognition and behavior (Feather, 1982). The main distinct characteristics of personal value has identified as their more abstract nature with not focusing to any specific object or situation (Rokeach, 1968). With their more central location in one's cognitive system, the personal values are more stable over time (Rokearch, 1973) and hence they have identified as better predictors of an individuals attitudes and behavior (Homer and Kahle, 1988).

Kumakura and Novak (1992) mentioned that the value system, rather than a single value, should provide a more complete understanding of the motivational forces driving individual's belief, attitudes and behavior. Shwartz and Blisky (1987) states that single values are grouped in this system based on their similarities and differences. In this study, as mentioned earlier, it has focused on relevant personal values belong to SVI as basis for market segmentation. The SVI incorporates most of the values contained in the RVS and it has overcome problem of non redundancy as a threat to reliability and factor variance as a threat to validity. Due to the validity of the SVI it has facilitated to achieve cross cultural comparability (See Grunert and Juhl, 1995 for a review).

Schwartz (1992) has shown that personal values can be categorized in to eleven motivational domains such as universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation, self-direction and spirituality. These motivational domains reflect either an individualistic interest dimension, or a collectivist, or both. These value types have been illustrated by arranging in a circular manner (figure 1). Spirituality has omitted from that circular arrangement due to the doubt on the universality of that domain. However, Schwartz has indicated that it can be located in between benevolence and tradition domains.

Rest of ten universal domains can be simplified in to four higher order value types such as Self transcendence, Self enhancement, Conservation and Openness to change (Schwartz, 1992; Grunert et al., 1995). Each value type represents by separate region of that circular arrangement which emerging from a common origin. Values near the boundaries of adjacent value types slightly overlap in their motivational meaning and are most compatible. But when increase the circular distance, decrease the compatibility among the value types. Values and value types that express opposite motivational meaning show greatest conflict and have emerge in opposing direction from the origin. Ten value types discuss above are organized in to two dimensions in the figure (see figure 2.1). First dimension is openness to change (self direction and stimulation type) versus conservation (security, conformity and tradition). Second dimension is self enhancement (achievement and power) versus self transcendence (universalism and benevolence). Hedonism is related to both openness to change and self enhancement (Schwartz, 1992; Grunert et al., 1995).



(Source: Schwartz, 1992)

Figure 2.1: Value domains and the structural relations among them

Therefore based on the literature and the accordance with the context (wild and farmed fish) of the study, this study wants to include values under the domains of universalism, benevolence and security to measure the personal values of the consumers. Benevolence values are motivated by the goal of the welfare of those people with whom one is in close contact, and includes values such as helpful, honest and forgiving. Universalism values focuses on the understanding, appreciation and tolerance of other people and ideas and, protection of the welfare of all people and nature. It includes values such as equality, protecting the environment and unity with nature etc. The values under security domain represent the goal of safety, harmony, and stability of society, relations and self (Schwartz, 1992). With including these values as one of the basis, in this study it is expected to identify the consumer segments based on personal values.

2.2.2 Values and Lifestyle

The concept of lifestyle has been developed to measure behavior as a function of inherent individual characteristics and defined as pattern in which people live and spend time and money (see Kesic and Piri-Rajh, 2003). Mitchell (1983) developed one of the more intriguing value methodology at Sri international called Values and Life Style (VALS).

In this approach, approximately 34 questions with various specific and general attitude statements and several demographic items has identified as useful in systematically classifying the US citizens in to nine different segments. The identified segments are the survivors, sustainers, belongers, emulators, achievers, I- am-me, experiential, societally conscious, and integrated. Those segments had distinct values and lifestyle patterns, leads to suggest VALS as basis for different marketing decisions.

Even the system of VALS widely used in commercial applications, it has rarely been investigated in academic research areas may be due to the conclusion of superior performance of LOV over VALS drawn by Kahle et al. (Novak and Macevoy, 1990). But Novak and Macevoy (1990) mentioned that VALS may be preferred over LOV as a segmentation basis with extensions of the set of 64 Leading Edge items. Even researchers predict some of the advantages of LOV over VALS, the best segmentation approach depends upon the particular goals and purposes of the segmentation (See Kahle et al, 1986 for a review). Although VALS 2 has introduced later by including more psychological factors, VALS 1 is considered more interested than VALS 2 (see Kesic and Piri-Rajh, 2003 for a review). Thus this study wants to include Values and Lifestyle as one of the variable use to identify consumer segments.

2.2.3 Domain specific values

Since general personal values tend to be widely shared by all members of a culture, those will not provide a better explanation and unlikely to account for much of the variability in specific attitudes and behaviors. Further, influence of personal values on attitudes and behavior occurs indirectly via domain specific values in the cognitive hierarchy and therefore, those basic beliefs serve to strengthen and give meaning to global values (Fulton et al. 1996; Vaske and Donnelly, 1999). Some other researchers refer to beliefs at domain specific level as value orientations or food related lifestyles (Vaske and Donnelly, 1999; Honkanen et al, 2006). Beliefs at this level are described as more numerous and specific than global values, and more abstract than attitudes. Honkanen et

al (2006) has states that the ethical food choice motives can be defined as value construct at domain specific level.

According to Lea and Worsley (2005) these values has been identified as the mostly related value type with the vegetarians and the people who have the strong attitude towards ethical and environmental friendly food consumption. Some studies have shown that even the personal values are better predictor of the behavior of the consumer; the predictive power of personal value is slightly less (Lea and Worsley, 2005). According to a food related study done by Grunert et al. (1993) personal values are the most distal influence of the behavior while beliefs are more proximal. Values and attitudes with regard to the behavioral domain will provide a better explanation than general personal values for specific behavior. To clarify this, Raaj and Varhallen (1994) measured general personal values; same values held with regard to breakfast (domain specific) and assessed the qualities of breakfast products such as margarine. It was found, as an example that the personal values (family security) corresponded significantly with domain specific values (extensive breakfast), but not with attitudes toward product (taste importance for margarine). However, these breakfast evaluations (extensive breakfast) were correlated significantly with the specific product evaluations (Raaj and Varhallen, 1994).

Literature prove that the consumers are highly concerned about general environmental and sustainability issues related to fishing in general rather than fish welfare issues (Frewer et al., 2005; Vanhonacker et al., 2006; Honkanen and Olsen, 2009). But Honkanen and Olsen (2009) viewed that consumers' attitudes related to farmed and wild fish can be linked with concern about the animal welfare issues such as rights to keep in captivity and painful feelings to animals. Verbeke et al. (2007b) found that refusing to eat wild fish by Flemish women is related to the sustainability and ethical concerns while rejection of farmed fish is driven by lower expected intrinsic quality rather than sustainability and ethical issues. Finding of the Honkanen and Olsen (2009) further confirm this by reporting that fish farming does not seem to arouse animal welfare concerns among the consumers. In their study, majority of the consumers has disagreed with the statements regarding violation of animal rights in fish farming. According to

Honkanen and Olsen (2009) some consumers may even evaluate fish farming positively since it may help to save the wild fish stocks from overexploitation while some are fear about the escapees.

Consumers' health consciousness has been heavily promoted during the last few decades, and as a results distinct trends towards healthy food consumption can be observed (Leek et al., 2000; Tudoran et al., 2009). When consider about elder consumers, they rate nutrition and health as important aspects of food selection (Roininen et al., 1999), reflect their involvement of healthy eating. But Leek et al. (2000) state that despite there is trend towards healthier eating, the consumption of food which consider as healthy has decreased. Since the regular consumption of fish is related to a lower chance of several chronic diseases, including cardiovascular disease (see Verbeke and Vackier, 2005), an increase in fish consumption would fit the healthy eating trend. The evaluation of wild versus farmed fish may be different according to the involvement of healthy eating of the consumer. For example, Verbeke et al. (2007a) states that Belgium consumers had considerable trust in aquaculture activities specially when considering safety issues; since the toxic contaminants can be easily controlled in farmed fish than in wild ones. On the other hand substances such as growth hormones believed to be present more in farmed fish.

This study will identify values in at least two different domains. First, it is related to a domain of food attitudes and behavior – and particular in the area of fish. Secondly, my intention is to understand possible differences in values related to farm versus wild fish. This differences open up for possible segments based on ethical, environmental and health values. Some of my expectations will be presented in the next section.

2.3 Profiling the segments

Numerous attempts have been made to characterize food-choice factors and their mutual relations (Furst et al., 1996; Shepherd, 1989). Based on current food-choice models all factors may be attributed to one of the three groups such as product-related factors,

consumer-related factors and environment-related factors (Furst et al., 1996). Each model differs from others in the way it places the emphasis on these aspects.

In the psychological perspective, many empirical studies have combined these interrelated factors to explain the behavior toward food choice and intake. These models includes the theory of planned behaviour (Scholderer and Grunert, 2001), the theory of reasoned action and the attitude strength theory (Olsen, 2001), the behavioral perspective model (Leek et al., 2000) and the model of buying behaviour of food products (Acebron et al., 2000). Together with other conceptually independent determinants, all of these models include attitudes to explain the variance in food consumption patterns. For example, the TPB postulates three conceptually independent determinants of intention such as attitude, subjective norms and the perceived behavioral control (Ajzen, 1991; Verbeke and Vackier, 2005). There are enough researches proving the relationship between attitudes and values by explaining how values guide individual's behavior by flowing influence from abstract values to midrange attitudes to specific behaviors (Homer and Kahle, 1988). According to this value-attitude-behavior hierarchy model, values are the most abstract of the social cognitions and from these abstractions attitudes and behaviors are manufactured (Vaske and Donnelly, 1999). This model has widely applied to investigate the influence of human values (general-personal/domain specific) towards different food/fish consumption behavior studies (e.g. Tudoran et al., 2009; Grunert and Juhl, 1995; Honkanen et al., 2006).

As discussed above, food/fish consumption behavior is affected by various factors. It has found that intention to consume fish product is mostly driven by health and less driven by hedonic reasons compared with other food products (Olsen, 2004; Tudoran et al., 2009). Kole (2003) indicate that consumers' levels of knowledge is aspects that play a important role in fish buying decisions, attitudes and perceptions towards farmed versus wild fish. Study of Verbeke et al. (2007b) have indicated that the sustainability and ethics with respect to fish were quite important to the consumers and the rejection of wild fish influenced by sustainability and ethical considerations to some extent, whereas refusing farmed fish is mainly due to lower intrinsic quality expectation (nutritional value,

healthiness, and taste) rather than sustainability and ethical considerations. Some studies indicate that consumers appreciate farmed fish as good as wild fish and sometimes slightly better in freshness, taste, juiciness and firmness (Luten et al., 2002). Further, environmental groups, several organizations which concern about environmental issues and public health (Staniford, 2002; Babcock and Weninger, 2004) and family members influence on fish consumption decision making of consumer and selection of wild versus farmed fish.

Honkanen and Olsen (2009) indicated that in their study the fish consumption was highest among the Wild fish concerned consumers while lowest and average among Unconcerned and Ambivalent groups respectively. Attitudes towards farmed fish, the importance of food naturalness, social class were considered as important factors when identifying the difference between consumers in their study. As reviewed by Kole et al. (2009), information about product type, price, freshness and the advantages of fish farming could influence on the decision making of the consumers and when product labelled as wild, it was highly priced.

The term profiling the segments in the literature has been used to describe the post hoc application of segmentation descriptors. Under the post hoc approach there are no constraints of determining the type and number of segments in advance as in priori approach. In this approach the number and characteristics of segments are determined by the data analysis (Green, 1977). But in some cases the identified segments after the data analysis do not clearly satisfy the identifiability and accessibility criteria which are required to assess the viability of the segments. Therefore a more detailed profile of consumers is required (Wedel and Kamakura, 2000). This raises the importance of identifying the differences between segmentation variables and segmentation descriptors or profiling variables. Wedel and Kamakura (2000) indicated that these profiling variables typically include demographic and socioeconomic characteristics and profiling by using these variables can substantially improve the appropriateness of marketing programmes developed. Similarly Hooley and Saunders (1993) have stated that the resulted segments can be further described on common characteristics such as

consumers' demographics and attitudinal characteristics will enable relevant media to be selected for promotional purposes and to get clear picture of the chosen segments (See Dibb and Wensley, 2002 for a review).

Therefore based on above discussion, this study wants to include frequency of fish/food consumption, attitude towards wild and farmed fish, norms and expectations from others (to consume wild and farmed fish), WTP for wild and farmed fish as an intentional variable, knowledge of the consumer (about fish and fish farming) as a barrier to consumption, and some basic demographics factors (age, gender, education, income, marital status, family size) in profiling the consumer segments. Frequency of fish consumption has been already discussed above and rest of the variables will be discussed in the next section.

2.3.1 Attitude towards wild and farmed fish

Food choice is a complex phenomenon depends on many factors which affect human behaviour. Attitudes are considered as one of the main determinants of food consumption behavior (Shepherd and Raats, 1996; Homer and Kahle, 1988). It influence on intention to buy food to a higher degree (Povey et al., 2001) and to a lesser degree on actual consumption (Verbeke and Vackier, 2005). Values are assumed to be building block of these attitudes (Dreezens et al., 2005) and several motives that determine the consumer's attitude to food choice has identified. Consumers' attitudes toward wild/farmed fish can be defined as the psychological tendencies that are expressed by evaluating the particular fish product with some degree of favour or disfavor (Eagly and Chaiken, 1993). The consumer's acceptance of seafood products depends on several attributes of food quality such as safety, nutrition, flavor, texture, color, appearance and the suitability of the raw material used for processing and preservation etc. (Haard, 1992).

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Verbeke et al. (2007a) found that even the majority of the Belgium consumers have no perceived differences between farmed versus wild fish, their mean perception scores were slightly in favour of wild fish on the attributes. They perceived that wild fish is healthier and more nutritious than farmed fish, but have trust on the aquaculture activities in term of safety issues. The controllability of the toxic contaminants in farmed fish than in wild one is the reason for that. Kole et al. (2009) found that information about product type, price, freshness and advantages of fish farming could influence product evaluation. Farmed cod was better appreciated when consumer do not know about the origin while they evaluate farmed fish as less favorable when know about the origin. Moretti et al. (2003) also states that consumer interest has increased recently on natural or wild fish products with declining confidence in quality and safety issues of farmed fish as well as concern about environmentally friendly production methods. Luten et al. (2002) found that Dutch consumers seemed to appreciate farmed cod as good as wild cod and some times slightly better in freshness, taste, juiciness and firmness. Farmer et al. (2000) also reported that even there are textural differences between farmed and wild salmon, the farmed salmon is at least as acceptable as the wild ones. The limitation of the wild fishery is the inability of the producer to influence the food quality attributed of the fish by controlling rearing conditions. The fisherman can only control, the harvest and post harvest part of the quality assurance system (Haard, 1992). Thus this study will focus on attitude toward both wild and farmed fish as profiling variables.

2.3.2 Norms and expectations from others

Social norms are intended to measure the influence of social environment, and are often operationalized as perceived social pressure or expectations from people in general (subjective norms) or from specific groups or individuals (normative beliefs) to perform or not to perform the behavior (Ajzen, 1991). It has widely accepted that the norms and

expectation from others has significant influence on food/fish purchasing behavior of the consumer (Olsen, 2004; Verbeke and Vackier, 2005). For example, the people, who think positively about the purchasing environmentally friendly food, have influence on the attitude formation of others (Tarkiainen and Sundqvist, 2005). If consumers believe that those people important to them think wild or farmed fish are good, then they will have more intention of purchasing that particular fish type. On the contrary, if consumers believe that those people important to them think wild or farmed fish are bad, then they will have lower intention of purchase.

It has reported that fish farming presents global environmental problems in terms of escapees, the spread of infectious diseases, parasite infestation, the reliance upon toxic chemicals, contamination of the seabed and the discharge of untreated waste effluents (See Staniford, 2002 for a review). Babcock and Weninger (2004) state that there is expectation of pressure from environmental groups would lead consumers away from the farmed products. Recent environmental groups (primarily against the salmon farming industry) may scare consumers away from farmed and toward wild salmon (Babcock and Weninger, 2004). Staniford (2002) also reported that consumers are being asked to consume wild fish by environmental groups. On the other hand, Koivisto and Sjoden (1996) state that even the purchases of some foods are not generally ethically motivated for some people, they purchase ethically produced foods due to family expectation (e.g. it concerns my children things like animal welfare). Tuu et al. (2008) found that social norms and descriptive norms have a significant positive effect on behavioral intention of food/fish consumption in Vietnam

Scientists sometimes argue that capturing fish is same to hunting terrestrial animals for food, which has almost entirely been replaced by farming livestock. Therefore aquaculture development is sometimes promoted as a means to relieve the pressure on wild fisheries (Goldburg and Naylor, 2005). Whilst, WHO (1999) has warned that aquaculture and farmed fish products now represent a global threat to both the marine environment and consumer safety. Currently Food Standards Agency is advising consumers only to eat one portion of oily fish per week while there are evidence that

some type of farmed fish contain up to 4-5 times the fat content of wild fish (e.g. salmon) and fed with so fatty and contaminated feed. The consumption of fish fed with fishmeal and fish oil from contaminated areas carries with a public health warning from EC's Scientific Committee on Animal Nutrition, EC's Scientific Committee on Food and government of the UK (Staniford, 2002). Therefore in this study norms and expectations from family, friends, food industry, doctors, advertising, environmental groups and government related to the both wild and farmed fish consumption will be used as profiling variable.

2.3.3 Willingness to pay

Generally in consumer surveys it is often determine the consumers' willingness to pay (WTP) for features either intrinsic or extrinsic to a product. Price premiums may be indicators of consumers' demand for that product (See Krystallis and Chryssohoidis, 2005 for review). In many countries consumers are becoming more interest about the food they eat and are increasingly concerned with food production issues such as food safety, quality, health, environment and animal welfare. The producer concern has also been encouraged by consumers' WTP price premiums (Aarset et al., 2004).

Formation of new regulations to force on informing consumers about the origin (wild or farmed), country of production or catch and the production process in order to obtain differentiation in price, provide evidence for variation of consumer WTP for wild versus farmed fish (Defrancesco, 2003). On the other hand some researchers has indicated that when product labelled as wild, it was highly priced, explain the consumers WTP for the wild origin of the fish products. Alfnes et al. (2006) conducted a study to investigate consumers' WTP for salmon with various degrees of flesh redness, and to investigate whether information on the origin of the color influences consumers' WTP. They mentioned that the farmed salmon acquire color from feed additives while wild salmon obtain their characteristic red color from the crustaceans they eat in the sea. But in recent years, consumer focus on food safety, ethical production, and animal welfare has increased, and food additives used for cosmetic reasons are cause debate. Hence, Smith

and Lowney (2003) have argued that consumers' WTP for farmed salmon would decrease if they knew the origin of the color (Alfnes et al., 2006).

Holland and Wessells (1998) state that when consumers presented with equally priced USDA (U.S. Department of Agriculture) inspected salmon versus wild USDA-inspected salmon, 81 percent are predicted to choose the farmed product over the wild product. Further, high-priced, FDA (Food and Drug Administration) inspected farmed salmon had higher demand over farmed, low priced product. This explains the consumers WTP for the safe fish product. They explained that this may be result of the perception that farmed salmon is higher quality and safer than wild due to the farmed product is connected with a product which has some degree of control. Thus this study will measure the consumers' WTP for both wild and farmed fish as intentional variable to profile the segments.

2.3.4 Knowledge about fish and fish farming

Consumer knowledge is an important factor in explaining choice of seafood (Olsen, 2004). Empirical researches have identified two different categories of knowledge as subjective knowledge and objective knowledge. Subjective knowledge can be defined as "person's perception of the amount of information about a product class stored in his or her memory". It can be over or under estimated and thought as including in the person's degree of confidence in his/her knowledge (Chiou, 1998). Knowledge is related to several aspects in sea food consumption from evaluating the quality of raw material in the market to the final dishes and highly correlated with frequency of use and experience (Olsen, 2004). Knowledge about the fish and fish farming is important in consumer selection of wild versus farmed fish (Verbeke et al., 2007b; Honkanen and Olsen, 2009).

Verbeke et al. (2007b) found that consumers who refusing to eat farmed fish reported a significantly higher subjective knowledge about fish with respect to fish quality and apparently associate farmed fish with lower intrinsic quality as compared to those accepting farmed fish. Further, these consumers highly scored on general attitude, health, and nutritional value of fish (Verbeke et al., 2007a; 2007b) indicate that they perceived

farmed fish as worse than wild fish on these issues. But this consumer opinion is contrast with scientific evidence mentioning absence of such difference between the two types of fish indicate the lack of consumer knowledge concerning aquaculture production process (Verbeke et al., 2007a; 2007b). On the other hand consumption decision of wild fish did not associate with subjective knowledge of the consumers. Some studies shown that even the consumers have sufficient knowledge about the fish farming activities, it is not barrier to eat farmed fish since they do not have ethical concern about farmed fish. For example, Honkanen and Olsen (2009) found that the perceived knowledge about fish farming practices is highest among The Wild fish concerned consumers but they have the lowest level of concern towards fish welfare issues in fish farming. Thus, in this study knowledge about fish and fish farming will be use to profile the segments as barrier to fish consumption.

2.3.5 Socio demographics factors

Social demographic variables such as *age and gender* were significant in explaining fish consumption decisions (Verbeke and Vackier, 2005) while income plays a small role (Myrland et al., 2000). Most empirical studies indicated that elder people in general eat fish more often than younger people (Olsen, 2003; Myrland et al., 2000). However, some studies have not found any significant relationship between age and seafood consumption (See Olsen, 2003). Gender differences appear to be important in the food choice and consumption of fish tends to be higher among women may be due to higher health consciousness as compared to men (Verbeke et al., 2007b). Boys are trying to eat certain foods in order to gain physical fitness and more interested in choice of food while girls discussed this issue only reference to weight (Neumark et al., 1999). But some studies have found that there is no gender difference regarding seafood consumption levels (Nayga and Capps, 1995; Myrland et al., 2000). In the literature it appears that the *education level* of the consumer in explaining seafood consumption has play an important role (Nauman et al., 1995; Myrland et al., 2000). This may mean that those with higher levels of education are more likely to be exposed to the arguments by nutritionists that explain the seafood as alternative for meat to improve health (Myrland et al., 2000).

Several studies in the literature have identified the ethically conscious consumer in term of demographic characteristics while some other researchers (e.g. Dickson, 2001) indicate that such consumer can not discriminate by those characteristics. Verbeke et al. (2007b) identified ethical concerned fish consumer as an *older* person who has a higher subjective knowledge about fish quality. They expect a higher benefit with respect to sustainability and better fish welfare in fisheries and aquaculture. On the other hand Anderson and Cunningham (1972) found that younger consumers were more socially conscious while the effect of their education level was not clear and *income* level was not relevant. Some researches have state that if consumers had more money, they actively search out products from more contented animals especially ethically produced products (e.g. organics) (Schroder and McEachern, 2004). But some times family income is reported as uniformly poor as a discriminator of social responsibility (Anderson and Cunningham, 1972). Hursti and Magnusson (2003) show that high proportion of *women* hold positive attitude toward organic food consumption than men do. Similarly, Hoek et al. (2004) has identified that vegetarians are predominantly women with highly education level. But Verbeke and Viaene (2000) indicate that male meat consumers attached more importance to the attribute of animal friendly production.

On the other hand Verbeke et al. (2007b) states that there is no difference observed in socio demographic character, in terms of *age or gender*, of consumers rejecting either farmed or wild fish. But there was tendency of lower education among the consumers refusing wild fish. Honkanen and Olsen (2009) identified that consumers in the Wild fish concerned group has higher education and belong to highest *social class* while consumers in the Unconcerned group possess lower levels of education, lower social class and men are likely to belong to this group. Further, consumers who ambivalent about farmed fish are mostly consist of middle social class women and they possess lower level of education. Based on the above discussion this study also wants to include age, gender, education, income, marital status and family size as demographic variables to profile the segments.

2.4 Conceptual model

The purpose of the theoretical discussion given above is to clarify various concepts and to form a conceptual model for this study. Values have been considered to be a powerful force in governing the behavior of individuals in all aspects of their lives including food consumption decision making. The variables selected to use as bases for the market segmentation in this study are personal values, values and lifestyle, and domain specific values. Personal values under the self transcendence higher order value type i.e. Universalism and Benevolence and domain specific values such as Environmental and fish welfare concern in general, Farmed fish welfare concern and Health involvement will be used. In this study it discusses the importance of the ethical, environmental and health issues for the respondents and how it affects to the farmed and wild fish consumption. Further it examine whether the fish (farmed/wild) consumers are a homogenous group, or, if it is in fact possible to identify distinguishable, practice relevant and addressable segments using these values as the basis for segmentation.

In order to gain the clear understand about the fish consumption behavior of the respondents, it is also important to study the segmentation variables together with profiling variables. Thus, this study includes the conceptual discussion of determinants of fish consumption with a more specific review on their influence in wild versus farmed fish consumption. Above discussion has provide explanation on variables used to profile consumers in different segments, including fish consumption frequency, attitude towards wild and farmed fish, norms and expectations from others, WTP, knowledge of the consumer (about fish and fish farming), and some basic demographics factors (age, gender, education, income, marital status and family size). The choice of these variables was based on the review of previous findings from the literature. A conceptual model for the value based segmentation is illustrated in figure 2.2

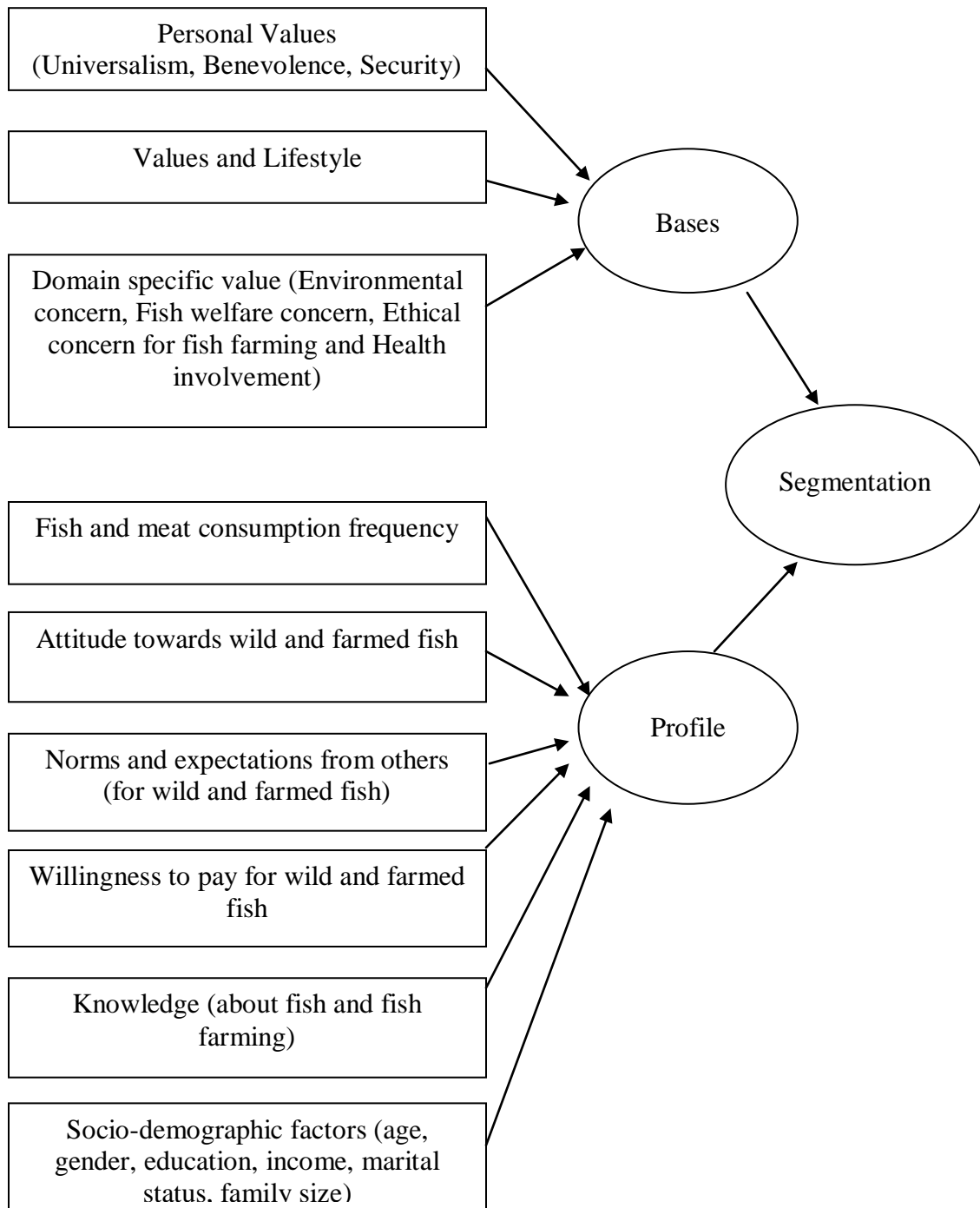


Figure 2.2: The conceptual model

The methodology applied to attain the objectives of this study will be discussed in the next chapter.

3. Methodology

The process of data collection, questionnaires and analysis methods are discussed in this section of the thesis. The main emphasis was given for designing items to measure the constructs. Cluster analysis, Discriminant analysis, ANOVA procedure and Crosstabs procedure has also discussed in this chapter.

3.1 Survey design and measurement procedure

Two broad categories of sampling methods can be found in the literature as probability and convenience sampling. Convenience sampling or non-probability sampling is mainly applied due to convenience of accessibility. Probability sampling methods includes sub categories as random, stratified, cluster, and multistage sampling methods (Yu and Cooper, 1983). It should be noted that this study use the convenience sampling with focusing easy of access to the respondents in the research area.

By using convenience sampling method, quantitative consumer survey was carried out in Nha Trang, Vietnam in March 2010. A random sample of 250 respondents was selected and 209 of usable questionnaires could be obtained from the survey. The English version of the questionnaire was developed and it was directly translated to Vietnamese version using bilingual researcher. The Vietnamese version was then back-translated into English by a different bilingual researcher to identify the problems with the original translation. Vietnamese versions of the final questionnaire were pre tested using convenience samples of 10 employees of the Nha Trang University, Vietnam. Several help mates were used to collect the data by personally delivering the questionnaire to the respondents at their residence or work place and then collected it later at agreed upon time. The questionnaire was fully self-administered.

The questionnaire, measuring a wide variety of constructs including personal values, ethical concern and environmental concern related to fish, ethical concern for farmed fish, health involvement, Values and Lifestyles as basis for segmentation and fish/food

consumption, attitude towards wild/farmed fish, WTP, norms and expectations from others, knowledge about the fish and fish farming and some socio-demographic characteristics as profiling variables has been consisted with multi-item questions. The measurements was developed benefiting from previously developed scales and measures in the literature. The questionnaire had multi-item questions and a mix of seven-point semantic-differential, seven point likert-related scales and multiple rating list scale. The reliability of the scales was assessed by Cronbach's Alpha.

3.2 Measurements of the segmentation variables

3.2.1 Personal values

Personal value measures of Universalism, Benevolence and Security domains (21 items) were selected from Schwartz's 56-item personal values inventory (Schwartz, 1992), and were translated into Vietnamese. Values were presented with brief explanations of their meanings in parentheses, e.g., "unity with nature (fitting into nature)" and "equality (equal opportunity for all)". Respondents were asked to indicate the level of importance they attach to each personal value as a guiding principle throughout life, on a multiple rating list scale ranging from 1 = Not important to 7 = Very important (see Appendix 1.1).

3.2.2 Values and Lifestyle (VALS)

The lifestyle defined as pattern in which people live and spend their time and money (see Kesic and Piri-Rajh, 2003). Values and Lifestyles (VALS) items adopted in this study were selected from the Values and Life Style methodology which developed by Mitchell (1983). In that approach, approximately 34 questions were included and ten most relevant items has considered in this study. VALS items were measured on a seven-point Likert scale anchored by 'Strongly disagree (1), 'Neither agree nor disagree' (4), and 'Strongly agree' (7). The items used are; I spend a lot of time on my homework, I often watch TV, Financial security is important to me, I'm very interested in sports, Feel have

more self-confidence than others, Family is most important thing to me, I often read news papers, I'm a spender, not a saver, Agree social status is important, and I'm very concerned about environmental questions (see Appendix 1.2).

3.2.3 Domain specific values

Environmental concern

Ethical consumption of the consumer can be defined as the purchase of a product that concerns a certain ethical issues such as animal well-being, environmental concern, etc. (see Pelsmacker et al., 2005). Honkanen et al. (2006) has defined the ethical concern of the consumer in food choice as a value under domain specific level. Scale to measure the Environmental concern for fish consisted with four items, adopted from Lindeman and Vaananen (2000) and was measured with a multiple rating list scale ranging from 1 = Not important to 7 = Very important. This construct was measured by using assertions such as “It is important to me that the fish I eat on a typical day . . .” “Has been produced in a way which has not polluted the sea or the other environments”, “Has been produced in an environmentally-friendly way”, “Is not threatened by over-fishing and loss species on the border of extinction” and “Is produced without negative consequences for the environment and nature” (see Appendix 1.3.1).

Fish Welfare concern

Fish Welfare concern of the consumer is measured by using a scale consisted with three items adopted from Lindeman and Vaananen (2000). The questions were presented with a scale ranging from 1 = Not important to 7 = Very important. The used items are “It is important to me that the fish I eat on a typical day . . .” “Has been caught and produced with respect for their rights and wellbeing”, “Has been caught and produced without suffering” and “Has been caught and produced in a friendly way” (see Appendix 1.3.2).

Ethical concern for fish farming

The consumers' ethical concern for fish farming was measured with a scale adopted from Honkanen and Olsen (2009). The scale consisted of six items, and was measured as an attitude question with a likert scale ranging from 1 = Strongly disagree to 7 = Strongly agree. At the mid point 4 = Neither agree nor disagree. This construct was measured by stating some assertions about farmed fish such as "I have no ethical concerns about eating farmed fish", "Fish farming can help to diminish over exploitation of wild stocks", "Fish farming violates animal rights", "The slaughtering of farmed fish causes unnecessary suffering for the fish", "Fish farming pollutes the environment" and "Fish farming is harmful for wild fish stocks" (see Appendix 1.3.3). The item of "I have no ethical concerns about eating farmed fish" was presented as a negative question and used revised scale when data entered to the SPSS.

Health involvement

Involvement can be define as a person's perceived relevance of the object based on inherent needs, values, and interests (Zaichkowsky, 1985). Involvement scale developed by Zaichkowsky (1985) and it often measured by items such as the important, relevant, means a lot to me, of concern to me, or interested linked to the attitude object, issue or action (Zaichkowsky, 1985). It also corroborates the food involvement scale suggested by Bell and Marshall (2003) (See Pieniak et al., 2008 for a review). In this study, health involvement measured with a scale consisted of five items which used by Honkanen and Olsen (2009) such as "It means a lot to me to have good health", "Good health is important to me", "I often think about my health", "I think of myself as a person who is concerned about healthy food" and "I am very concerned about the health related consequences of what I eat". Respondents were asked to score the each items on a seven-point Likert scale anchored from Strongly disagree (1) to Strongly agree (7) and at the midpoint (4) Neither agree nor disagree (see Appendix 1.3.4).

3.3 Measurements of the profiling variables

3.3.1 Fish/food consumption frequency

Fish/food consumption behavior was measured as self-reported frequency of consumption during the last year. The measure of this construct is parallel with some previous studies (e.g. Honkanen and Olsen, 2009). The scale was ranging from never (1) to 5 times a week or more (9). The respondents were asked how many times in average during the last year you have consumed given food items (e.g. pork, chicken, and beef) including fish (e.g. wild/farmed tilapia, shrimp, carp, pangasius) as a meal (see Appendix 1.4). In addition to that the consumption of wild fish and farmed fish also measured. For example tilapia, pangasius like well known farmed fish types have been included to observe the respondents real consumption of farmed fish and make them to understand the clear distinct between the wild and farmed fish through such examples.

3.3.2 General attitudes

Attitude is defined as an association in memory between a given object (e.g., a fish product) and a given summary evaluation of the object (Fazio, 1995). In this study, attitude toward wild/farmed fish consumption was assessed as global evaluation. Global attitude and evaluative responses in attitude research are usually assessed by their valence and extremity. The valence of the attitude is mostly assessed in terms of positive/negative, pleasant/unpleasant, favourable/unfavourably, like/dislike, good/bad, satisfied/unsatisfied whereas extremity is assessed in unipolar scale with judgment estimate of agree-disagree (Eagly and Chaiken, 1993). In this study, it was assess the participant's attitudes toward wild fish using five items on 7-point semantic differential formats. Then same five items used to assess attitudes toward farmed fish by mentioning "it is possible that the species of farmed fish you are familiar with is different for the one of wild fish". "We are interested to know your general opinion about farmed versus wild. Thus, try to think about the same kind of fish you have evaluated in the previous questions (wild) – and think it was farmed". As in previous studies (Olsen, 2001;

Verbeke and Vackier, 2005), in this study, respondents were asked with “In the following we would like you to think about how you feel when you eat wild/farmed fish as meal and the used bipolar adjectives were bad/good, unsatisfied/satisfied, unpleasant/pleasant, dull/exiting, and negative/positive with scale range from 1 (negative feeling) to 7 (positive feeling) (see Appendix 1.5).

3.3.3 Willingness to pay

Price premiums paid over and above the ‘fair’ price may be an indicator of consumer WTP for product produced in environmental and animal welfare friendly way and concerning food quality/safety characteristics (Krystallis and Chryssohoidis, 2005; Vlosky et al., 1999). In this study the scale used to measure the respondents’ WTP for wild/farmed fish consisted of three items adopted from the scales used by Vlosky et al. (1999) and Laroche et al. (2001). Items were measured with likert scale ranging from 1 = Strongly disagree to 7 = Strongly agree. At the mid point of the scale 4 = Neither agree nor disagree.

WTP for wild fish was measured by asking respondents to indicate how much they disagree or agree for the statements of “I would pay a price premium for wild fish products”, “It is acceptable to pay 10 % more for wild fish products compared to farmed fish (the same species)” and “I would accept paying 10 % less for wild fish compared to farmed fish (the same species)” (see Appendix 1.6). The item of “I would accept paying 10 % less for wild fish compared to farmed fish (the same species)” is presented as a negative item and used revised scale when data enter to the SPSS.

Similarly, the WTP for farmed fish (for the same species) was measured by using three items as “I would pay a price premium for farmed fish products”, “It is acceptable to pay 10 % more for farmed fish products compared to wild fish (the same species)” and “I would accept paying 10 % less for farmed fish compared to wild fish (the same species)” (see Appendix 1.7). “I would accept paying 10 % less for farmed fish compared to wild

fish (the same species)” is asked as a negative item and used revised scale when enter date to the SPSS.

3.3.4 Norms and expectations from others

Social norms are defined as the perceived social pressure or expectation from the society (subjective norms) or from specific groups or individual (normative beliefs) (Fishbein and Ajzen, 1975; Olsen, 2004). In consistence with the definition, this study defines norms as social pressure and expectation that impact on people’s preference and choice to consume wild fish and farmed fish.

The measurements of this construct were adopted from previous studies (Verbeke and Vackier, 2005; Bogers et. al., 2004; Olsen, 2003; Tuu et. al., 2008). The construct assessed as the mean of seven items in this study. Subjective norm was measured separately by using 7 items for wild fish consumption. The same items used to measure subjective norm on farmed fish consumption. Respondents were asked to evaluate the items such as “My family thinks that I should eat wild/farmed fish”, “My friends think that I should eat wild/farmed fish”, “The government stimulates me to eat wild/farmed fish”, “Doctors and nutritionists think that I should eat wild/farmed fish”, “Advertising stimulates me to eat wild/farmed fish”, “Environmental groups stimulate me to eat wild/farmed fish” and “The food industry encourages me to eat wild/farmed fish”. The items were measured using a 7-point Likert-scale anchored from 1= Strongly disagree to 7= Strongly agree and at the mid point 4= Neither agree nor disagree (see Appendix 1.8).

3.3.5 Knowledge of the consumer

Knowledge about the fish

Consumer subjective knowledge is an important factor in explaining choice of seafood (Olsen, 2004). Subjective knowledge can be defined as “person’s perception of the amount of information about a product class stored in his or her memory” (Chiou, 1998). Knowledge about the fish was measured with likert scale ranging from 1 = strongly

disagree to 7 = strongly agree. At the mid point of the scale 4 = neither agree nor disagree. The construct measured by using items adopted from the study of Verbeke et al. (2007b). The respondents were asked to indicate how much they agree or disagree for the statements such as “compared to an average person, I know a lot about fish”, “my friends consider me as an expert in the domain of fish”, and “I know a lot about how to evaluate the quality of fish” (see Appendix 1.9).

Knowledge about the fish farming

In order to measure this construct the respondents were asked to indicate whether or not s/he consider as a person who know about fish farming. Scale used to measure the consumers' knowledge about fish farming was adopted from Verbeke et al. (2007b). The items are the “Compared to an average person, I know a lot about fish farming”, “My friends consider me as an expert in the fish farming” and “I know a lot about how to evaluate quality of fish produced on fish farms” and were presented on a 7 points likert scale ranging from 1 = Strongly disagree to 7 = Strongly agree. At the mid point of the scale 4 = neither agree nor disagree (see Appendix 1.10).

3.4 Analytical methods and procedures

The objectives of this study are to identify market segments of Vietnamese fish consumers based on personal values, values and lifestyles and domain specific values and further to find out how the segments can be profiled by frequency of fish consumption, attitude towards wild and farmed fish, norms and expectations from others, WTP, knowledge about fish and fish farming, and some basic demographics factors. The main analytical methods used are cluster analysis, discriminant analysis, ANOVA procedure and crosstabs procedure to achieve these objectives. All the estimations were done by using SPSS 17.0 software package. The analytical methods used are described in the following sections of this thesis.

3.4.1 Exploratory factor analysis and test of reliability

The main applications of factor analytic techniques are: (1) to reduce the number of variables and (2) to detect structure in the relationships between variables, that is to classify variables with similar characteristics together. Therefore, factor analysis is applied as a data reduction or structure detection method by finding latent variables or factors among observed variables. It can be identified the factor analysis as a technique used to determine the number of dimensions underlying the constructs (Churchill, Jr., 1979). Exploratory factor analysis is powerful statistical techniques to achieve this purpose. There are several types of factor analysis such as Principal component analysis, Canonical factor analysis, Common factor analysis, Image factoring etc. Principal component analysis (PCA) with varimax rotation used in this thesis for the purposes of overall inspection of the convergent validity of proposed constructs considering the factor loadings of items and to explore the latent constructs (sub-construct) if occurred for further analysis (Hair et al, 1995).

Kaiser-Meyer-Olkin (KMO) and Bartlett's test is performed to test the overall suitability of data for factor analysis. The KMO measures the sampling adequacy which should be greater than 0.5 and Bartlett test of sphericity suggest the probability is less than 0.05 (Pallant, 2005).

When items are used to form a scale, they need to have internal consistency. It means the items should all measure the same things and hence they should be correlated with one another. Therefore, before performing further analysis, the reliability of the resulting factors was tested by Cronbach's alpha measure of internal reliability consistency (Hair et al, 1995). The higher value of Cronbach's alpha indicates the higher inter-correlations among measures and it reflects higher reliability of measurements. Cronbach's alpha reliability coefficient is ranges between 0 to 1 and 0.7 or higher is considered as acceptable to describe the concept in question in most social science research situations (Pallant, 2005).

3.4.2 Cluster analysis

Cluster analysis and the profiling of the resulted segments are the two stages described in this section. In this study cluster analysis is used to identify segments of consumers based on their personal values, Values and Lifestyles, health involvement, environmental concern, fish welfare concern and farmed fish welfare concern. For this purpose the study was used the average factor scores of above segmentation variables to find out the cluster solution. Even there are many different methods of cluster analysis have been developed, the literature much focuses on two types such as hierarchical agglomerative methods and iterative partitioning methods (e.g. K-means cluster analysis). The advantage of partitioning method is provides clusters that satisfy some optimality criterion, but it required initial number of clusters. The disadvantage of Hierarchical method is that rigid and cannot correct later for erroneous decisions made earlier. In this study first used Hierarchical agglomerative method of cluster analysis to determine the number of clusters and the appropriate starting seeds. Then K-means cluster analysis was used to optimize the results (Milligan, 1980).

Analogous to previous studies (e.g. Clatworthy et al., 2005) in this study, procedure chosen for a cluster solution is performed by four steps. Similarity measure is performed by using squared Euclidean distance, which used to ensure grouping like-minded individuals considering scores on the variables of interest and accounting difference in elevation of scores (Clatworthy et al., 2005). Then first approximation of the solution obtained by one of the hierarchical agglomerative methods called Ward's minimum variance method. Next step is determining the number of clusters in the data; the most straightforward method of doing this is examined both the agglomeration schedule and the dendrogram. Since the cluster analysis process will identify clusters in any data sets, there is a need to show first that the clusters are stable, and then whether they are of value to the field of study. There fore final step is performed to examine both the stability and validity of the clusters.

In order to determining the stability of the clusters in this study, divide the study sample randomly into two halves and repeated the cluster analysis on each to verify the accuracy of the solution. However Ketchen and Hult (2000) suggested that employing multiple techniques may be the best way to assess the stability of the clusters. Stability of the clusters is only not a sufficient determinant of validity (Aldenderfer and Blashfield, 1984). The validation of the clusters must include some evidence of their value to the field of study. Therefore, repeated K-means cluster analysis with different starting seeds is used to examine the validity of the final solution. Discriminant analysis is also used to evaluate the accuracy of classification. In addition to that it determines which predictor variables contribute to most of the inter-group differences.

The second stage of the analysis is profile the clusters. Bivariate analysis including cross-tabulation and One-Way ANOVA comparison of means were used to profile the clusters in term of fish/food consumption, attitudes towards wild/farmed fish, WTP, norms and expectation from others, knowledge about fish and fish farming and socio-demographic factors to provide meaning to the resulted segments.

3.5 Sample

It is important to note that the random sampling method and respondent selection procedures do not yield a statistically representative sample of the Nha Trang or Vietnam, hence finding do not allowing generalizations to the overall population. Screening issue was used to select the educated respondents and persons constitute the larger part of responsible for food/fish purchases in the household. This is the reason why the proportion of high educated people and women was higher in the sample. The educated people were focused since they supposedly have some awareness on the concept of sustainability and ethical concerns. If respondents do not know the concept of sustainability, it make impossible to understand the questions and segment the respondents according to their related values.

The majority of the respondents in the sample was women (80.9 %) and almost all the respondents (89.5 %) were less than or equal to 45 years old. More than half of them were married (65.1 %). The average household size was 4.69. The mean family income of the sample was 4.42 million VND per month (1USD = 19,000VND). The majority of the respondents (87.6 %) have education level more than high school. The table 3.1 depicted the socio demographic information (gender, age, marital status, education, income and family size) of the sample.

Table 3.1: Socio-demographic characteristics of the sample (% of respondents, n = 209)

Gender	Male	19.1	Family size	1-3 persons	20.1
	Female	80.9		4-5 persons	53.6
				≥ 5 persons	26.3
Education	≤ high school	12.4	Family income (VND)/month	< 3 millions	33.0
	> high school	87.6		3-5 millions	40.2
				> 5 millions	26.8
Age	18-30 years	36.4	Marital status	Single	34.9
	31-45 years	53.1		Married	65.1
	> 45 years	10.5			
	Mean	32.7			

The next part of the thesis will present the results of the data analysis.

4. Results

This part of the thesis describes the results obtained from the data analysis. First it has described the results of exploratory factor analysis and reliability test for the measures used for segmentation. Then the result of descriptive statistics has presented, in which the means and standard deviation of the measures that used to segment the respondents has reported before mentioning the findings of cluster analysis. Thereafter the result of the discriminant analysis has presented. Finally, the results of factor analysis, reliability test and descriptive statistics for the profiling variables and profiling the clusters conducted using cross-tabulation and One-Way ANOVA comparison of means has presented.

4.1. Exploratory factor solutions for segmentation variables

Principle component analysis with varimax rotation and Kaiser normalization was performed on the respondents' responses to the items intended to use for segmentation. The aim of this was to examine the underlying relationship between the items and to summarize them into a smaller set of components or factors. First, an overall test for suitability of data for exploratory factor analysis is performed based on Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity. The KMO measure of 0.81 indicated the suitability of the data for satisfactory factor analysis to proceed. Bartlett test of sphericity were significant ($p < 0.001$) and this suggest the presence of non-zero correlations (Pallant, 2005). All the variables had an eigenvalue greater than one.

Principal components analysis with the 49 items covering Personal values, Values and lifestyles, Environmental concerns for fish, Fish welfare, Ethical concern for fish farming and Health involvement pertaining yielded a fourteen factor solution, explaining 71.1 % of cumulative variance. The factors beyond the eight factors mostly have cross loaded for different factors, less factor loadings or less reliability were observed (see appendix 2). Therefore the first eight factors were selected and these factors could explain 53.5 % of the variance in the original data (table 4.1). From the selected eight factors containing 39 variables, three items that have low factor loadings or have cross loadings on other

factors did not considered as suitable indicator to measure the particular construct (Hair et al, 1995).

Table 4.1: Variables used in the segmentation, with Factor loadings, Eigenvalue, variance explained, reliability indicators (Cronbach's Alpha)

Factors	Loadings	Eigenvalue	% of variance	Cronbach's Alpha
Safety and welfare of relatives		7.12	14.5	0.91
True Friendship	0.80			
Clean	0.76			
Helpful	0.75			
Family security	0.74			
Healthy	0.73			
Mature Love	0.69			
Responsible	0.68			
Wisdom	0.67			
Loyal	0.67			
Honest	0.63			
National Security	0.57			
Forgiving	0.56			
Environmental concern for fish		3.73	7.6	0.94
Not threatened by extinction	0.89			
No negative consequences envt.	0.88			
Not polluted the sea/other envt.	0.83			
Environmentally-friendly way	0.81			
Health involvement		3.37	6.9	0.85
I think about my health	0.83			
Health is important to me	0.80			
I concerned about healthy food	0.78			
I concerned about the health	0.73			
Lot to me to have good health	0.67			
Ethical concern for fish farming		2.94	6.0	0.82
Fish farming harmful to wild fish	0.80			
Farming violates animal rights	0.80			
Fish farming pollutes envt.	0.75			
Slaughtering causes suffering	0.68			
Fish welfare		2.89	5.9	0.94
Produced without suffering	0.85			
Produced in an envt. friendly way	0.85			
Respect for fish rights and wellbeing	0.80			
Harmony, beauty and broad minded		2.23	4.6	0.80
A world of beauty	0.75			
Broad minded	0.68			
Inner harmony	0.68			
Nature and environment		2.02	4.1	0.76

Protecting the environment	0.81			
Unity with nature	0.72			
News interest and spending		1.93	3.9	0.60
Often read news papers	0.76			
Spender, not a saver	0.67			
Self-confidence than others	0.50			
Total variance explained			53.5%	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization

Finally 36 items were selected and they had factor loadings greater than 0.6 except the items National Security, Forgiving and Self-confidence than others which shows factor loading greater than 0.5. Then internal consistency (Cronbach's alphas) was calculated for the most reliable measures. The Cronbach's alpha coefficients were all higher than 0.7 except for one factor (News interest and spending), which reported Cronbach's alpha coefficient of 0.6 that is still acceptable. The factor loadings of items and Cronbach's alpha are used to consider the suitability of the items in describing the latent constructs. The result from the factor analyses is presented in Table 4.1.

Twelve items loaded together to form factor 1. This factor represented consumers' personal values mainly refers to benevolence and security domains and named as factor of "*safety and welfare of relatives*" factor for ease of interpretation (see Table 4.1). The factor loadings of these items are high and the Cronbach's alpha was observed as 0.91, which exceeding far than the recommended level of 0.7 (Hair et al., 1995). This factor had an eigenvalue of 7.12 and could explain 14.5 % of the total variance.

The second factor, *environmental concern for fish*, included four items as expected. This factor had an eigenvalue of 3.73 and accounted for 7.6 % of the variance. The Cronbach's alpha was 0.94 was indicate the suitability of the items to measure this construct. Labeled "*health involvement*," the third factor included five variables as expected. This factor had an eigenvalue of 3.37 and explained 6.9 % of the variance. The reliability alpha of this factor was 0.85, well above the recommended level, which indicates the higher internal consistency of the factor. With an eigenvalue of 2.94 and explaining 6.0 % of the total variance, the fourth factor was labeled "*ethical concern for fish farming*." This factor

included four items with reliability alpha of 0.82. “*Fish welfare concern*” the fifth factor, included three items as expected and this factor had an eigenvalue of 2.89 with an explanation of 5.89 % of the total variance. The reliability alpha was 0.94.

Factor 6 consisted with three personal value items such as “a world of beauty”, “Broad minded” and “Inner harmony” and can be named as factor of “*harmony, beauty and broad minded*”. The factor loading of these three items were high and the Cronbach’s alpha was 0.80. This factor had an eigenvalue of 2.23 and explained 4.6 % of the variance. Factor 7 consisted with two personal value items such as Protecting the environment and Unity with nature, therefore named as factor of the “*nature and environment*”. The Cronbach’s alpha of this factor was 0.76 with an eigenvalue of 2.02 and explaining 4.1 % of the total variance. The last factor consisted with three items that measure the values and lifestyles of the respondents. The items such as often read news papers, spender not a saver and self-confidence than others are included in this factor and named as “*news interest and spending*”. The factor loading of the items were quite low and the Cronbach’s alpha was 0.60. This factor had an eigenvalue of 1.93 and explained 3.9 % of the variance.

The items which are not qualified to be included in a factor are: “Financial security important to me” and “Social status is important to me” that formed ninth factor, “Spend a lot of time on homework” and “I’m very concerned about environmental questions” that formed tenth factor. And also single items of “Fish farming can help to diminish over exploitation of wild stocks”, “I often watch TV” and “A world at peace” which are loaded to form factor 12, 13 and 14 respectively were not considered in further analysis. The ninth and tenth factors were excluded due to less reliability alpha of both constructs (0.44 and 0.42 respectively). The single items or factors with low reliability are for parsimonious reasons not included in further analysis, even though I am aware the included variables explain less than 55 % of the variance in the data.

4.2 Descriptive statistics of segmentation variables

As mentioned at the beginning of this study, it was aimed to include the descriptive study of variables used in segmentation as secondary issue. To be consistent with that, this section present the descriptive results of all the variables that used in identification of clusters before performing the results of cluster analysis. By doing this it was expected to understand the importance of these values to the consumers.

Table 4.2: Consumers' personal values, environmental and fish welfare concern

Segmentation variables	Mean (SD)
Safety and welfare of relatives	
True Friendship	6.1 (1.1)
Clean	5.9 (1.2)
Helpful	5.8 (1.1)
Family security	6.5 (0.9)
Healthy	6.2 (1.1)
Mature Love	6.1 (1.1)
Responsible	6.2 (1.1)
Wisdom	5.8 (1.1)
Loyal	5.8 (1.1)
Honest	5.9 (1.2)
National Security	5.9 (1.3)
Forgiving	5.8 (1.1)
Harmony, beauty and broad minded	
A world of beauty	5.2 (1.4)
Broad minded	5.5 (1.2)
Inner harmony	5.6 (1.3)
Nature and environment	
Protecting the environment	5.6 (1.3)
Unity with nature	5.5 (1.4)
Environmental concern for fish	
Not threatened by extinction	5.5 (1.4)
No negative consequences environment	5.4 (1.3)
Not polluted the sea/other environment	5.2 (1.5)
Environmentally-friendly way	5.2 (1.3)
Fish welfare	
Produced without suffering	4.1 (1.4)
Produced in a environmentally friendly way	4.2 (1.4)
Respect for fish rights and wellbeing	4.0 (1.4)

Table 4.2 shows that all the personal value factors are seems to be very much important for the consumers. Factor analysis extracted 12 items as factor of *Safety and welfare of*

relatives. From which one item (Wisdom) was belongs to the theoretical construct of Universalism domain. The mean value of this item was 5.8 on a 7-point multiple rating scale, indicate that this value is quite important to the consumers. Four items (Clean, National Security, Healthy, Family security) were belongs to the theoretical construct of Security domain. The average mean value of these items was 6.2 (on a 7-point multiple rating scale), indicated that these consumers are much concerned about basic individual and group requirements as well as safety in their daily lives. The rest of 7 values (True Friendship, Helpful, Forgiving, Responsible, Loyal, Honest, and Mature Love) belongs to the factor of *Safety and welfare of relatives* are comes under Benevolence domain. The average mean value of these items was 5.9 on the same scale as above. It means that the preserve and enhance the welfare of those people with whom one is in frequent personal contact also quite important to the respondents in this study (Grunert and Juhl, 1995).

The factor of *Harmony, beauty and broad minded* consisted with three items (A world of beauty, Inner harmony, Broad minded) which belongs to the theoretical construct of Universalism. The average mean value of these items were 5.4 on a 7-point multiple rating scale. The factor of *Nature and environment* included two items belongs to the domain of Universalism (Protecting the environment, Unity with nature). The average mean value of these items was 5.5 on the same scale as other personal values. The mean values of these two factors of Universalism values indicated that the understanding, appreciation, tolerance, and protection of the welfare of all people and nature were quite important to the respondents (Grunert and Juhl, 1995).

Table 4.2 also shows that the consumers much concerned about the environmental issues related to wild fish harvesting (average mean value was 5.3 on a 7-point multiple rating scale) and neutral or somewhat concerned about the fish welfare issues (4.1 on same scale). It should be mentioned that for the fish welfare statements around 25 % of the respondents were neutral. This may be a sign of respondent's less awareness about the welfare issues related to fish and fail to identify the relationship between their personal values and those related to fish they consume. However, they were able to differentiate between environmental or sustainability issues and fish welfare issues.

Table 4.3: Consumer concern about fish farming, health involvement and lifestyles

Segmentation variables	Mean (SD)
Ethical concern for fish farming	
Fish farming harmful to wild fish	3.1 (1.9)
Farming violates animal rights	2.9 (1.8)
Fish farming pollutes environment	3.7 (1.7)
Slaughtering causes suffering	3.2 (1.7)
Health involvement	
I think about my health	5.9 (1.3)
Health is important to me	6.3 (1.2)
I concerned about healthy food	5.6 (1.4)
I concerned about health consequences	5.7 (1.4)
Lot to me to have good health	6.1 (1.4)
News interest and spending	
Often read news papers	4.6 (1.7)
Spender, not a saver	3.8 (1.8)
Self-confidence than others	4.5 (1.3)

Further the respondents were slightly disagreed for the statement indicating Ethical concern for fish farming. The average mean value of these items was 3.2 on a 7-point likert scale. This explains that they do not concern about the potential ethical issues related to fish farming as seen in the table 4.3. However their health involvement seems to be very high (average mean value was 6.0 on a 7-point likert scale). When concerning the factor of *News interest and spending* that describing 3 lifestyle items, the respondents were slightly agreed for the statements of often read news papers and have self-confidence than others, but slightly disagreed for the statement of spender, not a saver. This indicate that the respondents in the sample were somewhat interest about the news, saving and have some self confidence

4.3 Clustering

Cluster analysis was employed to identify groups of respondents based on similar responses to questions. In order to perform cluster analysis, the mean values of each factor solutions were used as the basis for clustering. First, hierarchical agglomerative method of cluster analysis was performed to get an indication of the proper number of clusters and the cluster centroids. Ward's minimum variance method was used to maximize within-cluster homogeneity. An examination of the dendrograms and the increase in agglomeration coefficient resulted from the hierarchic clusters analysis suggested a three-cluster solution as the most appropriate. A K-means procedure was therefore run on the total sample using a three-cluster solution to examine the validity of the final solution. The sample was split into two random samples and the K-mean procedure was run again to assure the stability of the final solution (Honkanen et al., 2004).

Table 4.4: Summary statistics of cluster solution based on different dimensions of value and lifestyles

	I	II	III	F *	Sig.*
Size of the cluster	36.8 %	35.9%	27.3%		
Safety and welfare of relatives	6.4	6.0	5.4	36.05	0.000
Environmental concern for fish	6.3	4.3	5.4	82.24	0.000
Health involvement	6.4	5.7	5.5	13.61	0.000
Fish welfare	5.1	2.9	4.1	80.24	0.000
Ethical concern for fish farming	2.6	2.5	5.0	133.43	0.000
Harmony, beauty and broad minded	6.0	5.2	4.9	20.73	0.000
Nature and environment	6.3	5.3	4.9	31.98	0.000
News interest and spending	4.6	3.8	4.4	10.68	0.000

* F-value and Sig. of ANOVA (The significant level of 95%), **Note:** Clusters; I, II, III

The first cluster, being the largest segment of the consumer, consist 77 respondents (36.8 %) of the sample. The second and third clusters consisted with 75 and 57 respondents,

representing 35.9 % and 27.3 % of the sample respectively. The mean values of each of the eight factors for the members of each cluster were calculated (table 4.4). The summary information of the descriptive statistics reveals the importance of each of the factors for members of each cluster. The differences in mean score of each factor were found, which indicated that statistically significant differences in terms of all eight factors among the three clusters.

4.3.1 Testing the cluster solution

To test the solution, a discriminant analysis was used (see table 4.5 and 4.6). The objective of the discriminant analysis was to identify which dimensions best discriminated among the three clusters. Due to the confirmatory character of this analysis, the clustering characteristics are defined as independent variables, while the cluster membership or segments represents the dependent variable (Barnes et al., 2007; Woo, 1995).

Table 4.5: Results of the discriminant analysis

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.979	58.0	58.0	0.815
2	1.431	42.0	100.0	0.767

The table 4.5 represents some results of the discriminant analysis. Eigenvalue associated with first function (the first segment) is 1.979, and this function accounts for 58.0 % of variance in the data. The second function (the second segment) has a smaller Eigenvalue of 1.431 and accounts for 42.0 % of variance. The Eigenvalue of the first function is larger, therefore it is likely to be superior. The Canonical Correlation associated with first function is 0.815, the square of it equals to 0.664, indicating 66.4 % of variance of the first dependent variable (the first segment) can be explained by this model. Similarly Canonical Correlation associated with second function is 0.767, the square of it equals to 0.588, indicating 58.8 % of variance of the second dependent variable (the second segment).

The solution of the table 4.6 shows the validity of the discriminant analysis with calculated Hit-ratio of 97.6 %. It indicates that 97.6 % of the original groups' participants were classified correctly and confirms the very good fit of the three cluster solution (Barnes et al., 2007; Woo, 1995). A value of 0.138 for the multivariate Wilks' Lambda suggests a significant separation between the clusters by the discriminant function. This transforms to Chi-square of 400.9 with 16 degrees of freedom, with a significant level of 95 %. Thus, the first functions contributes for significant discriminate among the groups. When the first function is removed, the value of Wilks' Lambda related to second function is 0.411, which transforms to Chi-square of 179.9 with 7 degrees of freedom with a significant level of 95 %. Thus the second function itself contributes significantly to group differences as well.

Table 4.6: Results of the discriminant analysis

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig	Hit-rate (%)
1 through 2	0.138	400.9	16	0.000	97.6
2	0.411	179.9	7	0.000	

Table 4.7: Results of the discriminant analysis

Factor	F	(p)	df	Standardized coefficient		coefficient	
				Fct. 1	Fct. 2	Fct. 1	Fct. 2
Safety and welfare of relatives	36.05	0.000	2; 206	0.381	-0.034	0.556	-0.049
Environmental concern for fish	82.24	0.000	2; 206	0.090	0.592	0.094	0.624
Health involvement	13.60	0.000	2; 206	0.128	-0.015	0.130	-0.015
Fish welfare	80.24	0.000	2; 206	0.337	0.513	0.331	0.503
Ethical concern for fish farming	133.4	0.000	2; 206	-0.800	0.401	-0.836	0.418
Harmony, beauty and broad minded	20.73	0.000	2; 206	0.084	-0.132	0.084	-0.131
Nature and environment	31.98	0.000	2; 206	0.284	0.130	0.274	0.125
News interest and spending	10.68	0.000	2; 206	0.065	0.233	0.057	0.205

Table 4.7 shows the standardized discriminant function coefficients in the discriminant equations for the eight factors used to identify the segments. The significance of the Univariate F-values indicates that when the predictors are considered individually, all the

independent factors are significant in differentiating between the three groups. In the first discriminant function, there are two factors with the largest coefficients: *Safety and welfare of relatives* (0.381) and *Nature and environment* (0.284). Therefore it is more reasonable to label the first dimension as “*Environment and Safety*”. Whereas, in the second function, the factors with largest coefficients are *Environmental concern for fish* (0.592), *Fish welfare* (0.513) and *Ethical concern for fish farming* (0.401). These factors are mostly associated with the ethical and environmental concern of the consumer. Hence, the second dimension which important to discriminate the second cluster can be identified as “*Ethical*”.

4.3.2 Identifying the segments

The results from the discriminant analysis, the Scheffe’s *post hoc* multiple comparison tests and the mean value of the factors for each segments were used to identify the segments.

Table 4.8: Means of the factors used in segmentation among the three consumer groups (ANOVA-analysis)

	Clusters (mean values)			ANOVA		Post Hoc Scheffe multiple comparison tests		
	E	U	F	<i>F</i> *	Sig*.	W-U**	W-F**	U-F**
Safety and welfare of relatives	6.4	6.0	5.4	36.05	0.000	0.002	0.000	0.000
Environmental concern for fish	6.3	4.3	5.4	82.24	0.000	0.000	0.000	0.000
Health involvement	6.4	5.7	5.5	13.61	0.000	0.001	0.000	0.492
Fish welfare	5.1	2.9	4.1	80.24	0.000	0.000	0.000	0.000
Ethical concern for fish farming	2.6	2.5	5.0	33.43	0.000	0.844	0.000	0.000
Harmony, beauty and broad minded	6.0	5.2	4.9	20.73	0.000	0.000	0.000	0.242
Nature and environment	6.3	5.3	4.9	31.98	0.000	0.000	0.000	0.109
News interest and spending	4.6	3.8	4.4	10.68	0.000	0.000	0.604	0.008

* F-value and Sig. of ANOVA, ** Sig. of Scheffe multiple comparison tests, The significant level of 95%, **Note:** E= Environment and safety concerned; U=Unethical; F=Farmed fish concerned

The Scheffe's *post hoc* multiple comparison tests showed significant differences in mean scores (based on a seven-point scale) of the responses among all three groups can be found only in terms of "*Safety and welfare of relatives*", "*Environmental concern for fish*" and "*Fish welfare*" (see Table 4.8). This means that all the clusters were different from each other (Cluster I differed from Clusters II and III, and Cluster II differed from Cluster III). The "*health involvement*", "*news interest and spending*", "*harmony, beauty and broad minded*", "*nature and environment*" and "*ethical concern for fish farming*" factors revealed differences between only certain pairs of clusters. For example, differences in the "*ethical concern for fish farming*" factor were found between Clusters I (2.6) and III (5.0) and between Clusters II (2.5) and III (5.0), but not between Clusters I (2.6) and II (2.5).

Table 4.8 also indicates that all three clusters placed higher importance on the "*Safety and welfare of relatives*" and "*health involvement*" factors than on the other factors. However these issues seem to be more important to the respondents in Cluster I. The ratings for the factors relative to each cluster are as follows: Cluster I placed the highest value on the all factors except "*Ethical concern for fish farming*". Cluster II placed the lowest value on the factors such as "*Environmental concern for fish*", "*Fish welfare*", "*Ethical concern for fish farming*" and "*News interest and spending*". Cluster III placed the lowest value on "*Safety and welfare of relatives*", "*Harmony, beauty and broad minded*", "*Health involvement*" and "*Nature and environment*", but the highest value on "*ethical concern for fish farming*". Based on the value placed on factors by each cluster, and results from the discriminant analysis, the Clusters I, II, and III were labeled Environmental and safety concerned, Unethical and Farmed fish concerned respectively.

4.4 Factor analysis for the variables used to profile the segments

Second principle component analysis with varimax rotation and Kaiser normalization was performed on the participant's responses to the variables use for profile the segments. Results of the analysis including the factor loadings of the items, explained variance and Cronbach's alpha of the constructs are shown in the Table 4.9. The value of the KMO

statistics was 0.825 and the Bartlett test of sphericity were significant ($p < 0.001$), thus it implies the suitability of the data for the factor analysis.

Principal components analysis with the 36 items that covering consumers attitudes, norms to eat wild/farmed fish, WTP and knowledge about fish and fish farming for profiling the segments resulted an eight factor solution, explaining 75.54 % of cumulative variance. The eighth factor contained two items and it was excluded because one item negatively loaded and the remaining one has less factor loading, not seems to be valuable as a factor for further analysis (see appendix 3). Therefore seven factors that explain 72.07 percent of the variance was selected (Table 4.9). From the selected seven factors containing 34 variables, only 28 items were used for further analysis after excluding the items that have low factor loadings or have cross loadings on other factors. The first factor, *Knowledge about fish and fish farming*, included six items. With the eigenvalue of 4.84, it accounted for 13.46 % of the variance. The Cronbach's alpha was 0.95. Five items loaded together to form factor 2. This factor represented consumers' *attitudes towards farmed fish*. The factor loadings of these items are high and the Cronbach's alpha was observed as 0.93. This factor had an eigenvalue of 4.24 and could explain 11.78 % of the total variance. The third factor "*attitudes towards wild fish*" included five variables as expected. This factor had an eigenvalue of 4.19 and explained 11.64 % of the variance. The reliability alpha was 0.93.

Table 4.9 Variables used in the profiling, with Factor loadings, Eigenvalue, variance explained, reliability indicators (Cronbach's Alpha)

Factors	Loadings	Eigenvalue	% of Variance	Cronbach's Alpha
Attitudes towards wild fish		4.19	11.64	0.93
Bad/Good (Wild fish)	0.88			
Unsatisfied/Satisfied	0.88			
Unpleasant/pleasant	0.86			
Dull/Exiting	0.88			
Negative/Positive	0.82			
Attitudes towards farmed fish		4.24	11.78	0.93

Bad/Good (Farmed fish)	0.87		
Unsatisfied/Satisfied	0.90		
Unpleasant/pleasant	0.87		
Dull/Exiting	0.85		
Negative/Positive	0.85		
Norms to eat wild fish		4.18	11.62
Government expect eat wild fish	0.79		0.87
Advertising expect eat wild fish	0.81		
Environmental groups expect eat wild fish	0.85		
Food industry expect eat wild fish	0.66		
Norms to eat farmed fish		3.62	10.06
Government expect eat farmed fish	0.69		0.87
Advertising expect eat farmed fish	0.81		
Envnt.groups expect eat farmed fish	0.81		
Food industry expect eat farmed fish	0.73		
WTP for wild fish		2.23	6.19
Willing to pay a premium for wild fish	0.79		0.85
Pay 10% more for wild fish	0.83		
WTP for farmed fish		2.64	7.33
Willing to pay a premium for farmed fish	0.74		0.79
Pay 10% more for farmed fish	0.82		
Knowledge about fish and fish farming		4.84	13.46
I know a lot about fish	0.86		0.95
Expert in the domain of fish	0.91		
know to evaluate the quality of fish	0.84		
Know a lot about fish farming	0.90		
Expert in the fish farming	0.92		
Know to evaluate fish quality from farms	0.84		
Total variance explained			72.07 %

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization

With an eigenvalue of 4.18 and explaining 11.62 % of the total variance, the fourth factor was labeled as “*norms to eat wild fish*”. This factor included four items. The Cronbach’s alpha of this factor was 0.87. “*Norms to eat farmed fish*” the fifth factor, included four items and this factor had an eigenvalue of 3.62 with an explanation of 10.06 % of the total variance. The reliability alpha was 0.87. Factor 6 consisted with two items explaining respondent’s WTP for farmed fish and can be named as factor of “*WTP for farmed fish*”. The Cronbach’s alpha of this construct was 0.792. This factor had an eigenvalue of 2.64 and explained 7.33 % of the variance. The last factor consisted with two items that measure the WTP for wild fish of the respondents and named as “*WTP for wild fish*”. The factor loading of the items were high and the Cronbach’s alpha was 0.852 with an eigenvalue of 2.23 and explained variance of 6.19 %.(see table 4.9)

Even the item of “willing to pay 10% less for farmed fish” loaded on eighth factor were excluded from the further analysis, it cover an important constructs of explaining unwillingness to pay of the respondents to the farmed fish. However, the mean value of the response for this item was 3.7 and when considers the group mean, there was no significant difference observed between clusters. Therefore in this study it could not be used as valuable construct. Further, the items of family expect me to eat wild/farmed fish, friends expect me to eat wild/farmed fish, and doctors/nutritionists expect me to eat wild/farmed fish are important items covering the construct of norms as mentioned in theoretical discussion. The results of factor analysis indicated the unsuitability to include those items in the factors for profiling the clusters in this study. However, the mean values indicated that consumers have slightly agree that they have pressure from above social groups and individuals (family, friends, doctors) to eat wild fish while they have slightly disagree with those related to farmed fish.

4.5 Descriptive analysis for the variables used to profile the segments

This study also aimed to include the descriptive results of variables used in profiling the segments as secondary issue. By performing such a study it was expected to assess the general pattern of consumer behavior and their characteristics. By comparing these

results with the results of profiling the segments, it can be further understood the importance and needs of segmentation and profiling the consumers in marketing point of view. Therefore, after the identification of suitable items related to constructs in profiling the segments, the descriptive analysis was conducted.

Table 4.10: Consumers attitudes towards wild and farmed fish consumption (mean values)

Segmentation variables	Mean (SD)
Attitudes towards wild fish	
Bad/Good (Wild fish)	5.6 (1.4)
Unsatisfied/Satisfied	5.4 (1.3)
Unpleasant/pleasant	5.5 (1.4)
Dull/Exiting	5.3 (1.5)
Negative/Positive	5.5 (1.5)
Attitudes towards farmed fish	
Bad/Good (Farmed fish)	4.5 (1.3)
Unsatisfied/Satisfied	4.4 (1.3)
Unpleasant/pleasant	4.4 (1.4)
Dull/Exiting	4.4 (1.4)
Negative/Positive	4.3 (1.6)

The results show that the consumers' attitudes towards wild fish consumption were higher than their attitudes towards farmed fish consumption (see table 4.10). When the item "satisfied" consider as representative item (the item that have highest factor loadings) to describe the attitude, the consumers were neutral to slightly satisfied (mean value is 4.4 on a 7-point semantic differential scale) with farmed fish consumption while quite satisfied (mean value is 5.4 on a 7-point semantic differential scale) with the wild fish consumption.

Table 4.11 indicates the mean values of consumers' norms, WTP and knowledge about fish and fish farming. Items belong to all these constructs were measured with 7-point likert scale. When consider the norms, mean values shows that the consumers neither

agree nor disagree to the statements concerning others norms for them to perform their wild or farmed fish consumption behavior. However, the norms from food industries to eat farmed fish were slightly higher (4.4) for the respondents while norms from food industries to eat wild fish seem to be very less (3.7).

Table 4.11: Consumers' norms, WTP and knowledge (mean values)

Segmentation variables	Mean (SD)
Norms to eat wild fish	
Government expects eat wild fish	4.0 (1.6)
Advertising expect eat wild fish	4.1 (1.7)
Environmental groups expect eat wild fish	4.0 (1.7)
Food industries expect eat wild fish	3.7 (1.7)
Norms to eat farmed fish	
Government expects eat farmed fish	4.0 (1.5)
Advertising expect eat farmed fish	4.0 (1.5)
Envnt.groups expects eat farmed fish	4.2 (1.5)
Foods industries expect eat farmed fish	4.4 (1.6)
WTP for wild fish	
Willing to pay a premium for wild fish	5.1 (1.5)
Pay 10% more for wild fish	4.8 (1.6)
WTP for farmed fish	
Willing to pay a premium for farmed fish	3.2 (1.6)
Pay 10% more for farmed fish	3.1 (1.7)
Knowledge about fish and fish farming	
I know a lot about fish	4.2 (1.6)
Expert in the domain of fish	3.8 (1.7)
Know to evaluate the quality of fish	4.0 (1.7)
Know a lot about fish farming	3.7 (1.7)
Expert in the fish farming	3.4 (1.6)
Know to evaluate fish quality from farms	3.6 (1.8)

The consumers were slightly agreed to pay a premium price for wild fish (mean value is 5.1) and were slightly disagreed to pay such a premium for farmed fish (3.2). The mean value also indicated that they were slightly agreed to pay 10 % more for wild fish (mean value is 4.8), but this mean value of the response was lesser than just asking about a price premium. However the mean value shows that the consumers slightly disagreed to pay 10 % more for farmed fish. In average, respondents had poor knowledge about fish and fish farming. Even they were slightly agree to the question of “I know a lot about fish”, when asked specific issues like knowledge about evaluation of fish quality and about fish farming, they were slightly disagreed.

Table 4.12: Fish and meat consumption frequencies (% of the sample)

	Less or never	1-2 times a year	2-5 times per 6 month	1-3 times months	Once a week	Twice a week	3 times Per Week	4 times Per week	5 times Per week
Consumption	1	2	3	4	5	6	7	8	9
Fish in general	0.0	1.4	1.4	2.4	6.7	10.0	20.6	23.0	34.4
Wild(W) fish	1.0	5.3	6.2	6.7	8.1	15.8	23.0	18.2	15.8
Farmed(F) fish	12.9	11.5	14.8	18.2	16.7	12.4	7.2	4.3	1.9
W. shrimp	12.0	15.8	20.6	19.1	17.7	6.7	5.7	1.9	0.5
F. shrimp	8.1	16.3	15.8	25.4	15.3	10.5	6.7	1.4	0.5
W. Tilapia	23.4	24.9	19.6	17.7	8.1	3.3	1.4	0.5	1.0
F. Tilapia	21.5	26.8	21.1	15.3	6.2	5.3	1.9	0.5	1.4
Wild Carp	32.6	24.9	23.4	7.7	4.3	2.9	2.4	1.9	0.0
F. Carp	41.1	28.2	15.8	7.7	2.4	2.9	1.9	0.0	0.0
F.rainbow trout	61.7	17.2	6.2	8.6	1.0	4.8	0.5	0.0	0.0
F. Pangasius	43.5	22.5	16.3	9.1	5.3	1.4	1.4	0.5	0.0
Crab	17.2	27.8	33.5	12.0	4.3	3.3	1.4	0.5	0.0
Tuna	10.5	13.4	21.1	28.2	7.7	12.0	5.7	1.0	0.5
Squid	0.5	4.8	20.6	32.5	21.1	11.5	5.3	2.4	1.4
Chicken	2.9	3.8	12.4	21.1	16.3	12.9	16.3	5.7	8.6
Pork	1.4	0.5	1.4	3.8	8.1	11.5	21.5	26.8	24.9
Beef/veal	3.3	6.7	9.1	23.4	15.3	14.4	15.8	6.7	5.3

Table 4.12 indicated that the majority of the sample consumes fish three times per week or more (78 %). All the respondents in the sample consumes fish at least 1-2 times a year or more while there is quite a high percentage (34.4 %) of consumers who eat fish five times or more per week. The consumers eat wild fish more frequently compared with

farmed fish, which has a share of 12.9 % of respondents never consuming it. The most commonly consumed sea food types are the tuna, squid, crabs, carps, shrimps and tilapia. In the case of Shrimp and Tilapia, the consumers consume the farmed products slightly higher than the wild ones. However the consumption frequency of meat types also seems to be high among the respondents and around 73 % of the respondents consume pork three times per week or more. About 60 % of respondents consume chicken once a week or more and more than 55 % consume beef in similar frequency.

4. 6 Profiling the segments

The segments were profiled based on fish/meat consumption frequency, individual and social characteristics of the consumer and several important demographics variables. Profiling the segments with consumption frequencies of fish in general, wild/farmed fish consumption and the frequency of consumption of several specific fish and meat types were used to understand the respondents' consumption behavior. Knowledge about fish and fish farming, attitude towards wild/farmed fish, norms to eat wild/farmed fish and WTP price premium for wild/farmed fish are the individual and social variables used in the profiling the segments. In order to understand the distribution of the segments among demographic groups, they were also profiled with age, gender, income, education, marital status and family size.

4.6.1 Fish/meat consumption behavior

The mean values of the consumer responses among segments for the consumption frequencies were evaluated. The results from ANOVA indicated that the difference of the mean values of dependent variables were statistically not significant with 95 % confidence level for three segments except for crab, chicken and pork consumption. The ANOVA F test examines only the overall difference in means. It can be said that differences exists among the means of any factor among the segments, if the null hypothesis of there is no difference of mean value is rejected. But all the differences between mean values may not be statistically significant. Therefore a post hoc test with Scheffe multiple comparisons was used to examine the differences among specific means.

Table 4.13: Profiling the different segments against fish/meat consumption (ANOVA)

	Clusters (mean values)				ANOVA		Post Hoc Scheffe multiple comparison tests		
	E	U	F	Total	F*	Sig.*	E-U**	E-F**	U-F**
Fish consumption	7.7	7.4	7.4	7.5	1.01	0.368	0.480	0.484	0.997
Wild fish	6.7	6.4	6.0	6.4	2.03	0.134	0.710	0.135	0.467
Farmed fish	4.6	3.8	4.0	4.1	2.56	0.080	0.099	0.292	0.910
Wild Shrimp	4.0	3.5	3.6	3.7	1.54	0.218	0.278	0.399	0.991
Farmed Shrimp	3.9	3.9	4.0	3.9	0.12	0.884	1.000	0.909	0.906
Wild Tilapia	2.8	2.9	2.8	2.9	0.08	0.920	0.960	0.992	0.926
Farmed Tilapia	2.9	2.9	3.0	2.9	0.15	0.864	0.970	0.951	0.864
Wild Carp	2.7	2.2	2.7	2.5	2.15	0.119	0.173	0.996	0.259
Farmed Carp	2.3	2.0	2.3	2.2	0.59	0.553	0.669	0.991	0.628
Farmed rainbow trout	2.0	1.6	2.1	1.9	1.95	0.145	0.341	0.883	0.182
Farmed Pangasius	2.3	2.2	2.2	2.2	0.09	0.917	0.917	0.985	0.978
Crab	2.9	2.4	3.1	2.8	5.14	0.007	0.076	0.638	0.010
Tuna	3.7	3.6	4.0	3.8	1.02	0.362	0.882	0.631	0.368
Squid	4.5	4.3	4.6	4.4	0.94	0.394	0.534	0.984	0.478
Chicken	5.7	5.2	4.8	5.3	3.55	0.031	0.308	0.033	0.487
Pork	7.1	7.7	6.7	7.2	6.18	0.002	0.103	0.330	0.003
Beef/veal	5.2	5.1	5.0	5.1	0.132	0.876	0.940	0.885	0.986

F-value and Sig. of ANOVA ; ** Sig. of Scheffe multiple comparison tests; The significant level of 95%; Nine point scale: 1= Less or never; 5= Once a week; 9 = 5 times/week or more; *Note:* E= Environment and safety concerned; U=Unethical; F=Farmed fish concerned

Table 4.13 shows that the consumption frequencies of fish in general was highest among The Environment and safety concerned consumers (note that 1 denotes “less or never”, whereas 9 denotes 5 times/week or more), while The Unethical and Farmed fish concerned groups reported equal consumption frequencies. However the difference in means of fish consumption between the segments was not significant at 95 % level and the same results were observed from the Scheffe’s *post hoc* measure. A significant difference of wild fish consumption among three groups were not observed, however frequency of wild fish consumption was highest among The Environment and safety

concerned group, while lowest among the farmed fish concerned group. The consumption of farmed fish was very low among the all three groups, which is less than once a week. However the difference in farmed fish consumption was close to significant among three groups ($F = 2.56$; $p = 0.08$). Even the farmed fish concerned group reported the highest attitudes towards farmed fish consumption; their frequency of consumption farmed fish (4.0 on a nine point scale) was lesser than The Environment and safety concerned segment (4.6 on a nine point scale).

The results show that consumers' consumption of the selected fish types was very low, and significant difference was not observed in consumption of these fish types among the groups. However, the consumption of wild shrimp was highest among The Environment and safety concerned consumers and the consumption of farmed shrimp was highest among the farmed fish concerned consumers. When compare with the consumption of other types of seafood considered here, the consumption of squid was relatively high among the consumers while the highest frequency reported by the farmed fish concerned consumers. Even the frequency of consumption is very less, there was a significant difference among the segments in consumption frequency of crab ($F = 5.14$; $p = 0.007$).

The results further indicate that the consumption frequency of pork (mean value is 7.2 on a nine point scale) was high as the consumption of general fish. Beef and chicken consumption frequency of the consumers also seems to be high, but not as much as the consumption of fish in general or wild fish consumption. The consumption of chicken was highest among The Environment and safety concerned consumers and *Scheffe post hoc* measures indicated that their consumption frequency was significantly different from the consumers having lowest consumption frequency in the farmed fish concerned segment ($p < 0.05$). Unethical consumers reported the highest pork consumption, which was significantly different from the farmed fish concerned consumers, who has lowest consumption. The farmed fish concerned consumers reported the lowest frequency of meet consumption.

4.6.2 Individual and social variables

In order to profile the segments, the mean values of each factor solutions were used. Every construct was transformed to an indicator based on the results from the factor analysis presented in Table 4.9. Examination of the differences in mean values of knowledge about fish and fish farming, attitude towards wild/farmed fish, norms to eat wild/farmed fish, WTP price premium for wild/farmed fish (dependent variables) between the segments (independent variable) was carried out using an analysis of variance (ANOVA). A summary of the results from the profiling is presented in Table 4.14.

Table 4.14: Profile of consumer segments against Individual and social variables (ANOVA-analysis)

	Clusters (mean values)				ANOVA		Post Hoc Scheffe multiple comparison tests		
	E	U	F	Total	F*	Sig.*	E-U**	E-F**	U-F**
Knowledge	4.0	3.4	3.9	3.8	3.857	0.023	0.032	0.897	0.143
Attitude farmed fish	4.4	4.3	4.5	4.4	0.308	0.735	0.989	0.826	0.755
Attitude wild fish	5.8	5.4	5.1	5.5	4.891	0.008	0.156	0.010	0.450
Norms wild fish	4.6	3.8	4.6	4.3	8.523	0.000	0.001	0.980	0.005
Norms farmed fish	4.0	3.6	4.4	4.0	6.932	0.001	0.189	0.127	0.001
WTP farmed fish	3.0	2.8	3.7	3.1	5.817	0.004	0.616	0.054	0.004
WTP wild fish	5.3	4.6	4.7	4.9	4.817	0.009	0.016	0.074	0.923

* F-value and Sig. of ANOVA; ** Sig. of Scheffe multiple comparison tests; The significant level of 95%; *Note*: E= Environment and safety concerned; U=Unethical; F=Farmed fish concerned

The perceived knowledge about fish and fish farming is highest among The Environment and safety concerned consumers and The Farmed fish concerned consumers, while the knowledge difference is not significant among these two groups. The unethical consumers had the lowest perceived knowledge with significant difference from The Environment and safety concerned consumers. In fact, Table 4.14 shows that all three groups have low perceived knowledge about fish and fish farming.

The Environment and safety concerned have the most positive attitudes towards wild fish consumption and The farmed fish concerned have most positive attitude towards farmed fish consumption than other groups. These findings are surprising, since these groups show much concern for the fish welfare issues for fish type they have most positive attitudes. Although all segments have positive attitudes towards both wild and farmed fish, the attitudes towards wild fish are higher among all three groups. However there is no significant difference of consumers' attitudes towards farmed fish. Significant difference can observe between the attitude towards wild fish of The Environment and safety concerned and The farmed fish concerned consumers.

Respondents in Unethical segments have lesser norms from government, food industries, environmental groups and advertising to eat both wild and farmed fish with scores 3.8 and 3.6 respectively. The norm to eat wild fish is higher for the all three groups than the norms to eat farmed fish. However the norms to eat farmed fish are higher for the farmed fish concerned group than other groups. The difference in means of norms to eat Wild fish ($F = 8.523$, $p = 0.000$) and norms to eat Farmed fish ($F = 6.932$, $p = 0.001$) is significant at 95 % level. But the Scheffe's *post hoc* measure showed that there is no significant difference between norms to eat both wild and farmed fish among the consumers in The Environment and safety concerned and the Farmed fish concerned groups.

For all three groups the respondent's WTP for farmed fish is lower when compare with their WTP for wild fish. The farmed fish concerned group had higher WTP farmed fish than other two groups. The difference in means of WTP for farmed fish among the segments is significant at 95 % level, although the Scheffe's *post hoc* measure showed such difference only between consumers in Unethical group and the Farmed fish concerned group. The WTP for wild fish is highest among The Environment and safety concerned consumers and the Unethical group showed lower WTP for both wild and farmed fish. According to the Scheffe's *post hoc* measure there was significant difference in WTP for wild fish between Wild fish concerned consumers and the Unethical consumers.

4.6.3 Demographic characteristics

There is significant difference in gender distribution among the three segments ($\chi^2=16.583$, $p < 0.001$) but most of the respondents in the sample were women therefore the results have to be interpreted carefully. However, that most of the men were belong to The Unethical group, while most women are in The Environment and safety concerned group (see Table 4.15).

When consider about the marital status of the respondents there was no significant difference among the three groups. All three segments had nearly half of the per cent of single persons as their married per cent. However The Unethical segment had the highest married persons (69.3 %) and lowest single persons (30.7 %). Age of the respondents among three segments was significantly differ from each other ($\chi^2=11.795$, $p < 0.05$). All three groups had lowest per cent of old age respondents (above 45 years) and highest of middle age respondents (31-45 years). However The Unethical group represent the largest portion of middle age consumers (62.7 %).

It was not observed the significant difference among the three segments of the consumers in term of family size. More than 50 % of respondents in each segment had family size of 4-5 persons/family. But The Farmed fish concern group consisted with highest per cent of both larger family categories (4-5 persons and More than 5 persons/family) i.e. 57.9 and 29.8 % respectively. As shown in the table 4.13 family incomes level was also not significantly differ among the three segments of the consumers. All categories of family income levels were equally distributed within The Unethical group (33.33 %). Farmed fish concern group can be identified as the less earning families (less than 3 millions/month) while Environment and safety concerned group can be identified as the middle income earning families (3-5 millions/month).

There was no clear distribution of education level among the three segments; almost all the respondents in the sample were highly educated. However, most of the respondents having more than high school education were belong to The Environment and safety

concerned group, while most of the respondents who had less or equal to high school education were in The farmed fish concern group.

Table 4.15: Profile of consumer segments against Demographic characteristics

Characteristic	E	U	F	Total	Pearson's χ^2	p-value
Number of cases	77	75	57	209		
Gender					16.583	0.000
Male	7.8	33.3	15.8	19.1		
Female	92.2	66.6	84.2	80.9		
Marital status					0.944	0.624
Single	37.7	30.7	36.8	34.9		
Married	62.3	69.3	63.2	65.1		
Age (years)					11.795	0.019
18-30	40.3	32.0	36.8	36.4		
31-45	51.9	62.7	42.1	53.1		
Over 45	7.8	5.3	21.1	10.5		
Family size					3.146	0.534
1-3 persons	22.1	24.0	12.3	20.1		
4-5 persons	51.9	52.0	57.9	53.6		
More than 5 persons	26.0	24.0	29.8	26.3		
Family income (VND/month)					7.256	0.123
Less than 3 millions	26.0	33.3	42.1	33.0		
3-5 millions	49.4	33.3	36.8	40.2		
More than 5 millions	24.7	33.3	21.1	26.8		
Education					0.186	0.911
Less or equal to high school	11.7	12.0	14.0	12.4		
More than high school	88.3	88.0	86.0	87.6		

Note: E= Environment and safety concerned; U=Unethical; F=Farmed fish concerned

4.7 Summary of the segments

The Environment and safety concerned (37%). These respondents are very concerned about environmental issues related to fish. They also placed highest importance on the personal value factors such as *safety and welfare of relatives, harmony, beauty and broad minded* and the *nature and environment*. It explains that they could find better relationship between these personal values and the environmental issues related to fish they consumed. They were somewhat concerned about the fish welfare issues, but not concerned about ethical issues related to the fish farming. This group consisted with highest per cent of female and the lowest per cent of male when compare with the other two groups and represents the highest per cent of respondents with medium level of

monthly income. Majority of them have more than high school education while having lowest per cent of less educated respondents. This group represents highest per cent of young consumers when compare with other groups. They have reported the highest health involvement when compare with other two groups and also showed highest score on the lifestyle factor of news interest and spending. This factor was dominated by the lifestyle items of *often read news papers, self-confidence than others, and the spender, not a saver.*

The respondents in this group have the highest knowledge about fish and fish farming. The group had the most positive attitude towards the wild fish with relatively higher attitude towards the farmed fish, and the highest fish consumption frequency. They also reported the highest frequency of both wild and farmed fish consumption. Norms to eat wild fish seems to be high among this group, with considerably higher level of norms to eat farmed fish. They have highest WTP for wild fish when compare with the other groups with less WTP for farmed fish. When consider the consumption frequency of meat, they consume pork than other meat types with relatively high frequency of beef and chicken consumption.

The Unethical consumers (36%). These respondents are not concerned about the farmed or wild fish welfare issues and they have no ethical problems with consuming both wild and the farmed fish. This group mainly consisted of middle age consumers with highest per cent of male when compare with the other two groups and it represents half of the amount of female per cent of the group. They have equal distribution of all categories of income level, although they can be introduced as higher income group when compare with other groups. Majority of them have more than high school education while having lower per cent of less educated respondents. The group also has the lowest score on environmental issues related to fish, although the environmental issues are somewhat important to them. But they showed considerable importance on the personal value factors such as *safety and welfare of relatives, harmony, beauty and broad minded* and the *nature and environment*. But they may fail to find any relationship between these personal values and the ethical and environmental issues related to the fish consumption.

They also have higher health involvement, but placed lowest score on the lifestyle factor of news interest and spending. It reflects their less attention on reading news papers, less self-confidence than others and less spending with higher interest on saving.

This group has reported lowest knowledge about fish and fish farming and lowest attitudes toward farmed fish, perhaps explaining the lowest level of farmed fish consumption. However, the rejection of farmed fish may not associate with ethical issues. They also have higher attitudes towards wild fish consumption, may reflect their relatively high consumption of wild fish. As a whole, they placed considerably high total fish consumption frequency. These consumers have lowest norms and expectation from others to eat both wild and farmed fish. They reported lowest WTP for both fish types when compare with the other groups, but WTP wild fish is high when compare to their WTP for the farmed fish. Their meat consumption was relatively higher with highest frequency of pork consumption, which was higher than their general fish consumption.

The Farmed fish concerned (27%). These respondents were much concerned about the farmed fish welfare issues and their concern about the farmed fish was higher than the concern about wild fish welfare issues. However, this group concern wild fish welfare issues than the consumers in The Unethical group. This group mainly consisted young and middle age consumers, but the per cent of older consumers also highest when compare with the other groups (21.1 %). Their family sizes were larger than other consumers. When consider the education level, this group consisted with somewhat higher percentage of less educated consumers than the other groups. Majority of them were belongs to less earning people and they represent the lowest per cent of consumers earning more than 5 million VND.

These consumers also place higher score on environmental issues related to fish, although their environmental concern was less than The Environment and safety concerned group and higher than the Unethical group. However their importance on all three personal value factors is somewhat lesser than other two groups. These personal value factors was dominated by the values under the domains of Benevolence, Security and the

Universalism values such as inner harmony, world of beauty and broad minded, protecting the environment and the unity with nature. But they also placed higher importance on the personal value factors, may explain their ability to find the direct relationship between the personal values and values related to animal welfare and environmental issues in fish consumption. They have considerably higher involvement in health related issues, but lesser than the other two groups. Their score on the lifestyle factor of news interest and spending is also higher than Unethical group, but lesser than The Environment and safety concerned consumers.

This group has reported knowledge about fish and fish farming lesser than The Environment and safety concerned group, but higher than Unethical group. They have lowest attitudes toward wild fish, explaining the lowest wild fish consumption frequency. Their attitude towards farmed fish is highest but reported lower level of farmed fish consumption. However, this consumer's fish consumption is high and equal to the Unethical group, but lesser than The Environment and safety concerned consumers. They have highest norms to eat farmed fish, while the norms to eat wild fish are equal to The Environment and safety concerned group and higher than Unethical. These consumers reported the highest WTP for farmed fish, explain their higher attitude towards the farmed fish. However they also reported higher WTP for wild fish than the farmed fish, it is higher than the Unethical group. When consider the consumption of meat, this group reported lowest frequency of consumption.

5. Discussion and implications

The objectives of this study was to identify market segments of Vietnamese fish consumers based on their personal value, values and lifestyles and domain specific values such as Environmental concern, Fish welfare concern, Ethical concern for fish farming and Health involvement as basis for the segmentation. And also it was aimed to find out how the segments can be profiled by frequency of fish consumption, attitude towards wild and farmed fish, norms and expectations from others, willingness to pay (WTP), knowledge of the consumer, and some basic demographics factors. To achieve these two objectives the study applied theory of market segmentation introduced by Smith (1956). In addition, this study also presents some descriptive results of variables used as basis for segmentation and profiling the segments. The items used to measure the constructs were either adopted or taken from previous marketing researches found in the literature. A convenience sample of 209 respondents was used to collect data through a survey conducted in Nha Trang, Vietnam. The analytical methods used were cluster analysis, discriminant analysis, ANOVA and crosstabs procedures to achieve above objectives. This section of the thesis discusses the findings and some practical implications of the study. Limitations and suggestions for future research has presented at the end of the thesis.

Descriptive results

The descriptive results of this study indicated that all the personal values are important for the consumers in Nha Trang. However the personal values related to Benevolence and Security domains were more important than Universalism values. When consider the lifestyle of the consumers they were somewhat alert about the news and had some self-confidence. The environmental issues related to fish were seems to be much important to them. The consumers' health consciousness was also relatively high. The mean values of the consumer responses indicated that neither wild fish harvesting nor fish farming arouse animal welfare concerns among the consumers in Nha Trang. However, the results from cluster analysis identified differences of the welfare concern among the consumer groups,

indicating the importance of the segmentation to identify segments in the market for better positioning of the products (Wedel and Kamakura, 2002).

In average the respondents were neutral towards the wild fish welfare issues while they have disagreed with the statements indicating suffering or violation of animal rights in fish farming. This contradicts the finding of Verbeke and Viane (2000) that identified animal welfare to become a critical theme in acceptance of food production in future and the finding of Verbeke et al (2007b), stating that ethical issues with respect to fish were quite important to the consumers. However, the above findings were related to the food production in Europe, but not for a developing country like Vietnam. The results of this study confirm the finding of Honkanen and Olsen (2009) and Frewer et al. (2005). They were found that the consumers are much concerned about environmental issues related to fish rather than fish welfare issues. However this study indicates that Vietnamese consumers concern for wild fish welfare was somewhat lesser than those reported from Europe by Honkanen and Olsen (2009).

Identification of segments

The main purpose of this study was based on the expectation that consumers may differ in their values and lifestyles, importance of personal values, and concern about health, environment as well as the ethical issues related to fish in general and farmed fish in particular. It was able to identify three clusters based on the respondents' responses for above aspects. Although this study found three clusters which clearly differ in their strength of concern for environmental issues, fish welfare issues related to wild and farmed fish, lifestyle characteristics and some personal values (under universalism), all three clusters rated that safety and welfare of relatives (values under benevolence and safety) and health involvement as important to them.

Environmental concern for fish was important for the consumers in *Environment and safety concerned* and *Farmed fish concerned* groups, but not for the *Unethical consumers*. Unethical group also had least concerned about the fish welfare issues related to wild and farmed fish. This may be due to their less awareness about the sustainability and ethical issues with the less interest in reading newspapers. And also the less self

confidence than others may leads them to think that their own concern can not make sound impact towards the sustainability. Consumers in Environment and safety concerned group seems to have relatively higher concern about wild fish welfare issues, while other groups do not have any ethical problems with eating wild fish. On the other hand, the consumers in Environment and safety concerned and Unethical groups do not have any ethical problems with eating farmed fish, but Farmed fish concerned consumers concerned about welfare of farmed fish they consume. The findings related to the Farmed fish concerned consumers is contradict with the previous findings by Honkanen and Olsen (2009) and Frewer et al. (2005), that reported the consumers do not have any ethical problems with eating farmed fish. One reason might be that these consumers viewed farmed fish similarly as the livestock in agriculture.

Profiling of segments

The second purpose of this study was to profile the segments based on frequency of fish consumption, attitude towards wild and farmed fish, norms and expectations from others, WTP, knowledge of the consumer, and some basic demographics factors.

The largest segment, *The Environment and safety concerned* group, accounted for 37 percent of the consumer market, consisted with high educated females in the age of 18 to 45. It seems that the knowledge about fish and fish farming is quite low among these consumers as other two segments. The Environment and safety concerned group seems to be the most important segment for the fish farming industries as their target market because they have highest fish consumption with very less concern about the welfare issues of farmed fish. Some marketing efforts should be performed towards this segment to increase their knowledge about the health quality of farmed fish products since these consumers are highly involve about the health aspects of their foods. It may also required to provide some knowledge about environmental standards of the product since their high concern about the environmental issues related to fish (Verbeke et al., 2007a).

However the Environment and safety concerned consumers had the most positive attitudes towards wild fish, as accordance with the finding of Verbeke et al. (2007a).

They found that Belgium consumers mean perception scores were slightly favour towards the wild fish on several attributes. But this high attitudes not reflect their high concerned about welfare issues regarding wild fish. This may be a sign that their high concerns about wild fish welfare issues arise with the expectation to improve the product quality (Bornett et al., 2003; Harper and Makatouni, 2002), may not express their sympathy. They also willing to pay a higher price for the wild fish product, may confirm the findings of Kole et al. (2009) indicating that when the product labelled as wild, highly priced. This may be important finding for food industries to differentiate their products in order to obtain differentiation in price (Defrancesco, 2003).

The smallest segment was *The Farmed fish concerned* group, accounted for 27 % of consumers. They were educated males and females having relatively lesser income. Their fish consumption was high but lesser than the average level of consumption in terms of fish in general, wild and farmed fish. But this group consume some farmed fish types (farmed shrimps, farmed tilapia), than the average consumption of the sample. Further, their meat consumption was lesser than other two groups. They also had slightly lesser knowledge about fish and fish farming. This group had slightly high attitude toward farmed fish consumption which is mealy higher than others two groups. Relatively higher norms to eat farmed fish may be the reason for their high attitude toward farmed fish consumption, leads to assume that this group having norms from environmental groups that indicating the negative impact of wild fish harvesting over fish farming and norms from food industries. But this make somewhat wonder, because they are highly concerned about welfare of the farmed fish. This may be due to the consumer view that welfare will affect to the quality of the product. This finding is corroborate the finding of consumers have higher positive attitudes towards free range products (e.g. free range eggs) because they believe that free range products have better sensory quality (Bornett et al, 2003), and higher safety and healthiness (Harper and Makatouni, 2002) than other products. However they also had quite high attitude toward wild fish consumption which is lesser than the others. On the other hand consumers belongs to *The Farmed fish concerned* group slightly disagreed to willing to pay premium for farmed fish, but this was not strong as other groups.

The Unethical segment, accounted for 36 percent of the consumer market, consisted with high educated males at medium age. Consumers in this segment had high consumption of both fish and pork. But their farmed fish consumption was less. The less attitudes and less consumption frequency of farmed fish were not associated with ethical reasons, may be due to the perception of less quality properties or belief of unhealthiness associated with farmed fish. This finding confirm the results of Verbeke et al. (2007b) stating that rejection of farmed fish by Belgium consumers was not associated with ethical reasons. Subjective knowledge about fish and fish farming was quite low among these consumers as other two segments. Both norms to eat wild fish and farmed fish were slightly less. WTP for wild fish was clearly higher than the WTP for farmed fish. This was contradict with the finding of Holland and Wessells (1998) indicating higher consumer WTP for farmed fish with the perception of better quality and safer due to the farmed products are connected with some degree of control. However, the less WTP of the consumers in this study may be due to the less knowledge about fish farming. The fish farming companies can target this segment easily through some marketing strategies because they do not have any ethical problem with eating fish. If they perceived that farmed fish is better for health or have good quality properties, could be make positive attitude toward farmed fish. Food industries can take advantages by advertising about their product because this group was rich in benevolence values, which depend on others opinion to guide their behavior. Even they do not have ethical or environmental values at domain specific level, higher personal values related to these issues can be activated to take marketing advantages (Honkanen et al., 2006).

Managerial implications

From a marketing point-of-view, wild and farmed fish may face some ethical problems in this part of the Vietnam market (Nha Trang area); because one segment slightly concerned about farmed fish welfare and one about wild fish. But this concern is not really ethical oriented, aroused due to their health and quality expectations. In fact, The Environment and safety concerned and Unethical segments had lowest concern over farmed fish welfare, and have highest fish consumption frequency. It should be fairly easy to market farmed fish to this group if there is some effort to make high positive

attitudes towards farmed fish. This could be done by increasing knowledge and proving the health advantages. The segment with Farmed fish concerned also can be targeted by similar way, but some knowledge about ethical aspects and quality is required. Environmental issues could also be used to position fish products in Vietnam to some extent, the fish farming companies can be focus on positive environmental impact of farmed fish over wild fish harvesting. It is an idea to address the personal values of the consumer to activate them, especially for The Unethical consumers to think about these issues, leads to take marketing advantages.

Limitations and suggestions for future research

This study also faces some limitations that are inherent to the research method. Main limitation is the sample was not a representative one and hence the results could not be generalized to Vietnam. More specifically, the sample was dominated with the women with higher education level. Future studies should include a more representative sample in Vietnam to portrait the real picture of value based consumer segments. The existing literature on the welfare issues related to fish is quite less, specially related to Vietnam or other developing countries, therefore it was difficult to present conclusive comparison of the results. However the comparison with the studies done in developed countries may not be valid, therefore the study is of a more explorative character. The future researches should take this issue into account.

This study did not focus on any specific species of wild or farmed fish, therefore this research explored value based segments only in more general level. The results may not be generalized for all types of wild and farmed fish. Future studies should apply the segmentation theory in a comparative examination of different types. Another limitation stay with the study was the consumers' lack of knowledge about the fish and fish farming practices. The evaluation of the negative or positive consequences of aspects of welfare and environmental sustainability of the practices may difficult to them and leads to form miss evaluation on health and quality aspects also. In the future studies, consumers need to be better informed about farmed and wild origin of the fish.

Even the cluster analysis is an accepted and superior method in marketing literature, it should be mentioned that using it as method for segmentation also has some weaknesses. The method of analysis is exploratory in nature and not based on probabilistic statistics. Further, it is unlikely that one single solution of unique clusters will result from its application and therefore the decision of the most relevant and the interpretable solution depend on the researcher's objectives.

Finally, the main objective of this study is to use value as basis for segmentation. Other bases such as preferences (Honkanen et al., 2004), specific attitude and opinions (Raaj and Varhallen, 1994) food related risk perceptions (McCarthy and Henson, 2005) could also be used in order to obtain more knowledge about Vietnamese consumers attitudes and expectations toward farmed and wild fish consumption.

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Appendix 1 Measurement of constructs

Appendix 1.1 Personal value

We would like you to describe your personal values; what is important in your life. We have selected several questions covering different aspect of your life. We would like you to assess questions carefully and tick off the value that best describes what is not important and important for you personally. For example, if you feel not important, tick off the box under 1. If you feel very important, tick off the box under 7, or somewhere in between if you have another perception. Some items are quite similar, but it is entirely up to you to what extent you choose to give the same assessment or not. What we do want, however, is that you mark only one box on each line you feel you can answer. (Mark one box per line)

	Not important					Very important	
	1	2	3	4	5	6	7
Unity with nature (fitting into nature)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting the environment (preserving nature)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equality (equal opportunity for all)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social justice (correcting injustice, care for the weak)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meaning in life (a purpose in life)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A world of beauty (beauty of nature and the arts)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broad minded (tolerant of different ideas and beliefs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inner harmony (peace with myself)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A world at peace (free of war and conflict)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forgiving (willing to pardon others)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpful (working for the welfare of others)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Honest (genuine, sincere)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loyal (faithful to my friends, group)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mature Love (Spiritual intimacy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wisdom (mature understanding of life)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
True Friendship (close companionship)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Responsible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(dependable and reliable)							
National Security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(protection from attack)							
Healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(not being sick physically/mentally)							
Clean (neat, tidy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family security (safety of loved ones)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.2 Value and lifestyle

We will make some assertions about your lifestyle. For each assertion, we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception. We want you to read each question carefully and mark only one box on each line.

Items	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
I spend a lot of time on my homework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often watch TV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financial security important to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm very interested in sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feel have more self-confidence than others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family is most important thing to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often read news papers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm a spender, not a saver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agree social status is important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm very concerned about environmental questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.3 Domain specific values

Appendix 1.3.1 Environmental concern

Now we will make some assertions about fish in general. For each assertion, we want you to state how much importance these to you. For example, if you feel not important, tick off the box under 1. If you feel very important, tick off the box under 7, or somewhere in between if you have another perception. Please read each question carefully, some assertions are quite similar, but it is entirely up to you to what extent you choose to give the same assessment or not. What we do want, however, is that you mark only one box on each line you feel you can answer

“It is important to me that the fish I eat on a typical day . . .”

	Not Important					Very Important	
	1	2	3	4	5	6	7
Has been produced in a way which has not polluted the sea or the other environments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has been produced in an environmentally-friendly way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is not threatened by over-fishing and loss species on the border of extinction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is produced without negative consequences for environment & nature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.3.2 Fish Welfare concern

We will make some assertions about Fish Welfare concern. For each assertion, we want you to state how much importance these to you. Mark one box per line.

“It is important to me that the fish I eat on a typical day ...”

	Not Important					Very Important	
	1	2	3	4	5	6	7
Has been caught and produced with respect for their rights and wellbeing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has been caught and produced without Suffering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has been caught and produced in a friendly way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.3.3 Ethical concern for fish farming

Then, we will make some assertions about farmed fish. For each assertion, we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception. Please read each questions carefully so that you understand the valence of the assertion. Some assertions are quite similar, but it is entirely up to you to what extent you choose to give the same assessment or not. What we do want, however, is that you mark only one box on each line you feel you can answer.

	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
I have no ethical concerns about eating farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming can help to diminish over exploitation of wild stocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming violates animal rights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The slaughtering of farmed fish causes unnecessary suffering to fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming pollutes the evnt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming is harmful for wild fish stocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.3.4 Health involvement

For each assertion we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception. Mark one box per line.

	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
It means a lot to me to have good health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good health is important to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often think about my health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I think of myself as a person who is concerned about healthy food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am very concerned about the health related consequences of what I eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.4 Fish/food consumption frequency

Below, we would like you to present some kinds of fish/meat that you consume on your meals. Please make a for each alternatives that best describes how many times on average during the last year you have consumed the following type of food items on your meal. If none of the response alternatives completely covers your situation, tick off for the alternative that is closest. Please mark only one answer in each row.

	Less or never	1-2 times a year	2-5 times every 6 month	1-3 times per months	Once a week	Twice a week	3 times Per Week	4 times Per week	5 times Per week or more
“Consumption of...”	1	2	3	4	5	6	7	8	9
Fish in general	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild shrimp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed shrimp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild Tilapia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed Tilapia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wild Carp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed Carp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed rainbaw trout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmed Pangasius	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crab	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuna	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Squid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Types of meat:									
Chicken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beef/veal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.5 General attitudes

In the following we would like you to think about how you feel when you eat wild/farmed fish as a meal. Please indicate for each row which word best describes your feeling. (Mark one box per line)

When I eat wild fish, I feel.....

	1	2	3	4	5	6	7	
Bad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Good
Unsatisfied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Satisfied
Unpleasant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pleasant
Dull	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exiting
Negative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Positive

Appendix 1.6 Willingness to pay (for farmed fish)

Now we will ask you some questions about willingness to pay for wild fish. For each assertion, we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception.

	Strongly Disagree		Neither agree nor disagree			Strongly Agree	
	1	2	3	4	5	6	7
I would pay a price premium for wild fish products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is acceptable to pay 10 % more for wild fish products compared to farmed fish (the same species)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would accept paying 10 % less for wild fish compared to farmed fish (the same species)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.7 Willingness to pay (for wild fish)

Now we will ask you some questions about willingness to pay for farmed fish. For each assertion, we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception.

Items	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
I would pay a price premium for farmed fish products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is acceptable to pay 10 % more for farmed fish products compared to wild fish (the same species)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would accept paying 10 % less for farmed fish compared to wild fish (the same species)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.8 Norms and expectations from others

Now we will ask you some questions about norms related to wild/farmed fish. For each assertion, we want you to state how much you disagree or agree. If, for example, you strongly disagree, tick off the box under 1. If you strongly agree, tick off the box under 7, or somewhere in between if you have another perception.

Items	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
My family thinks that I should eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends think that I should eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The government stimulates me to eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doctors and nutritionists think that I should eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advertising stimulates me to eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental groups stimulate me to eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The food industry encourages me to eat wild/farmed fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.9 Knowledge about the fish

For every statement below we want you to state how much you disagree or agree. Please mark only one answer from (1) to (7) in each row by making a cross per line.

Items	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
Compared to an average person, I know a lot about fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends consider me as an expert in the domain of fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know a lot about how to evaluate the quality of fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1.10 Knowledge about the fish farming

For every statement below we want you to state how much you disagree or agree. Please mark only one answer from (1) to (7) in each row by making a cross per line.

Items	Strongly disagree		Neither agree nor disagree			Strongly agree	
	1	2	3	4	5	6	7
Compared to an average person, I know a lot about fish farming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends consider me as an expert in the fish farming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I know a lot about how to evaluate the quality of fish produced on fish farms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 2: Rotated Component Matrix of variables used for segmentation

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Unity with nature							.722							
Protecting the environment							.814							
Equality													.538	
Social justice	.450						.442							
Meaning in life	.484													
A world of beauty						.753								
Broad minded	.427					.682								
Inner harmony						.680								
A world at peace														.817
Forgiving	.562													
Helpful	.750													
Honest	.629													
Loyal	.666													
Mature Love	.692													
Wisdom	.672													
True Friendship	.798													
Responsible	.677													
National Security	.567													
Healthy	.730													
Clean	.762													
Family security	.743													
Spend a lot of time on homework										.681				
I often watch TV													.733	
Financial security important									.633					
Interested in sports									.482		.479			
Self-confidence than others								.502						

Family is most important	.417													
Often read news papers								.756						
Spender, not a saver								.671						
Social status is important									.709					
Concerned about environmental quest										.690				
Not polluted the sea/other envt		.826												
Environmentally-friendly way		.813												
Not threatened by over-fishing/extinction		.889												
Without negative consequences envt.		.884												
Respect for fish rights and wellbeing		.406			.800									
Produced without suffering					.852									
Caught/produced in a friendly way					.850									
no ethical concerns eating farmed fish														
Farming help to diminish over exploitation													.884	
Farming violates animal rights					.797									
Slaughtering farmed fish causes suffering					.683									
Fish farming pollutes the environment					.751									
Fish farming is harmful for wild fish					.800									
It means a lot to me to have good health					.673									
Good health is important to me					.801									
I often think about my health					.832									
I concerned about healthy food					.775									
I concerned about health conseq. of food					.725									
% of variance	14.5	7.6	6.9	6.0	5.9	4.6	4.1	3.9	3.9	3.0	2.8	2.8	2.7	2.3
Cumulative %	14.5	22.2	29.0	35.0	40.9	45.5	49.6	53.5	57.4	60.4	63.3	66.1	68.8	71.1

1 = Safety and welfare of relatives (personal values), 2 = Environmental concern for fish, 3 = Health involvement, 4 = Ethical concern for fish farming, 5 = Fish Welfare, 6 = Harmony, beauty and broad minded, 7 = Nature and environment, 8 = News interest and spending

Appendix 3: Rotated Component Matrix of variables used for profiling the segments

Items	1	2	3	4	5	6	7	8
Bad/Good			.879					
Unsatisfied/Satisfied			.880					
Unpleasant/pleasant			.860					
Dull/Exiting			.884					
Negative/Positive			.822					
Bad/Good		.872						
Unsatisfied/Satisfied		.897						
Unpleasant/pleasant		.874						
Dull/Exiting		.854						
Negative/Positive		.849						
Family expect eat wild fish				.522			.496	
Friends expect eat wild fish				.630			.459	
Govt. expect eat wild fish				.787				
Doctors expect eat wild fish				.619				
Advertising expect eat wild fish				.807				
Envt. groups expect eat wild fish				.851				
Food industry expect eat wild fish				.661				
Family expect eat farmed fish					.451	.621		
Friends expect eat farmed fish					.488	.576		
Govt. expect eat farmed fish					.688			
Doctors expect eat farmed fish					.564	.485		
Advertising expect eat farmed fish					.810			
Envt. groups expect eat farmed fish					.806			
Food industry expect eat farmed fish					.727			

Willing to pay a premium for wild fish							.786	
Pay 10% more for wild fish							.826	
Pay 10% less for wild fish								-.658
Willing to pay a premium for farmed fish							.744	
Pay 10% more for farmed fish							.824	
Pay 10% less for farmed fish								.633
I know a lot about fish	.860							
Expert in the domain of fish	.907							
Know to evaluate quality of fish	.841							
Know a lot about fish farming	.904							
Expert in the fish farming	.917							
Know to evaluate fish quality from farms	.838							

1 = Knowledge about fish and fish farming, 2 = Attitudes towards farmed fish, 3 = Attitudes towards wild fish, 4 = Norms to eat wild fish, 5 = Norms to eat farmed fish, 6 = WTP for farmed fish, 7 = WTP for wild fish