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경제학박사학위논문

Consumer Sophistication in Food Industry

2018년 8월

서울대학교 대학원

농경제사회학부 지역정보전공

이 동 민

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지도교수 문 정 훈

이 논문을 경제학 박사학위논문으로 제출함

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Abstract

Consumer Sophistication in Food Industry

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This study investigates the effect of consumer sophistication, a qualitative component of demand, on individual shopping behaviors and industry competitiveness. To do so, the study develops a measurement system to explicate consumer sophistication. To develop and validate an appropriate measurement of consumer sophistication, the study modifies the process first devised by Churchill Jr. (1979). A 12-item measurement system with three first-order constructs about consumer sophistication—opinion formulation, sensitivity, and exposure to variety—is suggested. Using the developed measurement tool, the effect of consumer sophistication on individual shopping behaviors is investigated. The results indicate that this new measurement of consumer sophistication explains not only general grocery purchasing behaviors (e.g., purchase amount) but also variety-seeking or new product-buying behaviors. The amount of product variety within a given product category is used as a proxy variable of consumer sophistication to examine product variety effect on the competitiveness of that product

category's industry in a given country. The results show that product categories with more variety exhibit significantly higher competitiveness than other product categories in the same country. This expands understandings about the role of product variety to explain the competitive advantage of a specific industry within a given country.

Keywords: Consumer Sophistication, Diamond Model, Demand Condition, Competitiveness, Number of Variety

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I. Introduction

1. Background

The heightened importance of open innovation could be the reason behind the growing role of consumers in innovation processes. For instance, Busse and Siebert (2018) categorize consumer involvement as “inbound open innovation;” this is because consumer knowledge is a type of external knowledge that companies exploit to innovate.

Some literature discusses the role of the consumer in influencing competitiveness in regional and national clusters. Porter (1990) identifies demand conditions as one of the crucial factors that shape competitiveness at these levels. Demand conditions, which are defined as “the nature of home demand for the industry’s product or service” (Porter, 1990, p. 71), depend on the characteristics of home buyers or consumers. Nations or regions gain competitive advantage in industries where the home demand places on local firms (1) clear consumer needs and (2) pressure to innovate faster than their rivals.

When addressing the nature of home demand, both quality and quantity should be discussed. Quantitative perspectives toward demand, such as demand size, have been observed to trigger economies of scale and dynamic learning (Venturini and Boccaletti, 1998). Porter (1990) emphasizes, however, that the character of the home buyers within that demand is more important

than demand quantity. Sophisticated and demanding buyers pressure local firms to meet “high standards in terms of product quality, features, and service” (Porter, 1990, p. 89). Such buyers provide a window to the most advanced buyer needs. This can help firms innovate faster and create more advanced products or services than those of their competitors to meet sophisticated and changing buyer needs. Simply put, sophisticated consumers enhance and foster innovation within a firm and, by extension, within an industry. Firms must meet consumer needs to not only remain competitive but also gain competitive advantages in the global market.

Despite the noted influence of quality consumers on firm competitiveness, qualitative perspectives on demand are largely overlooked in mainstream economic studies. In terms of market demand function, quantity of demand is affected by price, the prices of other products, consumer incomes, the quantity of consumers and consumer preferences (Lee, 2013). The characteristics of the market (i.e., consumers) are dictated by these consumer preferences. Usually, price-related variables and the quantity of demand are considered as important variable to any product. The quality side of demand—determined by consumer tastes—is often viewed as constant or even overlooked. Porter (1990) notes that “most theories of trade look solely at cost, treating quality and differentiated products in a footnote” (p. 20). Even competitiveness theories that focus on demand conditions (e.g., representative demand theory) often focus only on quantitative demand size factors such as population.

To date, few consumer-related studies address the characteristics of sophisticated individuals in marketing or consumer literature. Only political communications-related literature actively uses the term “sophistication,” with the term “political sophistication” referring to a wide-ranging base of knowledge about politics and engagement with the political system (Danckert et al., 2017; Luskin, 1987; Rhee and Cappella, 1997). This term is often used to predict politics-related behaviors or attitudes (e.g., attitudes toward political issues, politic-related news, corruption, or voting behaviors). Few studies in the existing marketing and consumer literature apply such focus to consumer sophistication. A further limitation, these studies of consumer sophistication mainly focus on the characteristics of sophisticated consumers (Barnes and McTavish, 1983; Sauer, 2005) or their role in the development of public policy (e.g., Sproles et al., 1978; Titus and Bradford, 1996), rather than predicting its effect on consuming-related behaviors.

Despite what so little research on consumer sophistication might imply, the concept is a fascinating one in its uniqueness. Consumer sophistication involves the individual knowledge, skills, or abilities that explain product purchasing or consumption behaviors. In marketing, consumer knowledge, consumer involvement, and consumer expertise are processed as similar variables. However, these variables (1) only explain one of the many qualities required to be a sophisticated consumer (i.e., consumer knowledge), (2) are triggered only in a specific situation (i.e., consumer involvement), and (3) are measured by objective rather than subjective knowledge. “Sophistication,” in contrast, measures the holistic concepts of individual knowledge, skills, and

abilities to explain individual shopping behaviors. Inherent and innate, these consumer characteristics and abilities (Titus and Bradford, 1996) do not depend on specific situations. As such, measuring and empirically testing the effect of individual consumers' sophistication on their shopping behaviors should yield meaningful results.

One researcher, Porter (1990), devised a "diamond model" to address the importance of studying the character of home buyers, addressing the term "sophisticated consumer". The present study use Porter's diamond model to examine what effect consumer sophistication as a home-demand characteristic has on purchasing behaviors of individual consumers and the competitiveness of the given product category industry. To achieve the goal of the study, we first develop a measure of consumer sophistication and analyze its effect on individual shopping behavior. Unlike measures developed in previous marketing literatures, the present constructs incorporated personal sensory abilities. Moreover, this new measure was used to predict not only general shopping behavior but also purchasing behavior for newly released products and the varieties of a product, which may trigger the product innovation of local firms. Then, the number of product variety within a given product category is used as proxy variable of consumer sophistication to examine its effect on the competitiveness level of that product category's industry in a given country. This expands the understanding about the role of product varieties explaining the competitive advantage of the given industry within the given country.

2. Study objectives

This study proposes the concept of consumer sophistication in marketing and investigates the effect of consumer sophistication on individual shopping behaviors and industry competitiveness. To do so, an adequate measurement tool is developed to explicate consumer sophistication (Chapter II). PLS-graph and CEFA program are then used to conduct exploratory and confirmatory factor analysis. Chapter III uses the developed measurement tool to investigate the effect of consumer sophistication on individual shopping behaviors. The analysis includes basic shopping behaviors such as shopping amount and frequency, innovative buying behaviors, and variety-seeking behaviors. The effect of consumer sophistication on competitiveness is investigated using number of product varieties as proxy variables (Chapter IV). Table 1 details the present thesis' structure:

Table 1. Research structure

	Effect of consumer sophistication on shopping behavior		Effect of consumer sophistication on industry competitiveness (Ch.IV)
	Measuring consumer sophistication (Ch.II)	Shopping behavior of a sophisticated consumer (Ch.III)	
Research Question	How to measure consumer sophistication?	What is the effect of consumer sophistication on grocery shopping behavior?	What is the effect of consumer sophistication on the competitiveness of industry?
Content	<ul style="list-style-type: none"> · Scale development of consumer sophistication · Exploratory and confirmatory factor analysis using CEFA, PLS-graph program 	<ul style="list-style-type: none"> · Examine the effect of consumer sophistication on grocery shopping behavior (general purchase, variety-seeking purchase, and new-product purchase behavior) · Use of real grocery purchase data 	<ul style="list-style-type: none"> · Use number of products varieties on an online shopping mall shelf as a proxy variable of consumer sophistication · Examine the effect of consumer sophistication of a specific country's specific product category

3. Demand quality in Diamond model

Many competitiveness-based models identify demand condition as a critical factor to explain the competitiveness of the country or region. By defining competitiveness as a trade, Krugman (1979), explains intra-industry trade for differentiated goods as based on consumers' *love of variety* characteristics. Per this definition, consumers report increased welfare when given many varieties of a product to choose from; this characteristic leads to more opportunities for trade. Itself a representative theory, Porter (1990)'s diamond model explains this demand condition in a qualitative way.

The diamond model (see Figure 1) is one of the most known approaches for investigating cluster competitiveness among practitioners (Ketels, 2006). The model states that existing comparative advantage theories that rely on production factors—such as the theory by Heckscher and Ohlin—cannot fully explain trade patterns. The underlying assumptions about the factors of comparative advantage are becoming increasingly unrealistic. Other factors than production factors arises as new explanations of trade; “economies of scale are widespread, most products are differentiated, and buyers’ needs vary among countries (p.13)”.

To combat this, Porter suggests a new theory of national competitive advantage: the diamond model. The model responds to the following question: “Why does a nation achieve international success in a particular industry?” (p.71). To answer this question, Porter conducted a four-year study based on observations from various industries in 10 countries. He concluded that a

nation or region succeeds in a given industry if it possesses a competitive advantage over its competitors. The diamond model identifies four factors within a nation or region that shape the environment in which firms create competitiveness: (1) factor conditions, (2) demand conditions, (3) related and supporting industries, and (4) firm strategy, structure, and rivalry. Two peripheral elements that influence the four determinants (but are not determinants themselves) also merit consideration: the role of government and external events.

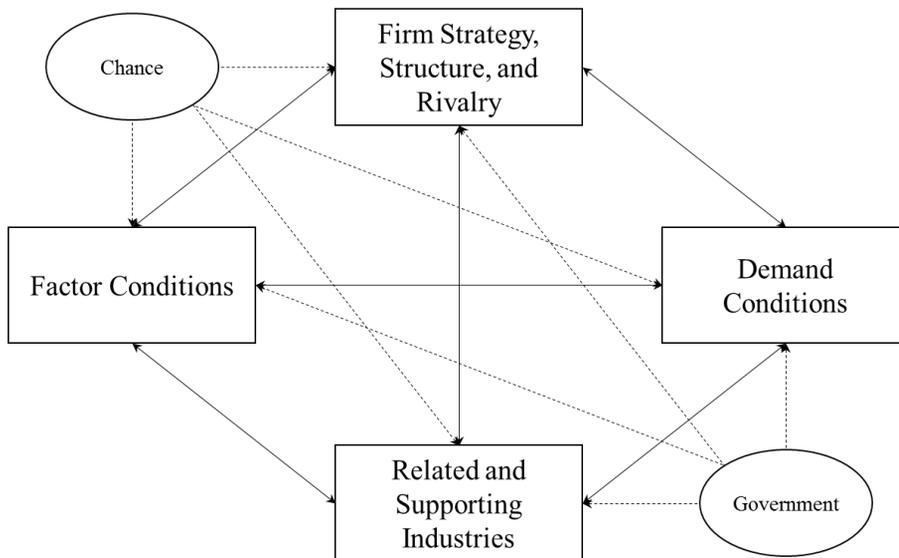


Figure 1. Diamond model (Porter, 1990)

The four identified factors form a system that differs from location to location. Thus, the diamond model explains why the success of some firms is location-specific in distinct segments and industries (Porter, 1990). Nations are most likely to succeed in industries with the most favorable factors, in terms of following four factors. The four determinants of competitiveness and two peripheral elements are summarized in Table 2.

Table 2. Definition of competitiveness factors (Porter, 1990)

Factors of competitiveness	Definitions
Factor (input) conditions	The underlying inputs the industry draws on in competition (e.g., skilled labor, infrastructure)
Demand conditions	The nature of the home demand for products and services
Related and supporting industries	The presence and quality of local suppliers and related industries
Firm strategy, structure, and rivalry	Conditions in the nation/region governing how companies are created, organized, and managed, as well as the nature of local rivalries
Government	Government actions (e.g., policy, tax) that can influence each of the above four determinants of competitiveness
Chance	Events outside the firm's control

“Demand conditions,” the factor of primary focus in this study, are defined as the nature of home-market demand for an industry’s product or service. Porter (1990), unlike other scholars of competitiveness, emphasizes the importance of “home” demand. Based on proximity and cultural similarities, home consumers are important to local firms. This characteristic of home demand dictates firms’ standards about how to perceive, interpret, and respond to consumer needs. Moreover, the clear communications received from home consumers put acute pressure on firms to improve their products and services (Porter, 1990).

Porter (1998) defines demand conditions from two perspectives: qualitative and quantitative. Demand quantity refers to the size and pattern of the home market, while demand quality is about the characteristics of home consumers (e.g., sophisticated or demanding). Quantitative perspectives toward demand, such as demand size, reinforce industry competitive

advantages due to economies of scale and dynamic learning (Venturini and Boccaletti, 1998). From the perspective of firms, sizable home demand facilitates investment decisions (Porter, 1990) and can minimize transportation costs (Krugman, 1991). Most prior studies in the literature refer to demand size in conjunction with the term “market size;” larger markets generate tougher competition and exhibit higher productivity (Melitz and Ottaviano, 2008).

Another aspect of home demand is the quality of local demand, a factor more critical than demand size (Porter, 1990). Porter uses the idea of the “sophisticated” consumer to explain home demand. Stigler and Becker (1977) demonstrated a similar view about demand quality in terms of consumer welfare. They suggested that a consumer’s utility function includes the person’s own time input as a variable in aiming to gain knowledge and skills to maximize utility. This learned knowledge or skill is called “consumer capital” and is needed to maximize a consumer’s total utility. Per Porter’s (1990) definition, sophisticated and demanding buyers pressure local firms to meet their higher standards of product quality, features, and service. The presence of sophisticated and demanding home customers leads firms to improve and differentiate their products and services, therefore gaining competitive advantages within the firm or even the industry.

II. Measuring consumer sophistication

1. Theoretical background

The present study applies the following theoretical structure: first, qualitative demand conditions as a concept are introduced using the term “consumer sophistication” as seen in prior marketing and political communications studies. The term is then operationalized within the scope of consumer sophistication. Comparable constructs are then reviewed to identify similarities and differences between them and consumer sophistication.

1.1 The consumer sophistication concept

Colloquial uses of the terms “sophisticated” or “sophistication” do not fully reflect the meaning of sophistication as described by Porter (1990). In *Oxford Learner’s Dictionaries*, “sophistication” is defined as “having a lot of experience of the world and knowing about fashion, culture, and other things that people think are socially important.” In academic literature, the term has been used widely for decades in political communications research. However, political sophistication is but one domain of a general variable. According to Luskin (1987), individuals possessing higher levels of political sophistication have belief systems that are larger and denser than those of others. Using this definition, “sophisticated consumers” might be described as having larger and denser belief systems about products for consumption and their related behaviors.

The few existing marketing studies that draw on such a definition of consumer sophistication (e.g., Barnes and McTavish, 1983; Sproles et al., 1978; Titus and Bradford, 1996), limit this “larger and denser belief system” to belonging to “wise” or “efficient” consumers or problem-solvers. In their 1978 study, Sproles *et al.* assessed the effect of consumer knowledge on their perceptions of competitive brands within a product class, defining consumer sophistication as “an individual’s aggregated level of acquired knowledge, experience in purchasing products, and skills which are relevant to being an efficient decision maker” (p. 91). Similarly, Titus and Bradford (1996) defined consumer sophistication as “the extent to which consumers possess and utilize the characteristics and abilities necessary to make efficient consumer decisions and participate in wise purchase practices” (p. 173). Barnes and McTavish (1983) also addressed the importance of the construct in segmenting the industrial B2B market. Their definition of consumer sophistication drew from Hirschman (1980)’s study, describing the concept as “the problem-solving capability possessed by the individual that may be applied toward solving consumption-related problems.” (Barnes and McTavish, 1983, p. 17)

To sum up, the prior literature defines consumer sophistication as the possession of abilities, skills, or capabilities necessary to be a wise and efficient consumer, but most of these studies do not define the standards that would qualify one as “efficient” or “wise.” Paradoxically, defining “wise and efficient consumers” could hurt the core characteristics of sophistication. Sophistication refers not to *what*, but *how* and *how much* a person thinks about

a specific domain (Luskin, 1987). Unless the scope of measurement is “wise and efficient consumption behavior,” the measurement should only assess *how* and *how much* the consumer thinks about the consuming object. To suit this, the present study broadens the definition of consumer sophistication to “the general knowledge, experience, skills, and abilities related to a specific product category;” per this definition, the “sophisticated” consumer does not need to be efficient or wise.

1.2. Similar constructs in marketing studies

The following literature review examines prior studies' use of the concepts related to consumer sophistication: consumer knowledge, consumer involvement, and consumer expertise. The similarities and differences between consumer sophistication and these related concepts are described below.

Prior studies use the concept of “consumer knowledge” as a mode to measure consumer sophistication (e.g., Gupta and Polsky, 2015; Sproles et al., 1978). However, consumer knowledge is but one of many qualities required to be a sophisticated consumer. Sproles *et al.* (1978), for instance, used eight items to measure consumer sophistication, including age, number of consumer-oriented courses, brand name awareness, and self-perceived knowledgeable in evaluating product quality.

“Consumer involvement” also appeared in the literature as resembling consumer sophistication. This term has been referred to as “the level of perceived personal importance, interest, or relevance evoked by a stimulus or stimuli, which are linked by the consumer to enduring or situation-specific goals” (Verbeke and Vackier, 2004, p. 159). Most important here is that consumer involvement depends on external stimuli; consumer sophistication, in contrast, is determined by the consumer's innate, inherent characteristics such as knowledge, experiences, and product category information (Titus and Bradford, 1996).

“Consumer expertise” has been defined as “the ability to perform product-related tasks successfully” (Alba and Hutchinson, 1987, p. 411). While consumer expertise generally applies the objective criteria of assessment and classification, consumer sophistication is determined by the consumer’s subjective perceptions (Sauer, 2005). Simply put, consumer sophistication is based on the consumer’s subjective knowledge and perceived feelings about a specific product evaluated by the consumers themselves. Sophistication does not have to be strictly logical; it is enough if the subjective knowledge and perceived feelings make sense to the consumers themselves (Luskin, 1987).

2. Methods

This chapter develops and validates a method for measuring individual levels of consumer sophistication in a food category. This section describes the process used to establish the content for these dimensions and to validate the scale both psychometrically and theoretically.

The method used was adopted and modified from those of Churchill Jr (1979), Smith Smith *et al.* (1996), and Sweeney and Soutar (2001). The devised process uses four steps to establish consumer sophistication content and to validate the scale, as described in Figure 2.

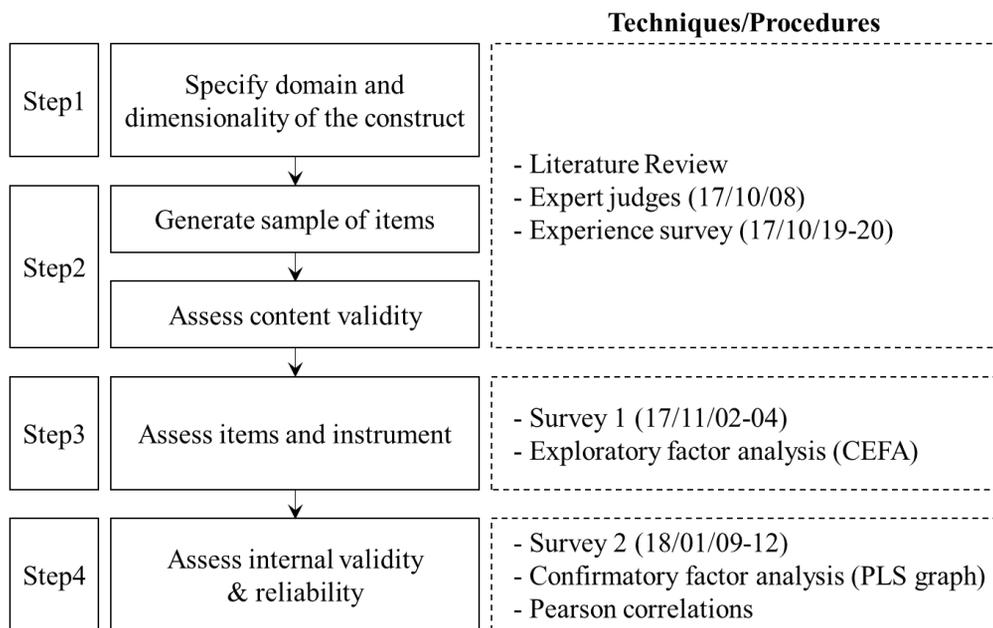


Figure 2. Instrument Development and Validation Process

3. Measurement development process

3.1. Step 1: Specify domain and dimensionality of the construct

First, the domains and dimensions of consumer sophistication were identified by approximating what characteristics sophisticated consumers might have based on the results of the existing literature on political sophistication (Danckert et al., 2017; Fiske *et al.*, 1990; Kölln, 2018; Luskin, 1987; Rhee and Cappella, 1997; Weitz-Shapiro and Winters, 2017), and consumer sophistication (Barnes and McTavish, 1983; Garry, 2007; Gupta and Polsky, 2015; Kim and La, 2012; Newell *et al.*, 2011; Porter, 1990; Sauer, 2005; Titus and Bradford, 1996). From this process, six dimensions of consumer sophistication were decided upon: knowledge, experience, sensory skills, interest and preference insights, the information process, and opinions.

Knowledge: Consumer knowledge is an indispensable characteristic of sophisticated consumers. Many sophistication-related studies describe being “knowledgeable” as a representative characteristic of a sophisticated individual (Sproles et al., 1978) and some even use knowledge alone to measure sophistication (Kinder and Sanders, 1990; Zaller, 1990). Such knowledge results from increased access to a product itself, product-related information, and even consumption situations (Hirschman, 1980; Titus and Bradford, 1996). Further, this knowledge is linked to the ability to evaluate or judge product quality. Sophisticated consumers compare products based on larger pools of information and make more accurate judgments of product quality (Barnes and McTavish, 1983). Demonstrably, Sproles et al. (1978)

used levels of self-perceived knowledgeableness in evaluating product quality as a measure of consumer sophistication.

Experience: Experience, or the record of past consumption, is highly relevant to sophisticated consumers and is often referred to as “product familiarity.” Greater experience means greater exposure to a variety of products; sophisticated consumers, then, are more receptive to new products (Barnes and McTavish, 1983) and want the latest models (Porter, 1990). Consumers with high sophistication are more likely to use their greater experiences to make accurate judgments of product quality. In the reviewed literature, most studies failed to specify the object of experiences, though some did so when related to consumption (Barnes and McTavish, 1983) or purchase activities (Hirschman, 1980; Newell et al., 2011; Sproles et al., 1978). The value of experience is worth exploring, as greater experiences can increase the ability to recall information to solve current consumption problems (Barnes and McTavish, 1983).

Sensory skills: The existing literature about consumer sophistication largely neglects the role of the five senses (Sauer, 2005; Sproles et al., 1978; Titus and Bradford, 1996). Consumer sophistication is associated with consumption behaviors, where the five human senses play an important role. The marketing field acknowledges sensory attributes through sensory marketing, which is “marketing that engages the consumers’ senses and affects their perception, judgment and behavior” (Krishna, 2012, p. 332). This kind of marketing is meant to trigger subconscious consumer perceptions,

such as product quality or sophistication (Krishna, 2012). Thus, sensory skills and abilities are important attributes in a consumer when using or purchasing a product or service. The present study focuses on food products that stimulate the five human senses simultaneously. Consumers use sensory cues to predict the quality of a food product (Compeau *et al.*, 1998; Grunert *et al.*, 2004), so many food manufacturers conduct sensory marketing to emphasize what characteristics of their products “appeal to the different senses” (Krishna, 2012, p. 334). Because human consumers exhibit wide individual differences in sensory sensitivity (Lawless and Heymann, 1998), the present study accommodates personal sensory abilities within the scope of consumer sophistication.

Interest and preference insights: Politically sophisticated individuals tend to be more interested in politics and are better at spotting and pursuing their political interests (Chong *et al.*, 1983; Converse *et al.*, 1965). This could be relevant in a consumer sophistication context as consumers identify their own interests or preferences. A person’s preference insights—the degree of awareness to their own preferences regarding a specific product category—are important when valuing segmented and customized products (Franke *et al.*, 2009). If consumers do not know what they want, they cannot evaluate whether an offering truly fits their preferences (Kramer, 2007) ; this in turn can affect their purchase behaviors. The present study includes preference insights when determining what makes a sophisticated consumer to accommodate how preference insights vary among different individuals (Chernev, 2003).

Information process: Sophisticated consumers exhibit different attitudes from those of non-sophisticated consumers throughout the entire information process. Sophisticated individuals tend to have a heightened ability to understand relevant information (Danckert et al., 2017). Prior studies describe this difference in information processing by explaining that sophisticated individuals engage in more extensive and effortful information processing (Beatty and Smith, 1987; Danckert et al., 2017) on a more abstract level to identify patterns and implications (Kölln, 2018). Such consumers know where to access information and how to interpret or issue advice (Egan *et al.*, 2016; Garry, 2007).

Opinion: The literature on political sophistication states that sophisticated individuals are more likely to have opinions on policy issues and behave based on these opinions (Luskin, 1987). Many studies used the frequency of discussions about politics to measure levels of political sophistication (Danckert et al., 2017; Weitz-Shapiro and Winters, 2017). Sophisticated individuals have been observed to possess the ability to issue advice and instructions to service or product providers (Garry, 2007). Such individuals express their opinions about the product categories about which they are most sophisticated online or by SNS.

3.2. Step 2: Generate a sample of items and assess content validity

Step 2 involves two means to specify the domain and dimension of the construct: generate a sample of items and assess content validity. A literature review, a discussion with expert judges, and experience surveys were used to complete this step. Using the domains of consumer sophistication identified in Step 1, measurement items were generated and explored. These items were examined for content validity by three marketing professors, one econometric professor, and one consumer-psychology professor. Such use of experts to judge a scale's domain is a common tactic in marketing (e.g., Babin and Burns, 1998; Sweeney and Soutar, 2001). Also, an experience survey were conducted to examine face validity by six Ph.D. students and five master students. During this process, items related to consumer sophistication were added, deleted and modified to increase the content validity. Finally, 30 items were selected (Table 3).

Table 3. Initial item pool to describe consumer sophistication

Dimension	No.	Items
Knowledge	1	I am very knowledgeable about <i>ramyun</i> .
	2	I know a lot of <i>ramyun</i> brand names.
	3	I know a lot of <i>ramyun</i> company names.
	*4	I have the ability to make accurate quality judgments regarding <i>ramyun</i> .
	5	Regarding <i>ramyun</i> , I have a large base on which to compare products.
	*6	Regarding <i>ramyun</i> , I have detailed and delicate standards on which to compare products.
	7	When I purchase <i>ramyun</i> , quality is more important to me than price.
	8	When I purchase <i>ramyun</i> , suiting my taste is more important than price.
Experience	9	I have a lot of experience eating <i>ramyun</i> .
	10	I have a lot of experience purchasing <i>ramyun</i> .
	*11	Regarding <i>ramyun</i> , I have been exposed to a variety of products.
	*12	I purchase new <i>ramyun</i> products when they become available.
	*13	I usually purchase a variety of <i>ramyun</i> products.
Sensory skills	*14	I know the sensory differences (sight/smell/taste/sound/touch) of different <i>ramyun</i> products.
Interest & preference insight	15	I am very much interested in <i>ramyun</i> .
	*16	Regarding <i>ramyun</i> , I know exactly what I want.
	17	When I purchase <i>ramyun</i> , I usually know immediately what I prefer.
	18	When I purchase <i>ramyun</i> , I find it easy to choose from different alternatives.
	19	Even someone who knows me well will not be able to make a good guess as to which <i>ramyun</i> may interest me.
	20	The <i>ramyun</i> I like fits some sort of pattern.
	21	I can easily tell which <i>ramyun</i> I will prefer and which I will not.
Information process	*22	I gather extensive information about <i>ramyun</i> .
	23	I know where to access information about <i>ramyun</i> .
	24	Regarding <i>ramyun</i> , I process information thoroughly and extensively.
	25	I am good at understanding new information about <i>ramyun</i> .
Opinion	*26	I often ask for advice about <i>ramyun</i> from my friends and neighbors.
	*27	I actively participate in offline/online communities regarding <i>ramyun</i> .
	*28	Regarding <i>ramyun</i> , I issue product advice to companies offline/online.
	*29	I leave my opinions or reviews about <i>ramyun</i> via online communities or SNS.
	30	When discussing <i>ramyun</i> , I am the one who gives the information.

* Indicates items chosen for the final consumer sophistication scale.

3.3. Step 3: Assess items and instrument

The items identified in Step 2 were used to develop a questionnaire in Step 3 to perform a preliminary assessment and refine all taken measurements. The instant noodle product category, ramyun, was selected as the target food category for assessing consumer sophistication because the respondents were expected to have at least heard about the product category. In terms of consumers, South Korea occupied the top spot in per capita consumption of the product at 73.7 servings in 2017 (World Instant Noodles Association, 2018).

The questionnaire was administered to 342 participants through the online survey system *Qualtrics*. Of these distributed surveys, 279 were completed and deemed usable. Thirty items were listed on three pages, which were presented in random order to prevent the ordering effect. Likert scales with anchors ranging from “strongly disagree (1)” to “strongly agree (5)” were applied to each item. The respondents were asked to report their demographic information such as age, gender, education, and occupation. The survey was conducted from 2 November 2017 to 4 November 2017. Table 4 profiles the respondents of the pilot sample. As shown, the respondent compositions were reasonably homogeneous in terms of gender and age.

Table 4. Profile of pilot sample respondents

Profile category		n	%
Gender	Male	145	52.0%
	Female	134	48.0%
Age (AVG=38.2, S.D.=10.21)	under 20s	68	24.4%
	30s	79	28.3%
	40s	96	34.4%
	over 50s	36	12.9%
Education	~high school	31	11.1%
	undergraduate school	139	49.8%
	graduate school	109	39.1%
Occupation	students	41	14.7%
	non-students	238	85.3%

An exploratory factor analysis (EFA) was conducted using the comprehensive exploratory factor analysis (CEFA) program. The factor analysis method used oblique and quartimax rotations to assume correlations between factors not at 0. Before finalizing the number of appropriate factors, items with communalities under 0.4 and with loadings under 0.4 were excluded. When conducting the EFA, factors that comprised only one or two items were removed, leaving 12 items.

Several criteria were used to decide on an appropriate number of factors to retain. The four-factor model was excluded as one of the four factors contained only one item. The Kaiser criterion, which assessed the number of factors with eigenvalues greater than 1.0, suggested three factors. Examination of the root mean square error of approximation (RMSEA) showed the three-factor model as an acceptable fit, with values between 0.05 and 0.08 (Fabrigar *et al.*, 1999). An expected cross-validation index (ECVI; Browne and Cudeck, 1993) did not offer conversions for the value, but the smaller value of the ECVI was better known. To sum up, the three-factor

model was selected for the study. Suitability statistics are presented in Table 5.

Table 5. Fit indices for one-, two- and three-factor solutions per the EFA

Fit indices	Number of factors		
	1	2	3
RMSEA point estimate (CI 90%)	.170 (.157; .184)	.128 (.113; .145)	.057 (.035; .078)
ECVI point estimate (CI 90%)	1.936 (1.694; 2.204)	.561 (.954; 1.305)	.550 (.483; .645)

This process eventually yielded a 12-item measurement system, wherein the second-order construct was drawn from three first-order constructs (see Table 6). Factor 1, “Opinion formulation (OF),” refers to the opinions about a specific food product voiced in online and offline communities. This factor uses four items to assess how subjects express their opinions and one item to identify how the subjects gather information to formulate these opinions. Factor 2, “Sensitivity (SE),” concerns the consumers’ sensitivity to specific food products when judging or evaluating, bearing in mind that consumers might have strict evaluation standards about the product or existing preferences within the product category. Two items address sense sensitivity to *ramyun* (e.g., knowing about sensory differences), and the other two items reflect the results of having sensitive senses (e.g., making accurate judgments of quality). Factor 3, “Exposure to variety (EV),” refers to consumers’ past and present exposure to various brands, breeds, or types within a product category. Two items address past and present exposure to variety (e.g.,

significant exposure to a variety of products) and one item identifies present behaviors toward new products (e.g., purchase new *ramyun* products).

An item analysis was conducted to assess the homogeneity of the items comprising each factor (DeVellis, 2016). Cronbach coefficient alpha were above 0.80 for all three factors as follows: OF, $\alpha = 0.836$; SE, $\alpha = 0.800$; EV, $\alpha = 0.821$.

Table 6. Final EFA with oblique rotation

Factor/Item		1	2	3
Opinion formulation				
OF1	I actively participate in offline/online communities about <i>ramyun</i> .	0.76	-0.14	-0.01
OF2	Regarding <i>ramyun</i> , I issue advice about the product to the company using offline/online platforms.	0.74	0.05	-0.12
OF3	I often ask for advice about <i>ramyun</i> from my friends and neighbors.	0.69	0.12	0.04
OF4	I leave my opinions or reviews about <i>ramyun</i> in online communities or by SNS.	0.69	-0.01	0.06
OF5	I gather extensive information about <i>ramyun</i> .	0.65	0.08	0.13
Sensitivity				
SE1	Regarding <i>ramyun</i> , I know exactly what I want.	-0.05	0.73	-0.14
SE2	I have the ability to make accurate judgments of quality regarding <i>ramyun</i> .	0.06	0.72	0.06
SE3	I know about sensory differences (sight/smell/taste/sound/touch) among <i>ramyun</i> products.	0.01	0.69	0.17
SE4	Regarding <i>ramyun</i> , I have detailed and delicate standards on which to compare products.	0.29	0.51	0.05
Exposure to variety				
EV1	Regarding <i>ramyun</i> , I have significant exposure to a variety of products.	-0.01	0.26	0.63
EV2	I purchase new <i>ramyun</i> products when they become available.	0.03	0.04	0.72
EV3	I usually purchase a variety of <i>ramyun</i> products.	0.02	-0.08	0.87

3.4. Step 4: Assess internal validity and reliability

Following the EFA in Step 3, a confirmatory factor analysis (CFA) was conducted using the PLS-graph program. To do so, a second survey was distributed to assess the reliability and internal validity of the measurement tool. To check the generalizability of the measurements, this second survey expanded the target food categories to include two fresh food categories and two processed food categories: potatoes, tomatoes, beer, and cheese.

For these product categories, 228, 226, 227, and 229 responses were collected, respectively. There was an even distribution of male and female respondents, and ages 20 to over 50 were represented. Three factors with 12 items were listed on three webpages, presented in random order to prevent the ordering effect. Likert scales with anchors ranging from “strongly disagree (1)” to “strongly agree (5)” were applied to each item. The respondents were asked to state their demographic information, such as age, gender, education, and occupation. The survey was conducted online from 9 January 2018 to 11 January 2018.

3.4.1. Reliability assessment

The reliability of each individual item was assessed by examining internal consistency measures, such as Cronbach’s Alpha or composite reliability. All three factors passed the reliability test with alpha values higher than 0.70, indicates that the construct has reasonable internal consistency (Bohrnstedt and Knoke, 1994) (see Table 7). Composite reliability, also

referred to as convergent validity (Werts *et al.*, 1974), is discussed in the construct validity assessment section of this paper.

Table 7. Cronbach's Alpha

Factors	Cronbach's alpha			
	Potato	Tomato	Beer	Cheese
Opinion Formulation (OF)	.940	.956	.926	.933
Sensitivity (SE)	.915	.913	.921	.918
Exposure with variety (EV)	.910	.916	.893	.859

3.4.2. Construct validity assessment

Construct validity was confirmed via convergent validity and discriminant validity assessments. Convergent validity was assessed using composite reliability (CR), factor loadings, and average variance extracted (AVE). For discriminant validity, the cross-loading matrix and the square root of AVE were examined.

Convergent validity assessment: Table 8 shows each individual item's PLS factor loadings and each factor's CR and AVE. Individual item factor loadings greater than 0.70 and AVEs greater than 0.50 were acceptable criteria (Fornell and Larcker, 1981; Gefen *et al.*, 2000). Values greater than 0.70 in CR meant the construct retained both its internal consistency (reliability) and convergent validity (Werts *et al.*, 1974). With these criteria, all items measured for all four food categories were tested and passed the convergent validity test.

Table 8. Factor loadings, CR and AVE of each factor

Item	Potato			Tomato			Beer			Cheese		
	Loading	CR	AVE									
OF1	.868	.954	.806	.927	.967	.852	.895	.946	.777	.864	.949	.790
OF2	.903			.931			.884			.916		
OF3	.890			.921			.863			.894		
OF4	.908			.941			.880			.901		
OF5	.920			.896			.883			.867		
SE1	.841	.941	.799	.866	.940	.796	.832	.945	.810	.848	.942	.804
SE2	.912			.900			.930			.923		
SE3	.912			.919			.928			.922		
SE4	.908			.883			.907			.890		
EV1	.900	.943	.847	.888	.948	.858	.885	.934	.825	.807	.914	.780
EV2	.936			.937			.921			.922		
EV3	.926			.953			.919			.915		

*Average variance extracted (AVE) = (summation of the square of the factor loadings)/[(summation of the square of the factor loadings)+(summation of the error variances)]

*Composite reliability (CR) = (square of the summation of the factor loadings)/[(square of the summation of the factor loadings)+(square of the summation of the error variances)]

Discriminant validity assessment: To assess discriminant validity, cross-loadings of each item were explored and compared across all latent variables (see Table 9). The cross-loadings of each item are the correlations of the factor scores with the measurement items that load highly on theoretically assigned factors and do not load highly on other factors (Gefen and Straub, 2005). The factor scores were calculated by multiplying each standardized indicator with its respective weight. Each number in Table 9 has been used as an index for the latent variables OF, SE, and EV.

In addition to the cross-loading table, the square root of the AVE was used to determine discriminant validity (see Table 10). The square root of the AVE should be greater than the correlations among the constructs (Fornell and Larcker, 1981). That is, the AVE between the constructs and their measurements should be greater than the variances shared between the constructs themselves (Saadé and Bahli, 2005); fulfillment of this requirement indicates a strong discriminant validity. Squared correlations were reported on off-diagonals, and the AVE squared roots were reported on the diagonal.

Table 9. Cross-loadings for the measurement model

		Potato			Tomato			Beer			Cheese		
		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
(1)	OF1	.873	.462	.558	.928	.538	.506	.904	.492	.389	.873	.494	.425
	OF2	.907	.493	.553	.933	.521	.466	.894	.481	.365	.921	.550	.489
	OF3	.885	.610	.669	.919	.614	.512	.854	.614	.568	.893	.598	.569
	OF4	.907	.573	.609	.942	.556	.503	.878	.581	.515	.900	.617	.550
	OF5	.917	.606	.656	.893	.625	.522	.876	.661	.538	.857	.694	.642
(2)	SE1	.440	.847	.638	.517	.866	.729	.465	.835	.685	.508	.851	.678
	SE2	.563	.911	.718	.530	.902	.709	.575	.930	.719	.621	.923	.727
	SE3	.570	.912	.705	.584	.919	.751	.597	.928	.728	.629	.921	.740
	SE4	.608	.905	.722	.571	.881	.721	.662	.905	.688	.616	.889	.663
(3)	EV1	.556	.680	.904	.403	.725	.893	.431	.702	.887	.430	.623	.816
	EV2	.643	.729	.935	.565	.747	.934	.517	.738	.918	.567	.716	.919
	EV3	.673	.743	.922	.537	.792	.951	.514	.694	.919	.586	.731	.910

Table 10. Correlations of the latent variables and the square root of the AVE

		Potato			Tomato			Beer			Cheese		
		(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
(1)	OF	(.898)			(.923)			(.881)			(.889)		
(2)	SE	.612	(.894)		.617	(.892)		.641	(.900)		.664	(.897)	
(3)	EV	.678	.779	(.920)	.543	.816	(.926)	.537	.783	(.908)	.601	.783	(.883)

4. Discussion

This chapter proposes a practical, 12-item measurement of consumer sophistication using three factors. To develop and validate an appropriate measurement for consumer sophistication, this study modified the process first devised by Churchill Jr (1979). EFA and CFA were conducted by distributing surveys two times. To assess the generalizability of the measurement, different product categories were selected for each survey. The target of the first survey was *ramyun* (i.e., instant noodles), and the second survey extended the target product category to other processed foods (cheese and beer) and fresh foods (tomatoes and potatoes). Three factors of consumer sophistication were identified: Opinion formulation (OF), Sensitivity (SE), and Exposure to variety (EV).

Per the results, “sophisticated” consumers about the chosen product categories (1) formulated more opinions, (2) exhibited sensitive standards and preferences when purchasing and evaluating, and (3) had experience with more variety within the product categories. Consumer sophistication differs from similar concepts due to its inclusion of sensory skills. Consumption behaviors closely involve the five senses, so a sophisticated consumer may exhibit notable sensory skills. Unlike other existing consumer characteristic concepts (e.g., consumer expertise), sensory skills are assessed based on subjective standards; these subjective perceptions are then used to determine consumer sophistication. While consumer expertise, for example, is assessed based on objective criteria, consumer sophistication is determined by the

consumers' own subjective perceptions (Sauer, 2005). Even with the current advanced methodologies in the sensory evaluation field for the objective measurement of sensory aspect using expert sensory panels, most ordinary consumers use their own subjective standards to evaluate sensory skills.

III. Shopping behavior of a sophisticated consumer

1. Theoretical background

Politically sophisticated individuals tend to be more interested in politics, participate more in voting and other politics-related activities (Fiske et al., 1990; Luskin, 1990). This is because more sophisticated individuals tend to understand relevant information and engage in more extensive information processing (Danckert et al., 2017).

In the same vein, because political sophistication is just the political version of a more general concept (Luskin, 1987), sophisticated consumers may be defined as an individual participating more in consumption-related activities (i.e., purchasing or consuming products). In the present study, shopping behavior is predicted using the variable of consumer sophistication. A consumer can gather this sophistication from just engaging in market transactions.

It might be argued that shopping behavior is a consequence of consumer sophistication or the other way around. Even in literature on political expertise, political behavior functions as both cause and consequences of expertise (Fiske et al., 1990). However, unlike the concept of expertise, consumer sophistication is a measurement that explains the inherent set of characteristics and abilities possessed by consumers regarding a specific product category (Titus and Bradford, 1996). That is, if the present shopping

behavior is measured, the concern about shopping behavior being a consequence or cause may disappear.

2. Research model

The second objective of this study is to investigate the effect of consumer sophistication on individuals' innovative shopping behaviors (see Figure 3). Propositions 1, 2, and 3 focus on the effect of consumer sophistication on shopping behaviors.

- Proposition 1: Consumers who are more sophisticated in regard to a specific product category buy more of the specific product.
- Proposition 2: Consumers who are more sophisticated in regard to a specific product category buy more varieties of the specific product.
- Proposition 3: Consumers who are more sophisticated in regard to a specific product category buy more new products.

Proposition 1 is about general purchasing behavior (i.e., purchase amounts). Propositions 2 and 3 are about consumer's variety-seeking purchase behavior and new product purchase behavior, so called innovative shopping behavior. Cotte and Wood (2004) define consumer innovativeness or consumer innovative behavior as "the tendency to want to embrace change and try new behaviors or products" (Cotte and Wood, 2004, p. 79) which is the response of consumers towards companies' innovations. Consumers might be innovative due to higher than average stimulation level preferences, regulated through variety-seeking behaviors (Menon and Kahn, 1995) or exploring novel products (Raju, 1980). Variety-seeking, one way that

consumers respond to innovation, occurs when consumers recognize significant differences between brands (Dodd *et al.*, 1996). That is, when consumers have enough knowledge or experience, they might purchase varieties of a product (Proposition 2). These consumers also tend to purchase new products, which is another response towards firms' innovations (Proposition 3). Steenkamp and Gielens (2003) found that consumers who want to acquire knowledge tend to try new products.

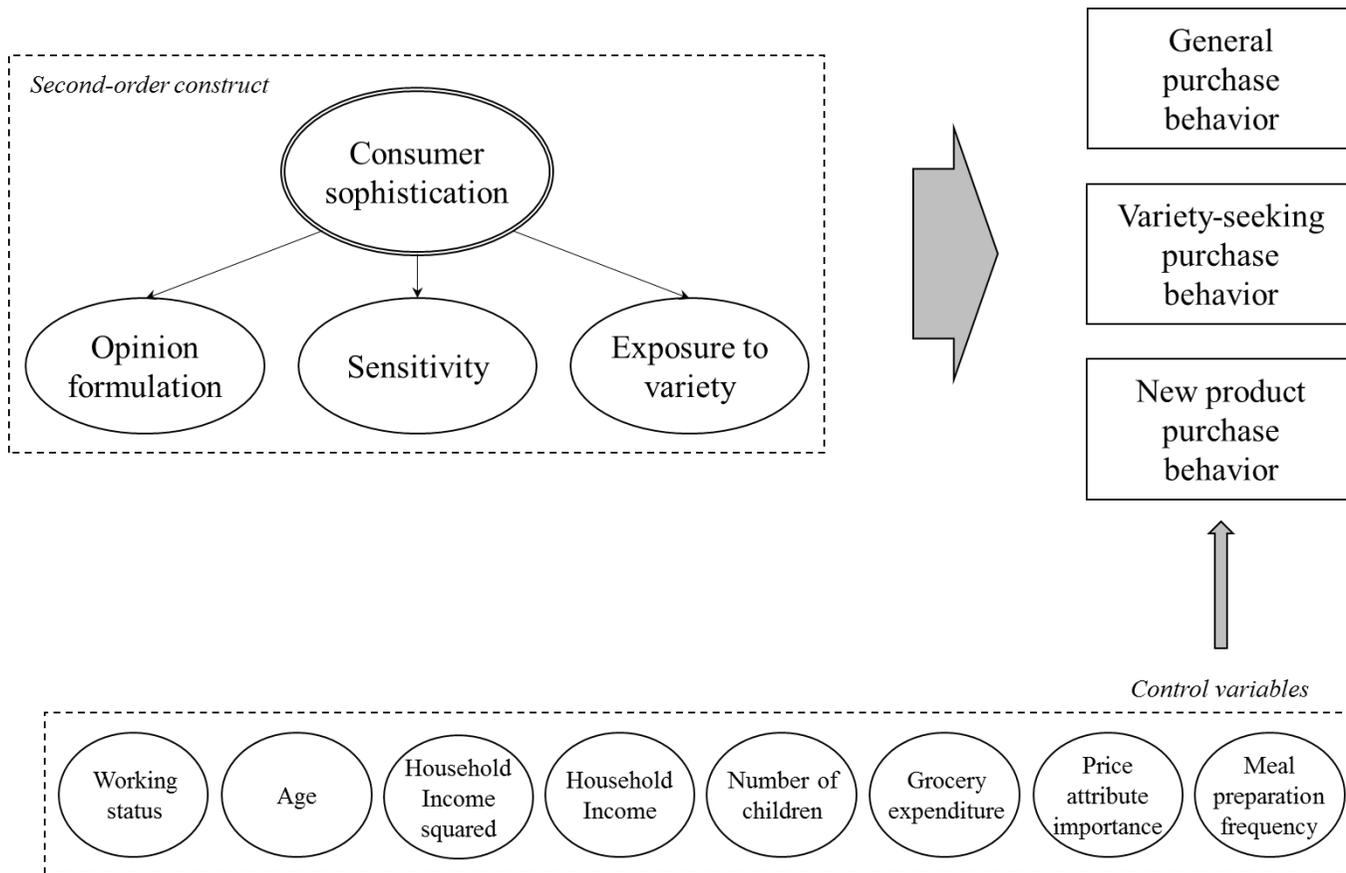


Figure 3. Research model

3. Methods

3.1. Data collection and analysis

This study uses grocery purchase data collected by the Rural Development Administration (RDA) of Korea. The RDA has collected all grocery purchase receipts of a household from a selected panel of consumers since 2010. These selected consumers are housewives who were randomly selected from the Seoul metropolitan area. The present study uses their grocery purchase data and demographic information from the year of 2016.

Additional questionnaires were distributed to the panels selected by RDA to measure the level of consumer sophistication about specific product categories (see Appendix A). Here, *ramyun* and tomatoes were selected as the target product categories that various consumer groups remember as having the most varieties in pilot surveys. Consumer panels who wanted to participate in this survey voluntarily received about a \$5 incentive for completing the questionnaires. A total of 723 responses were collected. However, 69 out of 723 and 68 out of 723 had missing data and were excluded for tomato and ramyun questionnaires, respectively.

The research model was assessed by using the PLS-graph program, which is based on the partial least squares (PLS) method. PLS is known as a latent structural equation modeling technique that utilizes a component-based approach (Saadé and Bahli, 2005). Here, the analysis of the data was made in two steps: a measurement model and a structural model. First, the

measurement model was assessed using PLS in terms of item loadings, internal consistency, and discriminant validity. Second, the structural model and hypothesis were tested by examining the path coefficients, represented as standardized beta coefficients with their significance. The explained variance (R^2) in the dependent constructs was assessed as an indication of the overall predictive strength of the model.

3.2. Operational definition of variables

Table 11 shows details of the operationalization of the dependent, independent, and control variables used in this study.

3.2.1. Independent variable

Consumer sophistication: The measurement for consumer sophistication developed in Chapter 2 was used. As this is a second-order variable, factor scores with 3 factors and 12 indicators were calculated using the PLS-graph program. The degree of consumer sophistication regarding ramyun and tomato are measured separately.

3.2.2. Dependent variables

General purchase behavior: General purchase behavior is defined by the amount of product purchased and the frequency of product purchases in 2016.

Variety-seeking purchase behavior: This is defined as the number of product varieties purchased. Product varieties can be based on several characteristics, such as brand, flavor, or even container size (Kahn and Isen, 1993; Walker *et al.*, 2008). In this analysis, the varieties of ramyun were counted in terms of soup flavor, noodle type, product brand, and corporate brand. The variety of tomatoes is defined based on the different breeds.

New product purchase behavior: New product purchases are measured by the value of new product purchases and by that value's ratio to the

Table 11. Variable operationalization

Variable			Notation	Description
Independent variable (IV)	Consumer sophistication		cso	Factor score of consumer sophistication measured with 12 indicators
Dependent variables (DV)	General purchase behavior	Purchase amount	gpa	Amount of product purchased in 2016 (unit: \$)
	Variety-seeking purchase behavior		<i>ramyun</i> : vcb vpb vsf vnt <i>tomato</i> : vbr	Number of varieties purchased in 2016 Ramyun: number of (1) company brand, (2) product brand, (3) soup flavor, and (4) noodle varieties purchased Tomato: number of breed varieties purchased
	New product purchase behavior	New product purchase amount	Nam	Amount of new product purchased in 2016 (unit: \$)
		New product purchase amount ratio	nar	Ratio of amount of new product to the purchase amount in 2016
Control variables (CV)	Working status		wst	Working status of respondent in 2016 (coded as 1 if <i>yes</i> , including full or part-time work, coded as 0 if <i>no</i>)
	Age		age	The year the respondent was born (unit: year)
	Household monthly income		mic	The average household income per month in 2016 (unit: \$, mean-centered)
	Household monthly income squared		mis	Square of the average household income per month in 2016 (income is mean-centered)
	Number of children		nch	Number of children in 2016
	Grocery expenditure		gre	Spent amount on groceries in 2016 (unit: \$)
	Price attribute importance		pri	The portion of the price attribute's importance when purchasing groceries (unit: %)
	Meal preparation frequency		mpf	The frequency of meal preparation per week

purchase amount in a specific product category. For ramyun, products that were released after 2015 were considered to be new products. However, because tomatoes do not have specific release dates, we defined tomato varieties that were publicly recognized after 2015 as new products.

3.2.3 Control variables

Because the individual demographic characteristics of consumers are known to influence their behavior from previous studies, some demographic variables of the respondents were used to control for the effect on demographic variables on buying behavior. Females who work outside the home are expected to have more time constraints than nonworking women and therefore have a reduced shopping frequency (Zeithaml, 1988). As the data used in this study was supplied by female housewives representing their household data, the working status of the respondent was added. Age, household income, and the number of children are also thought to have an influence on buying behavior and were therefore added as control variables (Fox *et al.*, 2004; Homburg and Giering, 2001). The square of monthly income was also used to prevent overestimating the effect of income. Here, monthly income was mean-centered to avoid multicollinearity.

Variables related to their usual behaviors in grocery shopping were controlled for; specifically, grocery expenditure and price attribute importance. Price is a critical attribute when buying products. Fox *et al.* (2004) expressed the importance of retailer prices and promotions on shopping

behavior in previous research. They used the price index as an explanatory variable. The price index is the weighted average of category-level price indices and controls different commodity bundle across households. In the present study, however, the grocery expenditure of each household, and the level of importance they assign to the price attribute when buying groceries were used instead due to the limitations of the data. The importance of the price attribute was measured in percentages using the following question: “When buying groceries, how much do you consider the price attribute among other attributes? Answer in a percentage.”

Meal preparation frequency was used as a control variable. Consumer’s number of meals eaten away from home is likely to influence negatively shopping frequency to decrease their efficiency in holding inventory (Blaylock, 1989). Instead of using the number of meals eaten away from home as a variable, the frequency of preparing meals at home is included in the present study.

4. Results

4.1. Descriptive statistics of variables

Tables 12 and 13 shows descriptive statistics of variables for ramyun and tomato-related responses, respectively. Twelve items related to consumer sophistication developed in chapter II are included separately. Respondents had levels of opinion formulation about ramyun and tomato ranging from 1.24 to 1.79: they formed fewer opinions about these products. Evidently, the average of the first item of *sensitivity* and the first item of *exposure to variety* were higher than other items, with 3.29 and 3.25, respectively. That is, Korean consumers tend to know exactly what they want about ramyun and are frequently exposed to various ramyun products.

To check the correlation between variables, the average consumer sophistication was used as it is a second-order factor (see Appendix B1 and B2). The largest correlation between independent variables were 0.540 and 0.566 between household monthly income and its square for ramyun and tomato data, respectively. Because those two variables are both independent variables, multicollinearity needed to be tested for using variance inflation factors (VIFs). The VIFs for each variable in this model were all under 1.8. Therefore, it was acceptable to include all variables in the model, as a VIF over 10 suggests multicollinearity.

Table 12. Descriptive statistics of variables (*ramyun*, $n = 665$)

Variables		Mean	SD	Min	Max	
IV	Consumer sophistication	OF1	1.51	0.88	1	5
		OF2	1.24	0.60	1	5
		OF3	1.56	0.88	1	5
		OF4	1.28	0.64	1	5
		OF5	1.55	0.86	1	5
		SE1	3.29	1.10	1	5
		SE2	2.71	1.01	1	5
		SE3	2.75	1.07	1	5
		SE4	2.53	1.09	1	5
		EV1	3.25	0.99	1	5
		EV2	2.98	1.18	1	5
		EV3	2.78	1.06	1	5
DV	Purchase amount	60.0	46.0	0	305.3	
	Number of company brand varieties purchased	2.9	1.7	0	7	
	Number of product brand varieties purchased	7.3	5.3	0	28	
	Number of soup flavor varieties purchased	3.0	1.9	0	8	
	Number of noodle varieties purchased	1.2	0.8	0	3	
	New product purchase amount	18.1	19.4	0	111.8	
	New product purchase amount ratio	0.29	0.25	0	1	
CV	Working status	Non-working = 279, Working = 386				
	Age	1966.6	1.3	1940	1995	
	Household monthly income*	4,045.0	2,116.0	363.6	18,181.8	
	Number of children	0.86	0.99	0	6	
	Grocery expenditure	3,898.8	1,841.9	197.6	13,320.8	
	Price attribute importance	31.1	16.2	0	100	
	Meal preparation frequency	12.0	5.0	0	21	

*Uncentered income data was used for the comprehension

Table 13. Descriptive statistics of variables (*tomato*, $n = 654$)

Variables		Mean	SD	Min	Max	
IV	Consumer sophistication	OF1	1.71	0.94	1	5
		OF2	1.39	0.67	1	5
		OF3	1.73	1.04	1	5
		OF4	1.36	0.66	1	5
		OF5	1.79	0.98	1	5
		SE1	2.66	1.04	1	5
		SE2	2.75	1.01	1	5
		SE3	2.80	1.01	1	5
		SE4	2.57	1.03	1	5
		EV1	2.92	0.92	1	5
		EV2	2.85	1.05	1	5
		EV3	2.75	0.92	1	5
DV	Purchase amount	60.0	36.8	39.8	0	
	Number of company brand varieties purchased	2.9	2.5	1.6	0	
	Number of product brand varieties purchased	7.3	5.1	14.9	0	
	Number of soup flavor varieties purchased	3.0	0.09	0.19	0	
	Number of noodle varieties purchased	1.2	1.71	0.94	1	
	New product purchase amount	18.1	1.39	0.67	1	
	New product purchase amount ratio	0.29	1.73	1.04	1	
CV	Working status	Non-working = 287, Working = 367				
	Age	1966.0	9.9	1940	1995	
	Household monthly income*	4,084.2	2,185.2	363.6	18,181.8	
	Number of children	0.84	0.96	0	4	
	Grocery expenditure	3,995.6	1,858.5	193.2	13,320.8	
	Price attribute importance	30.3	15.9	0	100	
	Meal preparation frequency	12.2	5.0	0	21	

*Uncentered income data was used for the comprehension

4.2. Assessment of the measurement model

First, the measurement model was assessed in terms of its reliability and construct validity. Factor loadings, CR, AVE, and Cronbach's alpha were assessed to examine the measurement model (Table 14).

All the outer loadings of the constructs and AVEs for three latent variables were well above the minimum threshold value of 0.70 and 0.50, respectively. Cronbach's alpha was used to check the reliabilities of individual items. The alpha values were higher than 0.70, which indicates that a construct has reasonable internal consistency (Bohrnstedt and Knoke, 1994).

Table 14. Factor loadings, Cronbach's alpha, CR and AVE of each factor

Item	Ramyun				Tomato			
	Loading	CR	AVE	α^*	Loading	CR	AVE	α^*
OF1	0.6833	0.878	0.591	0.814	0.7806	0.898	0.639	0.844
OF2	0.7712				0.8338			
OF3	0.7983				0.7806			
OF4	0.8104				0.8037			
OF5	0.7728				0.7966			
SE1	0.7421	0.906	0.707	0.859	0.8151	0.925	0.754	0.891
SE2	0.8841				0.8963			
SE3	0.9038				0.8865			
SE4	0.8241				0.8740			
EV1	0.7943	0.875	0.700	0.785	0.8285	0.893	0.736	0.819
EV2	0.8745				0.8800			
EV3	0.8386				0.8640			

*Cronbach's alpha

For convergent and discriminant validity, the cross-loading matrices and the square roots of the AVEs are examined. Table 15 shows the cross-loadings of each item that load highly on their theoretically assigned factors and do not load highly on other factors (Gefen and Straub, 2005). Also, the square roots of the AVEs shows this measurement of consumer sophistication

is discriminately valid (Table 15). The square roots of the AVEs are greater than the correlations among the constructs (Fornell and Larcker, 1981).

Table 15. PLS loadings: convergent and discriminant validity

Item	Ramyun			Tomtato		
	OF	SE	EV	OF	SE	EV
OF1	.709	.165	.241	.788	.292	.355
OF2	.789	.251	.251	.851	.298	.306
OF3	.788	.372	.349	.775	.354	.350
OF4	.813	.317	.297	.812	.325	.311
OF5	.744	.437	.399	.771	.507	.439
SE1	.219	.758	.268	.364	.814	.465
SE2	.376	.882	.383	.386	.898	.483
SE3	.385	.898	.440	.359	.888	.495
SE4	.358	.819	.340	.427	.871	.507
EV1	.315	.408	.780	.351	.500	.825
EV2	.339	.391	.876	.400	.469	.882
EV3	.347	.283	.851	.376	.478	.866
Correlations of the latent variables and the square roots of the AVEs						
OF	(.769)			(.799)		
SE	.402	(.841)		.442	(.868)	
EV	.399	.402	(.837)	.438	.561	(.858)

*OF: Opinion formulation; SE: Sensitivity; EV: Exposure to variety

4.3. Assessment of the structural model

Once the measurement model was confirmed as reliable and valid, the next step was to evaluate the structural model results. This is involved examining the model's ability to predict constructs (Hair et al. 2013).

The PLS-graph program was used to assess the significance and relevance of the structural model relationships, which estimate the path coefficients to demonstrate the hypothesized relationships between constructs. Their significance was obtained using the bootstrapping option of PLS-graph program. Tables 16 to 18 show the results of the proposition testing and the structural relationships.

Proposition 1: Consumers who are more sophisticated in regard to a specific product category buy more of the specific product.

Table 16 shows that consumers who are more sophisticated in regard to a specific product category tend to purchase more of those specific products. Simply put, the more sophisticated a consumer is regarding ramyun or tomatoes, the more ramyun ($p < 0.10$) or tomatoes ($p < 0.01$) that consumer purchases.

Proposition 2: Consumers who are more sophisticated in regard to a specific product category buy more varieties of the specific product.

Consumer sophistication was also observed to influence the purchase behavior associated with different varieties of a product (Table 16). Consumers who are more sophisticated about tomatoes and ramyun tended to

buy various types of the respective products. Specifically, consumers who are more sophisticated about ramyun purchased products from various company brands ($p < 0.01$) and product brands ($p < 0.01$). They also bought various soup flavors ($p < 0.01$) and noodle types ($p < .01$). Consumers who were sophisticated in association with tomatoes bought various breeds of tomatoes ($p < 0.05$).

Proposition 3: Consumers who are more sophisticated in regard to a specific product category buy more new products.

Consumer sophistication is also a good predictor of other innovative behaviors, such as purchasing new products (Table 17). Sophisticated consumers tended to purchase more novel products. For instance, consumers who were sophisticated about ramyun or tomatoes bought more newly released ramyun ($p < 0.10$) or tomatoes ($p < 0.05$). However, we could not find a significant effect on the purchase ratio.

Table 16. Results of linear regression (dependent variable: general purchase behavior)

	Ramyun		Tomato	
	Purchase amount		Purchase amount	
	Path coef.	SE	Path coef.	SE
Independent variable				
Consumer Sophistication	0.054*	0.0314	0.117***	0.0366
Control variables				
Working status	0.018	0.0388	0.046	0.0372
Age	0.120***	0.0392	-0.021	0.0341
Household income	0.111***	0.0417	0.005	0.0435
Household income squared	-0.145***	0.0452	-0.007	0.0506
Number of children	0.226***	0.0441	-0.079	0.0436
Grocery expenditure	0.280***	0.0436	0.431***	0.0409
Price attribute importance	0.127***	0.0331	-0.033	0.0311
Meal preparation frequency	0.055	0.0374	0.055	0.0343
R²	0.235		0.234	

*p<.10, **p<.05, ***p<.01

Table 17. Results of linear regression (dependent variable: variety-seeking purchase behaviors)

	Ramyun								Tomato	
	Number of company brand varieties purchased		Number of product brand varieties purchased		Number of soup flavor varieties purchased		Number of noodle varieties purchased		Number of breed varieties purchased	
	Path coef.	SE	Path coef.	SE	Path coef.	SE	Path coef.	SE	Path coef.	SE
Independent variable										
Consumer Sophistication	0.122***	0.0390	0.121***	0.0349	0.108***	0.039	0.104***	0.0380	0.082***	0.0382
Control variables										
Working status	0.013	0.0381	0.015	0.0388	0.009	0.0395	0.010	0.0397	0.072*	0.0418
Age	0.147***	0.0426	0.143***	0.0383	0.173***	0.0433	0.117**	0.0473	-0.026	0.043
Household income	0.189***	0.0472	0.121***	0.0463	0.171***	0.0488	0.131**	0.0510	0.047	0.0486
Household income squared	-0.158**	0.0676	-0.119*	0.0618	-0.150**	0.0621	-0.115*	0.0676	-0.027	0.0552
Number of children	0.137***	0.0415	0.231***	0.0421	0.140***	0.0435	0.139***	0.0447	-0.016	0.0458
Grocery expenditure	0.175***	0.0399	0.212***	0.0415	0.165***	0.0406	0.189***	0.0418	0.314***	0.0467
Price attribute importance	0.101***	0.0380	0.117***	0.0367	0.108***	0.0370	0.097**	0.0393	-0.036	0.0368
Meal preparation frequency	0.055	0.0425	0.059	0.0399	0.082**	0.0384	0.037	0.0422	0.008	0.0429
R²	0.167		0.218		0.170		0.134		0.142	

*p<.10, **p<.05, ***p<.01

Table 18. Results of linear regression (dependent variable: new product purchase behaviors)

	Ramyun				Tomato			
	New product purchase amount		New product purchase amount ratio		New product purchase amount		New product purchase amount ratio	
	Path coef.	SE	Path coef.	SE	Path coef.	SE	Path coef.	SE
Independent variable								
Consumer Sophistication	0.065*	0.038	0.063	0.0408	0.095**	0.0467	0.061	0.0389
Control variables								
Working status	-0.002	0.0400	-0.016	0.0419	-0.009	0.0517	0.06	0.0451
Age	0.074*	0.0381	0.065	0.0506	0.004	0.0282	-0.011	0.0379
Household income	0.089*	0.0485	0.076	0.0567	0.034	0.0515	0.086*	0.0473
Household income squared	-0.138***	0.0497	-0.086	0.0523	0.095	0.1142	0.017	0.0723
Number of children	0.082*	0.0444	-0.06	0.0436	0.063	0.0633	0.018	0.0483
Grocery expenditure	0.278***	0.0504	0.083*	0.0467	0.138***	0.0432	0.047	0.0436
Price attribute importance	0.098***	0.0352	0.029	0.0449	-0.048*	0.0274	-0.044	0.0361
Meal preparation frequency	0.020	0.0364	0.006	0.0433	0.076**	0.0363	0.021	0.0443
R²	0.121		0.019		0.076		0.032	

*p<.10, **p<.05, ***p<.01

5. Discussion

This study aimed to investigate the effect of consumer sophistication on individuals' shopping behaviors using the measurement developed in Chapter II. The results indicated that this new measurement of consumer sophistication explains not only general grocery purchase behaviors, such as the amount of product purchased, but also innovative purchase behaviors, such as variety-seeking and new product purchase behaviors. A more detailed explanation follows.

First, consumers who are more sophisticated about ramyun and tomatoes tend to spend more budget on ramyun and tomatoes, respectively. This means that these sophisticated consumers consume more the product categories that they are familiar with. However, this can also be explained by sophisticated consumers buy the higher priced products such as premium brands when buying the product category that they are familiar with.

Second, sophisticated consumers tend to buy newly introduced products and varieties of a product. More specifically, consumers who are sophisticated in association with ramyun purchase newly introduced products and more varieties of ramyun in terms of the company brand, product brand, soup flavors, and noodle type. Again, consumers who are more sophisticated about tomatoes tend to buy newer breeds and more various breeds of tomato. Sophisticated consumers have a higher interest in certain product categories, which leads consumers to easily learn when a new product is released. Moreover, having rigorous standards for certain product categories means

that they may have rigorous standards for certain variety to uses or consume in a certain situation. This explanation is possible, because the finding was consistent for not only various brands but also for various sensory aspects, including the types of flavor or noodles.

5.1. Theoretical implications

This study investigates consumer sophistication and its effect on individual shopping behaviors. The findings have the potential to contribute to various fields of academia.

First, this study examines the effect of the qualitative characteristics of home demand, referred to as “consumer sophistication,” on various shopping behaviors. A new system for measuring consumer sophistication is described in Chapter II. This measure can be used to predict not only general shopping behaviors but also purchasing behaviors around newly released products and varieties of a product. This study offers empirical evidence that a consumer’s level of sophistication can trigger individual behaviors and in turn encourage local firms to innovate.

Second, this study develops a measurement for measuring the demand quality—namely, consumer sophistication—of a region or country within a specific industry. This is one of the first attempts to measure the level of home demand conditions to include detailed instruments for measuring the characteristics of a specific industry (i.e., the food industry). Unlike measures developed in previous studies, the present constructs incorporate personal sensory abilities within the scope of consumer sophistication. In prior studies, the importance of sensory awareness was noted only in sensory marketing literature, where it was described as able to enhance consumer perceptions of product quality (Krishna, 2012).

Third, this study expands understandings of variety-seeking purchasing behaviors. In this study, variety was segmented as being based not only on extrinsic cues (e.g., brands) but also intrinsic cues (e.g., taste or texture). Per the cue utilization theory, cues are assigned to products as proxies to indicate quality (Olson and Jacoby, 1972), and intrinsic cues generally are used over extrinsic cues to assess product quality (Purohit and Srivastava, 2001). Intrinsic cues are product-inherent attributes (e.g., flavor or ingredients), whereas extrinsic cues relate to but are not part of the physical product (e.g., brand names). The present analysis reveals that sophisticated consumers tend to buy more varieties of brands, flavors, textures, and breeds. That is, sophisticated consumers recognize and use not only extrinsic cues but also intrinsic cues when purchasing products.

5.2. Practical implications

Companies must consider the relevant consumer sophistication levels when launching a new product or service. Development teams for new products should first target the consumer group with the highest consumer sophistication level. The product's portfolio should be managed effectively based on sophisticated consumers' varying perspectives. Sophisticated consumers have their own rigorous standards about any product category, so understanding their needs and wants is critical; this can be done through focus group interviews, for example. In addition to their needs, how sophisticated consumers recognize products differently within a given product category must be understood. These differential points should be used in R&D and new product development processes.

On a practical level, the proposed measurement system may guide managers in the food industry to find an appropriate entry location by considering the characteristics of home customers. When a new business venture or existing firms seek to expand, they must decide on a location; it is important to know that the business environment of the chosen location will accommodate innovation easily. Based on the networks from a particular location, firms may expect network externalities and knowledge spillovers (Zaheer *et al.*, 2009). The results of the present study demonstrate the importance of home consumers as network members.

5.3. Limitations and further research

While investigating the effect of consumer sophistication, some limitations may have impeded the generalizability of the present study. First, the antecedents of consumer sophistication were not addressed. The present analysis shows that sophisticated consumers can help improve profit margins through their active responses toward market segmentation-related activities (e.g., new product development or branding). However, this study focuses only the present level of sophistication that consumers possess; follow-up studies might address how to increase individual levels of consumer sophistication.

Second, the present study addresses only the food industry. This limits the generalizability of the present findings in other industries. Future studies might apply the current concept of consumer sophistication to other industries to identify where sophistication levels have positive (or even negative) effects. Other product categories, such as high-involvement products (e.g., luxury goods), could be examined to determine where individual sensory aspects, opinions, and exposure to variety have an influencing role.

Third, future studies might extend the target product category to socially controversial products with debatable characteristics, such as genetically modified organism (GMO) food products or in vitro meat. GMOs, for example, have made valuable contributions to advance sustainable development and agriculture (Guruswamy, 2002), but public opposition remains strong. Many consumers receive information about GMO foods from

sources less reliable than scientific experts, and therefore might have misconceptions or limited understandings of GMO food products (Wunderlich and Gatto, 2015). Danckert et al. (2017) pointed out that unsophisticated individuals have less understanding about mass-mediated information, relying instead on neighborhood cues for politically relevant information. That is, as sophisticated individuals are less easily persuaded by symbolic displays and priming by the media (Luskin, 1990), attitudes toward GMOs (to use the example) might vary per the consumer's sophistication level.

IV. The effect of consumer sophistication on industry competitiveness

1. Theoretical background

1.1. Demand conditions in prior competitiveness-related studies

To allocate resources for social welfare, knowing which sector contributes the most to a nation's economic growth is important. Researchers often turn to the concept of competitiveness as a basis for analysis (Latruffe, 2010). The Organization for Economic Cooperation and Development (OECD) defines competitiveness as the “ability of companies, industries, regions, nations, and supranational regions to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment levels on a sustainable basis” (Hatzichronoglou, 1996, p. 20). Competitiveness has been mostly studied from the view of the neoclassical economics, which focuses on trade success.

However, traditional studies about trade-related competitiveness missed the role of demand as an explanation factor (Sen, 2010). Heckscher-Ohlin theory, for instance, minimizes the role of demand patterns and focuses on the resource endowments of nations as the main explanation factors of trade. From the new trade theory era of Krugman (1980), the home market has been researched as one of the important factors that affects competitiveness

through frameworks such as representative demand theory and product life cycle theory.

Representative demand theory, suggested by Linder (1961), is an alternative explanation of trade success within the demand-focused viewpoint. Linder shows that countries export products due to larger demand, or so-called representative demand. This enhancement to exports happens because of the proximity of the home market, which leads firms to be more aware of easy business opportunities that is needed for the home market and have reduced costs to do research and development. Vernon (1966)' product life cycle theory has a similar viewpoint. Vernon proposed five stages of the product life cycle and stressed the importance of a country entering the product life cycle before other countries. When the cycle moves to the maturity and saturation stage, the product diffuses to countries who are behind in terms of the cycle. Again, the role of home demand is stressed in the early stage to cause local firms to innovate.

Nonetheless, these prior theories focus on the size of demand, such as the population size. Of course, a sizable home demand is known to facilitate the act of making investment decisions (Porter, 1990) and minimize transportation costs (Krugman, 1990). It is often measured by the population number (Moon and Lee, 2004), gross domestic product (GDP) (Mayer *et al.*, 2014; Moon and Lee, 2004), or the number of users times their marginal willingness to pay (Acemoglu and Linn, 2004). On the other hand, Porter (1990) addressed the qualitative perspective of home demand using the term

of “sophisticated consumers” in his diamond model. Consumers who live near firms, the so-called home demand, can help firms to create more advanced products or services to meet sophisticated buyers’ needs by exerting pressure on local firms. That is, these consumers may affect the speed and direction of innovation and product development, which might foster innovation within a firm and by extension, within an industry. Because of physical and cultural proximity, home demand may influence local firms in terms of how they perceive consumers’ needs. If they are more sophisticated than other competitor’s home demand, local firms have a greater chance to perceive advanced consumer needs in the world and therefore may be competitive in their products and services.

2. Research model and hypothesis

We argue that consumer sophistication ultimately affects the competitiveness of firms and industry within a region. In political communication literature also, they views the aggregate distribution of sophisticated individuals affects the whole quality of democratic politics in the given area (Luskin, 1990). Consumer sophistication, the independent variable in this study, is a representative characteristic of home demand and affects the level of competitiveness of a given industry (Porter, 1990). We define consumer sophistication as the aggregated general knowledge, experience, skills, and abilities associated with specific product categories. Sophisticated consumers encourage firms in their proximity to produce a greater variety of and more new products—in other words, to innovate—to meet their higher standards. Therefore, a nation’s firms or industry may gain a competitive advantage if its local consumers are more sophisticated consumers.

Hypothesis: The consumer sophistication associated with a specific product affects the competitiveness level of that product’s industry in a given country.

To fully account for the differences among regions and product categories, we also included five control variables. These control variables were added in the estimation model based on Porter (1990) diamond model. Other than demand quality determinants, Porter addresses (a) factor conditions; (b) related and supporting industries; (c) firm strategy, structure,

and rivalry; and (d) the quantitative perspective of demand in his diamond model, as follows:

- Factor conditions: The presence of high-quality and specialized inputs, such as skilled labor or infrastructure, that are needed to compete in a given industry affects the level of competitive advantage of the industry.
- Related and supporting industries: The presence in the nation of supplier industries or related industries that are competitive also affects the competitiveness of a given industry.
- Firm strategy, structure, and rivalry: This refers to the nature of domestic rivalries within an industry.
- Quantitative perspective of demand: Other than the qualitative perspective of demand, the main explanatory variable, the quantitative perspective of demand also affects the level of competitiveness.

The level of competitiveness is estimated based on following linear model.

$$Y_{i,j} = \beta_0 + \beta_1 NV_{i,j,s} + \beta_2 CM_i + \beta_3 UL_i + \beta_4 TE_i + \beta_5 LG_i + \beta_6 BR_i + \epsilon$$

· $Y_{i,j}$: Competitiveness of the product category j in the country i

· $NV_{i,j,s}$: Number of varieties sold of the product category j on the shelf of online shopping mall s in the country i

· CM_i : Size of the consumer market in the country i

- *UL_i*: Unit labor cost in the country *i*
- *TE_i*: Temperature difference in the country *i*
- *LG_i*: Level of logistic industry in the country *i*
- *BR_i*: Level of business rivalry in the country *i*

3. Research method and data

3.1. Variable operationalization

Table 19 shows details of the operationalization of the dependent, independent, and control variables used in this study.

3.1.2. Independent variable: Number of varieties

In this study, we used varieties number ($NV_{i,j,s}$) of the given product category (i) in a given country (j) and store (s) as a proxy variable for consumer sophistication based on the following rationales.

A sophisticated consumer unceasingly pressures local firms to meet their standards of product quality, features, and services (Porter, 1990). Therefore, firms situated in proximity to sophisticated consumers need to introduce new and various products to meet consumer needs. In Chapter II, we found out that the individual level of consumer sophistication significantly tracks variety-seeking and new product purchasing behaviors. More sophisticated consumers tend to buy more varieties of brands, flavors, or types of product. We may assume that if there are many sophisticated consumers in a certain region or country, there will be more varieties of a product on the grocery shelf.

Moreover, we may assume that these sophisticated consumers recognize the subtle ways a given product is different from similar products, and therefore will purchase different varieties of a product for different purposes.

Table 19. Variable operationalization

Variable		Description	
Independent variable	Number of varieties (NV)	Number of varieties sold of product category j on the shelf of online shopping malls in country i	
Dependent variables	Level of competitiveness	Revealed comparative advantage (RCA)	Ratio of country i's export share of product category j in the international market to the country i's export share of all other commodities
		Revealed symmetric comparative advantage (RSCA)	Symmetric version of RCA
		Net export index (NEI)	Country i's or a product category j's exports minus its imports divided by the total value of the trade
Control variables	Size of consumer market (CM)		Size of the consumption market in country i
	Unit labor cost (UL)		Average cost of labor per unit of output in agriculture, forestry, and fishing sectors in country i
	Temperature difference (TE)		Difference between the highest and lowest temperature recorded in country i
	Level of logistic industry (LG)		Overall level of coordination in country i
	Level of business rivalry (BR)		Level of ease of doing business in country i

Local consumers can reveal segments of the market where local firms can differentiate (Porter, 2000) based on consumers' subtle but distinct needs. Product differentiation, a classic marketing strategy, requires "distinguishing a product or brand from competitors on an attribute that is meaningful, relevant, and valuable" (Carpenter et al., 1994, p. 339). That is, these sophisticated consumers acknowledge that these various products have distinguishable attributes that are relevant, meaningful, and valuable to them. Studies on how product variety is associated with consumer utility shows the intensity of product differentiation playing a critical role (e.g., Lancaster, 1990). The greater intensity of differentiation means the smaller the elasticity of substitution between the varieties, leading to the influence of product variety on consumer utility. Therefore, we may assume that sophisticated consumers easily recognize product differentiation in the marketplace, which leads to local firms producing more varieties of products on the grocery shelf.

3.1.2. Dependent variables: The level of competitiveness

The level of competitiveness ($Y_{i,j}$), the dependent variable, is defined as firms' "ability to face competition and to be successful when facing competition" (Latruffe, 2010, p. 5). The measurement of competitiveness is divided into two disciplines (Latruffe, 2010): (1) neoclassical economics, which focuses on trade success, and (2) the strategic management field, which focuses on firms' structures and strategies. In this study, measurements related to trade success were used due to the availability of the data.

Based on prior research and the availability of the data, the following three dependent variables were selected: revealed comparative advantage (RCA), revealed symmetric comparative advantage (RSCA), and net export index (NEI).

RCA was first described by Balassa (1965) and modified by Vollrath (1991) in order to avoid double counting between pairs of countries. Here, we use Vollrath's modified version, which is sometimes called the Balassa index. This is the ratio of a country's export share of a commodity in the international market to the country's export share of all other commodities (Balassa, 1965; Vollrath, 1991). The RCA index is not appropriate for comparing countries with differently sized total export baskets (Gnidchenko and Salnikov, 2015), but it is suitable in the present study, as the data were collected only from OECD members who have similar level of development and participation in international trade.

As RCA ranges from zero to infinity, "the use of the non-adjusted RCA in regression analysis gives much more weight to values above one, when compared to observations below one" (Laursen 2015, p104). Because the distribution of RCA is highly unstable over countries or products, an index is needed to reflect the comparability over countries and products. Here, we also use the symmetric version of RCA, RSCA, which makes RCA symmetric around its neutral value (Laursen, 2015).

$$RCA_{ij} = \frac{x_{ij}/x_{ik}}{x_{nj}/x_{nk}}$$

$$RSCA = \frac{RCA - 1}{RCA + 1}$$

· *x* denotes exports

· *n* denotes all countries other than *i*

· *k* denotes all product categories other than *j*

NEI is a country's or sector's exports minus its imports divided by the total value of the trade (Banterle and Carraresi, 2007). NEI lies between -1 and 1, with a value of 0 in the case that imports and exports equal each other. NEI is 1 when a country only exports and -1 when a country only imports. Unlike RCA and RSCA, NEI is about the relationship between exports and imports rather than exports alone. However, NEI cannot identify the importance of export and import flows for the economy in terms of volumes, whereas RSCA correctly reflects this. The common calculation for NEI is as follows:

$$NEI_{ij} = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}$$

· *X* denotes exports

· *M* denotes imports

· *i* denotes a country

· *j* denotes a product category

3.1.3. Control variables

Other than qualitative demand conditions (namely consumer sophistication) four determinants of a nation were included as control variables based on Porter's diamond model (1990). Five control variables were included.

In terms of the factor condition, one human resources related variable (unit labor cost [UL]) and one physical resources related variable (temperature difference [TE]) were used. Companies may gain competitive advantage if they possess low-cost factors (Porter, 1990) which is linked to lower labor cost. As climate is critical factor in agrifood industry among many physical resources, temperature-relate variable is included.

UL is calculated by dividing the labor cost by the value added from the agriculture, forestry, and fishing sectors. TE is calculated by the difference between the highest and lowest temperature recorded in the country.

$$UL_i = \frac{Labor\ cost_i}{Value\ added\ in\ agriculture,\ forestry,\ and\ fishing\ sector_i}$$

$$TE_i = Highest\ temperature_i - Lowest\ temperature_i$$

· i denotes a country

The logistics industry was selected as the related industry of food products. In the agri-food industry, logistic costs constitute a significant part of the operational costs of a company (Tarantilis and Kiranoudis, 2002).

Better performance of the logistic industry may not only lower costs but also increase the quality of agri-food products; therefore, it may affect the competitiveness of the agri-food industry. The level of performance of the logistic industry was measured to be used as control variable.

The level of business rivalry was used as a control variable. The level of business rivalry was used as a control variable; specifically, the overall level of ease of doing business in a given country was used. Vigorous local competition increases the competitiveness at home but also triggers local firms to export in order to grow (Porter, 1990).

Lastly, the size of the consumer market (CM) was used to represent the quantitative perspective of demand conditions. The size of home demand may lead firms to invest in facilities, technological development, or productivity improvements (Porter, 1990). The CM is calculated by multiplying the number of all potential consumers with the purchasing power of the given country.

$$CM_i = \text{number of consumers}_i \times \text{purchasing power}_i$$

· i denotes a country

3.2. Data collection

To examine the effect of consumer sophistication on the level of competitiveness, the present study used secondary data.

3.2.1. Dependent variables: The level of competitiveness

First, the level of competitiveness, a dependent variable, is related to trade success. Therefore trade data were obtained from the UN Comtrade database (UN, 2018) which contains annual international trade statistics data detailed by commodities and partner countries since 1962. Table 21 shows the matched HS product code and its description for each product category. When including fresh product categories such as fruits, vegetables, or meat and eggs, we tried not to include the processed forms.

3.2.2. Independent variable: Number of varieties

To count the number of product varieties, the independent variable, we used the data from an online grocery shopping mall. As there is no structured secondary data for the number of varieties sold, we used the *Selenium* program to retrieve the data from the online website.

To obtain the product variety data, target countries, stores, and product categories were selected. From the selected countries' selected stores and selected product categories, product names and images were retrieved from March 25, 2018, to April 5, 2018, using the Selenium program. In total, 460 data were collected: 23 product categories \times 2 stores \times 10 countries. As the

optimal sample size to achieve 90% power is 215 (Gatsonis and Sampson, 1989), the collected sample was of a sufficient size. Appendix C2 shows the average number of varieties per product category per country based on the retrieved data.

To begin, we selected ten countries based on online grocery market share or size (Statista 2016; Kantar World Panel). Two countries from Asia, five from Europe, one from Oceania, and two from North America were selected (Table 20).

Table 20. List of countries selected

Country Name	Market Share (2016, %)	Market Size (2015, \$bn)
South Korea	16.6%	\$7 bn
Japan	7.2%	\$12 bn
United Kingdom	6.9%	\$1 bn
France	5.3%	\$9 bn
Czech Republic	2.1%	NA
Netherlands	1.7%	\$0.5 bn
Germany	NA	\$3 bn
Australia	NA	\$2 bn
United States	1.4%	\$7 bn
Canada	NA	NA

※ NA: not found in either sources

Table 21. HS Code used from UN Comtrade database

Product		HS Code	Description
Fruit	Apple	080810	Fruit, edible; apples, fresh
	Grape	0806	Grapes; fresh or dried
	Kiwi	081050	Fruit, edible; kiwifruit, fresh
	Pear	080830	Fruit, edible; pears, fresh
	Pineapple	080430	Fruit, edible; pineapples, fresh or dried
	Strawberry	081010	Fruit, edible; strawberries, fresh
Vegetable	Carrot	070610	Vegetables, root; carrots and turnips, fresh or chilled
	Garlic	070320	Vegetables, alliaceous; garlic, fresh or chilled
	Mushroom	070951	Vegetables; mushrooms of the genus <i>Agaricus</i> , fresh or chilled
		070959	Vegetables; truffles and mushrooms (other than of the genus <i>Agaricus</i>), fresh or chilled
	Onion	070310	Vegetables, alliaceous; onions and shallots, fresh or chilled
	Potato	0701	Potatoes; fresh or chilled
	Sweet Potato	071420	Vegetable roots and tubers; sweet potatoes, with high starch or inulin content, fresh, chilled, frozen or dried, whether or not sliced or in the form of pellets
Tomato	0702	Tomatoes; fresh or chilled	
Meat & Eggs	Beef	0201	Meat of bovine animals; fresh or chilled
		0202	Meat of bovine animals; frozen
	Chicken	0207	Meat and edible offal of poultry; of the poultry of heading no. 0105, (i.e. fowls of the species <i>Gallus domesticus</i>), fresh, chilled or frozen
	Pork	0203	Meat of swine; fresh, chilled or frozen
Eggs	0407	Birds' eggs, in shell; fresh, preserved or cooked	
Processed food	Cheese	0406	Cheese and curd
	Yogurt	040310	Dairy produce; yoghurt, whether or not concentrated or containing added sugar or other sweetening matter or flavored or containing added fruit or cocoa
	Ketchup	210320	Sauces; tomato ketchup and other tomato sauces
	Soy Sauce	210310	Sauces; soya
	Water	2201	Waters, including natural or artificial mineral waters and aerated waters, not containing added sugar or other sweetening matter nor flavored; ice and snow
	Chips	200410	Vegetable preparations; potatoes, prepared or preserved otherwise than by vinegar or acetic acid, frozen

Then, we selected two online grocery shopping malls from each selected country based on the market share, number of offline stores, etc. To ensure that consumers really have access to these varieties, most of the shopping malls (which have both online and offline shops) were selected (Table 22). To control for the seasonality effect, the data were retrieved over a certain period (± 10 days).

Lastly, we selected products from the fresh and processed product categories to minimize the effect of seasonality. Fresh groceries included fresh-cut vegetables, marinated fresh meat but excluded anything dried or frozen. In total, 23 product categories were selected.

- Fruit(6): Apple, Grape, Kiwi, Pear, Pineapple, Strawberry
- Vegetables(7): Carrot, Garlic, Mushroom, Onion, Potato, Sweet Potato, Tomato
- Meat(3): Beef, Chicken, Pork
- Dairy(3): Eggs, Cheese, Yogurt
- Processed(4): Ketchup, Soy sauce, Water, Chips

Table 22. List of stores selected

Country name	Store name	Store website	Retrieved date
South Korea	Emart	emart.ssg.com	04/02/2018
	Homeplus	www.homeplus.co.kr	04/05/2018
Japan	Seiyu	www.the-seiyu.com	04/05/2018
	Ito-Yokado	www.iy-net.jp	04/04/2018
United Kingdom	Tesco	www.tesco.com/groceries	03/27/2018
	Sainsburys	www.sainsburys.co.uk/shop/gb/groceries	03/27/2018
France	Carrefour	ooshop.carrefour.fr	03/28/2018
	Auchan	www.auchandirect.fr	03/28/2018
Czech Republic	Tesco	nakup.itesco.cz/groceries/cs-CZ	04/04/2018
	Rohlik	www.rohlik.cz/?wp=1	04/04/2018
Netherlands	Albert Heijn	www.ah.nl/producten	03/28/2018
	Jumbo	www.jumbo.com	03/28/2018
Germany	Rewe	www.rewe.de	04/02/2018
	Bringmeister	berlin.bringmeister.de	04/04/2018
Australia	Coles	shop.coles.com.au	03/27/2018
	Woolworths	www.woolworths.com.au	03/26/2018
United States	Walmart	www.walmart.com	04/04/2018
	Safeway	shop.safeway.com/aisles.2912.html	03/28/2018
Canada	Walmart	www.walmart.ca/en/grocery	03/27/2018
	Grocery Gateway	www.grocerygateway.com	04/05/2018

The control variables also used secondary data from many sources. Table 23 shows the data sources of each control variable. These are mostly collected from international organizations such as the Food and Agriculture Organization (FAO), World Bank, and OECD.

Table 23. Data source of control variables

Variables	Data Source
Size of consumer market (CM)	<i>Total Population – Both sexes</i> of FAOSTAT (2016) <i>GDP per capita, PPP</i> of World Bank (2016)
Unit labor cost (UL)	<i>Value added, current prices</i> of OECD STAN (2014) <i>Labour costs (compensation of employees)</i> of OECD STAN (2014)
Temperature difference (TE)	<i>Temperature</i> of World Bank (2015)
Level of logistic industry (LG)	<i>Logistics performance index: Overall</i> of World Bank (2016)
Level of business rivalry (BR)	<i>Ease of doing business index</i> of World Bank (2017)

4. Results

4.1. Overall descriptive findings

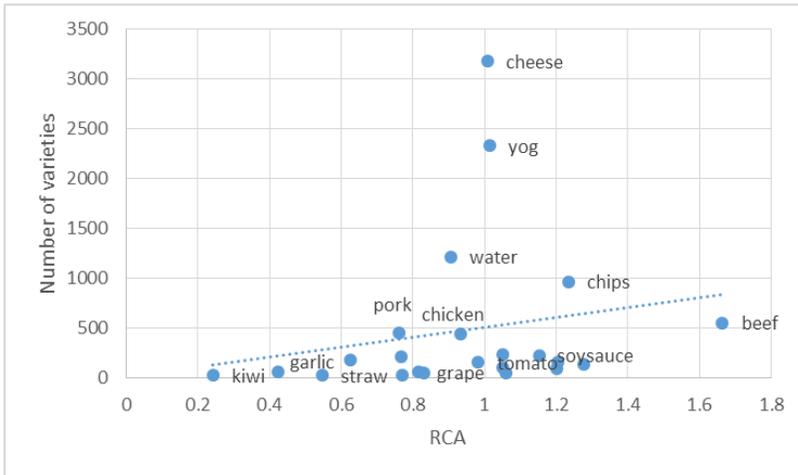
Table 24 shows the descriptive data of the data used in this study.

Table 24. Descriptive statistics

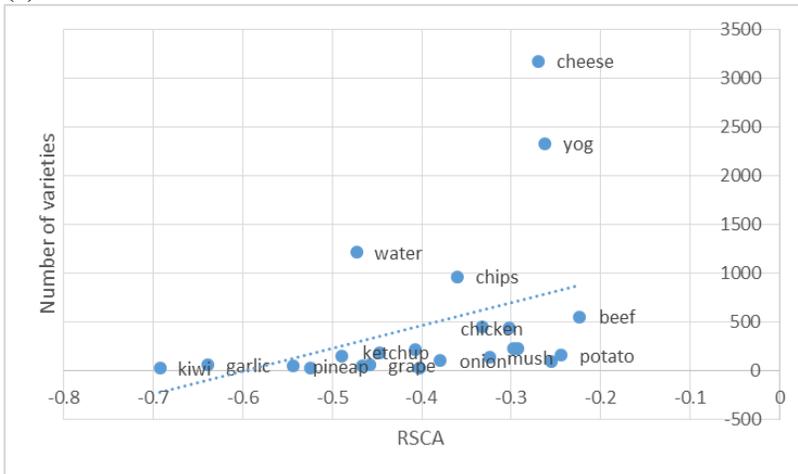
	Variable	Unit	Mean	SD	Min	Max
IV	Number of varieties (NV)	Number	47.82	87.38	0	623.00
DV	RCA	Range (0–inf)	25.43	41.12	0.00	210.53
	RSCA	Range (-1–1)	0.53	0.56	-0.99	0.99
	NEI	Range (-1–1)	-0.27	0.63	-1.00	1.00
CV	Size of consumer market (CM)	Billions USD	3.93	5.09	0.37	18.57
	Unit labor cost (UL)	-	0.30	0.09	0.14	0.42
	Temperature difference (TE)	°C	4.86	9.85	-17.78	25.33
	Level of logistic industry (LG)	Likert (1–5)	3.95	0.18	3.67	4.23
	Level of business rivalry (BR)	Range (0–190)	19.60	11.06	4.00	34.00

Figure 4 reports the number of varieties sold summed across subcategories within a product category versus the level of competitiveness averaged across categories in that country. As expected, the number of varieties and the level of competitiveness is positively related at the product category level. For three variables of competitiveness (RCA, RSCA, NEI), the resultant correlations are 0.19, 0.38, 0.34, respectively. We also correlated the number of varieties and the level of competitiveness (RCA, RSCA, NEI)

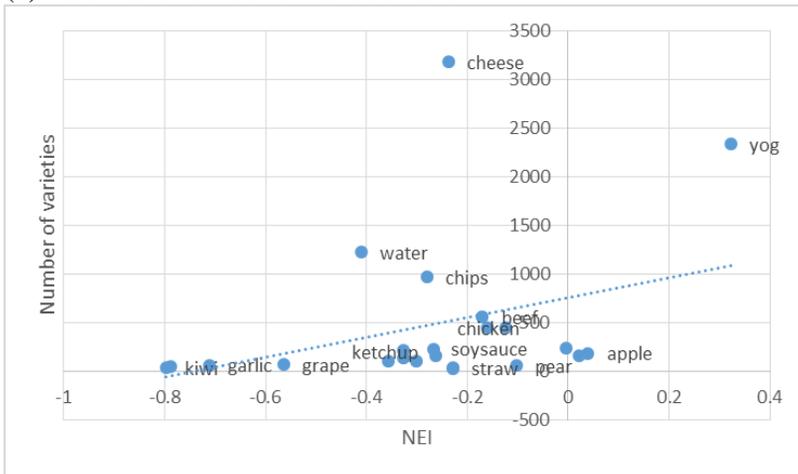
at the country level, and the correlation values are 0.56, 0.71, 0.38, respectively. Without suggesting a causal relation, both category- and country-level analyses show that the number of varieties is related to the level of competitiveness. Appendix D1 to D3 shows the level of competitiveness (RCA, RSCA, NEI) per product category per country based on the retrieved data.



(a) RCA and number of varieties sold



(b) RSCA and number of varieties sold



(c) NEI and number of varieties sold

Figure 4. The level of competitiveness and number of varieties sold

4.2. Hypothesis testing

The hypothesis is examined using the general linear model. Prior to estimating the proposed linear regression model, several tests were conducted. Heteroscedasticity and multicollinearity were tested using the Breusch-Pagan (BP) test and the VIF measure.

In total, if there are more varieties of a product on the online grocery shelf of a specific product category, the country where that online shopping mall exists is more competitive in the specific product category. This tendency occurred in all three dependent variable analyses: RCA, RSCA, and NEI. Moreover, we also found out this tendency in the part of product category, vegetables and fruits (see Appendix E). Only vegetables and fruits are selected due to the sample size issue.

4.2.1. RCA

There is no multicollinearity ($VIF < 1.5$), but the results of the Breusch-Pagan test showed that there is heteroscedasticity problem ($BP = 77.013$, $df = 6$, $p < 0.001$). To deal with this problem, this study used a robust (Huber-White) standard error.

Table 25 shows the results of the linear regression with RCA as the dependent variable. Countries where the representative online shopping malls had more varieties of a given product categories tended to show higher levels of RCA in that product category. That is, the given product category has

higher competitiveness compared to other trade product category in the given country.

Table 25. Result of linear regression (dependent variable: RCA)

Variables	B	Robust SE	Stan.B	t
(constant)	-354.231	42.59422		-8.3164***
Number of variety (NV)	0.036038	0.014152	0.077	2.5466*
Size of consumer market (CM)	-0.5635	0.250879	-0.070	-2.2461*
Unit labor cost (UL)	-268.978	25.76046	-0.57	-10.4415***
Temperature (TE)	-0.27913	0.145252	-0.067	-1.9217
Level of logistic industry (LG)	109.1081	12.16375	0.465	8.9699***
Level of business rivalry (BR)	1.66179	0.178723	0.447	9.2981***
Adjusted R ²	0.3742			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2.2. RSCA

Again, there is no issue due to multicollinearity ($VIF < 1.5$). However, the results of the Breush-Pagan test showed that there is a heteroscedasticity problem ($BP = 78.504$, $df = 6$, $p\text{-value} < 0.001$). To deal with the heteroscedasticity problem, this study used a robust (Huber-White) standard error.

Table 26 shows the results of the linear regression with RSCA as the dependent variable. Countries where the representative online shopping malls had more varieties of a given product categories tended to show higher levels of RSCA in that product category. That is, the given product category has

higher competitiveness compared to other trade product category in the given country.

Table 26. Result of linear regression (dependent variable: RSCA)

Variables	B	Robust S.E	Stan.B	t
(constant)	-1.18698	0.439892		-2.6984**
Number of variety (NV)	0.000792	0.000166	0.124	4.7725***
Size of consumer market (CM)	0.018771	0.00461	0.171	4.0718***
Unit labor cost (UL)	-0.94802	0.312509	-0.148	-3.0336**
Temperature (TE)	-0.02158	0.004328	-0.276	-4.9852***
Level of logistic industry (LG)	0.559713	0.103435	0.175	5.4112***
Level of business rivalry (BR)	0.006283	0.002499	0.124	2.514*
Adjusted R ²	0.1667			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2.3. NEI

There is no multicollinearity ($VIF < 1.5$), but the results of the Breusch-Pagan test showed that there is a heteroscedasticity problem ($BP = 59.375$, $df = 6$, $p < 0.001$). To deal with the heteroscedasticity problem, this study used a robust (Huber-White) standard error.

Table 27 shows the result of the linear regression with NEI as the dependent variable. Countries where the representative online shopping malls had more varieties of a given product categories tended to show higher levels of NEI in that product category. That is, the given product category has higher competitiveness compared to other trade product category in the given country.

Table 27. Result of linear regression (dependent variable: NEI)

Variables	B	Robust S.E	Stan.B	t
(constant)	-1.60517	0.579027		-2.7722**
Number of variety (NV)	0.001317	0.000237	0.181	5.5494***
Size of consumer market (CM)	0.009306	0.006253	0.074	1.4883
Unit labor cost (UL)	-3.27029	0.32609	-0.449	-10.0288***
Temperature (TE)	-0.00314	0.004469	-0.035	-0.7017
Level of logistic industry (LG)	0.513294	0.134169	0.142	3.8257***
Level of business rivalry (BR)	0.013666	0.002378	0.238	5.7472***
Adjusted R2				
	0.1793			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion

This chapter examines the effect of product variety as a proxy variable of consumer sophistication on competitiveness in the food industry. Results indicate that product categories with more variety exhibit significantly higher competitiveness than other product categories in the same country. This tendency is observable with both types of dependent variables: RCA and RSCA, and NEI. RCA and RSCA consider a country's export share of all other commodities in their formulas. NEI does not consider total export amounts, but rather both exports and imports; as such, it does not explain the role of trade competitiveness and includes only export and import perspectives.

5.1. Theoretical implications

The present findings have the potential to contribute to various fields of academia. First, this study examines the relationship between the qualitative aspects of demand and industry competitiveness empirically. Prior studies have examined quantitative demand characteristics such as population size, but this study is the first to address qualitative points. This qualitative perspective can be linked to one of the innovation process models suggested by Clark and Guy (1998) (see Figure 5): the “demand pull” process. The demand pull model represents innovation from a market need detected and exploited by a firm (i.e., the innovator), and is opposite to the “technology push” model that stems from basic technology (Clark and Guy, 1998; see

Figure 5). Market need per the demand pull model may be explained using the level of consumer sophistication. Sophisticated consumers have higher standards of product quality, features, and service, linking them to more complicated and varied needs. Porter (1990) explains the process of innovation in a local firm in that sophisticated consumers pressure firms to meet their standards and, in doing so, innovate their products and services.

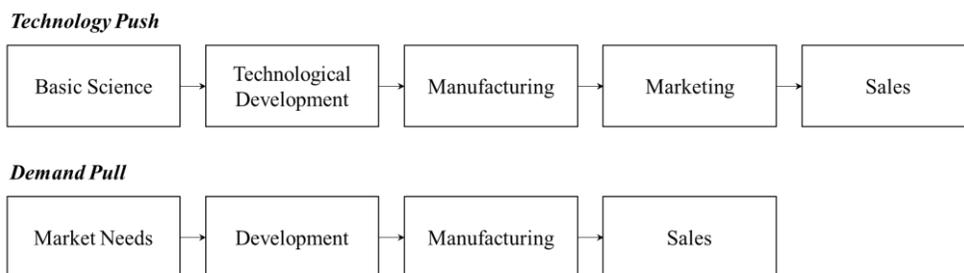


Figure 5. Linear models of innovation (Clark and Guy, 1998)

Second, the present study uses several variables closely linked with the innovation strategy of differentiation. The higher standards of sophisticated consumers regarding a given product category can spur innovation; this relates closely to a type of competitive advantage that a firm can possess: differentiated products (Porter, 1990). Having a sound product differentiation strategy that ensures the provision of quality products and services is one way for firms to maintain their competitive advantage. Increasing product variety is often used by firms as a way to differentiate products and change consumer perceptions, thereby improving the firm's long-term performance (Ramdas, 2003). This link between innovation and differentiation calls on using “number of variety” as a variable to explain how consumers' sophistication levels are reflected in their preferences and tastes.

“Number of variety” can also represent the qualitative aspects of demand when used as a proxy variable of consumer sophistication. Product variety appears often in the literature in terms of firms’ variety management strategies. For instance, Ramdas (2003) asserts the need to balance the revenue and cost impact of a firm’s decisions on variety. The concept is also used to measure quality of life in a given location. For example, Oxfam, a charitable organization, developed the *Good Enough to Eat Index* to try to bring about a reality in which people around world eat the right food. A core question of the index concerns food quality, which is measured by diversity of diet and access to clean, safe water. Similarly, Mercer (a commercial consulting firm) used the availability of consumer goods—including fresh groceries and diversity of restaurants—to measure their *Quality of Living Index*. The present study expands the utility of the product variety variable by showing, through empirical research, the effects of consumer characteristics on trade competitiveness.

5.2. Practical implications

First, the results of this study could be applied to investigate the economic effects of biodiversity. Product variety in fresh groceries relates closely to the issues of biodiversity and species diversity described widely in environmental literature (e.g., Loreau et al., 2001). Global biodiversity declined by 52 percent between 1970 and 2010, and this rate of decline only continues to accelerate (CBD, 2010). Such phenomena weaken the functioning of ecosystems and the provision of ecosystem services, thereby creating concern for the loss of human well-being (Balvanera et al., 2006). Of the 25 product categories that appear in Chapter IV to analyze the effect of product variety on industry competitiveness, 10 are fresh grocery categories (e.g., vegetables, fruits, and fresh meat). Results show that the variety volume of fresh groceries significantly affects the industry competitiveness of a given product category (see Appendix E). Supporting biodiversity may not only benefit all life on Earth but also increase economic and trade-related value.

Second, decision-makers in the food industry might use this “number of variety” measure to find an appropriate entry location by considering the characteristics of their home customers. It is important to know whether an entry location will be a business environment that allows innovation. The present results suggest that where there are sophisticated consumers, there will exist more variety in the market. With such valuable information about the characteristics of nearby consumers, managers can make better decisions toward more appropriate marketing and product strategies in specific regions or countries.

5.3. Limitations and Further Research

The results of the present study show that sophisticated individuals help increase profit margins by providing immediate responses to firms' innovation-related actions (e.g., new product development, co-branding, or other marketing-related activities). However, this study only addresses the consequences of consumer sophistication on industry competitiveness. Future studies should consider the antecedents of consumer sophistication; a person's behaviors are affected not only by individual differences but also by the norms and beliefs embedded in cultural environments (Steenkamp et al., 1999; Triandis, 1989). Thus, cultural and historical contexts should be considered where consumers have developed sophistication about a given product category.

Second, variety-related decisions concerning fresh groceries should be studied in the strategy-related literature as part of the Creating Shared Value (CSV) strategy. CSV is a firm strategy that "enhance[s] the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates" (Porter and Kramer, 2011, p. 6). In the food industry, most notably within the fresh grocery category, the importance of product variety correlates strongly with biodiversity and, by association, social values. From a company's perspective, decisions on variety should consider both economic and social values.

Third, while this study used only empirical data to examine product variety, some limitations may have impeded its generalizability. As the

“number of variety” variable used in the present study was crawled from online, only OECD countries could be included in the study; countries where online grocery shopping is not popular (e.g., South American and African countries) were excluded. To increase the generalizability of this study, other ways of recording grocery variety could be considered.

Moreover, only trade-related competitiveness variables were used in the present study due to availability. Future studies could expand to multi-dimensional aspects of competitiveness, such as “efficiency” and “profitability.” And competitiveness should adopt the concept of the cluster to explain the innovation process, an agglomeration of related firms in a particular location that is known to increase the capability of participating firms for innovation (Porter 2000). Once a cluster forms, its spatial proximity not only lowers transportation and switching costs but also allows organizations affiliated with the cluster to interact and create networks through cooperation or competition (Steinle and Schiele 2002). Based on the networks at a particular location, firms may expect network externalities and knowledge spillovers (Zaheer et al. 2009) and therefore gain competitiveness.

V. Conclusion

Companies need to innovate continuously to survive in a rapidly changing business environment. Especially with the transition from a centrally-planned to a consumer-planned economy, firms give more importance to understand consumer's needs within innovation process. In the same vein, firms allow consumer to participate or involve into their value-chain activities to understand and reflect their needs into products and services produced. Prior studies address consumer participation or involvement lead their satisfaction, loyalty, evaluation on such product or firm. That is, consumer's role has been studied to address its effect on firm's innovation and performance.

The present study focuses on these consumer's characteristic as a source of innovation and competitiveness of industry. One of competitiveness model, Diamond model (Porter, 1990), also address demand condition as one of critical elements that trigger competition and innovation in a nation or region. Not only nation or region, but demand conditions are known to shape the rate and character of improvement and innovation by firms (Porter, 1990).

In this context, this study begins with one major research question: Does qualitative perspective of demand empirically affects the level of competitiveness of an industry? To address this research question, this study investigates the effect of consumer sophistication, a qualitative component of demand in two steps: on (1) individual shopping behaviors and (2) industry competitiveness.

To do so, the study first develops a measurement system to explicate consumer sophistication. To develop and validate an appropriate measurement of consumer sophistication, the study modifies the process first devised by Churchill Jr. (1979). A 12-item measurement system with three first-order constructs about consumer sophistication—opinion formulation, sensitivity, and exposure to variety—is suggested. Using the developed measurement tool, the effect of consumer sophistication on individual shopping behaviors is investigated. The results indicate that this new measurement of consumer sophistication explains not only general grocery purchasing behaviors but also variety-seeking or new product-buying behaviors.

Then, the amount of product variety within a given product category is used as a proxy variable of consumer sophistication to examine product variety effect on the competitiveness of that product category's industry in a given country. The results show that product categories with more variety exhibit significantly higher competitiveness than other product categories in the same country. This expands understandings about the role of product variety to explain the competitive advantage of a specific industry within a given country.

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Appendix A. Survey Questionnaires (Chapter II)

안녕하십니까? 농촌진흥청과 서울대학교에서는 농업인들과 도시 소비자들에게 보다 깊은 정보를 제공하기 위해 본 조사를 실시하고자 합니다. 본 조사는 통계법 제33조에 의거하여 비밀이 보장되며 연구목적으로만 이용됩니다.

1. 다음은 라면과 관련한 귀하 본인의 평소 행동에 대한 질문입니다.

1-1. 다음은 귀하 본인의 라면 제품군에 대한 의견이 얼마나 형성되어 있는지에 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이다	약간 그렇다	매우 그렇다
1	나는 라면과 관련된 커뮤니티(온라인 오프라인)에서 적극적으로 활동하고 있다.	①	②	③	④	⑤
2	나는 라면 제품에 대한 조언(개선점 등)을 제조기업 홈페이지/SNS에 남기거나 업체 직원에게 전달한다.	①	②	③	④	⑤
3	주위에서 라면에 대한 조언이나 의견을 나에게 요청하는 경우가 많다.	①	②	③	④	⑤
4	나는 라면에 대하여 온라인 커뮤니티나 SNS(블로그, 인스타그램 등)에 의견이나 후기를 남긴다.	①	②	③	④	⑤
5	나는 라면에 대한 정보를 광범위하게 수집한다.	①	②	③	④	⑤

1-2. 다음은 라면 제품군에 대해 귀하 본인께서 얼마나 까다로우신지 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이다	약간 그렇다	매우 그렇다
1	내가 원하는 라면의 스타일(맛, 브랜드, 포장 등)이 무엇인지 정확하게 알고 있다.	①	②	③	④	⑤
2	나는 라면의 품질에 대해 정확한 평가를 할 수 있다.	①	②	③	④	⑤
3	나는 라면 제품들 간의 감각적인 차이(시각/청각/후각/미각/촉각)를 잘 안다.	①	②	③	④	⑤
4	나는 라면 제품들을 비교 평가할 때 사용하는 기준이 정밀하고 까다롭다.	①	②	③	④	⑤

1-3. 다음은 귀하 본인이 라면 제품군을 얼마나 경험해 보셨는지에 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이다	약간 그렇다	매우 그렇다
1	나는 자라오면서 보거나 경험한 라면의 종류가 다양하다.	①	②	③	④	⑤
2	나는 새로운 라면이 나오면 구매해본다.	①	②	③	④	⑤
3	내가 평소에 구매하는 라면의 종류는 다양하다.	①	②	③	④	⑤

2. 다음은 토마토와 관련한 귀하 본인의 평소 행동에 대한 질문입니다.

2-1. 다음은 귀하 본인의 토마토에 대한 의견이 얼마나 형성되어 있는지에 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이하	약간 그렇다	매우 그렇다
1	나는 토마토와 관련된 커뮤니티(온라인 오프라인)에서 적극적으로 활동하고 있다.	①	②	③	④	⑤
2	나는 토마토에 대한 조언(개선점 등)을 제조기업 홈페이지/SNS에 남기거나 업체 직원에게 전달한다.	①	②	③	④	⑤
3	주위에서 토마토에 대한 조언이나 의견을 나에게 요청하는 경우가 많다.	①	②	③	④	⑤
4	나는 토마토에 대하여 온라인 커뮤니티나 SNS(블로그, 인스타그램 등)에 의견이나 후기를 남긴다.	①	②	③	④	⑤
5	나는 토마토에 대한 정보를 광범위하게 수집한다.	①	②	③	④	⑤

2-2. 다음은 토마토 제품군에 대해 귀하 본인께서 얼마나 까다로우신지 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이하	약간 그렇다	매우 그렇다
1	내가 원하는 토마토의 스타일(맛, 브랜드, 포장 등)이 무엇인지 정확하게 알고 있다.	①	②	③	④	⑤
2	나는 토마토의 품질에 대해 정확한 평가를 할 수 있다.	①	②	③	④	⑤
3	나는 토마토 종류들 간의 감각적인 차이(시각/청각/후각/미각/촉각)를 잘 안다.	①	②	③	④	⑤
4	나는 토마토 종류들을 비교 평가할 때 사용하는 기준이 정밀하고 까다롭다.	①	②	③	④	⑤

2-3. 다음은 귀하 본인이 토마토 제품군을 얼마나 다양하게 경험해 보셨는지에 대한 질문입니다.

번호	설문 문항	매우 아니다	약간 아니다	보통 이하	약간 그렇다	매우 그렇다
1	나는 자라오면서 보거나 경험한 토마토의 종류가 다양하다.	①	②	③	④	⑤
2	나는 새로운 토마토가 나오면 구매해본다.	①	②	③	④	⑤
3	내가 평소에 구매하는 토마토의 종류는 다양하다.	①	②	③	④	⑤

3. 지난 한달 간 귀하께서 직접 요리한 경우를 떠올리면서 응답해주세요.

3-1. 주중기준, 1주일 평균 몇 회 직접 요리하십니까? 약 _____회/15회
(주중 5일 동안 3끼를 모두 직접 요리할 경우 총 15회)

3-2. 주말기준, 1주일 평균 몇 회 직접 요리하십니까? 약 _____회/6회
(주말 2일 동안 3끼를 모두 직접 요리할 경우 총 6회)

Appendix B1. Correlation table for ramyun data (Chapter III)

		IV	DV							CV							
		cso	gpa	vcb	vpb	vsf	vnt	nam	nar	wst	age	mic	mis	nch	gre	pri	mpf
IV	cso	1															
DV	gpa	.043	1														
	vcb	.129	.553	1													
	vpb	.119	.728	.835	1												
	vsf	.124	.610	.822	.837	1											
	vnt	.107	.467	.780	.699	.741	1										
	nam	.058	.639	.492	.592	.545	.473	1									
	nar	.077	.053	.352	.232	.354	.420	.607	1								
CV	wst	-.020	.090	.044	.065	.038	.046	.060	-.016	1							
	age	.160	.157	.184	.205	.208	.151	.066	.043	-.227	1						
	mic	.049	.163	.186	.167	.169	.156	.124	.052	-.022	.017	1					
	mis	.013	-.055	-.043	-.038	-.050	-.026	-.045	-.028	-.029	-.058	.540	1				
	nch	-.050	.374	.278	.367	.288	.259	.202	-.001	.092	.390	.164	-.056	1			
	gre	-.069	.313	.205	.248	.190	.209	.267	.050	.262	-.234	.385	.216	.263	1		
	pri	-.070	.057	.041	.053	.052	.041	.036	.011	-.089	.100	-.155	-.069	-.028	-.200	1	
	mpf	-.073	.037	.059	.007	.037	.047	-.011	-.031	.036	-.035	.042	.003	-.038	.022	-.001	1

*cso=consumer sophistication

*gpa=purchase amount; vcb=company brand variety; vpb=product brand variety; vsf=soup flavor variety; vnt=noodle type variety; nam=new product amount; nar=new product amount ratio

*wst=working status; age=age; mic=household monthly income; mis=household monthly income squared; nch=numbe of children; gre=grocery expenditure; pri=price attribute importance; mpf=meal preparation frequency

Appendix B2. Correlation table for tomato data (Chapter III)

		IV	DV				CV							
		cso	gpa	vbr	nam	nar	wst	age	mic	mis	nch	gre	pri	mpf
IV	cso	1												
DV	gpa	.142	1											
	vbr	.093	.611	1										
	nam	.104	.526	.320	1									
	nar	.073	.219	.254	.636	1								
CV	wst	.017	.166	.157	.047	.080	1							
	age	-.163	-.187	-.128	-.034	-.040	-.213	1						
	mic	.020	.150	.145	.154	.120	-.040	.054	1					
	mis	.042	.093	.069	.142	.077	-.051	-.044	.566	1				
	nch	-.158	.004	.049	.086	.034	.099	.416	.141	-.061	1			
	gre	-.010	.446	.352	.205	.115	.245	-.212	.363	.208	.232	1		
	pri	-.136	-.131	-.111	-.105	-.079	-.040	.086	-.143	-.087	-.003	-.172	1	
	mpf	-.045	-.019	-.027	-.005	-.029	-.003	-.048	.047	.005	-.047	.024	.033	1

*cso=consumer sophistication

*gpa=purchase amount; vbr=breeds variety

*wst=working status; age=age; mic=household monthly income; mis=household monthly income squared; nch=number of children; gre=grocery expenditure; pri=price attribute importance; mpf=meal preparation frequency

Appendix C1. Correlation table (Chapter IV)

		IV	DV			CV			
		NV	RCA	RSCA	NEI	UL	TE	LG	BR
IV	NV	1							
DV	RCA	.088	1						
	RSCA	.155	.454	1					
	NEI	.188	.545	.530	1				
CV	UL	.023	-.067	.113	.058	1			
	TE	.003	-.181	-.021	-.298	-.099	1		
	LG	.047	.317	.255	.045	.204	.355	1	
	BR	-.013	.279	.069	.037	-.358	.436	.123	1

*NV=number of varieties

*RCA= revealed comparative advantage; RSCA=revealed symmetric comparative advantage; NEI=net export index

*CM=size of consumer market; UL=Unit labor cost; TE=Temperature; LG=level of logistic industry; BR=level of business rivalry

Appendix C2. Average number of variety per product category, per country

	Fruit						Vegetable							Meat			Dairy			Processed				Sum
Country	Apple	Grape	Kiwi	Pears	Pine-apple	Straw-berry	Carrot	Garlic	Mush-room	Onions	Potato	Sweet potato	Tomato	Beef	Chicken	Pork	Eggs	Cheese	Yogurt	Chips	Ketchup	Soy sauce	Water	
AUS	19.5	9.0	3.5	5.5	4.0	2.0	10.0	5.0	16.5	7.0	20.0	6.5	14.5	69.5	61.0	37.0	32.5	329.0	229.5	82.0	21.0	23.5	98.0	1,106
CAN	21.5	4.5	3.0	6.5	2.5	2.0	13.5	8.5	13.0	11.5	16.5	5.0	10.0	59.0	36.5	29.5	24.0	267.5	174.5	141.0	9.0	13.5	130.0	1,002
CZE	16.5	4.0	2.0	5.5	2.5	2.0	5.0	7.0	12.0	14.0	14.0	1.0	15.0	49.5	38.0	41.5	13.5	423.0	288.5	98.5	39.0	6.5	143.5	1,242
DEU	12.5	4.5	3.5	5.0	1.5	1.0	6.5	1.5	5.0	7.0	10.0	2.0	13.0	29.5	14.0	26.0	9.5	284.5	191.0	65.0	36.0	9.5	173.5	912
FRA	19.5	4.5	5.0	4.5	3.5	2.5	11.0	4.0	6.5	10.0	20.0	2.5	23.0	50.0	23.5	11.5	27.0	325.5	306.0	67.0	11.5	6.0	131.5	1,076
GBR	24.5	17.0	4.0	10.0	8.0	3.5	15.0	6.0	17.0	15.5	23.5	5.0	22.0	84.0	51.0	78.5	22.5	367.5	417.5	138.0	21.5	14.5	131.5	1,498
JPN	4.5	2.5	1.5	0.0	3.0	4.5	3.5	4.0	17.5	5.5	4.0	1.0	16.5	14.5	32.0	44.5	14.5	126.5	108.5	52.0	12.0	65.0	39.0	577
KOR	6.5	3.5	1.5	3.0	7.5	1.0	5.0	14.5	23.0	6.0	3.0	4.0	11.0	35.0	24.5	32.0	21.0	142.5	113.0	52.0	15.0	63.0	74.5	662
NLD	31.5	6.5	4.0	6.5	14.0	4.5	11.0	4.0	15.5	16.0	27.5	3.5	17.0	89.0	97.5	111.5	34.0	569.5	184.0	138.5	27.0	14.5	108.5	1,536
USA	29.0	8.0	3.5	10.0	3.5	4.5	20.0	5.5	15.5	14.0	21.0	3.5	16.0	74.5	64.5	37.5	35.0	343.0	320.0	132.5	24.0	13.5	190.5	1,389
Mean	18.6	6.4	3.2	5.7	5.0	2.8	10.1	6.0	14.2	10.7	16.0	3.4	15.8	55.5	44.3	45.0	23.4	317.9	233.3	96.7	21.6	23.0	122.1	1,100
Mean_t	6.9						10.9							48.2			191.5			65.8				
Min	4.5	2.5	1.5	0.0	1.5	1.0	3.5	1.5	5.0	5.5	3.0	1.0	10.0	14.5	14.0	11.5	9.5	126.5	108.5	52.0	9.0	6.0	39.0	577
Max	31.5	17.0	5.0	10.0	14.0	4.5	20.0	14.5	23.0	16.0	27.5	6.5	23.0	89.0	97.5	111.5	35.0	569.5	417.5	141.0	39.0	65.0	190.5	1536

※ AUS: Australia, CAN: Canada, CZE: Czech, DEU: Germany, FRA: France, GBR: Great Britain, JPN: Japan, KOR: S.Korea, NLD: The Netherlands, USA: United States

Appendix D1. RCA per product category, per country

	Fruit						Vegetable							Meat			Dairy			Processed			
Country	Apple	Grape	Kiwi	Pears	Pine-apple	Straw-berry	Carrot	Garlic	Mush-room	Onions	Potato	Sweet potato	Tomato	Beef	Chicken	Pork	Eggs	Cheese	Yogurt	Chips	Ketchup	Soy sauce	Water
AUS	3.9	97.4	18.5	18.1	0.0	21.3	105.8	1.2	2.8	15.3	7.8	2.3	0.6	123.6	3.8	4.9	1.2	36.6	14.1	1.6	3.6	1.2	3.8
CAN	7.6	0.5	0.0	0.2	0.8	0.7	32.9	0.9	56.0	15.0	36.9	18.3	49.7	16.1	9.6	64.3	9.9	1.5	4.8	80.4	6.9	3.9	6.4
CZE	6.7	4.3	10.3	3.3	1.7	1.4	8.7	19.8	5.6	4.3	5.2	0.9	4.8	1.4	8.3	5.2	20.0	13.2	45.4	1.3	22.4	4.4	16.2
DEU	3.4	4.2	17.7	2.4	5.5	5.4	3.5	2.8	3.2	4.6	16.4	1.7	1.2	4.3	13.2	33.9	17.6	31.1	54.8	6.6	13.2	4.3	9.7
FRA	91.7	6.2	79.0	8.7	7.7	13.7	28.5	69.6	6.6	26.2	77.9	5.8	37.6	8.5	34.4	18.8	28.2	76.7	88.9	22.5	4.2	2.0	210.5
GBR	2.3	3.8	0.7	1.2	13.0	0.5	8.0	19.2	0.2	1.9	22.8	20.8	1.1	5.1	14.5	8.6	15.3	18.6	20.7	4.3	15.1	15.5	19.4
JPN	14.4	2.1	0.5	2.9	0.0	2.8	0.3	0.1	1.7	1.8	0.0	6.8	0.0	0.8	0.4	0.1	1.1	0.2	0.1	0.1	0.1	57.2	2.1
KOR	1.3	0.7	10.5	33.3	0.0	11.2	0.6	0.2	10.7	1.4	0.1	1.1	1.1	0.2	1.0	0.0	0.1	0.1	2.5	0.0	0.9	16.4	1.5
NLD	31.4	89.3	108.4	172.9	206.4	106.3	124.4	191.1	77.9	195.0	114.3	63.0	203.9	24.4	99.5	47.5	136.7	90.1	13.2	131.6	108.3	130.2	7.1
USA	48.9	54.4	19.4	29.4	28.2	52.7	26.1	10.5	2.5	22.2	8.9	65.8	12.6	15.2	40.6	30.4	25.7	9.5	3.7	26.3	47.0	21.5	10.3
Mean	21.2	26.3	26.5	27.2	26.3	21.6	33.9	31.5	16.7	28.8	29.0	18.6	31.3	19.9	22.5	21.4	25.6	27.8	24.8	27.5	22.2	25.7	28.7
Mean_t	24.9						27.1							21.3			26.1			26.0			
Min	1.3	0.5	0.0	0.2	0.0	1.3	0.5	0.0	0.2	0.0	1.3	0.5	0.0	0.2	0.0	1.3	0.5	0.0	0.2	0.0	1.3	0.5	0.0
Max	91.7	97.4	108.4	172.9	206.4	91.7	97.4	108.4	172.9	206.4	91.7	97.4	108.4	172.9	206.4	91.7	97.4	108.4	172.9	206.4	91.7	97.4	108.4

※ AUS: Australia, CAN: Canada, CZE: Czech, DEU: Germany, FRA: France, GBR: Great Britain, JPN: Japan, KOR: S.Korea, NLD: The Netherlands, USA: United States

Appendix D2. RSCA per product category, per country

	Fruit						Vegetable							Meat			Dairy			Processed			
Country	Apple	Grape	Kiwi	Pears	Pine-apple	Straw-berry	Carrot	Garlic	Mush-room	Onions	Potato	Sweet potato	Tomato	Beef	Chicken	Pork	Eggs	Cheese	Yogurt	Chips	Ketchup	Soy sauce	Water
AUS	0.59	0.98	0.90	0.90	-0.91	0.91	0.98	0.10	0.47	0.88	0.77	0.39	-0.26	0.98	0.58	0.66	0.08	0.95	0.87	0.23	0.56	0.11	0.59
CAN	0.77	-0.37	-0.98	-0.60	-0.11	-0.16	0.94	-0.06	0.96	0.87	0.95	0.90	0.96	0.88	0.81	0.97	0.82	0.21	0.65	0.98	0.75	0.59	0.73
CZE	0.74	0.62	0.82	0.54	0.25	0.15	0.79	0.90	0.70	0.63	0.68	-0.07	0.66	0.15	0.78	0.68	0.90	0.86	0.96	0.13	0.91	0.63	0.88
DEU	0.54	0.61	0.89	0.41	0.69	0.69	0.55	0.47	0.53	0.64	0.89	0.27	0.10	0.62	0.86	0.94	0.89	0.94	0.96	0.74	0.86	0.63	0.81
FRA	0.98	0.72	0.98	0.79	0.77	0.86	0.93	0.97	0.74	0.93	0.97	0.71	0.95	0.79	0.94	0.90	0.93	0.97	0.98	0.91	0.61	0.34	0.99
GBR	0.40	0.58	-0.17	0.09	0.86	-0.29	0.78	0.90	-0.65	0.30	0.92	0.91	0.04	0.67	0.87	0.79	0.88	0.90	0.91	0.62	0.88	0.88	0.90
JPN	0.87	0.36	-0.31	0.49	-0.95	0.48	-0.53	-0.86	0.25	0.29	-0.99	0.74	-0.97	-0.11	-0.39	-0.82	0.05	-0.73	-0.87	-0.83	-0.87	0.97	0.36
KOR	0.14	-0.20	0.83	0.94	-0.99	0.84	-0.23	-0.66	0.83	0.15	-0.85	0.03	0.06	-0.69	0.00	-0.96	-0.87	-0.89	0.43	-0.99	-0.04	0.89	0.21
NLD	0.94	0.98	0.98	0.99	0.99	0.98	0.98	0.99	0.97	0.99	0.98	0.97	0.99	0.92	0.98	0.96	0.99	0.98	0.86	0.98	0.98	0.98	0.75
USA	0.96	0.96	0.90	0.93	0.93	0.96	0.93	0.83	0.42	0.91	0.80	0.97	0.85	0.88	0.95	0.94	0.93	0.81	0.58	0.93	0.96	0.91	0.82
Mean	0.69	0.53	0.48	0.55	0.15	0.54	0.61	0.36	0.52	0.66	0.51	0.58	0.34	0.51	0.64	0.51	0.56	0.50	0.63	0.37	0.56	0.69	0.71
Mean_t	0.49						0.51							0.55			0.56			0.58			
Min	0.14	-0.37	-0.98	-0.60	-0.99	-0.29	-0.53	-0.86	-0.65	0.15	-0.99	-0.07	-0.97	-0.69	-0.39	-0.96	-0.87	-0.89	-0.87	-0.99	-0.87	0.11	0.21
Max	0.98	0.98	0.98	0.99	0.99	0.98	0.98	0.99	0.97	0.99	0.98	0.97	0.99	0.98	0.98	0.97	0.99	0.98	0.98	0.98	0.98	0.98	0.99

※ AUS: Australia, CAN: Canada, CZE: Czech, DEU: Germany, FRA: France, GBR: Great Britain, JPN: Japan, KOR: S.Korea, NLD: The Netherlands, USA: United States

Appendix D3. NEI per product category, per country

	Fruit						Vegetable							Meat			Dairy			Processed			
Country	Apple	Grape	Kiwi	Pears	Pine-apple	Straw-berry	Carrot	Garlic	Mush-room	Onions	Potato	Sweet potato	Tomato	Beef	Chicken	Pork	Eggs	Cheese	Yogurt	Chips	Ketchup	Soy sauce	Water
AUS	0.71	0.55	-0.86	0.72	-0.95	1.00	1.00	-0.98	-0.30	0.71	1.00	0.39	0.35	0.99	1.00	-0.65	-0.02	0.16	0.56	-0.85	-0.73	-0.98	-0.72
CAN	-0.74	-0.99	-1.00	-0.99	-0.98	-0.99	-0.48	-0.98	0.73	-0.57	0.47	-0.57	0.03	0.28	-0.31	0.68	-0.28	-0.64	0.68	0.86	-0.88	-0.85	-0.55
CZE	-0.43	-0.76	-0.71	-0.70	-0.88	-0.89	-0.58	-0.60	-0.33	-0.67	-0.59	-0.54	-0.77	-0.50	-0.57	-0.76	-0.04	-0.27	0.43	-0.69	0.10	-0.33	0.17
DEU	-0.79	-0.81	-0.81	-0.89	-0.79	-0.73	-0.80	-0.89	-0.77	-0.57	0.13	-0.78	-0.95	-0.19	-0.22	0.46	-0.40	-0.01	0.60	-0.02	-0.20	-0.47	-0.33
FRA	0.66	-0.70	-0.54	-0.75	-0.84	-0.65	-0.25	-0.27	-0.68	0.01	0.65	-0.70	-0.28	-0.13	-0.10	0.09	0.27	0.37	0.66	-0.21	-0.89	-0.91	0.77
GBR	-0.94	-0.95	-0.99	-0.97	-0.82	-0.99	-0.63	-0.76	-1.00	-0.95	0.10	-0.76	-0.97	-0.47	-0.64	-0.51	0.00	-0.46	-0.58	-0.81	-0.66	-0.52	-0.45
JPN	0.93	-0.80	-1.00	1.00	-1.00	-0.44	-0.97	-1.00	-0.88	-0.89	-0.99	-0.34	-0.99	-0.91	-0.97	-1.00	0.08	-0.98	0.49	-0.99	-0.93	0.95	-0.89
KOR	0.99	-0.94	-0.87	1.00	-1.00	1.00	-0.96	-1.00	0.26	-0.61	-0.93	0.33	1.00	-0.98	-0.75	-1.00	-0.72	-0.99	0.62	-1.00	-0.63	0.21	-0.81
NLD	-0.09	-0.09	-0.46	0.43	0.14	0.52	0.59	0.21	0.49	0.73	0.40	-0.17	0.70	0.17	0.50	0.56	0.34	0.49	-0.43	0.73	0.74	0.52	-0.64
USA	0.50	-0.16	-0.73	0.13	-0.75	-0.11	0.08	-0.84	-0.77	-0.33	-0.03	0.85	-0.74	0.03	0.83	0.52	0.74	-0.04	0.20	0.16	0.81	-0.29	-0.64
Mean	0.08	-0.56	-0.80	-0.10	-0.79	-0.23	-0.30	-0.71	-0.32	-0.32	0.02	-0.23	-0.26	-0.17	-0.12	-0.16	0.00	-0.24	0.32	-0.28	-0.33	-0.27	-0.41
Mean_t	-0.40						-0.30							-0.15			0.03			-0.32			
Min	-0.94	-0.99	-1.00	-0.99	-1.00	-0.99	-0.97	-1.00	-1.00	-0.95	-0.99	-0.78	-0.99	-0.98	-0.97	-1.00	-0.72	-0.99	-0.58	-1.00	-0.93	-0.98	-0.89
Max	0.99	0.55	-0.46	1.00	0.14	1.00	1.00	0.21	0.73	0.73	1.00	0.85	1.00	0.99	1.00	0.68	0.74	0.49	0.68	0.86	0.81	0.95	0.77

※ AUS: Australia, CAN: Canada, CZE: Czech, DEU: Germany, FRA: France, GBR: Great Britain, JPN: Japan, KOR: S.Korea, NLD: The Netherlands, USA: United States

Appendix E. Result of linear regression (Chapter IV)

(a1) Result of linear regression (dependent variable: RCA of vegetables)

Variables	B	Robust SE	Stan.B	T
(constant)	-156.455	27.77392		-5.6331***
Number of variety (NV)	0.312059	0.115251	0.158121	2.7076**
Size of consumer market (CM)	-0.4409	0.170784	-0.15521	-2.5816*
Unit labor cost (UL)	-98.4347	13.86399	-0.59258	-7.1***
Temperature (TE)	0.03813	0.109079	0.018828	0.3496
Level of logistic industry (LG)	45.67214	7.457836	0.553058	6.124***
Level of business rivalry (BR)	0.625495	0.095431	0.477949	6.5544***
Adjusted R^2				
	0.4869			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(a2) Result of linear regression (dependent variable: RCA of fruit)

Variables	B	Robust SE	Stan.B	T
(constant)	-77.3995	21.29274		-3.635***
Number of variety (NV)	0.132039	0.149358	0.09729	0.884
Size of consumer market (CM)	0.124347	0.101973	0.062568	1.2194
Unit labor cost (UL)	-78.9309	10.98796	-0.67919	-7.1834***
Temperature (TE)	-0.17817	0.069314	-0.12575	-2.5705*
Level of logistic industry (LG)	25.5463	5.708637	0.442175	4.475***
Level of business rivalry (BR)	0.446501	0.078926	0.487671	5.6572***
Adjusted R^2				
	0.4935			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(b1) Result of linear regression (dependent variable: RSCA of vegetables)

Variables	B	Robust S.E	Stan.B	t
(constant)	-3.10664	0.994596		-3.1235**
Number of variety (NV)	0.0165	0.0071	0.191947	2.3238*
Size of consumer market (CM)	0.010502	0.010193	0.084876	1.0303
Unit labor cost (UL)	-1.72346	0.655677	-0.23821	-2.6285**
Temperature (TE)	-0.00578	0.009094	-0.06557	-0.6361
Level of logistic industry (LG)	0.876342	0.23406	0.243638	3.7441***
Level of business rivalry (BR)	0.014976	0.005654	0.262726	2.6489**
Adjusted R^2				
	0.1239			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(b2) Result of linear regression (dependent variable: RSCA of fruits)

Variables	B	Robust S.E	Stan.B	t
(constant)	-0.83733	0.855771		-0.9785
Number of variety (NV)	0.009421	0.005044	0.110413	1.8677 [^]
Size of consumer market (CM)	0.051636	0.006399	0.413254	8.0693***
Unit labor cost (UL)	-4.4231	0.541533	-0.60537	-8.1677***
Temperature (TE)	-0.03145	0.006682	-0.35303	-4.7059***
Level of logistic industry (LG)	0.555526	0.195272	0.15294	2.8449**
Level of business rivalry (BR)	0.024472	0.004138	0.425132	5.9144***
Adjusted R^2				
	0.5220			

[^] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(c1) Result of linear regression (dependent variable: NEI of vegetables)

Variables	B	Robust S.E	Stan.B	t
(constant)	-1.97502	0.899234		-2.1963*
Number of variety (NV)	0.02017	0.006475	0.238833	3.1150**
Size of consumer market (CM)	-0.01655	0.011701	-0.13615	-1.4144
Unit labor cost (UL)	-4.24322	0.516898	-0.59693	-8.209***
Temperature (TE)	-0.00087	0.007647	-0.01001	-0.1135
Level of logistic industry (LG)	0.658601	0.191003	0.186369	3.4481***
Level of business rivalry (BR)	0.011447	0.00361	0.204394	3.1711**
Adjusted R^2				
	0.3044			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(c2) Result of linear regression (dependent variable: NEI of fruits)

Variables	B	Robust S.E	Stan.B	t
(constant)	0.850382	0.942449		0.9023
Number of variety (NV)	0.013825	0.006155	0.151522	2.2460*
Size of consumer market (CM)	0.01629	0.010036	0.121923	1.6231
Unit labor cost (UL)	-4.29937	0.681061	-0.5503	-6.3128***
Temperature (TE)	-0.00586	0.00687	-0.06149	-0.8526
Level of logistic industry (LG)	-0.08039	0.209933	-0.0207	-0.3829
Level of business rivalry (BR)	0.016894	0.005059	0.274456	3.3396**
Adjusted R^2				
	0.2430			

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

요약 (국문초록)

식품 산업에서의 소비자 까다로운 소비성향

Consumer Sophistication in the Food Industry

본 연구는 소비자의 까다로움이 식품 산업에서 어떠한 역할을 하는지 분석하는데 목적이 있다. 마이클 포터의 다이아몬드 모델의 산업 경쟁력 영향 요인 중 소비자 수요의 질적 특징, 달리 말해 소비자의 까다로운 소비 성향에 대해 집중적으로 살펴본다. 기존의 소비자의 개별 특성은 경쟁력 관련 연구에서 대부분 배제되거나, 지식 및 경험 등의 일부 개인적 특징만을 반영한다는 점에서 한계가 있다. 본 연구에서는 소비자 까다로움의 통합적 측정 도구를 새롭게 개발하고, 이 것의 영향력을 개인수준에서의 구매행동과 산업수준에서의 경쟁력에 적용하여 살펴본다는 점에서 차별성을 지닌다.

우선, 기존 문헌을 바탕으로 소비자 까다로움 성향을 정의하고 측정 도구를 개발하였다. 특히, 탐색적 요인분석과 확인적 요인분석을 순차적으로 적용하여 측정 도구의 신뢰도와 타당성을 확인하였다. 그 결과, ‘의견형성’, ‘예민함’, ‘다양성 노출’의 3개의 요인으로 구성된 12개 문항이 도출되었다. 소비자 까다로움은 특정 제품군에 대한 소비자가 갖고 있는 총체적인 지식, 능력, 경험 등으로 정의한다.

이어서, 개발된 소비자 까다로움의 측정 도구를 사용하여 특정한 제품군에 대해 소비자들이 까다로운 정도에 따라 어떠한 구매행동을 보이고 있는지 분석하였다. 특히, 일반적인 구매행동, 다양성 구매행동, 신제품 구매행동의 3가지 개인행동으로 구분하여 살펴보았다. 본 분석의

결과, 까다로운 소비자들이 특정 제품군을 더 많이, 더 다양하게 구매하며, 새로 출시된 제품을 더 많이 구매하는 경향을 보였다.

마지막 분석은 이러한 소비자 까다로움의 영향력이 산업의 경쟁력에도 영향을 미치고 있는지에 대한 분석이다. 한 지역(국가) 내의 산업 경쟁력을 분석하기 위해 제품의 다양성 개수를 소비자 까다로움의 대리변수로 사용한다. 분석 결과, 특정 제품군의 다양성 개수가 많은 국가에서 해당 제품군의 경쟁력이 타 제품군에 비해 높다는 것을 밝혔다.

본고는 소비자 까다로움이라는 수요의 질적인 특성이 개인의 구매행동과 산업의 경쟁력과 어떠한 관계가 있는지 분석한 첫 시도 중 하나이다. 소비자의 역할은 ‘소비’하는 데에 그치지 않고 더 나아가 기업의 결정과 판단을 이끄는 주체로 변화하고 있다. 본고의 결과는 이러한 흐름 속에서 더 새롭고 다양한 제품을 매대 위에 올려놓게 하는 데까지 소비자의 역할이 확장되고 있다는 점을 밝히고 있다. 또한, 본고는 농식품 산업에서의 종 다양성 보존의 필요성을 사회적인 가치뿐만 아니라 경제적 가치로 이해시키는데 기여할 것으로 기대된다.

주요어: 소비자 까다로움, 다이아몬드 모델, 수요조건, 경쟁력, 다양성 개수

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