CUSTOMER EDUCATION:

DEFINITION, MEASURES AND EFFECTS ON CUSTOMER SATISFACTION

A thesis submitted in partial fulfilment
of the requirements for the degree of

Doctor of Business Administration

by

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2007

ABSTRACT

Despite companies' growing interest for customer education (for instance: Nikon, Orange, Sony) and the recent awareness in marketing literature of this concept (Hennig-thurau et al., 2005), research on customer education remains relatively scarce.

Thus, the present research study aims to contribute to the development of knowledge on customer education. More specifically, it endeavours to clarify the concept of customer education and to understand and measure its outcomes on customer satisfaction, a key indicator of corporate performance.

To achieve this goal, a literature review was conducted in order to provide an original conceptualization of customer education and its outcomes. Then, a reliable and valid scale to measure customer education was developed. Finally, an experimental procedure based on hypothetic-deductive methodology was performed. A structural model was built that depicts the effects of customer education on customer satisfaction and tested a set of hypotheses covering the mediating and moderating effects. The experimental fieldwork was conducted in partnership with the digital camera manufacturer Nikon France, on a sample of 321 customers. Structural Equation Modelling was used to test the hypotheses.

The results of this research were twofold. First, a 5-item original scale to measure customer education was developed. The psychometric qualities of this scale were shown, using Churchill's procedure (1979). Second, a model which details the relationships between customer education and customer satisfaction was proposed and validated. The existence of two mediating variables was unveiled: product usage and product-usage related knowledge and skills. The moderating role of customer expertise with a product category was also substantiated.

Keywords: customer education, customer satisfaction, product usage, product usage related knowledge and skills

ACKNOWLEDGEMENTS

I would first like to thank Thierry GRANGE and Loïck ROCHE, respectively Director General and Associate Director Vice-Dean for Academics, Research and Faculty of Grenoble Ecole de Management for their institutional and personal support throughout my research journey.

I am indebted to the efforts of my supervisor, David GOTTELAND, whose academic and personal support was infallible. My heartfelt thanks go to him for his advice and for the countless hours spent on my dissertation.

I also greatly benefited from the support of fellow researchers, whose help was indeed invaluable. My seemingly endless discussions with Peter HONEBEIN (University of Nevada, Reno) and Thorsten HENNIG-THURAU (Bauhaus University of Weimar) really sharpened my academic vision on customer education. These two gentlemen also offered me the possibility to co-write a conference paper on this topic, presented at the 2005 AMA Winter Educators' Conference. I would like to sincerely thank them for their help.

Shailey MINOCHA (Open University, UK) took an enthusiastic interest in my research. Our exchanges concerning my dissertation were fruitful, to say the least.

Jean-Jacques CHANARON (CNRS, France) also offered me his support. I would like to thank him for his kind revision of my work.

I also benefited from the support of the marketing team of Nikon France. I particularly would like to thank Bernard de LA PEYRIERE, Alexandra TOUZET and Roland SERBIELLE who put their faith in my ideas and my work. They offered their support for the empirical investigation and allowed me interview over 300 customers. My best wishes go to the NIKONSCHOOL.

My colleagues from Grenoble Ecole de Management did not hesitate in providing me with their help. Specifically, I would like to thank Nancy ARMSTRONG-BENETTO for reviewing my English. I also would like to thank Valerie CHEVALLIER who

conscientiously reviewed the bibliography and helped me during the Nikon survey. The support of Lamya BENAMAR and Danilo DANTAS was also useful in the data collection stage. Many thanks to them.

Finally, I would like to extend my warm thanks to my three "*favorite customers*", Françoise, Fanny and Tom, for their patience and support.

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INTRODUCTION

"*Learning organizations are increasingly pursuing customer education and channel partner education to increase revenue, improve customer satisfaction and drive competitive differentiation*"

This assertion is actually a key finding of the Accenture Learning 2004 Survey of Learning Executives. This study unveils that 47 percent of companies interviewed offer customer and/or channel partner education and that a large majority (71%) of high-performance learning organizations plan to launch or develop their customer education initiatives. For these companies, the key objectives of customer education are primarily to increase competitive advantage and strengthen customer loyalty.

These findings open up promising perspectives for the development of customer education, in so far as companies are now investing in improving customer expertise in the goods and services they market (Honebein and Cammarano, 2005). Even though customer education is hardly a novel activity on industrial markets (Meer, 1984), its development is on the increase and has now reached the consumer goods market (Honebein, 1997).

In fact, many examples from the consumer goods market confirm the growing interest of companies for customer education. Nikon has created the Nikonschool in the USA and France and offers formal training sessions on digital camera usages to individual consumers (de Chauliac, 2004). Sony offers individual training sessions by phone and helps customer discover their newly purchased computer (Delon, 2005). The French Do-It-Yourself distributor Castorama organizes workshops and trains more than 40.000 consumers a year (L'herminier, 2003). In the UK and France, Orange, the mobile-phone company, has developed the "*Mobile Coach*" program, and offers individual coaching sessions (Aubert and Ray, 2005). Financial brokers propose online or face-to-face seminars and provide their customers with basic or advanced skills in finance (Aubert and Humbert, 2001). And the possibilities are endless.

Different reasons can explain corporate interest in customer education.

One reason is the development of knowledge-based business. An increasing number of products are becoming smarter and more interactive. Examples of smart products are electronic information products and services, such as personal digital assistants or information websites (Mittal and Sawhney, 2001). Davis and Botkin (1994) and Honebein (1997) explained that the development of smart products turns companies into educators and consumers into active learners:

"*As information technologies become so much friendlier and smarter, and as they become intrinsic to more and more products and services, learning will become a by-product (and by-service) of the customers*" (Davis and Botkin, 1994: 170)

A second reason is related to the development of information and communication technologies that allow companies to contact and interact with their customers directly. Thus, e-learning has become a true opportunity to implement large-scale customer education (Aldrich, 2000; Dankens and Anderson, 2001).

Finally, the last reason, which is crucial, is related to corporate strategy. To be profitable, companies must ensure the development of customer loyalty (Anderson and Sullivan, 1993; Fornell et al., 1996; Fornell et al., 2006). In this respect, as suggested by Hennig-thurau et al. (2005) and Honebein and Cammarano (2006), the development of customer performance, the ability of customers to perform consumption-related tasks, becomes a crucial determinant of satisfaction, loyalty and consequently of company performance. The same authors also suggest that customer education can help customers to perform the expected tasks better.

The hypothesis that customer education is a driver of customer and company performance initiated my interest in research on customer education. To my knowledge, this topic has not yet been directly addressed in marketing literature.

To specify the nature and the merit of this work, the background to the research is presented hereafter. Especially, the emerging interest in customer education in marketing theory is discussed. Then, the research objectives are presented and their

academic and managerial relevance is justified. As the research question addresses an emerging topic, the scope of this research is also delimitated, before presenting its organization.

BACKGROUND TO THE RESEARCH

- **Role and importance of customer education from a marketing theory perspective**

The interest for customer education in marketing theory is particularly recent (Hennig-thurau et al., 2005). One reason is an emergent reflection on consumption as the primary source of value creation. This stream of interest has directed research towards the definition of antecedents and drivers of customer performance at the consumption stage (Honebein and Cammarano, 2005).

Consumption as a source of value creation

Creating value is a major concern for companies. But the locus of value creation has steadily changed over recent decades because markets have evolved from an industrial era to a post-industrial era (Prahalad and Ramaswamy, 2004).

In the industrial era, every actor -supplier, company, customer- occupied a position on a value chain and added its own value. Customers were considered as passive receivers (Wikström, 1996a).

In the post-industrial era, the value creating system has changed and is now composed of a constellation of actors working together to co-produce value (Normann and Ramirez, 1994). Customer involvement has become particularly prominent in the design, development, and production of new products or services (Von Hippel, 1978; Wikström, 1996a, 1996b). Bendaupi and Leone (2003) considered that encouraging customers to be co-producers represented the next frontier of competitive effectiveness. The first reason is economic, since the active participation of customers allows companies to save important labour costs (Bendaupi and Leone, 2003; Honebein and Cammarano, 2005). Secondly, there is a much higher level of adequacy between needs and wants and actual offers

(Wikström, 1996a). This leads to higher levels of customer satisfaction (Wikström, 1996a; Honebein and Cammarano, 2005).

In this perspective, Vargo and Lusch (2004a: 2) considered that:

"*Marketing has moved from a goods-dominant view, in which tangible output and discrete transactions were central, to a service-dominant view, in which intangibility, exchanges processes and relationships are central*"

The service-centred dominant logic of marketing implies that every market offer should provide a service for and in conjunction with the consumer.

This perspective highlights consumption as a source of value creation. Vargo and Lusch (2004a) observed that firms only make value propositions. The actual value of a product or service is determined by the consumption itself: "*in using a product, the customer is continuing the marketing, consumption, and value creation process*" (Vargo and Lusch, 2004b: 11). This implies that in the new dominant logic of marketing proposed by these authors, "*value is perceived and determined by the consumer on the basis of value in use*" (Vargo and Lusch, 2004a: 7). Thus, customer performance, the ability of consumers to perform consumption-related tasks, becomes crucial.

Antecedents of customer performance and the role of customer education

Consumers thus are responsible for unlocking the value embedded in the good/service through consumption. Consequently, one important objective of marketing theory and marketing practice is to identify the antecedents of customer performance at the consumption stage.

Honebein and Cammarano (2006) suggested that four determinants of customer performance should be analysed: vision, access, incentives and expertise.
"*Vision*" refers to the goals, objectives and desired performance that consumers define before performing consumption tasks. From a managerial perspective, helping customers to enhance such a vision is mainly the role of marketing.

"*Access*" refers to the tools, environment and information that enable a given level of performance desired by customers. Honebein and Cammarano (2005) stress the role of product design and ergonomics as one key component of access.

"*Incentive*" must be provided to help customers perform in the desired way. Incentives can be considered as signals interpreted by customers as what they are invited to do or not to do with their products.

Finally, "*expertise*" refers to the customers' ability to use a product or service. It is related to the level of knowledge and skills, or the degree of expertise, customers possess about the product/service.

This last determinant of expertise is paramount for this research. According to Vargo and Lusch (2004a: 11): "*the customer still must learn to use, maintain, repair and adapt the appliance to his or her unique needs, usage situations and behaviours*". This implies that knowledge and skills are crucial determinants of customer performance and of customer value creation at the consumption stage.

Consequently, both marketing theory and marketing practice should aim to identify the drivers of customer knowledge and skills. Obviously, customer education must be analysed as one of these potential drivers. If customer education increases the degree of customer expertise and performance, then the customer can unlock the value embedded in products or services properly. This can lead to higher levels of customer satisfaction and, consequently, to improved company performance.

- **The limited research on customer education in the marketing field**

The idea that customer education can increase customer and company performance is intuitively appealing. However, current research is rather limited (Hennig-Thurau et al., 2005) and does not provide clear evidence of the efficacy of customer education.

Aubert et al. (2005) distinguished four current streams of interest in customer education. One stream of research examines the role of education in the context of service operations, by trying to define the conditions under which customers participate actively in the production of services (Lovelock et al., 1996; Bitner et al., 1997; Bateson, 2002a,b). The second stream of interest offers a managerial

perspective to customer education. Empirical studies have been conducted which describe different cases of customer education implementation in companies (Meer, 1984).

The third stream of interest focuses on the organisational dimensions of customer education. It discusses the responsibility of customer education within companies and, for example, considers the roles of customer service departments (Armistead and Clark, 1992) or marketing or human resources departments (Aubert and Ray, 2005). The last stream of analysis is directed towards instructional methods of customer education. Recent evidence on the topic can be found in discussions relating to the role and the implementation of e-learning for customer education (Aldrich, 2000; Montandon and Zentriegen, 2003).

Even though various research perspectives have been highlighted, few studies on customer education are directly related to marketing theory (Meer, 1984; Hennig-Thurau et al., 2005). Indeed, hardly any research at all has attempted to define and explain how customer education influences customer behaviour. Many studies assert that customer education has several positive effects on customer satisfaction and consequently on company performance without providing clear empirical evidence of such effects.

Existing literature is nevertheless rich and helpful in giving impetus to further research. Most research on customer education is exploratory and qualitative. Such studies would help any researcher to apprehend the topic of customer education and to define his/her own line of research.

The emerging and steadily increasing interest in customer education in marketing theory, as well as the lack of knowledge on the concept and its outcomes, has guided the definition of the research questions.

OBJECTIVES AND RELEVANCE OF THE RESEARCH

This research aims to define the concept of customer education and to understand and measure the impact of customer education on customer satisfaction.

The decision to investigate customer satisfaction as the ultimate outcome of customer education has been purposefully taken. Satisfaction has been demonstrated to be a key indicator of future company performance. Many studies have established that customer satisfaction is an antecedent of customer loyalty and company profit (Fornell, 1992; Anderson and Sullivan, 1993; Jones and Sasser, 1995; Rust et al., 1995; Reicheld, 1996; Mittal and Anderson, 2000; Fornell et al., 2006). Thus, understanding the impact of customer education on customer satisfaction is a first step towards analysing the impact of customer education on company performance.

The choice of satisfaction is also justified by existing literature on customer education. Satisfaction is an evaluative judgment following a consumption experience (Oliver, 1981; Westbrook, 1987; Oliver, 1997). Most studies suggest that customer education keeps customers more satisfied with their product and that satisfaction with a product increases when the intensity of customer education increases (Shih and Venkatesh, 2004). Such a hypothesis should be verified and therefore encourages to further pursue this stream of research, which was initiated by peers.

This study aims to provide quantitative evidence of the impact of customer education on satisfaction. This study will therefore complete qualitative exploratory studies on the topic.

Given that this study focuses specifically on the field of marketing, the following research questions have been formulated:

DOES CUSTOMER EDUCATION INFLUENCE CUSTOMER SATISFACTION OF A PRODUCT? IF YES, THEN BY WHICH MECHANISMS AND UNDER WHICH CONDITIONS IS THIS INFLUENCE EXERTED?

These research questions lead to three core objectives: a conceptual analysis of customer education and its outcomes, the development of a scale to measure customer education and the analysis of the mechanisms of customer education – customer satisfaction relationships.

- **A conceptual analysis of customer education and its outcomes**

As already explained, very few research studies have actually been conducted on customer education. But, these academic or empirical studies were the first inputs to the reflection, which were then further commented and completed through relevant streams of literature.

The outcomes of the literature review are twofold. First, a definition of customer education has been proposed. Second, the different outcomes of customer education have been identified and defined. One outcome refers to the level of knowledge and skills customers possess as a result of customer education. Another outcome pertains to the different dimensions that characterize product usage. And lastly, the ultimate outcome is customer satisfaction.

The relationships between customer education and customer satisfaction were then discussed, specifically by trying to clarify the role of the level of customer knowledge and skills as well as the role of product usage in these relationships.

This leads to build a framework around the outcomes of customer education. In order to provide quantitative evidence of the effects of customer education, a scale to measure the concept of customer education had first to be developed.

- **The development of a scale to measure customer education**

A reliable and valid multi-item scale to measure the concept of customer education has been developed. To achieve this goal, the usual procedure known as the "*Churchill paradigm*" (Churchill, 1979) has been respected. The effort invested in this objective is proportionate to its importance for the research. Given the emerging interest in customer education, the development of a psychometric tool that measures

customer education is an important achievement that goes far beyond the realms of this research. For this reason, attention has been paid to develop a multi-item scale that was independent from the product category used in the field survey. It should give the marketing research community the opportunity to use this scale in other contexts in order to confirm that the scale is generally applicable.

- **The analysis of customer education mechanisms – customer satisfaction relationships**

After completing the development of a multi-item scale, an experimental procedure was launched. This procedure was intended to test a set of hypotheses built upon theoretical considerations on how to measure the mechanisms that explain if and how customer education has an impact on customer satisfaction. To achieve these goals, a structural model that depicts the effects of customer education was built.

Researchers aiming to define the relations between two concepts, usually try to establish the potential existence and role of mediators. As indicated, it has been deduced from the literature that the mediating role of product usage-related knowledge and skills, as well as the different dimensions of product usage, should be investigated.

The mechanisms that explain the role of customer education on customer satisfaction must also take into account the role of moderators. Customer education mainly aims to increase customer expertise with a particular product. Thus, this study mainly investigates the moderating role of product-category expertise.

DELIMITATION OF SCOPE

As explained initially, the research originally tries to understand and measure the effects of customer education. In order to provide accurate answers to the research question, the scope of the study was delimitated to post-purchase and usage-related customer education. A specific field of study was also arguably chosen.

- **Post-purchase and usage-related customer education**

Early definitions of customer education espoused a holistic orientation where education had a place in all phases of the decision-making process (Hennig-Thurau et al., 2005). It implied that customer education could influence both consumer decision-making and the actual usage of a product. But, nevertheless, as it will be demonstrated in the literature review, the core objective of customer education is to provide usage-related knowledge and skills.

Thus, the study focused on post-purchase and usage related education. This implied that a homogenous sample of consumers be interviewed in the field study: they had all purchased their product, had learnt how to use it and were current users of the product.

- **Specific fieldwork**

To clearly identify the existence and the nature of the mechanisms that explain the relationships between customer education and customer satisfaction, different exogenous variables were controlled.

One variable was related to the cultural context of the survey. Managerial evidence shows that customer education is more developed in certain countries compared to others. For instance, Aubert and Ray (2005) recall that customer education seems to be more developed in the USA than in France. Consequently, it has been decided to conduct the survey in only one country: France.

Product category is the second exogenous variable to control. Even though Honebein (1995) suggested that customer education could be useful in many markets, even for simple products, the nature of customer education and consumer interest for such initiatives may differ depending on the product category in question.
The literature review stresses the relevance of using consumer electronics for the purpose of case studies. Moreover, the number of features contained in these products makes their analysis all the more pertinent (Ram and Jung, 1990). The case of digital cameras was investigated. Such products match the theoretical requirement

of presenting multiple features. Furthermore, the development of this market seems to depend on the ability of companies to incite their customers to discover the various usages of their products (Niedercorn, 2005).

A third exogenous variable could be the brand. A given market can have many competitors with different brand equities and also different approaches to customer education. To control the effect of brand equity, one specific brand, Nikon, was investigated. One reason for choosing this brand is that Nikon invests huge efforts in educating its French customers. One illustration is the creation of the NIKONSCHOOL, a professional training centre for digital camera users.

ORGANISATION OF THE RESEARCH

Following the INTRODUCTION, the research is divided into two parts covering four chapters.

PART 1: LITERATURE REVIEW

As mentioned, customer education has been neglected in marketing literature. The conceptualization of both the concept and its outcomes should be provided. The objective of CHAPTER 1 is to provide an extensive literature review on CUSTOMER EDUCATION. This first chapter aims to define customer education and identify its outcomes. Then, CHAPTER 2 aims to elaborate on the OUTCOMES OF CUSTOMER EDUCATION (product usage-related knowledge and skills, product usage and customer satisfaction with the product) and situate them with respect to their theoretical foundations.

PART 2: RESEARCH HYPOTHESES, MEASURE AND RESULTS

The literature review was helpful to build the RESEARCH HYPOTHESES presented in CHAPTER 3. Most of the hypotheses are original but some were replicated from other studies and adapted to suit the specific context of customer education.

As the experimental approach is based on quantitative measurement, CHAPTER 4 MEASURE AND RESULTS presents both the measures carried out in the experimentation and the results identified.

Especially, the creation and validation of a multi-item scale that measures customer education is detailed. The scale is central to this work, because the rest of the project is conditioned by the reliability and validity of this scale. A lot of attention has also been paid to the choice and validation of the scales that measure the outcomes of customer education.

Then, the successive results of each hypothesis are presented. Structural equation modelling (SEM) is used to highlight the mechanisms through which customer education has an impact on different outcomes and finally on customer satisfaction.

Finally the CONCLUSIONS of the research are drawn. First, a synthesis of the key results of the research is presented. Then, the key contributions of the research are pinpointed from both the academic and managerial perspectives. The limitations of the research and the paths for future research are also presented. These perspectives should arouse the interest of scholars and practitioners alike, in a field which remains relatively new.

PART 1:

LITERATURE REVIEW

INTRODUCTION

This study deals with customer education as a strategy to increase customer performance and company performance. This chapter scans previous research on the topic. Even though an increasing number of companies include customer education as part of their marketing strategy, little academic research has been conducted to date. This chapter therefore aims to give a general overview of publications and research related to customer education and its outcomes.

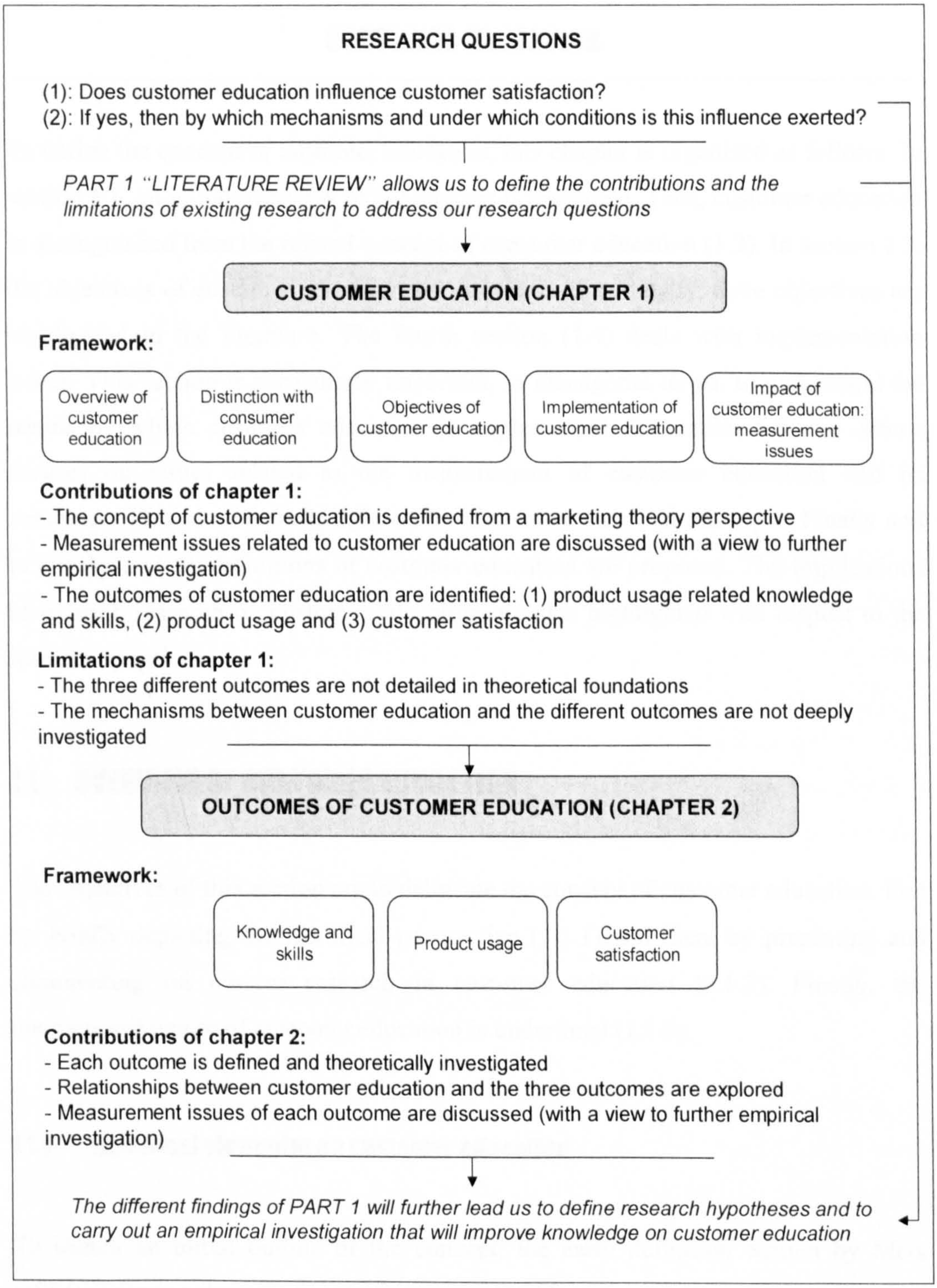
The literature review is organized in two chapters (see figure 1).

The first chapter aims to explore the concept of customer education, justify its theoretical foundations and identify the levers of performance impacted by customer education. Specifically, the different definitions of customer education found in the literature as well as its key objectives are discussed. This enables to propose a definition of customer education from a marketing theory perspective. It also allows to identify three distinct outcomes of customer education.

In the second chapter, these three potential outcomes are further explored, by defining the concepts of each and investigating their potential relationships with customer education.

The literature review will thus contribute to define the general framework of customer education and to show the limitations of existing research on the topic. It will justify the need for an empirical investigation that will be further presented in the second part of this work (chapters 3 and 4).

Figure 1: Organization of part 1 "*literature review*"



CHAPTER 1:
CUSTOMER EDUCATION

To define the concept of customer education, this chapter is organized as follows. In section 1.1, an initial overview of the concept is presented. Then, customer education is distinguished from the related concept of consumer education (1.2). In section 1.3, the objectives of customer education are discussed. Specifically, three objectives are highlighted in the literature. The fourth section (1.4) deals with implementation issues. This section is particularly important, in managerial terms, to understand the means by which customer education is implemented. In section 1.5, the debate focuses on issues related to the measurement of customer education and its outcomes. This section sheds light on the limited research on this topic. Finally and to conclude (1.6), definitions of customer education are proposed. The implications of existing research on customer education are also highlighted with respect to the research questions.

1.1 OVERVIEW OF CUSTOMER EDUCATION

The objectives of this section are to delineate the concept of customer education, first by briefly depicting the historical perspective (1.1.1) and then, by presenting and commenting on current research in customer education (1.1.2). Finally, the instructional nature of customer education is underlined (1.1.3).

1.1.1 Historical viewpoint on customer education

To sketch an initial outline of the concept, the early definition written by Meer (1984) is proposed. According to this author (1984: vii)

"The term customer education refers to any purposeful, sustained and organized learning activity that is designed to impart attitudes, knowledge or skills to customers or potential customers by a business or industry. It can range from self-

instructional material for a particular product to a formal course related to a product or service"

Interest for research in company-sponsored education appeared in the USA in the late seventies. McNeal (1978: 51) suggested that companies should consider education as a major competitive strategy:

"*Business, not the public school systems, should educate consumers about their products. In meeting their responsibility, they will receive many benefits – including bigger profits*"

McNeal (1978: 51) considered three potential outcomes for companies:

"*To obtain and keep satisfied customers*", "*to contribute to the favourable attitude formed among consumers toward a product or company, and to reduce confrontations with customers' advocates*".

The vision of McNeal was shared by many researchers who not only asserted that education would have a long-term impact on consumer behaviour, but that it would enhance consumer behaviour at every step of the decision-making process (Bloom, 1976; Bloom and Silver, 1976; Kaeter, 1994).

1.1.2 Existing literature on customer education

Even though there has been some apparent interest in customer education for more than 25 years, academics have paid little attention to the topic. Hennig-Thurau et al. (2005) observed that academic research was scarce. These authors supported the claim made by Meer (1984: 1) "v*irtually no research has been done on the topic, even though its existence appears to be widespread*".

Due to the lack of academic work on the topic, the concept of customer education is analyzed by using both conceptual and empirical studies relating to company-

sponsored education. In order to clarify existing literature, two tables have been structured.

The first table (table 1) is a detailed presentation of *conceptual* work related to customer education. The references of the research and the definitions proposed by the authors are presented. The key characteristics of the implementation of customer education are also highlighted. Specifically, the type of customers targeted (individuals / business customers) and the phase of the decision-making process concerned by customer education (pre-purchase or post-purchase) are described. Finally, the key findings of each study are unveiled.

The second table (table 2) summarizes information from *empirical* work related to customer education. The references of the study are presented which include some information on the market sector and the objectives of customer education initiatives. Then, details are given on the implementation of these programs: targets, tools and evaluation methods. Finally, the key findings of these empirical studies are unveiled.

The research studies and surveys presented in tables 1 and 2 will be used throughout this chapter to define and discuss the concept of customer education. Indeed, despite the exploratory nature of most of these works, researchers share many ideas about the nature of customer education, the implementation issues and the outcomes of such initiatives.

In order to consolidate the literature review, core topics of marketing literature, such as consumer behaviour or services marketing, have been investigated. Indeed, while this literature does not formally define or discuss the concept of customer education, the importance of educating customers is often underlined therein (see for example Zeithaml and Bitner, 2003: 463).

The literature review is also enhanced by the analysis of research in instructional design, especially in terms of the instructional nature of customer education as well as the main instructional methods.

1.1.3 Customer education: an instructional activity

A key finding that emerges from the different definitions summarized in tables 1 and 2, is that most authors agree to position customer education as an instructional activity. The authors refer to instruction (Noel et al., 1990; Filipzack, 1991; Honebein, 1997; Roush, 1999) when they explain the objectives and implementation of customer education. Meer (1984) and Honebein (1997) suggest that customer education, just like employee education, is built upon instructional design, "*a system of procedure for developing education and training in a reliable fashion*" (Reiser and Dempsey, 2002: 17).

When describing and defining instructional design, authors always seem to present (Reiser and Dempsey 2002) the same core components: **A**nalysis of learners' needs, **D**esign, **D**evelopment and **I**mplementation of instruction; and finally **E**valuation. The so-called **ADDIE** model is interesting because it sheds light on three aspects that should be covered to define the concept of customer education: objectives, implementation issues and outcomes of education.

Consequently, to explore the concept of customer education, each of these points will be developed in further sections of this literature review (section 1.3 to section 1.5). But, before addressing these topics, the terminology will be first clarified: customer education will be distinguished from consumer education (section 1.2).

Table 1: Review of conceptual studies on customer education

References	Definition of customer education	Customer targeted	Phase	Key Findings
Meer (1984) conducts an exploratory study and presents six case studies on large companies in various sectors.	Customer education refers to any purposeful, sustained, and organized learning activity that is designed to impart attitudes, knowledge, or skills to customer or potential customers by a business or industry. The educational activity is directly related to promoting sales or to assisting the customer in the use of the product or service (p. vii).	Business professionals	Mainly Pre-purchase but some cases of post-purchase educational activities	**Outcomes of customer education for customers** • Customers are more aware of products and services (p122) • Customers make better purchase decisions (p 122) • Customers are more satisfied with their product (p 122) **Outcomes of customer education for companies** • Positive impact on sales (p. 122) and customer satisfaction (p. 122-123) **Contribution to the understanding of customer education** • Customer Education is usually a separately organized unit within the company and tends to have low visibility (p. 124)
Noel, Ulrich, and Mercer (1990) discuss customer anticipation – i.e. predicting customer needs – and explain the worth of customer education to better anticipate these needs. They present four case studies involving General Electric.	Customer education is the active involvement of customers in all aspects of training efforts (p 411). Customer education takes the shape of academic and practical courses (p 415, p 417).	Business professionals	Pre-purchase and post-purchase	**Outcomes for customers** • Customers better understand the business environment of their suppliers and express greater commitment to their supplier **Outcomes for companies** • Customer education enhances the quality of relationships a company has with its customers **Contribution to the understanding of customer education** • Customer Education is mainly assimilated to formal training programs
Honebein (1997) conceptualizes customer education and analyses the case of six companies to illustrate his theoretical development.	Customer Education is the process by which companies systematically share their knowledge and skills with external customers to foster the development of positive attitudes (p. 8).	Individuals and Business professionals	Pre-purchase and post-purchase	**Outcomes for customers** • Impact on customer performance at every stage of the decision making process (p. 25) • Better ability to use a product (p. 21) **Outcomes for companies** • Positive relation to customer satisfaction and loyalty (p. 19-21) **Contribution to the understanding of customer education** • Definition of the instructional design process adapted to customer education (p. 82-91) • Integration of customer education to marketing policies (p. 138-155)

References	Definition of customer education	Customer targeted	Phase	Key Findings
Hennig-Thurau (2000) builds a structural model which describes the relationships between customer skills and relationship quality. He validates his hypotheses with a quantitative survey carried out on a sample of 293 consumers of electronic goods (video recorders and cameras).	The author does not formally use the term "customer education" but "communication of customer skills" that he defines as "the communication of all knowledge and skills relevant to any aspects of the post-purchase interaction between the customer and the product, e.g. the ability to use the full range of product features" (p. 57).	Individuals	Post-purchase (with a focus on product usage)	**Outcomes for customers** • Better perception of the product's quality • More trust in the product and the brand • Stronger commitment to the brand **Outcomes for companies** • Positive impact of the communication of customer skills on the quality of "supplier-customer" relationships **Contribution to the understanding of customer education** • Definition of the customer skills construct • Description of the different product usage situations • Definition of the "skills mix" e.g. different skills communication tools
Aubert and Humbert (2001) define the role of customer education in e-services. They take the example of financial e-services and conduct an exploratory survey on 10 online brokers to depict the state of the art in this sector.	A peripheral service dedicated to help customers of online services to better understand the process (how to use the service) and the content (what is the service). In their case studies, the process is the way the website can be used by customers to issue stock exchange orders. The content deals with basic knowledge and skills about finance and investment techniques.	Individuals	Pre-purchase and post-purchase (with a focus on service usage)	**Outcomes for customers** • Acquisition of knowledge and skills related to financial matters • Acquisition of skills related to proper usage of the online service **Outcomes for companies** • Positive impact on customer acquisition, satisfaction and retention **Contribution to the understanding of customer education** • Specific role of customer education in e-commerce and e-services • Use of e-learning : description of the instructional method, its worth and the limits • Difficulties of companies in measuring the financial return on investment of customer education programs
Dankens and Anderson (2001) define the roles of customer education and explain its interest at different stages of the customer decision-making process.	Skill-based education related to purchased goods or services to directly increase their levels of satisfaction. Well trained customers are more knowledgeable about products and more likely to use them efficiently (p. 3).	Individuals and Business professionals	Pre- and post purchase	**Outcomes for customers** • Positive impact on buying decision • Positive impact of customer education on product usage **Outcomes for companies** • Increased sales • Increased customer satisfaction **Contribution to the understanding of customer education** • Added value of e-learning as an instructional method for customer education. This method is described as more engaging and more flexible than other instructional approaches.

References	Definition of customer education	Customer targeted	Phase	Key Findings
Duymedjan and Aubert (2003), in a conceptual paper, propose a definition of customer education. They recommend firms not to limit customer education to product training, but to extend it to encompass all aspects of the customer experience lifecycle.	A set of pedagogical actions devoted to helping potential or current customers to acquire the knowledge and skills necessary at every stage of the experience lifecycle: 1- Awareness of the identity of the company and the value of products and services, 2- Needs analysis and buying 3- Ordering 4- Delivering and installing 5- Usage of products and services 6- Troubleshooting 7- Upgrading of products and services	Individuals and Business professionals	Pre- and Post-purchase	**Outcomes for customers** • Knowledge and skill acquisition at every stage of the lifecycle • The authors recognize that product usage is the true core application of customer education **Outcomes for companies** • Positive impact on customer acquisition, satisfaction and retention **Contribution to the understanding of customer education** • Pedagogy as a market positioning for companies • Education can help the transition towards a pedagogical relationship as opposed to a purely commercial one
Hennig-Thurau, Honebein and Aubert (2005) write a conceptual paper and propose a structural model that illustrates the outcomes of customer education.	Customer education is defined as the use of instructional tools to enhance those customer skills that enable the consumer to make use of the value embedded in the product by the producer once the product has been bought. Customer education takes the form of communicative activities that help the customer to unlock the value embedded in a product.	Individuals	Post-purchase, with a focus on product usage	**Outcomes for customers** • Skill and knowledge acquisition that help the customer to fully unlock the value of the product that s/he has bought **Outcomes for companies** • Impact of customer education on satisfaction and loyalty **Contribution to the understanding of customer education** • Structural model that describes the potential relationships between customer education, satisfaction and loyalty • Description of a joint value creation framework that explains the role of companies and customers in value creation

References	Definition of customer education	Customer targeted	Phase	Key Findings
Aubert and Ray (2005) define the concept of customer education and explain the conditions for the successful development of customer education in companies. Especially, they stress the need for close cooperation between the Marketing department and the Human Resources Department.	Customer education is presented as pedagogical activities; most of them are training activities. It implies that companies develop their program according to an instructional design process. First, they must define the training needs, then design, develop, implement and evaluate training or education actions.	Individuals	Pre and post purchase, with a focus on product or service usage.	**Outcomes for customers** • Skill and knowledge acquisition on product usage • More intense product usage **Outcomes for companies** • Increased customer satisfaction and loyalty • Shift of perspective from a commercially-oriented strategy to a pedagogically-oriented strategy. **Contribution to the understanding of customer education** • Different steps of the instructional design process to be respected in customer education programs development
Honebein and Cammarano (2005) discuss the concept of customer expertise and the role of customer education in developing such expertise.	Customer education reflects the process companies use to build the skills of customers over time (p. 176).	Individuals	Pre and post purchase, with a focus on post-purchase stage (p. 176).	**Outcomes for customers** • Increased customer expertise • Increased customer satisfaction and repeat purchase **Outcomes for companies** • Stimulate trial and adoption of goods and services • Establish barriers to diminish switching • Reduce the costs of support and service **Contribution to the understanding of customer education** • Impact of customer education on customer expertise • Distinction between customer education and consumer education

Table 2: Review of empirical studies on customer education

References	Market sectors	Context and objectives of customer education	Description of customer education actions			Key Findings
			Target	Method and tools	Evaluation	
Finegan (1990) describes the case of an American SME which has implemented a customer education strategy.	Retailing (archery business)	<u>pre-purchase</u>: To develop its business, a wholesaler needs to improve the business practices of its retailers. *"get smarter customers"* (p112)	Business professionals (retailers)	A one week face to face seminar. This seminar is proposed once a year. 600 retailers trained between 1986 and 1990	Satisfaction measurement. Observation of retailers (behaviour during and after the seminar) *- No statistical data provided in the paper -*	• Increase of annual sales (from 540.000 USD to 3,8 millions USD in 4 years) • Indirect effects: recruitment of new retailers, increased brand awareness
Graham (1990) takes three examples in different sectors to exhort companies to develop customer education.	- Telecom (example 1) - Public relations (2) - Stock broking (3)	<u>Pre purchase</u>: - To offer access to a company's expertise and knowledge - To help customers run their businesses better	Business professionals and Individuals	- Series of articles for business applications (telecom) - Newsletters that provide assistance to customers (public relations) - Ad campaign oriented toward educational matters (stock broking)	*- No information provided on the evaluation method-*	• Increased awareness • Increased brand credibility and confidence • Better understanding of suppliers' jobs and know-how • Increased sales

References	Market sectors	Context and objectives of customer education	Description of customer education actions			Key Findings
Filipzack (1991) presents evidence from the industrial sector to explain the role of customer education and its impact on customer behaviour.	- Computer industry - Electronics industry	<u>Pre-purchase:</u> - shaping customer expectation <u>Post-purchase</u>: - To support users - To give them necessary skills to use the product - to avoid product returns *" One third of all customer complaints are caused by customers who do not know how to use a product*" (p31)	Business professionals and Individuals	- Ad campaign with educational content - Phone hotlines - User manuals - Training sessions	Customer satisfaction measurement Analysis of buying behaviour *- No statistical data provided in the paper -*	• Increased customer ability to use a product or service • Increased customer satisfaction and loyalty • Fewer complaints • Fewer product returns
Bell and Scobie (1992) explain the contribution of customer education to new technologies adoption. They present the case of the introduction of an ATM in a Scottish bank. They conduct a survey of 205 users and 203 non users of the ATM.	Banking services	<u>Pre-and post purchase:</u> - To help customers to adopt a new service and a new technology - To help customers use the new service *"To encourage the technologically naïve customer to use new technical bank services*"	Individuals	- promotional material: external printed advertising, leaflets, posters and hand-written sign on the terminal - support material: interactive video terminal - To introduce some basic training in the use of technical services to new customers who open a bank account	Authors formulate propositions: - To measure user performance - To measure actual usage of new technical bank services *- No statistical data provided in the paper -*	• Increased customer ability to use the service • Relieves reticence to adopt new technology

References	Market sectors	Context and objectives of customer education	Description of customer education actions			Key Findings
Roush (1999) explains how Home Depot – one of the major DIY distributors in the USA – has developed its customer education activity.	DIY sector	<u>Pre-purchase</u> - To help customers acquire basic skills in different DIY activities (p 101) - To have knowledgeable customers (P 104) "*Home Depot teaches and directs customers to the right products for their projects and make sure they have the right tools*" (p 101) <u>Post-purchase</u> - To make people come back to DIY shops (p 102)	Individuals	- Classes: wallpapering, painting, etc. (p 101) - Workshop for specific targets, such as kids (p 102, p 111-113) - Tutoring from Home Depot experts (p 101, 105) - TV program (p 102, 108) - Book (p 102, p 106-107) - Magazine (p102)	- *No information provided on the evaluation method-*	• Better self-confidence of customers to tackle DIY projects (p 101) • Increased sales (p115) • Brand awareness and image (p115) • Indirect result: "*There has been a far reaching societal by-product as a result. Home Depot has been at the forefront of a shift in how consumers care for their home*" (p 101)
Aldrich (2000) explains the role of e-learning in customer education.	- Software industry - Electronic goods - Self-services Websites	<u>Pre and post-purchase</u> - To help customers adopt complex products "*Smarter customers are more loyal customers*" (p 35)	Business professionals and Individuals	Online methods: - virtual seminars or classrooms - simulation - online course	- *No information provided on the evaluation method-*	• Positive impact of education/training on sales and usage, especially for complex products • The advantage of e-learning as a new educational tool. Positive impact on training costs, flexibility and number of customers reached
Goodman, Ward and Broetzmann (2001) empirically demonstrate the payoff of customer education. They report the results of two quantitative surveys (one on 2149 respondents, the other on a basis of 4000 customers).	- Floors - Car-renting service	<u>Pre and post-purchase</u> - a proactive approach to develop customer competences - to avoid product misuse - To respond to customer-based problems	Business professionals and Individuals	Brochures Consumer guides	For each case: quantitative experimentation with one control group	• Significantly lower level of product misuse (floors) • Significantly higher satisfaction, lower number of complaints from educated customers • Significantly higher intentions to buy (floors) or rent (cars) again

References	Market sectors	Context and objectives of customer education	Description of customer education actions			Key Findings
Aubert (2002) explains the interest of customer education in the field of e-commerce and e-services. He reports evidence from many examples.	- e-commerce: online booksellers, - e-services: financial brokers,	<u>Pre-purchase</u> - to incite consumers to buy <u>Post-purchase</u> - to support users of complex products or services - to generate supplementary revenues for companies (by selling education sessions)	Individuals	Online methods - virtual seminars - self-paced online courses	- 'Stickiness' on the website (number of visits to the site, length of navigation, etc.) - transfer rate of visitors into actual customers of the web seller	• The number of pages visited has more than doubled on websites which offer customer education activities • 50% of participants of a training session become loyal to the site and 11% buy a product or a service (only 5% of non participants buy a product or a service).
Montandon and Zentriegen (2003) present two main applications of customer education: educommerce and product training. They simultaneously explain the specificities of e-learning for customer education. They briefly report the results of three case studies.	- Computer industry - Financial services - Staffing and employment service - Health care	<u>Pre-purchase</u> Education as a marketing tool: the goal is to win customers and to boost sales <u>Post-purchase</u> - Education to familiarize customers with products faster - Education as a lever to increase customer loyalty	Business professionals and Individuals	Authors describe mainly what they call "Customer-focused e-learning". They list many methods based on internet-mediated education: - product simulation - learning communities - user support - detailed knowledge content - etc.	- *No information provided on the evaluation method-*	• Authors give evidence of the widespread development of e-learning based customer education • Seven of the ten biggest US medicinal drug providers offer such programs • Eight of the ten largest suppliers of medical devices also use these solutions • Most hardware suppliers offer courses to their customers (on computer knowledge for example) • Publishing houses and booksellers are steadily developing such offers

1.2 DISTINCTION BETWEEN CUSTOMER EDUCATION AND CONSUMER EDUCATION

Both business professionals and individual consumers are targeted by customer education programs. Indeed, individual consumers can also largely benefit from consumer education programs. However, consumer education and customer education can not be considered as equivalent. Consumer education has been defined (Bloom, 1976) as:

"*The process by which people learn the workings of the marketplace so that they can improve their ability to act as purchasers or consumers of those products and services they deem most likely to enhance their well being*".

Table 3 presents different studies which propose relatively similar visions of consumer education. As explained earlier, one early definition of customer education was proposed by Meer (1984: vii) as:

"*Any purposeful, sustained and organized learning activity that is designed to impart attitudes, knowledge or skills to customers or potential customers by a business or industry*"

In the paragraphs that follow, the two concepts are distinguished by commenting on the respective definitions outlined above.

1.2.1 Consumer education

These programs are generally implemented by public organizations such as schools or consumer associations (Bloom, 1976; Royer, 1980; Oumlil and Williams, 2000). Their main objective is to help people acquire consumption-related knowledge (Bloom and Silver, 1976; Fast et al., 1989; Engel et al., 1990). These programs target citizens. Specific attention is drawn to some segments such as elderly or young people. When such programs target children, the objective is to ensure their

socialization, "*the process by which young people acquire skills, knowledge and attitudes relevant to their functioning as consumers in marketplace*" (Ward, 1974).

The expected outcome of such consumer education programs is thus consumer protection (Staelin, 1978; Oumlil and Williams, 2000).

Table 3: Studies on consumer education

Authors	Definition of consumer education	Sponsor	Beneficiaries	Objectives
Bloom (1976)	Process by which people learn the workings of the marketplace so that they can improve their ability to act as purchasers or consumers of those products and services.	Public and private organizations	Consumers (young and adults)	Well-being of consumers
Bloom and Sylver (1976)	It "*aims to teach people how to seek out, use, and evaluate consumer information so that they can improve their ability to purchase or consume the products and services they deem most likely to enhance their well-being*" (p33).	- Non-profit organizations (from national to local levels) - Profit organizations (private programs)	Consumers	Changes in consumer behaviour (consumers are more willing to express their needs, seek out more information, become less likely to purchase potentially harmful products).
Staelin (1978)	Education programs that focus on how to maximize current and future family consumption.	Governments (educational institutions)	Young students	Improving consumer product safety behaviour
Royer (1980)	Educational efforts that prepare young or adult consumers to make decisions	Governments (educational institutions and adult education)	Children Adults	Improving consumers' ability to make decisions
Fast et al. (1989)	Educational efforts that can improve consumer and market place efficiency. The authors present six levels of consumer education: 1/ formal courses 2/ workshops, seminars or short courses 3/ printed material related to general buying strategy 4/ printed material related to a buying strategy that is specific to a product category 5/ consumer information and action columns in the popular press 6/ consumer periodicals	Public organizations	Children Adults	Improving consumers' acquisition and use skills
Engel et al. (1990)	Educational efforts that help the customer to buy "*wisely*" (p.5).	Public organizations	Consumers	Improving consumers' analysis of market offers
Oumlil and Williams (2000)	Consumer education provides consumers with the necessary equipment to take full and complete advantage of the fruits of our economic system.	Governments	Mature / elderly consumers	Satisfaction and well-being of consumers

1.2.2 Customer education

These educational activities are sponsored by companies (Meer, 1984; Noel et al., 1990; Honebein, 1997). The targets of these programs are potential or current customers of the company (Meer, 1984, Hennig-Thurau, 2000). The main objective is to support customers in their product usage (Meer, 1984; Honebein, 1997; Roush, 1999). Two broad categories of targets are concerned by customer education: business professionals and individual consumers.

Honebein (1997: 5) considers customer education as outsourced employee training: "*business customers can reduce the workload of their training department if the vendors [...] take the responsibility for employee teaching*". The expected outcomes of customer education are increased customer satisfaction and loyalty (Meer, 1984; Honebein, 1997; Dankens and Anderson, 2001).

Finally, Honebein and Cammarano (2005: 176) propose to distinguish customer education from consumer education as follows:

"*Third-party organizations [...] offer consumer education –content that teaches people how to be better consumers. When a company invests in improving customer expertise in relation to the goods and services the company markets, the methods employed by a company fall under the label of customer education*"

These studies, as well as those on customer education (tables 1 and 2) enable to distinguish customer education from consumer education. Four dimensions seem relevant (Honebein, 1997; Honebein and Cammarano, 2005): sponsors, beneficiaries of the educational program, objectives and outcomes.

Table 4 presents the key differences between the two concepts.

Table 4: Distinctions between consumer education and customer education

	Consumer education	Customer education
Sponsors	Policy makers (governments, public organizations, schools, etc.)	Companies
Beneficiaries / targets	Citizens. some segments such as young people or elderly people are particularly sensitive to customer education	Potential or actual customers of a company. These customers can be individuals or business professionals
Objectives	To help consumers acquire consumption-related knowledge	Supporting the customer in the use of a product
Outcomes	Customer protection	Customer satisfaction, loyalty

These distinctions are important for the rest of the study. Consumer education goes beyond the current the scope of research. Company-sponsored educational initiatives designed to help customers in their product usage is actually the central topic of this research.

This latter point is particularly detailed in the next section which is devoted to the objectives of customer education.

1.3 OBJECTIVES OF CUSTOMER EDUCATION

In this section the objectives of customer education shall be discussed. Three cross-related objectives emerged from the literature on customer education (section 1.3.1). The understanding of each objective are hence discussed and deepened in the sections that follow (section 1.3.2 to section 1.3.4).

1.3.1 Three objectives of customer education

Researchers in marketing reminded us of the importance of product usage and consumption, both as an important research topic and as a key business issue for companies. Best (2005) states that the inability to use a product can prevent a market from expanding to its full potential. Vargo and Lusch (2004a, 2004b) suggest that customers appreciate the value of products mainly by using them. Fornell and Wernerfelt (1987) also reminded us that most buyer complaints are related to customer experience problems while using the product. Rust et al. (2006) illustrate this aspect. They reported that 9% of consumers returned a home networking product they bought. 85% of these returns "*were simply because people couldn't get the equipment to work*" (Rust et al., 2006: 104).

These reasons justify the advantages of educating customers in product usage. Best (2005) explains that specialized education can be necessary to use some products. Similarly, Vargo and Lusch (2004a: 11) state that companies must provide customers with the necessary skills to use a product: "*customers must learn to use, maintain, repair and adapt the appliance to his or her unique needs, usage situations and behaviours*". Shih and Venkatesh (2004) note that usage behaviours are conditioned by use knowledge and use-based learning. To Wikström (1996a, 1996b), it implies that companies must support their customers at the consumption stage.

Research and surveys (tables 1 and 2) show that the role of customer education is consistent with these concerns. Meer (1984), Honebein (1997) and Hennig-Thurau (2000) stress that a primary objective of customer education is to develop customer

product-usage related skills. By learning about a product, customers can perform their consumption-related tasks better and appropriately unlock the product's value potential. For instance, the empirical survey conducted by Goodman et al. (2001) revealed the positive effects of education on the customers' ability to use and maintain floors. It also revealed that the satisfaction of the customer increases when their ability to use a product increases.

It can be deduced from previous developments that the objectives of customer education seem threefold. One objective is to provide customers with product usage related knowledge and skills. The other objective is to influence product usage. Finally, the last objective is to keep customer satisfied and loyal with their product.

The literature related to each objective is presented in the following sections.

1.3.2 Providing product usage related knowledge and skills to customers

For specialists of educational research, knowledge and skills are the outcomes of the customer learning process (Gagné and Medsker, 1996). Driscoll (2000: 11) proposed a synthesis of the many definitions of learning. According to this author, most psychological theories define learning as a "*persisting change in human performance or performance potential*". From a marketing perspective, Schiffman and Kanuk (1994: 201) define consumer learning as "*the process by which individuals acquire the purchase and consumption knowledge and experience they apply to future related behaviour*". Consumer learning is a crucial topic in marketing. Engel et al. (1990: 396) explain that an understanding of learning is an essential prerequisite to any attempt to influence consumer behaviour. To Schiffman (1994: 201), marketers consider how individuals learn because they must teach their customers about product attributes, product benefits, buying conditions and product usage.

Marketing researchers and practitioners generally agree that promotion is the most widely used means to influence purchase behaviour. Through promotion, companies spread information and knowledge about their products (Masterson and Pickton, 2004). The mix of communication vehicles is commonly labelled "*Integrated*

Marketing Communication" (Belch and Belch, 1998; Kotler, 2003; Masterson and Pickton, 2004). The principal tools are advertising, personal selling, sales promotion and public relations.

If the main objective of Integrated Marketing Communication is to influence purchase behaviour, customer education has the specific role of providing usage-related knowledge and skills to customers.

This objective is depicted under various forms in the studies on customer education (see tables 1 and 2). In most of the case studies she presents, Meer (1984) reminds us that the main objective of customer education is to teach the skills needed to use and maintain the products. Aubert and Humbert (2001) stated that the main objective of education is to provide customers with the knowledge and skills necessary to consume a product or service. To Dankens and Anderson (2001), educated customers are more knowledgeable about products and are therefore more likely to use them efficiently. Goodman et al. (2001) demonstrated that customer education develops customer competences that circumvent the misuse of products. Hennig-Thurau et al. (2005) suggest that education provides skills that enable customers to make use of the value embedded in the product.

Despite very few insights into the topic, existing literature in the field of marketing, especially services marketing and the diffusion of innovation, confirm the important role of customer education to develop product-usage related knowledge and skills.

- **Services marketing literature**

In the field of services marketing research, the production and consumption of services are considered to be closely related (Eiglier and Langeard, 1975). Customers are active players in the production of services and have been assimilated to partial employees (Bowen, 1986; Mills and Morris, 1986).

Service quality depends on the ability and willingness of the customer to participate in the service process (Goodwin, 1988; Kelley et al., 1990; Lovelock et al., 1996; Bitner et al., 1997; Bateson 2002a, 2002b; Zeithaml and Bitner, 2003). So, one of the

main issues for marketers is to provide customers with the skills they need to perform their tasks properly (Bitner et al., 1997; Bateson, 2002a, 2002b; Zeithaml and Bitner, 2003). Zeithaml and Bitner (2003) present several approaches to customer education; each of them has an impact on service consumption-related knowledge and skills. A first approach is to prepare customers for the service process and to give them the necessary skills to experience it. The second approach consists in providing customers with necessary knowledge and skills to evaluate the service quality. A third approach is dedicated to avoiding the customers' eventual disappointment. In this case, the objective of customer education is to clarify promises on the service's outcomes. Finally, Zeithaml and Bitner (2003) suggest that customers should be taught the conditions under which a service can best be consumed.

- **The diffusion of innovation literature**

One important path of research in marketing deals with the diffusion of innovation. This particular stream of research is very broad. Therefore the ambition is not to give a comprehensive literature review on the topic. However, some findings in this literature have suggested the importance of customer education and must be highlighted.

Traditionally, research on innovations diffusion and new products focused on the adoption-diffusion perspective (Rogers, 1976). This perspective mainly examines how an innovation reaches a critical mass of adopters, how attributes of an innovation affect its rate of adoption, and how the innovation decision process actually takes place (Rogers, 2003; Shih and Venkatesh, 2004). More recently, Shih and Venkatesh (2004) suggested that the use-diffusion perspective should be examined further. The use-diffusion perspective focuses on patterns of product usage as well as their determinants and outcomes. According to the authors, the structural differences between the adoption-diffusion perspective and the use-diffusion perspective are the typology of the population (categories of adopters vs. categories of users) and the relevant criteria (timing-rate of adoption vs. rate and variety of use).

With respect to the research topic, the adoption-diffusion and use-diffusion perspectives implicitly underline the importance of consumer product-related knowledge and skills.

Customer education in the adoption diffusion perspective

In research on adoption-diffusion, different models of the innovation-decision process have been designed (see Antil, 1988: 6 for a review of these models). The objective of these models is to describe the process and the different stages of the adoption of innovations. Rogers (2003: 169) acknowledged that the different models came to a "*somewhat similar set of stages*": (1) Knowledge (2) Persuasion (3) Decision (4) Implementation and (5) Confirmation.

Product usage related knowledge and skills seem crucial at stage 1 "*knowledge*" and stage 4 "*implementation*". Stage 1 "*Knowledge*" occurs when an individual is exposed to an innovation's existence and acquires a certain understanding of how it functions. At this stage, consumers gain *awareness knowledge* (information that an innovation exists), *how-to knowledge* (information necessary to use an innovation properly) and *principles knowledge* (information dealing with the functioning principles underlying how an innovation works). Stage 4 "*implementation*" occurs when consumers put an innovation to use. Consumers need to know how to use the innovation, what types of problems may occur and how to solve these problems.

One problem which may arise in innovation diffusion is consumer resistance. Ram and Sheth (1989) considered that two types of barriers exist: functional barriers and psychological barriers. Functional barriers encompass the usage barrier, the value barrier and the risk barrier, while psychological barriers refer to the tradition barrier and the image barrier. Ram and Sheth (1989) proposed that customer education can help customers overcome these barriers, notably the tradition barrier (cultural change created for the customer by an innovation).

Literature on adoption-diffusion has also established that the characteristics of innovations, as perceived by consumers, can explain their adoption. The key attributes highlighted by literature (Rogers, 1995; Rogers, 2003; Shih and Venkatesh,

2004) concern (1) the relative advantage of an innovation (2) the compatibility with existing values or experiences (3) the complexity of understanding and using the innovation (4) the triability, i.e. the degree to which an innovation can be experimented on a limited basis and (5) the observability, i.e. the degree to which the results of an innovation are visible to others. These attributes, especially complexity and triability, are implicitly related to customer education.

Customer education can help customers to better understand / use a product. Customer education can also allow customers to experience the product. For instance, Parthasarathy and Bhattacherjee (1998: 366) recalled the importance of providing skills to customers. They observed that:

"*Early adopters by virtue of their superior technological skills and ability to mobilize effort and resources to learn the innovation, are able to utilize it better than later adopters [...] In contrast, later adopters may lack the technological and cognitive skills and access to resources required for complete service utilization*"

Customer education in the use-diffusion perspective

In their research on use-diffusion, Shih and Venkatesh (2004: 59) quote Robertson and Gatignon (1986: 3) who asserted that "*[t]he speed of diffusion of technological innovation depends on the consumer's ability to develop new knowledge and new patterns of experience*". Shih and Venkastesh (2004) empirically demonstrated that consumers who exhibit intense product usage were more receptive to and satisfied with technology. Thus, they concluded that companies should provide their customers with new usage scenarios and use-based learning activities. This proposition illustrates the need for customer education.

1.3.3 Influencing usage behaviour

Through customer education, customers increase their level of knowledge and skills. Hopefully, it leads to an evolution in consumer behaviour. When examining the behavioural outcomes of customer education, Honebein (1997: 24) argues that the

ambition is to improve customer performance, i.e. "*customer ability to act in a way* [companies] or [customers] *desire*". This assertion reveals at least two functions of customer education. One function is to ensure compliant behaviour, i.e. "*the act of using a product as it is intended to be used*" (Bowman et al., 2004). The other function of customer education is to help customers fully unlock the value embedded in the product.

- **Ensuring compliant behaviour**

Tragic figures presented in the research carried out by Bowman et al. (2004: 324) help to understand the importance of consumer compliant behaviour:

"*In the United States alone, noncompliant behaviour in pharmaceuticals has been estimated to cause 125.000 deaths and more than $ 100 billion in increased health care expenses and productivity losses each year*"

If, fortunately, the consequences are not always so serious, compliance with a product's intended use is a real concern for marketers. As suggested by Bowman et al. (2004) and Wosinska (2005), non compliance can lower a product's perceived performance, decrease consumer satisfaction and retention. The literature on services marketing also stresses the importance of compliance. Service quality depends on the quality of consumer involvement in the product process (Bateson, 2002b). So, customer participation in service delivery must happen in a compliant way (Bitner et al., 1997; Dellande et al., 2004).

Various studies in marketing literature are inclined to show that customer education is crucial to ensure compliant behaviour. For example, in the field of services, Bitner et al. (1997) empirically demonstrated that extensive education of customers led to better compliance behaviour and then to a greater level of satisfaction. Cox et al. (1997) conducted a meta-analysis on the effects of product warnings and demonstrated their positive impact on compliance. In the context of services, Dellande et al. (2004) built a structural model and showed that education leads to compliance through better levels of clarity in customer roles.

Research on customer education (see table 1 and 2) also stresses the role of education in inciting compliant behaviour. To Honebein (1997), educating customers to use products safely is a primary function of customer education. Filipzack (1991) reminds us that one third of all customer complaints are caused by customers who do not know how to use the product. Consequently, Bell and Scobie (1992), Roush (1999), Aubert and Humbert (2001), Goodman et al. (2001) suggest that education allows customers to acquire the minimum threshold of skills necessary to use products.

To conclude, one challenge addressed by education is to provide customers with knowledge and skills which ensure compliant usage behaviour. This objective is somewhat minimized by customer education literature. The second objective can be considered as the optimal one: helping consumers to unlock the value embedded in the product.

- **Unlocking product value**

Vargo and Lusch (2004a) argue that it is the customer who determines the value of a product by using it. The same authors (Vargo and Lusch, 2004b) remind us that value is created upon consumption, not in the factory. Gummesson (1998) states that value creation is only possible when a good is consumed. One issue for marketers is therefore to make consumers discern a product's value (Best 2005; Hennig-Thurau et al., 2005) by inciting them to use it extensively.

With regard to the objectives of customer education, one can perhaps wonder which products/services actually need customer education. Honebein (1995: 4) puts forward a simple answer: "*When in doubt, always educate. Never assume the intelligence of your customers*". Other authors are more moderate. Fodness et al. (1993), suggest that complex behaviours require specialized learning, while simple behaviours belong to the repertory of many individuals. Best (2005) reminds us that only specialized products, such as computer software, require education.

Evidence from literature (see tables 1 and 2) shows that in most cases, customer education deals with technical topics such as medical diagnosis devices (Meer,

1984), brokerage (Honebein, 1997; Aubert and Humbert, 2001), or DIY products (Roush, 1999; Aubert and Ray, 2005; Honebein and Cammarano, 2005).

These examples refer to complex products or services. According to Rogers (2003), complexity denotes the customers' difficulty to understand and use products. Honebein and Cammarano (2005: 181) specified that product complexity "*reflects the degree of difficulty inherent in a good or service*". Similarly, Mukherjee and Hoyer (2001) suggest that complexity leads to high learning costs for consumers, i.e. comprehension difficulty. Burton (2002) suggests that education is necessary for novel, complex and knowledge-intense products, while basic information is sufficient for easy-to-understand products. But, to Mittal and Sawhney (2001), complexity is difficult to characterize: complexity is relative and depends on consumer expertise, market maturity and personal goals of product usage.

Ram and Jung (1990, 1991), Shih and Venkatesh (2004) and Thompson et al. (2005) put forward the perspective that products with multiple features such as consumer electronics (i.e. cameras, digital audio players, etc.) require customer education. When products offer multiple features or functions, customers can combine these features to use the product more intensively (Ram and Jung, 1990; Shih and Venkatesh, 2004). Most research experiments were carried out with consumer electronics goods or computers (Ram and Jung, 1989, 1991; Shih and Venkatesh, 2004). Results show that intense use leads to a higher degree of product satisfaction. One limitation however has been stressed by Thompson et al. (2005). These researchers have empirically demonstrated that adding features to products has a negative effect on the consumer's beliefs about the difficulty of learning and using these products.

As a consequence, one important challenge for customer education is to incite customers to discover and use the features of their products (Ram and Jung, 1990; Thompson et al., 2005), discover the variety of usages (Shih and Venkatesh, 2004), and make more intense use of the product (Ram and Jung, 1991; Mittal and Sawhney, 2001; Shih and Venkatesh, 2004).

In the literature on customer education (tables 1 and 2), relationships between education and intense usage of products are rarely studied. Hennig-Thurau et al.

(2005) built a conceptual model on such relationships but did not provide any empirical validation of this model. Aubert and Ray (2005: 107) also reported managerial evidence of education-usage relationships, but once again without any empirical evidence.

1.3.4 Improving customer satisfaction

As shown in sections 1.3.2 and 1.3.3, customer education is supposed to improve customer performance by increasing their skills and by helping them to unlock the value embedded in the product.

These direct effects of customer education also seem to influence company performance, specifically, customer satisfaction and customer loyalty. The findings of customer education studies on this point are presented. Then, the justification to narrow the scope of the study on customer satisfaction is given.

- **From customer education to customer satisfaction and loyalty**

Research and surveys on customer education (see tables 1 and 2) almost agree that customer satisfaction and loyalty are the ultimate outcomes of customer education. Satisfaction can be defined [1] as:

"*A judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfilment, including levels of under- or over-fulfilment*" (Oliver, 1997: 13)

[1] Other definitions of customer satisfaction exist in the satisfaction literature. A more comprehensive overview of the concept of satisfaction is proposed in section 2.3 "*customer satisfaction*"

Loyalty can be defined as:

"*A deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behaviour*" (Oliver, 1997: 392)

According to Dick and Basu (1994), loyalty encompasses both behavioural and attitudinal dimensions.

Meer (1984: 122) deduces from the case studies she conducted that customer satisfaction is a concrete outcome of educational programs. She claims that customers are more satisfied because they are more skilled with the products. Honebein (1997) states that satisfaction increases when customers are successful with the product they use. Filipzack (1991) reports that education leads to a decrease in product complaints and product returns and to customers feeling satisfied with their products.

Customer education also has a positive impact on both dimensions of customer loyalty. Regarding the impact on the attitudinal dimension of loyalty, Hennig-Thurau (2000) demonstrates that customer education increases perceived product quality, trust in the product and commitment to the brand. Noel et al. (1990) depict positive outcomes in terms of customer relationships. Graham (1990) describes effects on customer confidence.

Regarding the impact on the behavioural component of loyalty, Finegan (1990) shows that new customers are recruited and that sales increase over time. Graham (1990), Meer (1984), and Dankens and Anderson (2001) draw similar conclusions from their surveys.

Studies on customer education only mention the positive effects of education. No real contesting view is proposed in the literature. One exception comes from services marketing literature. Burton (2002) discusses the different perspectives of the relationship between education and service quality. The author wonders if education is really necessary in a post-modern world, where consumers are depicted as

powerful and already educated. Burton (2002: 129) also claims that no meaningful association between education and service quality exists:

"*Increasingly, educated consumers may be more likely to detect poor service quality and under certain circumstances be predisposed to become less loyal and more likely to shop around.*"

Bitner et al. (1997) also consider that providing skills to customers can lead to a loss of turnover for companies. Indeed, skilled customers may become competitors of service organizations, preferring to perform tasks themselves rather than buying them.

- **The focus on satisfaction in this study**

As explained, both loyalty and satisfaction are considered as ultimate outcomes of customer education. However, the decision to narrow the scope of this study to focus on customer satisfaction has been taken. Research on the outcomes of customer education is at an early stage. Satisfaction is the most interesting concept for this study because it is directly related to product consumption. Moreover, many research studies have already established that satisfaction is an antecedent of loyalty (Fornell, 1992; Anderson and Sullivan, 1993; Jones and Sasser, 1995; Rust et al., 1995; Reicheld, 1996; Mittal and Anderson, 2000).

Thus, the focus is primarily on customer satisfaction.

1.4 IMPLEMENTATION OF CUSTOMER EDUCATION

The discussion on implementation is important to complete the understanding of customer education. Actually, customer education can be defined not only by its objectives but also by the way companies implement it.

In this section, two core aspects of implementation are discussed. In section 1.4.1 the role and the place of customer education in the decision-making process are discussed. Then, the instructional methods of customer education are detailed (section 1.4.2).

1.4.1 Customer education and the decision-making process

Even though customer education focuses on usage, evidence from the literature shows that definitions of customer education espoused a holistic orientation whereby customer education has a place in all phases of the decision-making process. Honebein (1997) argued that a company must provide educational experiences throughout the company's relationships with the customer. The author referred to the "*comprehensive theory of choice*", i.e. "*a series of sequential phases that take the consumer from a need all the way to disposing of what remains of a product*" (Honebein, 1997: 8), and sustained that customer education opportunities exist in each of the different phases. Similarly, Duymedjan and Aubert (2003) detailed the potential impacts of customer education in every phase of the customer lifecycle.

But, in most cases, researchers consider that two key moments are relevant for customer education: the pre-purchase stage and the post-purchase stage.

- **Customer education at the pre-purchase stage**

At the pre-purchase stage, the main ambition of customer education is to give potential customers the knowledge and skills necessary to increase their awareness and their understanding of a product's potential usages (Meer, 1984; Noel et al.,

1990; Honebein 1997; Dankens and Anderson, 2001). Best (2005: 69) considers this issue as crucial:

"*If potential customers are unaware of a product or do not fully or accurately understand its benefits, they will be unable to discern the product's potential value*"

This characteristic is notably true for technological process innovations. In this case, buyers need to be educated about potential applications of the new technology in order to confirm its appropriateness (Meyers and Athaide, 1991; Athaide et al., 1996).

Another ambition is to give potential customers self-confidence in their ability to use the product (Roush, 1999; Aldrich, 2000; Goodman et al., 2001). Through customer education, companies can teach customers or potential customers how to use the products (Roush, 1999). Finally, through usage-related education, the objective is to reinforce consumer learning in order to incite the consumer to choose the product.

- **Customer education at post-purchase stage**

While the holistic orientation of customer education has been highlighted, specific attention has recently been given to post-purchase customer education (Hennig-Thurau, 2000; Dankens and Anderson, 2001; Mittal and Sawhney, 2001; Aubert and Ray, 2005; Hennig-Thurau et al., 2005). The main reasons are the (re) emergence of an interest in consumption and post-purchase outcomes (Wilstrom, 1996a, 1996b), in order to create value at the consumption stage (Vargo and Lusch, 2004ab) and identify drivers of embedded consumption (Hennig-Thurau et al., 2005).

At the post-purchase stage, the main objective is to support customers in their use of the product. In this case, usage covers a wide range of activities, from assembling to disposal (Bell and Scobie, 1992; Honebein, 1997; Henig-Thurau, 2000; Duymedjan and Aubert, 2003; Hennig-Thurau et al., 2005). According to Mittal and Sawhney (2001), different consumer learning experiences appear at this stage, from which they distinguish the initial learning experience and the ongoing learning experience. The initial learning experience is the first exploration of product functionalities. The

ongoing experience can be considered as more passive learning that results from consumption.

1.4.2 Instructional methods

As already justified in section 1.1.3, customer education is an instructional activity. An important dimension of instruction is the development of instructional methods (Romiszowski, 1981; Reiser and Dempsey, 2002). Weston and Cranton (1986:260) have defined instructional methods as "*the vehicle or technique for instructor-student communication*". A discussion on instructional methods is also necessary to deepen the understanding of customer education.

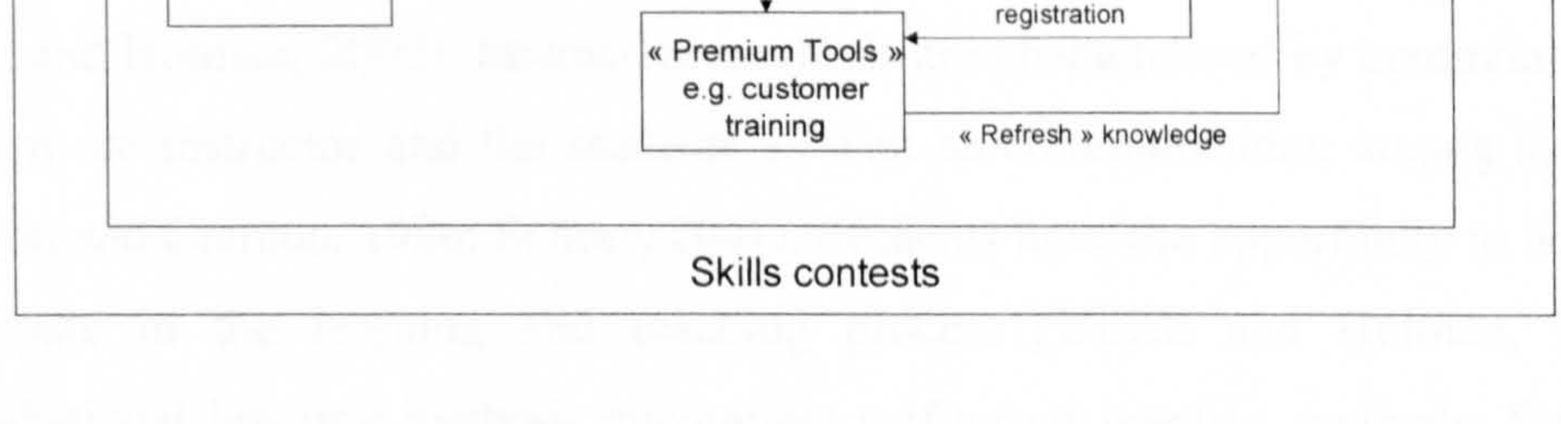
- **A large panel of instructional methods**

In the literature on customer education (see tables 1 and 2), a large panel of educational methods are presented, from individual coaching (Roush, 1999) to training seminars (Filipzack, 1991; Roush, 1999) or corporate universities (Honebein, 1997). Meer (1984) stated that there is a wide range of customer education formats and many types of materials are used. Honebein (1997) lists many methods, among which product instructions, videotapes, and user bulletins. Aubert and Ray (2005) specify that educational material can be directly integrated into the product, as is often the case for software. Educational programs also rely on information and communication technologies and can take the form of computer-based training or e-learning sessions (Aldrich, 2000; Aubert, 2002; Burton, 2002; Montandon and Zentriegen, 2003).

These examples raise the important issue of delimitating the scope of customer education methods. Literature on customer education and marketing literature provide very few answers to this question. Lovelock et al. (1996) consider that instructional methods encompass some specific materials: websites, manuals, brochures, video-audiocassettes, software, CD-ROM and voice mail. Burton (2002) distinguishes face-to-face methods from methods based on written materials or on

the internet. Hennig-Thurau (2000) structured the "*skills mix*" (see figure 2), which represents the integration of different tools for customer education.

Figure 2: The "skills Mix" (Hennig-Thurau, 2000)



According to Hennig-Thurau (2000), customer education encompasses a set of instructional methods, comprising basic methods (such as instruction manuals or packaging), support methods (telephone hotlines, internet services, etc.) or premium methods (customer training).

In spite of their advantages, the existing typologies of instructional methods (Lovelock et al., 1996; Hennig-Thurau, 2000) have some limitations. One limitation is that the different instructional methods are not defined. Another limitation is that the patterns of interaction between customers and manufacturers are not clearly described. One can assume for example that user manuals belong to self-paced methods, while customer training is an instructor-led method. But further clarifications are needed.

Consequently, to give a comprehensive overview of customer education methods, the literature on customer education has been cross-matched with literature on instructional design.

- **Definitions of principal instructional methods**

In the field of instructional design, two broad categories of instructional methods are generally considered (Gagné, 1965; Gagné and Medsker, 1996; Mager, 1997; Molenda, 2002): One is instructor-led instruction; the other is self-instruction.

Weston and Cranton (1986) divide these categories into four types: (a) instructor-centered methods, (b) interactive methods, (c) individualized learning methods, and (d) experiential learning methods. Instructor-centered methods primarily rely on one-way communication from the instructor to the students (Weston and Cranton, 1986; Ulrich and Holman, 2000). Interactive methods are characterized by communication between the instructor and the students as well as communication among students (Weston and Cranton, 1986; Scheer, 2001). Students have the opportunity to actively participate in the learning and teaching process (Ulrich and Holman, 2000). Individualized learning methods encompass self-paced learning methods. Students can learn at their own speed (Weston and Cranton, 1986; Scheer, 2001). Experiential learning methods incite students to perform in real or simulated settings (Weston and Cranton, 1986; Scheer, 2001).

Table 5 summarizes for each of the four categories defined by Weston and Cranton (1986), the most common instructional methods as well as some examples.

Table 5: Most common instructional methods

INSTRUCTOR-CENTERED METHODS: *"One way communication from the instructor to students"* (Weston and Cranton, 1986: 260)	
COMMON FORMATS	**DEFINITION AND EXAMPLES**
Lecture / presentation	*"Oral communication on the part of the teacher"* (Gagné, 1965) *"One instructor speaks directly to students"* (Weston and Cranton, 1986: 260) *"One-way information flow from source (teachers) to many receivers (learners)" (Molenda, 2005)* **Examples**: oral presentation, Film presentation, Internet-based lecture, online lecture, face-to-face lecture
Demonstration	*"Instruction by example. The objective is to show rather than to tell"* (Romiszowski, 1981: 316) *"Demonstration can be used in a variety of contexts. A concept, the application of a concept, or a psychomotor skill is illustrated by the instructor"* (Weston and Cranton, 1986: 261) **Examples**: face-to-dace demonstration, video demonstration, web video, audio clips
INTERACTIVE METHODS: *"Communication between instructor and students and communication among students "* (Weston and Cranton, 1986: 261)	
COMMON FORMATS	**DEFINITION AND EXAMPLES**
Discussion	*"Discussions are any form of oral communication between teachers and students ... [and] interaction between students"* (Gagné, 1965) Discussions have also been defined as *"two-way interchanges among learners"* (Molenda, 2005). In this case, learner-to-learner interactions are not interrupted by experts or teachers (Molenda, 2002) **Examples**: debates, Panel discussions, Web-based discussion boards, cooperative learning (Molenda, 2002), Web-based chats
Workshop and seminar	*"Workshops have generally a practical applications aspect. The instructor presents information, procedures and principles that participants apply to a new task under supervision of the instructor"* (Romiszowski, 1981) *"Seminars are a specific form of discussion characterized by the previous preparation of the topic by learners. Group members carry out a study/research/project, present their findings to the rest of the group. There follows a discussion on the findings"* (Romiszowski, 1981) **Examples**: group projects

INDIVIDUALIZED LEARNING METHODS: *"Students work directly with prepared materials at their own pace"* (Weston and Cranton, 1986: 262)	
COMMON FORMATS	**DEFINITION AND EXAMPLES**
Tutorial	*"Tutorials are characterized by two-way communication between instructor and learner with instructor responses varying according to the learner responses"* (Molenda, 2002) *"The one-to-one relationship ensures that the tutor can diagnose precisely the difficulties and misconceptions of the learner"* (Romiszowski, 1981: 311) **Examples**: Apprenticeship, Coaching, Adaptive computer-assisted instruction, Mentoring, peer-tutoring, web chat
Readings	*"Readings are characterized by learner interaction with print-based material"* (Molenda, 2002) **Examples**: Books, self-instructional booklets, web texts, programmed instruction, computer-assisted instruction
Computerized instruction	*"With the advent of microcomputers and their steadily decreasing cost and increasing capabilities, computerized instruction in a variety of formats is available to many instructors"* (Weston and Cranton, 1986: 263) **Examples**: Computer-Based Training
EXPERIENTIAL LEARNING METHODS: *"take place in settings other than classroom or in simulations of the natural settings"* (Weston and Cranton, 1986: 263)	
COMMON FORMATS	**DEFINITION AND EXAMPLES**
Practice	*"Learner uses new skill repeatedly and may be guided by an instructor for that"* (Molenda, 2005) **Examples**: drill and practice
Simulation / Game	*"Simulations accurately represent real simulations and are commonly used to allow students to participate in the application of rules or principles to the situation while remaining in a safe or practical environment"* (Weston and Cranton, 1986: 264). *"Games are characterized by learner interactions with a problem and with other learners immersed in a contrived context that involves artificial rules and efforts to attain a goal"* (Molenda, 2002) **Examples**: Role playing, computer games
Laboratory	*"In laboratory methods, students are still able to perform in situations which are realistic, but the consequences of their performance are carefully controlled by the instructor"* (Weston and Cranton, 1986) *"Characterized by learner interactions with a real problem and real sources individually and collaboratively under the guidance of an instructor"* (Molenda, 2002)" **Examples**: Problem-based learning, social simulation, science lab, case study, field study

- **Toward a typology of instructional methods for customer education**

My own taxonomy of common instructional methods for customer education based on the four categories defined by Weston and Cranton (1986) is built hereafter. According to Scheer (2001), this typology focuses on the communication between the instructor and the learner. This perspective serves in imagining how companies could interact with their customers in order to educate them.

In table 6, he four broad categories of instructional methods as well as the most common formats identified in the literature are recalled. Then, on the basis of the literature review on customer education (see tables 1 and 2), the formats of instructional methods that seem specific to customer education have been added. This table gives a comprehensive taxonomy of instructional methods for customer education.

Table 6: Taxonomy of instructional methods for customer education

Instructor-centered methods	Interactive methods	Individualized learning methods	Experiential learning methods
MOST COMMON FORMATS			
Lecture / presentation Demonstration	Discussion Workshop and Seminar	Tutorial Readings Computer-based training	Practice Simulation Laboratory
FORMATS SPECIFIC TO CUSTOMER EDUCATION			
Product demonstration	User's forums Hotlines	Usage instructions Individual coaching	Product experience

Instructor-centered method

Regarding instructor-centred methods, evidence from customer education literature shows that lectures, presentations and demonstrations are widely used tools (Meer,

1984; Honebein, 1997; Aldrich, 2000), especially for product demonstrations. Roush (1999) reminds us that video is a widely used format for such applications.

Interactive methods

Evidence of interactive methods can also be found in customer education literature. Finegan (1990) highlights the advantages of training seminars. Bell and Scobie (1992) and Roush (1999) depict the example of consumer workshops. Aldrich (2000), Aubert and Humbert (2001) demonstrate that online seminars and online discussions among consumers are emergent practices. Specific methods for customer education must also be added to the interactive methods category: hotlines and user forums. Hennig-Thurau (2000) distinguishes telephone hotlines dedicated to problem solving and internet hotlines, more oriented towards general customer support. Aubert and Ray (2005) take the example of Sony in France and explain that hotlines are also sometimes used to deliver individual courses to customers. User forums, that companies make available to consumers, also belong to the interactive methods. Based on the internet, these discussion boards enable consumers to interactively learn about products and their usage (Filipzack, 1991; Montandon and Zentriegen, 2003; Aubert and Ray, 2005).

Individualized learning methods

Regarding individualized learning methods, two formats specific to customer education should be highlighted: usage instructions and individual coaching. Usage instructions may be displayed directly on the product, on the packaging or in a user manual (Honebein, 1997; Cox et al., 1997; Hennig-Thurau, 2000; Jones et al., 2003). They can take the form of product warnings (Cox et al., 1997), of user manuals (Filipzack, 1991; Honebein, 1997) or of handbooks (Roush, 1999; Jones et al., 2003). According to many researchers, usage instructions are a basic tool for customer education (Honebein 1997; Hennig-Thurau, 2000). Jones et al. (2003) remind us that the commonly accepted role of instructions is to enhance the consumer usage experience. But, despite its "rudimentary" characteristic, many questions remain open as to the pedagogical quality of such documents (Jones et al., 2003; Aubert and

Ray, 2005). For instance, Jones et al. (2003) have shown that little attention has been paid to the understanding of instructions or their behavioural outcomes.

Individual coaching is also part of individualized instruction. Many examples show growing interest in this approach to customer education. Briard (2005) suggests that coaching is not only a trend. According to this author, consumers need to surround themselves with experts that deliver specific advice. Aubert and Ray (2005) argue that coaching is steadily growing in many B-to-C activities such as telecommunications.

Experiential learning methods

Experiential learning methods also belong to instructional methods for customer education. Product experience is generally seen as the optimal method to learn about products because customers can interact with the product (Hoch, 2002; Klein 2003). Product manufacturers must consequently create the conditions to enhance this experience. Product experience can then take the form of trials. Kempf and Smith (1998) have defined product trials as "*the consumer's first usage experience with a brand* [that] *provides direct sensory contact with the product*". Product experience can also be performed through virtual simulation (Klein, 2003; Schlosser, 2003). Finally, in the specific case of electronic information products and services, such as internet services or personal digital assistants (Mittal and Sawhney, 2001; Aubert and Ray, 2005), product experience is guided by instructions and advice which are directly integrated into the product.

To conclude, the taxonomy of instructional methods for customer education has been derived from existing literature on instructional methods. The importance of this work is twofold. First, from a managerial point of view, this taxonomy can help companies to better apprehend customer education implementation. Second, in any attempt to measure its impact, the efforts of customer education can perhaps be defined through the set of instructional methods implemented.

1.5 IMPACT OF CUSTOMER EDUCATION: CONCEPTUALIZATION AND MEASUREMENT ISSUES

The investigation on customer education enabled to understand how companies can organize customer education and what benefits they can gain from a customer education policy. Now the question is how to measure the impact.

Since many studies on customer education are exploratory, the need for quantitative measurements and quantitative evidence of the impact of customer education (section 1.5.1) is debated. This question also involves defining the construct of customer education (section 1.5.2).

1.5.1 Measuring the impact of customer education

As explained earlier, the outcomes of customer education, as revealed by the literature (see tables 1 and 2), deal with customer skills, product usage and customer satisfaction.

Evidence also shows that most of the research on customer education relies on exploratory studies. As Meer (1984: 15) states "*when little is known about a problem such as customer education, this type of inquiry is particularly appropriate*". Meer (1984), Noel et al. (1990), Finegan (1990), Graham (1990), Honebein (1997), Roush (1999), Aubert and Humbert (2001), Montandon and Zentriegen (2003) use case study methodology to depict customer education practices and their outcomes. Aldrich (2000), Dankens and Anderson (2001), Burton (2002), Duymedjan and Aubert (2003), Hennig-Thurau et al. (2005) propose conceptual developments, but without any fieldwork to support their hypotheses.

Consequently, one limitation of existing academic and empirical works in customer education is that very few attempts have been made to quantitatively measure the outcomes of customer education. Many hypotheses formulated in these studies are not supported by empirical validation. In actual fact, only a handful of quantitative

studies on customer education exist. Two of these studies are extracted from customer education literature (Hennig-Thurau, 2000; Goodman et al., 2001), the others are extracted from marketing literature (Mittal and Sawhney, 2001; Jones et al., 2003).

Hennig-Thurau (2000) conducted an academic study to define whether communicating skills to customers increased perceived relationship quality and customer retention. He carried out a quantitative survey on a sample of 293 consumers of electronic goods and built a structural model.
With respect to the study, one limitation of Hennig-Thurau's work is that he does not provide direct measurements of customer education. The author only measures consumers' skill levels (sum of individual customer skills), skill attribution (that measures to whom the customer attributes the acquisition of new skills) and skill specificity (the skills necessary for a particular product).

Goodman et al. (2001) conducted two empirical surveys on large samples (n_1= 2149, n_2 = 4000). They revealed that education can positively impact satisfaction and loyalty. In each survey, they demonstrated the payoff of customer education by comparing the results of educated customers to the results of non-educated customers. In their first survey, they demonstrated that education can lead to greater loyalty. The second survey dealt only with customer satisfaction.
With respect to the study, one limitation of this empirical study is that the impact on customer skills and product usage has not been taken into account. Even though the direct relationships between education and satisfaction/loyalty are established, the underlying mechanisms are not explained.

Besides the literature on customer education, two other studies exist (Mittal and Sawhney, 2001; Jones et al., 2003) that partially deal with the outcomes of education.

Mittal and Sawhney (2001) conducted a field study to define how initial post-purchase learning experiences of electronic information products and services impact their usage. They conducted a field experiment on a small sample of consumers (n = 84) who attended a lecture on product usage. Then, they recorded the impact on effective usage of the product. Based on this experiment, the authors came to the

conclusion that positive relationships exist between the lecture's characteristics and the product's usage intensity.

With respect to the study, two limitations appear in Mittal and Sawhney's experiment. Firstly, customer education is limited to one particular instructional method (the lecture). Secondly, the impact of education on satisfaction is not measured.

Jones et al. (2003) turned to measuring the impact of instruction understanding on satisfaction. Their academic research relied on a large-scale quantitative survey (n = 1127). The authors unveiled the positive impact of instruction understanding on usage and on customer satisfaction.

With respect to the study, one limitation of this research is that customer education focuses on one particular instructional method. The whole effort of customer education is not taken into account.

As such, the mechanisms of the effects of customer education have neither been clearly defined nor quantitatively measured. In this perspective, the first important task is to define a customer education construct that is consistent with the purpose of the study.

1.5.2 Defining the "*customer education*" construct

- **A lack of conceptualization**

To provide reliable and valid measures, researchers must primarily clearly define the constructs and their measurements (Nunally, 1967; Churchill, 1979). Owing to its emerging status, research on customer education has not yet achieved this goal.

In fact, it can be deduced from literature on customer education (see tables 1 and 2) that the "*customer education*" construct remains to be delimited clearly. Two approaches have been developed in quantitative studies on customer education. One is to focus directly on outcomes, such as skills or product usage, without measuring the customer education construct itself (Hennig-Thurau, 2000). The other attempt,

which is the most common, is to reduce customer education to one single instructional event. For instance, Mittal et Shawney (2001) measure the outcomes of training sessions while Jones et al. (2003) measure the outcomes of instruction manuals. But no studies have developed a global measurement of customer education.

- **Two perspectives to provide a definition of customer education**

In his paradigm for developing measures of marketing constructs, Churchill (1979: 67) suggests first to specify the domain of the construct: "*the researcher must be exacting in delineating what is included in the definition and what is excluded*".

Marketing literature helps to understand that important marketing constructs can be defined from at least two different perspectives: the company's perspective and the consumer's perspective. While the company's perspective focuses on actions and organizational matters (Mitra, 2002), the consumer's perspective focuses on perceptions, i.e. "*the cognitive impression that is formed of 'reality' which in turn influences the individual actions and behaviour toward that object*" (American Marketing Association[2]). For instance, researchers generally distinguish objective quality from perceived quality (Dodds and Monroe, 1985; Holbrook and Corfman, 1985; Mitra, 2002). Perceived quality has been surveyed for both products and services (Parasuraman et al., 1985; Parasuraman et al., 1988; Parasuraman et al., 2002). Objective quality has been identified as an antecedent of perceived quality (Parasuraman et al., 1988; Brady and Cronin, 2001).

Value is also a multidimensional construct in marketing literature. It can be depicted as the value proposition made by companies to their customers (Payne and Holt, 2001) as well as the value perceived by customers (Zeithaml, 1988; Raval and Grönroos, 1996; Lapierre, 2000). Many authors summarized perceived value as a trade-off between perceived benefits and costs (Lovelock, 2001; Ravald and Grönroos, 1996; Jen and Hu, 2003). They implicitly acknowledge that the actual

[2] see: http://www.marketingpower.com/mg-dictionary.php (last visit : July, 2005)

effort made by companies to deliver superior value leads to higher levels of perceived value.

Quality and value are not the only examples of both company-directed and customer-directed marketing constructs. Schiffman and Kanuk (1994) argue that perception is relevant for the study of many marketing variables such as product's, service's, store's or manufacturer's images.

Two consequences can be drawn from this bi-dimensional definition of the various marketing constructs. Firstly, the construct of customer education can be defined in two ways: (1) the actual effort of customer education developed by companies toward their customers and (2) the effort of customer education as perceived by customers. Secondly, the actual effort of customer education is probably an antecedent of the perceived effort of customer education.

Regarding the state-of-the-art in academic research on customer education, most studies focus on describing the actual efforts of customer education. This is the essence of works by Meer (1984), Honebein (1997), Aubert and Humbert (2001), Dankens and Anderson (2001) which analyse companies' approach to customer education.

Oppositely, as stated earlier, very few studies deal with the customers' perception of customer education. From a marketing perspective, this analysis should be developed. Indeed, early definitions of the marketing concept stress the importance of satisfying customer needs (Drucker, 1954; Levitt, 1960; Keith, 1960). For marketers, it means, as reminded by Shiffman and Kanuk (1994), that consumers' perceptions are much more important than their knowledge and reality.

1.6 CONCLUSIONS AND IMPLICATIONS FOR THE RESEARCH QUESTION

- **Defining customer education for the purposes of this study**

The review of literature on customer education allowed to address the issue of defining the concept. In the context of this study, two definitions of customer education are proposed. The first definition reveals the company's perspective of customer education, the second focuses on the consumer's perspective. These definitions are built from the findings of the literature review and highlight both the instructional nature of customer education and its objectives.

Company-directed definition of customer education

Customer education is the instructional activity developed by companies for their actual or potential customers. The main objectives of customer education are to provide customers with product usage related knowledge and skills and to enhance product usage.

Customer-directed definition of customer education

Customer education is the global effort of company-sponsored, product-usage related education perceived by customers. Through education, the customer increases his knowledge and skills and performs better with the product.

- **Implications of the results for the research question**

The first chapter of the literature review helped to hone down the research question. Indeed, it has been established in the literature review that there is a need (1) to give priority to customer-oriented customer education, (2) to quantitatively measure the outcomes of customer education and (3) to understand the mechanisms of the "*education-satisfaction*" relationship.

A first consequence of such a research orientation is the need to provide definitions of product-usage related knowledge and skills, of product usage and of customer satisfaction.

A second consequence of the research orientation is the need to clarify the mechanisms that would explain how customer education can contribute to increasing customer satisfaction. Literature that deals with such an analysis must be overviewed. Especially, the role of product usage and product usage related knowledge and skills must be investigated.

In the second chapter of the literature review, such topics are explored. Each outcome and its role in the "*education-satisfaction*" relationship are defined.

- **Scope reduction**

Regarding the analysis of outcomes of customer education, customer education can take place at the pre-purchase and post-purchase stages. Since many researchers in the field of marketing focus on the post-purchase stage and on consumption issues (Wilkström 1996a, 1996b; Vargo and Lusch 2004a, 2004b; Best, 2005; Hennig-Thurau et al., 2005), their recommendations must be respected. So the analysis of customer education outcomes will focus on the post-purchase stage.

Regarding the products which are concerned by customer education, tangible goods with multiple features are primarily involved. So, the scope is restricted to the analysis of customer education outcomes to this specific product category.

CHAPTER 2:
OUTCOMES OF CUSTOMER EDUCATION

The first chapter of the literature review established that three outcomes of customer education have been identified. Indeed, customer education has an impact on product usage-related knowledge and skills and product usage. It has also been hypothesized that product usage and product usage related knowledge and skills could be two drivers of customer satisfaction.

Since the ambition of this work is to quantitatively measure the outcomes of customer education, each outcome must be now conceptualized and the potential mechanisms of the customer education – customer satisfaction relationship defined.

Thus, the chapter is organized as follows. First, the concepts of knowledge and skills are analyzed. The key findings from literature on the relationships between customer education and product-usage related knowledge and skills are also presented (section 2.1). In section 2.2, a conceptualization of product usage and its links with knowledge and skills is proposed. In section 2.3, the concept of customer satisfaction is defined. In the same section, the antecedent role of satisfaction played by product usage and product usage related knowledge and skills is debated.

2.1 KNOWLEDGE AND SKILLS

In order to define the potential outcomes of customer education in terms of knowledge and skills acquisition, the concepts of knowledge and skills are defined (2.1.1). Then, issues related to the assessment of knowledge and skills are discussed (2.1.2). This aspect is paramount to the study with a view to further empirical testing. In particular, there is much debate about objective, as opposed to subjective, measures in the literature (Park and Lessig, 1981; Selnes and Gronhaug, 1986; Cole

et al., 1986; Kanwar et al., 1990; Park et al., 1994; Cordell, 1997; Flynn and Goldsmith, 1999).

Finally, the literature that deals with relationships between customer education and product usage related skills is explored (2.1.3).

2.1.1 Definitions of knowledge and skills

Knowledge and skills are concepts which have been defined in the fields of psychology and cognitive sciences. Marketing research has also taken an interest in these concepts. However, defining knowledge and skills from a marketing perspective is a difficult task. A first reason is that the literature recognizes the constructs to be complex and multidimensional (Brucks, 1986; Alba and Hutchinson, 1987; Dacin and Mitchell, 1986), and sometimes as confusedly defined (Gattiker, 1992; Chervonnaya, 2003). Another difficulty is that the concept of skills has received very little attention in marketing literature, while knowledge has been recognized for some time as a central construct for the analysis of consumer behaviour (Park and Lessig, 1981; Engel et al., 1990; Park et al., 1992; Cordell, 1997; Ladwein, 1999).

Thus, in the context of the study, this section simply aims to provide working definitions of knowledge and skills. To this effect, consumer behaviour literature is explored as well as cognitive psychology and instructional design literature.

- **Overview of the concepts**

Romiszowski (1981: 241) proposed to define and distinguish knowledge and skills as follows. Knowledge refers to:

"*Information stored in the learner's mind*". Skills refer to "*actions (intellectual or physical) and indeed 'reactions' (to ideas, things or people) which a person performs in a competent way in order to achieve a goal*"

Romiszowski (1981) reminds us that knowledge is necessary to practice skills. Gagné and Medsker (1996) explain that learning is cumulative. Skills are conditioned by the command of simpler skills and knowledge.

The definition of knowledge presented above is largely shared in consumer behaviour literature. For example, Engel et al. (1990: 281) define knowledge as "*the information stored in memory*". To Page and Uncles (2004), knowledge is facts and principles stored in memory about a given domain. Kanwar et al. (1981) assume that knowledge is a coded representation of information about the external world in symbolic form. Researchers have also proposed a definition of knowledge, termed as "*consumer knowledge*", which is specific to the field of consumer behaviour. Indeed, Engel et al. (1990: 281) define consumer knowledge as "*the subset of total information relevant to consumers functioning of the marketplace*". Blackwell et al. (2001: 259) define the same concept as "*the subset of total amount of information stored in memory that is relevant to product purchase and consumption*".

As mentioned earlier, very little attention has been paid to conceptualizing skills in marketing literature. Chervonnaya (2003) proposes a working definition that is specific to the context of service operations. He suggests defining customer skills as the ability of customers to carry out their role in service production, while customer knowledge is assimilated to understanding how they perform their role. Lee and Lee (2001) discuss the role of skills in the consumer adoption of internet banking. The authors do not define the term precisely and consider it as a proxy of prior usage or prior experience with a product. Finally, Hennig-thurau (2000) proposes a definition of customer skills that is specific to his own research and thus somewhat confusing.

Indeed, the author defines customer skills as:

"The total of all product-related knowledge and skills of relevance to any aspect of the customer's post-purchase behaviour"

- **knowledge: a concept characterized by both the content and the structure of information stored in the mind**

Many research studies have highlighted the importance of knowledge in understanding consumer behaviour such as information search (Brucks, 1985) or information processing (Bettman and Park, 1980; Park and Lessig, 1981; Alba and Hutchinson, 1987; Johnson and Russo, 1984; Rao and Monroe, 1988; Peracchio and Tybout, 1996; Cordell, 1997).

From the late seventies cognitive psychologists, as well as marketers, recognized that two aspects of knowledge are important in explaining how information is processed by mankind: the content and the structure of knowledge. According to Brucks (1986), content refers to the subject matter of information stored in memory. Engel et al. (1990: 182) suggest that content depicts what customers know about a given topic.

Solomon et al. (2002: 78) consider knowledge structure as "*a complex spiders' web filled with pieces of information*". According to Brucks (1986), structure refers to how knowledge is represented in memory. Similarly, Dacin and Mitchell (1986) specify that structure refers to how information within a domain is organized in memory, while content of knowledge refers to the types of information stored in the nodes of memory. Most studies have established that cognitive structures are conceptualized as associative networks (Brucks and Mitchell, 1981; Mitchell, 1981; Kanwar et al., 1981; Dacin and Mitchell, 1986). According to Mitchell (1981), associative networks are depicted by nodes which represent concepts, and links between these concepts.

In the context of this study, it is crucial to establish which knowledge characteristics –content or structure- should be assessed. Various studies have tried to conceptualize and measure knowledge structure (Kanwar et al., 1981; Mitchell, 1981; Dacin and Mitchell, 1986). But, Page and Uncles (2004) advocate that studies dealing with the understanding of consumer knowledge should first examine the "content" aspect. Analyzing the structure of knowledge should constitute a second step in the analysis.

Customer education literature also seems more interested in measuring knowledge content. This approach is defended by Hennig-Thurau et al. (2005), who suggest concentrating on the impact of the "*amount of knowledge*". Honebein (1997: 167) also suggests analyzing which "*types of knowledge*" have been acquired.

So, owing to the newness of this research and as cautioned by peers (Page and Uncles, 2004), the focus will be essentially on knowledge content forthwith.

- **Types of knowledge content**

Brucks (1986: 58) reminds us of the theoretical and practical importance of defining distinct categories of knowledge:

"*A multi-dimensional account of knowledge content may provide a better understanding of consumer behaviour if different types of knowledge content affect behaviour in different ways*"

Actually, two broad types of typologies exist in the literature. The first category, "*marketing-oriented typologies of knowledge content*", depicts knowledge about the product, its usage and its distribution (Ladwein, 1999: 186)[3]. The second category, "*cognitive sciences-oriented typologies of knowledge content*", distinguishes the different types of knowledge according to their degree of complexity and abstraction.

The "***marketing oriented typologies of knowledge content***" are descriptive (see table 7). They provide various indications on consumer knowledge at different stages of the decision-making process. One can observe that these typologies are cross-related. In particular, the typology designed by Blackwell et al. (2001) is an extension of the typology drawn by Engel et al. (1990). Compared to Engel et al. (1990) and Blackwell et al. (2001), Brucks (1986) makes a distinction between

[3] The original observation written in French by the author is the following : "*les approches classiques en comportement du consommateur et de l'acheteur se sont bien souvent contentées de distinguer les connaissances relatives au produit, à son usage et à sa distribution*"

general and specific pieces of knowledge (see for example in table 7 "*general product usage*" versus "*personal product usage*"). His view is based on Hastie's (1982) description of knowledge. Hastie (1982) suggests that knowledge can be either generic (i.e. "*information on a class of products*") or individual (i.e. "*about specific products that are involved in a judgment or choice*"). Blackwell et al. (2001: 267) propose an original dimension: "*persuasion knowledge*", which they define as "*what consumers know about the goals and tactics of those trying to persuade them*".

This dimension is of particular interest to this study. Indeed, the credibility and suspicion of consumers vis-a-vis marketer-generated information has been identified as an important issue (Bickart and Schindler, 2001). It could then be interesting to define whether customer education has a positive influence on knowledge persuasion. In their typology, Mitchell and Dacin (1996) also propose original dimensions, "*interdomain, intradomain knowledge*", and "*personal knowledge*". Personal knowledge is of particular interest to this study. Indeed, Mitchell and Dacin (1996) include personal experience with the product in this category.

Table 7: Typologies of knowledge content

References	Typologies of knowledge content
Brucks (1986) defines and empirically validates a typology of consumer knowledge content. The typology encompasses 8 broad categories.	**1- Terminology**: knowledge of the meanings of terms used within a domain **2- Product attributes**: knowledge of the attributes available to evaluate brands and products **3- General attribute evaluation**: knowledge of the overall evaluation for an attribute or an attribute level **4- Specific attribute evaluation**: knowledge of specific criteria used to evaluate an attribute **5- General product usage**: knowledge of how the product can be used **6- Personal product usage**: knowledge including memories of experience **7- Brand facts**: knowledge of how brands "score" an attribute, overall evaluation of a brand and other brand facts **8- Purchasing and decision-making procedure**: knowledge about the purchasing process.
Engel et al. (1990) define a typology which they dedicate to marketing practitioners. This typology is composed of 3 main categories.	**1- Product knowledge**: this dimension encompasses (1) awareness of the product category and brands within the product category (2) product terminology (3) product attributes or features and (4) beliefs about the product category in general and about specific brands **2- Purchase knowledge** "*encompasses the various pieces of information consumers possess that are germane to acquiring products* (page 287). Two basic dimensions are highlighted: information on where to buy and information on when to buy **3- Usage knowledge**: "*encompasses information available in memory about how a product can be used and what is required to actually use the product*" (page 289)
Mitchell and Dacin (1996) describe 5 categories used in classifying content of knowledge. These categories were defined for the specific purpose of their study on motorcycles.	**1- Specific product knowledge:** statements mentioning brands, models, product type, and physical and performance attributes **2- Associated-product knowledge:** statements about events, people and objects associated with the product **3- Product-usage knowledge:** statements about using and maintaining products **4- Personal Knowledge:** statements about personal experiences and feelings about the product **5- Inter-domain, Intra-domain knowledge:** comparisons between different products within the same category (intra-domain) or from different categories (interdomain)
Blackwell et al. (2001) define 5 categories of consumer knowledge.	**1- Knowledge of the product's existence** (or awareness of product's existence) **2- Knowledge about the product's attributes and associations**: "Associations" is defined as (page 262) "*the product's physical properties and attributes as well as the benefits and feelings that come from product consumption*". **3- Purchase knowledge** encompassed the various pieces of information consumers possess about buying products (page 264) **4- Consumption and usage knowledge** "*encompasses the information in memory about how a product can be consumed and what is required to actually use the product*" (page 284) **5- Persuasion knowledge** "*represents what consumers know about the goals and tactics of those trying to persuade them*" (page 267)

The *"cognitive sciences-oriented typologies of knowledge content"* are more dedicated to defining the different natures of information with regard to their degree of complexity and abstraction. Romiszowski (1981) presents four types of knowledge: facts, procedures, concepts and principles. But, the most common typology found in the literature is the twofold typology, initially defined by Anderson (1976, 1983), which distinguishes declarative knowledge from procedural knowledge. According to Anderson (1976) and to Brucks (1986), declarative knowledge concerns knowledge about concepts, objects, or events, while procedural knowledge refers to knowledge of rules for taking actions.

Dacin and Mitchell (1986: 454) specify that:

"D*eclarative knowledge consists primarily of the facts that are known about a particular domain, while procedural knowledge represents the algorithm and heuristics that operate on these facts*"

To Best (1989), declarative knowledge encompasses factual, static and describable information, while procedural knowledge deals with dynamic information underlying skilful actions. Page and Uncles (2004) specify that procedural knowledge refers to procedures and rules. Kirmani and Wright (1993) remind us that procedural knowledge refers to mental or physical acts related to decision-making or other behaviours.

The importance of distinguishing declarative knowledge from procedural knowledge was stressed by Gagné and Medsker (1996) who remind us that the conditions for learning the two categories of knowledge are different. Consequently training implications are also specific. For instance, the authors explain (Gagné and Medsker, 1996) that learning declarative knowledge implies previously acquiring sets of organized knowledge. Thus, in terms of training implications, there is a need to provide a meaningful context which allows learners to make the links between new declarative knowledge and prior knowledge stored in memory.

Another reason for distinguishing declarative knowledge from procedural knowledge was proposed in the consumer behaviour literature. Engel et al. (1990),

Ladwein (1999), Page and Uncles (2004) state that both the analysis of declarative and procedural knowledge must be taken into account when analyzing product knowledge and purchase knowledge. Ladwein (1999) states that purchase knowledge encompasses both declarative knowledge about the distribution characteristics or the specific dimensions of each distributor and procedural knowledge such as the buying process. Page and Uncles (2004) indicate that both declarative and procedural knowledge are part of the knowledge content of World Wide Web users. The authors suggest that each dimension could explain phenomena such as the adoption or 'disadoption' of internet services.

- **Skills: applying knowledge to intellectual and physical activities**

Gattiker (1992) emphasizes that it is difficult to give a simple definition of skills and that the meaning of this concept has fuelled many a discussion. Generally speaking, skills are the actions and reactions that a person develops through practice and experience (Romiszowsi, 1981; Honebein, 1997) and through training (Gattiker, 1992). As already mentioned, skills refers to:

> *"Actions (intellectual or physical) and indeed 'reactions' (to ideas, things or people) which a person performs in a competent way in order to achieve a goal"* (Romiszowski, 1981: 242)

Romiszowski (1981: 239) considers skills as the application of knowledge in a given practical or theoretical situation. The application of knowledge can take the form of an "*algorithm*" (individuals rigorously follow a procedure) or of a "*heuristic problem solving process*" (whereby individuals apply known concepts and principles to deal with a new situation). Gattiker (1992) refers to Adams' (1987) research and presents three defining characteristics of skills: (1) skills are a wide behavioural domain in which behaviour is assumed to be complex (2) skills are learned gradually through training (3) attaining a goal depends upon behaviour and processes. Gattiker (1992) finally proposes his own definition of skills that he characterizes as both learned behaviours and mental processes.

Cognitive psychology literature identifies and defines different categories of skills. Romiszwoski (1981) built a fourfold typology in which he distinguishes (1) cognitive skills, (2) psychomotor skills, (3) reactive skills and (4) interactive skills. Gattiker (1992) defines five categories of skills: (1) basic skills, (2) social skills, (3) conceptual skills, (4) technology skills and (5) technical skills. Hennig-Thurau (2000) distinguishes technical skills from social skills. Although authors such as Newell (1991) ponder on the exclusivity of each category of skills, each of them is defined hereafter. These typologies are inclined to overlap.

Romiszowski (1981: 242) defines cognitive skills as "*the individual's ability to make decisions and to solve problems*". VanLehn (1996) states that cognitive skills acquisition is a complex and knowledge-intensive task "*where the success is determined more by the subject's knowledge than by his/her physical prowess*". Cognitive skills are close to conceptual skills, a category defined by Gattiker (1992) as "*decision-making about tasks [...] and judging or assessing tasks done by self or others*".

Psychomotor or motor skills represent the second category of skills. Romiszowski (1981: 242) and Honebein (1997) define motor skills as the ability to perform physical actions. To Newell (1991), motor skills refer to those skills where both the movement and the outcome of the action are emphasized. Gagné and Medsker (1996) specify that motor skills are generally related to conceptual knowledge and procedural rules. These skills improve with practice. It implies, as established by Fitts and Posner (1967), that several phases are necessary to acquire motor skills. Fitts and Posner (1967) actually distinguish three phases: (1) the "*early phase*" during which the subject tries to understand the domain knowledge and related tasks; (2) the "*intermediate phase*" during which practice is used to improve one's ability to perform the task; and (3) the final phase during which the skill becomes automatic and requires fewer intellectual resources. Finally, Gagné and Medsker (1996) specify that pictures, demonstrations and practice are relevant instructional methods for learning motor skills.

Gattiker (1992) determines two categories, technology skills and technical skills which can actually be considered as subcategories of psychomotor skills. Technology skills encompass the appropriate use of technology. Technical skills

refer to an individual's "*physical ability to transform an object or item of information into something different*" (Gattiker, 1992: 552). To Hennig-Thurau (2000), these skills are essential in order to use a product properly. He used the term "*technical competence*" to characterize the cognitive and physical skills a consumer must possess to fully unlock the value embedded in the product.

Reactive skills are defined (Romiszowski, 1981) as people's ability to react to things, situations or other people, in terms of values, emotions and feelings. For instance, the customer's choice to avoid using a product in a dangerous way is an illustration of reactive skills (Honebein, 1997).

Interactive skills, also termed as social skills, are defined as an individual's ability to interact with other people in order to achieve some goals (Romiszowski, 1981). More simply, they have also been defined as the ability to deal with others (Honebein, 1997). Gattiker (1992) considers social skills are interpersonal skills. Morgeson et al. (2005) consider social skills as a constellation of skills which depicts an individual's ability to communicate with others, to listen to others or to influence others. Applied to the field of customer education, social skills mainly refer to the consumer's interaction with the employees of the product manufacturer (Hennig-Thurau, 2000).

- **Working definitions of product usage related knowledge and skills**

It has been justified earlier that this research will focus on product usage. Engel et al. (1990) and Blackwell et al. (2001) proposed closed definitions of usage knowledge (see table 7) that they assimilate to information stored in memory about how a product can be consumed and what is required to actually use the product. Mitchell and Dacin define (1996) the same concept as knowledge about how to use and maintain the product. Their definition reveals that different usage situations exist. Hennig-Thurau (2000) summarizes these general situations into three broad categories: (1) pre-use (transportation, assembling, installation of the product), (2) use (usage of basic features, full usage and innovative usage) and (3) post-use of the product (keeping the product, getting rid of the product permanently and getting rid of the product temporarily).

So, **product usage-related knowledge** is defined as the declarative and procedural knowledge customers possess that allow them to understand how a product can be consumed and what is required to actually use the product, whatever the usage situation.

By extension, **product usage-related skills** is defined as the intellectual, motor, reactive and social skills customers develop, which allow them to properly perform usage-related tasks, whatever the usage situation.

Finally, **product usage-related knowledge and skills** is defined as the amount of product-usage related knowledge and skills that customers possess.

2.1.2 Assessment of knowledge and skills

As explained in the previous section, consumer knowledge has long been recognized as a key concept in marketing behaviour literature and especially in information processing and decision-making research. But, Flynn and Goldsmith (1999) observe that even though the concept of knowledge has consistently been defined in marketing literature, an important debate exists on how to measure knowledge. Cole et al. (1986) acknowledge that one of the major difficulties is the lack of consensus over appropriate methods for measuring knowledge.

Actually, three types of measures have been developed and used in the literature (Brucks, 1985): objective knowledge, subjective knowledge and experience. Selnes and Gronhaug, (1986), note that consumer research favours subjective measures, whereas research in cognitive psychology favours objective measures. Thus, an important path of research consists in defining the relationships between the three measures (Selnes and Gronhaug, 1986; Cole et al., 1986; Kanwar et al., 1990; Park et al., 1992; Park et al., 1994). The aim is to determine whether the different types of measures operationalize the same construct. Another important stream of research investigates the differential effects of objective knowledge, subjective knowledge and experience on decision-making (Bettman and Park, 1980; Brucks, 1985; Rao and Monroe, 1988; Raju et al., 1995).

This literature is reviewed in order to define the most appropriate method for measuring knowledge for the purpose of this study. Then, discussion on the ways to assess skills is undertaken.

- Objective knowledge, subjective knowledge and experience

Objective knowledge, also termed as **actual knowledge** (Park et al., 1992; Park et al., 1994), refers to what an individual actually knows (Brucks, 1985) and how much this individual knows (Park and Lessig, 1981). In other words, Park et al. (1992) define objective knowledge as the nature and amount of information stored in long term memory. According to Engel et al. (1990: 295), "*measures of objective knowledge are those that tap what the consumer actually has stored in memory*". Various assessment methods have been employed in the literature. Selnes and Gronhaug (1986) suggest that objective measures are based on another person's evaluation of this knowledge. Similarly, Cole et al. (1986) and Raju et al. (1995) describe objective measures based on tests of knowledge.

Subjective knowledge is also termed as **self-assessed knowledge** (Cole et al., 1986; Park et al., 1992; Park et al., 1994) or **self-reported knowledge** (Kanwar et al., 1990). Park and Lessig (1981) and Park et al. (1992) define subjective knowledge as a person's self report or perception of how much she/he knows about the product. To Brucks (1985), subjective knowledge refers to what individuals perceive they know. Similarly, Engel et al. (1990: 296) propose to consider subjective knowledge as the consumers' perception of their own "*knowledgeableness*". Finally, Flynn and Goldsmith (1999) define subjective knowledge as a consumer's perception of the amount of information they have stored in mind.

A key conceptual distinction between subjective knowledge and objective knowledge was established by Park and Lessig (1981). The authors considered subjective knowledge as a combination of consumers' knowledge and of their self-confidence in their knowledge. Thus, Brucks (1985) suggested that subjective knowledge contains an individual's degree of confidence in his/her knowledge. For this reason, subjective knowledge seems to measure the "*feeling of knowing*" (Raju et al., 1995). The methods currently used to measure such types of knowledge

involve the subjects' self-reports on their knowledge about a product (Brucks, 1985; Rao and Monroe, 1988; Flynn and Goldsmith; 1999).

Experience, or **prior experience,** is the third measure of knowledge discussed in the literature. Amazingly, no formal definitions of experience are provided in the literature. Depending on the studies, experience can refer to ownership of the product (Bettman and Park, 1980), to usage experience (Bruck, 1985; Rao and Monroe, 1988; Cole et al., 1986; Kanwar et al., 1990), to product class experience (Selnes and Gronhaug, 1986) or to purchase experience (Cole et al., 1986).

Despite the lack of common understanding on the concept, many authors agree that experience is not a relevant measure of knowledge (Brucks, 1985; Selnes and Gronhaug, 1986; Rao and Monroe, 1988; Cole et al., 1986; Kanwar et al., 1990). Selnes and Gronhaug (1986) identified two conceptual problems. First, product knowledge may be developed without any experience of the product, but through information search and use. The second problem, also stressed by Rao and Monroe (1988), is that product experience may not lead to increased product knowledge.

Kanwar et al. (1990: 604) explain that product involvement can affect the impact of experience on consumer knowledge:

"*Because of differential product involvement, consumers with similar amounts of usage experience may have learned different amounts about a product domain*".

- **Relationships between the different measures**

Park et al. (1992) observe that knowledge has often been treated as a one-dimensional construct, where the results obtained in objective and subjective measures are supposed to represent the knowledge effect. Thus, the coexistence of three measures raises an important question in the literature: do these measures operationalize the same underlying construct (Selnes and Gronhaug, 1986; Kanwar et al., 1990)?

Answers to these questions are contradictory. Flynn and Goldsmith (1999) review some studies and observe that subjective knowledge and objective knowledge have shown moderate to strong correlations. As a conclusion, researchers generally

suggest that the different measures are related but are not substitutable (Selnes and Gronhaug, 1986; Cole et al., 1986; Flynn and Goldsmith, 1999). For instance, Selnes and Gronhaug (1986) compare objective and subjective measures of knowledge about home computers. Statistical results lead them to conclude that the two measures are not sufficiently correlated to be substitutable. Similar findings are revealed in the study carried out by Cole et al. (1986). The authors assess the convergent, discriminant and criterion validity of the three measures of knowledge. The convergent and discriminant validity of the three measures are empirically established in their survey, while criterion validity is only partially validated. The authors observed that the different measures should be generalized with caution. Thus, Cole et al. (1986: 66) concluded:

"*One can generalize with caution across measures of knowledge. This seems to be especially true for objective test and self-reported measures of knowledge. Usage measures of knowledge need to be refined and used with care*"

Kanwar et al. (1990) tried to explain divergent findings concerning relationships between subjective measures. They empirically indicated that the convergent validity of these measures depends on the consumer's prior knowledge. In particular, knowledgeable people provide more accurate self-reports of their knowledge than less knowledgeable people. Thus, Kanwar et al. (1990) concluded that self-report measures and objective measures are highly correlated for people who have a good level of knowledge and instruction about a particular domain. However, the authors stress that their findings, established through a single study, suffer from a lack of generalization.

- **Differential effects of objective knowledge, subjective knowledge and product experience on decision-making**

Owing to the aforementioned contradictory findings, Flynn and Goldsmith (1999: 57) state that "*a measure of one type is unacceptable as a measure of the others*". Thus, various authors reflected on the most suitable method (Raju et al., 1995). They investigated the different types of knowledge in terms of their effects on several aspects of the decision-making process. Most of the researchers concluded that

objective knowledge, subjective knowledge and experience actually have distinct effects on attribute importance, information search and decision outcomes (Brucks, 1985; Park et al., 1992; Park et al., 1994; Raju et al., 1995).

Brucks (1985) investigated the effects of subjective and objective prior knowledge on information search behaviour. The author empirically demonstrated that objective knowledge was significantly related to the number of product attributes examined, while subjective knowledge was significantly related to the tendency to ask for the dealer's opinion. Brucks (1985) concluded that these results are consistent with the view that subjective knowledge is related to consumers' self-confidence in their decision-making abilities.

Park et al. (1992, 1994) attempted to model relationships between subjective measures, objective measures and experience. To do so, they tried to understand how information stored in memory about a particular product (e.g. features of the product) or experience, are related to objective and subjective knowledge. They concluded that experience is the strongest determinant of subjective and objective knowledge. They also concluded that experience has a stronger impact on subjective knowledge than on objective knowledge. The main reason proposed by the authors is that product experience cues that drive subjective knowledge are more accessible in memory than product class information.

Raju et al. (1995) investigate the differential aspects of objective knowledge, subjective knowledge and experience on pre-and post-purchase aspects of the decision-making process. They conclude that subjective knowledge is more closely related to decision outcomes (such as "*perceived task complexity*", "*confusion while performing task*" or "*satisfaction with purchase decision*"). Raju et al. (1995) observe that subjective knowledge, with its implicit connotation of confidence, is the primary determinant of perceived decision outcomes.

- **The decision to use subjective measures in this study**

The key findings on consumer knowledge assessment highlighted in this section reveal that the different measures are related. However, some evidence leads to favour the subjective measure of knowledge in this study. Selnes and Gronhaug (1986) deduce from their study that subjective measures should be preferred when research focuses on the motivational aspects of product knowledge while objective knowledge should be favoured when research focuses on the individuals' ability differences. Park et al. (1992, 1994) observe that experience is a determinant of subjective knowledge. Raju et al. (1995) draw the same conclusions and also empirically show that subjective measures, more than objective measures or experience, are related to decision outcomes. This conclusion is of particular interest to the study, because Raju et al. (1995) carried out one of the rare surveys that examine the post-purchase aspects of decision-making. Cordell (1997) reminds us that subjective knowledge is more influential in product judgments because subjective knowledge relies on experience and because memory of experience is more accessible than memory of product information. Flynn and Goldsmith (1999) also suggest that subjective knowledge motivates the behavi surrounding product purchase and use, more than objective knowledge. Finally, Raju et al. (1995) assert that subjective knowledge is a consequence of objective knowledge and usage experience; and mediate their effects on decision outcomes.

So, as cautioned by the literature, subjective knowledge is more appropriate for the study. Subjective knowledge seems to be a more accurate determinant of post-purchase outcomes. Subjective knowledge is also likely to be more closely related to customers' post-purchase experience.

- **A subjective measures of skills**

If consumer knowledge assessment has been widely discussed in the marketing literature, few studies have actually tackled skills assessment. Thus, the possibility of subjectively measuring skills must be discussed. The findings drawn from the literature are threefold: (1) the few studies in marketing literature seem to measure skills subjectively, (2) some studies on consumer knowledge assessment also

implicitly measure skills (3) literature on training and education evaluation recognize that skills can be subjectively measured. Each of these points is detailed hereafter.

In marketing literature, studies dealing with skills assessment seem to rely on subjective measures. Hennig-Thurau (2000) does not mention the exact nature of the method used for skills measurement, but it seems that this method is likely to be subjective. Indeed, face-to-face questionnaires are organized and people are asked, among other things, to answer a set of questions about their skill level. Similarly, Lee and Lee (2001) use subjective measures of skills. Indeed, they refer to self-assessment methods.

In some studies dealing with consumer knowledge assessment, the measures of consumer knowledge encompass skills. For instance, Raju et al. (1995) provide the scale they used to measure subjective knowledge in their study. They asked the interviewees to self-evaluate their ability to use the product. In this case, self-rated ability refers not only to declarative and procedural knowledge but also to cognitive and motor skills. A similar conclusion can be drawn from Park et al. studies (1992, 1994). The authors show that subjective knowledge is related to cognitive responses which refer to both knowledge and skills (see Park et al., 1992 – table 1 – for a complete overview of categories of knowledge and skills mentioned by participants in the survey).

Finally, specialists of training and education evaluation assert that skills can be subjectively measured. Phillips and Stone (2002) remind us that the self-assessment of knowledge and skills is particularly applicable to discerning whether learning is actually taking place. According to the author, this method can constitute a preliminary step to more formal tests. Kirkpatrick (1998) also empirically shows that subjective measures are used to assess skills. This author provides the example of the evaluation of communication skills and reveals that participants self-assess their skills (Kirkpatrick, 1998).

Thus, the literature indicates that using subjective measures of skills seems relevant to this study. Such measures have been performed in a similar context (Hennig-

Thurau, 2000) and were useful in confirming the impact of skills on product-related quality perception.

2.1.3 Relationships between customer education and customer knowledge and skills

The different conceptual and managerial studies on customer education assert that customer education leads to an increase in customer knowledge and skills. Unfortunately, very few studies tried to empirically and quantitatively measure the effects of customer education on knowledge and skills acquisition. A first reason already discussed is the lack of conceptualization of customer education. A second reason could be the lack of interest in the skills concept in marketing literature. A third reason could be the methodological issues related to knowledge and skills assessment. However, the handful of qualitative and quantitative studies that attempted to define the impact of customer education on knowledge and skill acquisition will be presented.

In most of the existing studies, the key outcome of customer education is the level of skills, also termed by some researchers as the "*amount*" of knowledge and skills. Actually, these studies tend to define whether customer education contributes to increasing the consumers' level or amount of knowledge and skills. Meer (1984) analysed the case of six companies. Only one of these companies -Digital- measured the impact of its customer education program on consumer learning. The methods employed for such an assessment were formal individual tests and subjective reports performed by the instructors (Meer, 1984). Honebein (1997) also studied the case of three companies, one of them -Pfizer- tried to measure the impact in terms of skills acquisition and behavioural change. The impact was shown to be positive. Goodman et al. (2001) carried out two managerial surveys and provided empirical evidence that customer education provides product-usage related skills to customers. These skills prevent customers from misusing the products. Mittal and Sawhney (2001) measured the impact of training on initial learning experiences. They concluded that training sessions improve consumption-oriented skills. They also stressed that in the case of electronic and information products and services, educational programs

should focus on the acquisition of two types of knowledge and skills. One type deals with the actual content of information stored in the product. The other type deals with the process, i.e. the knowledge and skills, needed to use the product. Wood and Lynch (2002) also provide evidence that education improves consumption-oriented knowledge and skills. They objectively measured how consumers increased their level of knowledge and skills in the use of a pharmaceutical product. Finally, Jones et al. (2003) empirically demonstrated that customers who understand usage instructions acquire product related skills. The authors carried out a quantitative survey on a large sample (n = 1127) and subjectively measured instructions for understanding service usage.

This section allowed proposing working definitions of product usage related knowledge and product usage related skills. Current findings on the relationships between customer education and customer knowledge and skills acquisition were also highlighted: customer education seems to have a positive impact on the level of knowledge and skills.

Finally, this section also discussed methodological concerns related to knowledge and skills measurement. In the context of this study, it has been deduced from existing debates in the literature, that subjective measures should be preferred to objective measures of knowledge and skills.

2.2 PRODUCT USAGE

Product usage refers to the way consumers actually use a specific product. The chapter 1 stressed that the scope of study homes in on the functional utilization perspective of product usage. The functional utilization perspective examines the usage of product attributes in different situations of consumption (Ram and Jung, 1990). The main assumption is that products offer many application situations and circumstances of consumption (Srivastava et al., 1978). Ram and Jung (1990) suggest that the functional utilization perspective is relevant for products with many features. In this case, customers can combine these features to vary the usage of their products. Examples of products with multiple features are Videocassette Recorders (Harvey and Rothe, 1986; Potter et al., 1988; Hennig-Thurau, 2000); cameras (Ram and Jung, 1989; Hennig-Thurau, 2000) or computers (Shih and Venkatesh, 2004).

To discuss the conceptualization and measurement of product usage, the empirical foundations of product usage conceptualization are first presented (part 2.2.1). Then, the conceptualization and measurement of product usage as developed by Ram and Jung in 1990, and completed in 1991 by the same authors (part 2.2.2) is presented. The interest for such research is twofold. First, Ram and Jung identified key conceptual dimensions of product usage. Second, they provided reliable and valid measures of usage. In part 2.2.3, the relationships between knowledge, skills and product usage are explored.

2.2.1 Empirical foundations of product usage conceptualization

- **Early works on product usage**

Early studies related to product usage propose descriptive or explicative patterns of usage (see table 8). Potter et al. (1988) analysed the usage situation to define segments of VCR owners. Metzger (1985) and Harvey and Rothe (1986) also surveyed usage patterns of VCRs.

Table 8: Early studies on product usage

References and objectives of the survey	Phase of the decision making concerned by the study	Conceptualization and measurement of product usage
Twedt (1964) demonstrates the importance of the "heavy user" category for marketing strategy. Twedt suggests moving from a "non users / users" dichotomy to a typology based on the amount of consumption.	Pre-purchase	Volume and frequency of purchase and consumption.
Banks (1967) tries to measure the impact of 17 demographic variables on the consumption of 12 products.	Pre-and post purchase	No clear statement on the measure of consumption.
Silk and Geiger (1972) investigate relationships between advertisement size, advertisement exposure and product usage.	Pre-purchase	People were questioned about their use of advertised brands. A four-item scale was used : *"yes, last used / no, not last used / never used this type of thing / don't know"*
Srivastava et al. (1978) focus on the usage or application situation; that is the objective circumstances in which the product or service is purchased. The aim is to develop a situational typology which can account for a comprehensive array of usages.	Pre and post-purchase	Different items are proposed which depict usage situations. Examples of these items are presented in exhibit 2, p.33: *"before going to a formal party", "before an important meeting late in the afternoon"*.
Bettman and Park (1980) measure the effect of prior knowledge and prior experience with a product category on the consumer decision process.	Pre-purchase	Authors define a 3-item scale to subjectively measure experience. *"high experience / moderate experience / low experience"* The classification depends on consumer search for information, possession of the product and previous usage of the product.

References and objectives of the survey	Phase of the decision making concerned by the study	Conceptualization and measurement of product usage
Schaninger et al. (1980) use multivariate analysis to investigate relationships between personality and product usage.	Pre and post-purchase	Three dimensions of usage are proposed to measure frequency of usage (p.119) *"heavy/moderate/light"*.
Bloch (1981) develops a scale to measure product involvement. To ensure scale validity, the author measures relationships between involvement and product usage.	Pre-and post purchase	Measure of reported behaviour. Behavioural measures tapped the frequency of participation in a variety of activities presumed to be associated with high involvement with the automobile. Frequency was measured on a six-point scale ranging from "always" to "never".
Johnson and Russo (1984) analyse how product familiarity (including product usage) affects shoppers' ability to learn new product information.	Pre-purchase	A short questionnaire provided self-rated product familiarity. Subjects rate their previous knowledge of automobiles and report their usage experience in the product class.
Metzger (1985) develops benchmark research on the household use of VCRs and then focuses on specific behaviours such as *"zipping and zapping of commercials"* (p. 8).	Post-purchase	The questionnaire used to describe product usage was developed for specific purposes of the survey. Topics such as frequency of use, activity, etc. are addressed in the survey.
Harvey and Rothe (1986) survey VCR users about modifications in their viewing behaviour, how they use their VCR and VCR owners' satisfaction with their equipment.	Post-purchase	The authors measure the importance of different usage situations of VCRs. Importance is measured on a 3-item scale (*"unimportant" / "somewhat important" / "very important"*).
Potter et al. (1988) propose a segmentation of videocassette owners according to current usage patterns.	Post -purchase	(p 31) VCR usage measures include questions about the frequency of taping programs, playing back tapes, zapping and zipping.

Twedt (1964) suggested focusing on the importance of the "heavy user" category to depict usage patterns. Banks (1967) explained how demographic variables influence the consumption of twelve products. Srivastava et al. (1978) defined how the usage situation -i.e. the objective circumstances in which the product is purchased- influences purchase behaviour. For instance, Bettman and Park (1980) measured the effect of product usage on the consumer decision process. Johnson and Russo (1984) reflected on the role of product usage in the customers' ability to learn information about new products. Other studies analysed how different characteristics impact usage. Silk and Geiger (1972) tried to explain the influence of advertising characteristics on product usage. Schaninger et al. (1980) established relationships between personality and product usage. Bloch (1981) measured how product involvement influences product usage. So, most surveys aimed to describe or understand usage behaviours.

When looking at the actual conceptualization of product usage in the aforementioned studies (see table 8, third column), the studies generally consider one single dimension of usage. In most cases, this dimension is usage frequency (Bettman and Park, 1980; Schaninger et al., 1980; Bloch, 1981; Potter et al., 1988). One probable reason for the interest in frequency is that it depicts both usage and buying behaviours. Many of the studies focus on the pre-purchase stage. Consumption and buying frequency are thus related. Folkes et al. (1993) observe that many research studies have examined how frequently people buy and that same type of measure could be carried out on usage.

In a few studies, researchers consider another single dimension of usage which is the usage situation (Srivastava et al., 1978; Metzger, 1985; Harvey and Rothe, 1986). The usage situation depicts different situations in which the product can be used. These studies deal with the analysis of usage at the post-purchase stage and are more interested in describing usage patterns.

Despite the added-value of exploring consumption, Ram and Jung (1990) suggest four limitations of early studies on product usage. A first limitation is that most of the studies are product-specific. For instance, Metzger (1985) and Harvey and Rothe (1986) study only VCR usage patterns. A second limitation is that surveys are

mainly descriptive. For example, Potter et al. (1988) describe usage behaviours of VCR owners. A third limitation, which is important for this study, is that many studies focus on the pre-purchase stage rather than the post-purchase stage (Twedt, 1964; Silk and Geiger, 1972; Bettman and Park, 1980). The fourth limitation is related to usage measurement. The scales proposed and developed in the different surveys have not provided reliable and valid measures (Ram and Jung, 1990).

- **Propositions for conceptualization of product usage**

If previous works have implicitly revealed several dimensions of product usage without clearly conceptualizing them, Gatignon and Robertson (1985) and Zaichkowski (1985) explicitly put forward proposals for its conceptualization. Their propositions are presented hereafter and are considered (Ram and Jung, 1989; Ram and Jung, 1990) to be seminal works.

Gatignon and Robertson's proposition (1985)

Gatignon and Robertson (1985) provide an enhanced and updated inventory of diffusion theory and put forward propositions for new diffusion research. In this specific context, they discuss the adoption process and acknowledge that the concept of adoption has been used in a limited way to refer to a single decision (Gatignon and Robertson, 1985). They assume that for many consumer products, repeat purchase is the key to adoption, while for other products, different dimensions must be taken into account. This proposition is original and Gatignon and Robertson (1985) recognize that no previous academic work supports their hypothesis. The authors suggest that two dimensions must be taken into account to depict product adoption: the width and depth of usage. The width of usage refers to "*the number of people within the adoption unit who use the product or the number of different uses of the product*" (Gatignon and Robertson, 1985: 854). The depth of usage indicates *"the amount of usage or the purchase of related products" (*Gatignon and Robertson, 1985: 854*)*

The authors put forward the hypothesis that the product's maximum diffusion potential depends on these two dimensions.

Zaichowski's proposition (1985)

Zaichkowski (1985) discusses the concept of familiarity and its relationships with involvement, expertise and product usage. To empirically validate the aforementioned relationships, the author proposes a one-dimensional construct of usage and arguably proposes to consider usage frequency. But she acknowledges some limitations to this approach (Zaichkowski, 1985: 298):

"*One of the problems I had with gathering data was the measure of product use. How does one define a product in a universal sense over many product categories*".

Consequently, she suggests considering two dimensions of the construct that could better characterize usage: depth and breadth. Depth of usage (Zaichkowski, 1985: 298) refers to

"*The frequency of usage or how often the product is consumed. [...] For durable goods depth might be the number of times in the time period the product was used*"

Breadth of usage (Zaichkowski, 1985: 299) measures "*for durable goods a variety of use situations, e.g., for cameras, use indoors, outdoors, flash, touring, studio, etc.*"

Propositions for usage conceptualization have also been made by Dutton et al. (1985). These researchers investigated the usage of computers. They suggested measuring two dimensions of usage: the amount of usage and the variety of usage. Foxall and Bhate (1991) also investigated computer usage. They included two types of measures. The first measure consisted of time-based behaviour measures (frequency of computer usage and number of years of computing experience). The second measure deals with usage variety and refers to the range of computer package-based applications employed.

Propositions for usage conceptualization highlight two key dimensions of product usage. One is related to the frequency of usage, the other depicts usage variety. These academic works have been conducted in different contexts. Gatignon and Robertson (1985) focused on diffusion research. Zaichkowski (1985) dealt with

product-class issues. Dutton et al. (1985) and Foxall and Bhate's (1991) studies focused on computers, a specific class of product. But these works prompted further reflection on usage conceptualization, such as the significant work produced by Ram and Jung (1990, 1991) which is presented in the next section.

2.2.2 Ram and Jung's conceptualization of product usage (1990, 1991)

Ram and Jung (1990, 1991) conducted academic studies which are interesting for several reasons. They identified the key conceptual dimensions of product usage which can be generalized across product classes. They also provided reliable and valid measures of usage based on these dimensions. Finally, the context of their measures is pertinent with respect to this study. Indeed, the conceptualization and measurement proposed by Ram and Jung (1990, 1991) are specific to post-purchase usage and to products with multiple features.

- **Usage as a two-dimensional concept (Ram and Jung, 1990)**

Based on early attempts to conceptualize product usage (see section 2.2.1), Ram and Jung suggest that two key dimensions must be taken into account: usage frequency and usage variety.

Usage frequency refers "*to how often the product is used - usage time – regardless of the different applications for which the product is used*" (Ram and Jung, 1990: 68)

Usage variety refers to "*the different applications for which a product is used and the different situations in which the product is used*" (Ram and Jung, 1990: 68)

This two-dimensional conceptualization of usage is consistent with early thoughts on the topic. Usage frequency was widely used in early empirical works (Bettman and Park, 1980; Schaninger et al., 1980; Bloch, 1981; Potter et al., 1988). Usage frequency also comes close to depth of usage (Gatignon and Robertson, 1985; Zaichkowski, 1985). Usage variety was also considered in the early works on

product usage. In these cases, authors mainly referred to the different situations in which the product is used (Srivastava et al., 1978; Metzger, 1985; Harvey and Rothe, 1986. Definitions of width of usage (Gatignon and Robertson, 1985) and breadth of usage (Zaichowski, 1985) also reveal proximity with usage variety.

Ram and Jung (1990) also developed reliable and valid measures of the two dimensions of usage. To achieve this goal, they analysed the usage of four different products with multiple features (videocassette recorders, personal computers, micro-wave ovens and food processors) on a large sample (n = 471). They employed and compared two methods for measuring product usage: diary and self-report. The diary method relied on the respondents' description of their own daily usage of products. The self-report method relied on the completion of a questionnaire after a certain period of time. The self-report subjectively measured usage frequency and variety, while the diary seemed to be more objective.

The reasons for comparing two methodologies (diary and self-report questionnaire) were twofold. Firstly, the authors needed to develop reliable and valid measures of usage and had to compare measurement methods to that effect. Secondly, as product usage may vary over time, the most effective method had to be found. The authors report that the diary is actually the most commonly used method but it is generally applied over a short period of time (Ram and Jung, 1990). Thus, measures must be found that can depict usage over a long period of time. Indeed, as Hennig-Thurau (2000) recalls, different phases and areas of application exist to depict usage, from pre-use (installation, start) to use (usage of basic features, full usage, etc.) and to post-use (keeping and storing the product, maintenance, update, etc.). This wide range of applications means that usage varies over time and that usage cannot be measured only over a short period.

The results of their empirical validation show that self-report provides reliable and valid measures of usage. This finding is important because self-reported measures are definitely easier to implement than diary reports.

- **Usage as a three-dimensional concept (Ram and Jung, 1991)**

Despite the empirical validation of their two-dimensional approach of usage, Ram and Jung (1991) argue that their initial definition of usage variety (Ram and Jung, 1990) actually encompassed two dimensions which depicted different facets of usage: usage function and usage situation. Consequently, they suggest retaining three dimensions of usage rather than two. They propose new definitions of each dimension (Ram and Jung, 1991: 404).

Usage frequency refers to "*how often the product is used, regardless of the product functions used, or the different applications for which the product is used*"

Usage function refers to "*what extent the product features/functions are utilized by the consumer, regardless of how often the product is used*"

Usage situation refers to "*the different applications for which a product is used, and the different situations in which a product is used regardless of either usage frequency or usage function*"

Ram and Jung provide different reasons for considering three key dimensions rather than two. A first reason is related to methodological issues. They observed in their first survey (Ram and Jung, 1990) that measuring only one aspect of variety leads to low statistical significance of the measure. A second reason, which is of direct interest to this study, is that three dimensions are more relevant than two dimensions in analyzing the influence of product usage on consumer behaviour and attitude. Interestingly, the authors provide empirical evidence that each dimension of usage actually has a specific level of impact on customer satisfaction (Ram and Jung, 1991).

In their previous survey, the authors provide empirical evidence of the reliability and validity of the measures of the three usage dimensions.

- **Discussion about the relationships between the different dimensions**

This discussion focuses on the relationships and overlaps between the dimensions. Shih and Venkatesh (2004) observe that variety and frequency are probably linked, even if their exact relationship has not been empirically examined. Ridgway and Price (1994) also consider that potential links exist. In particular, when consumers enjoy using their product, it is probable that they spend a lot of time using it. Ram and Jung (1989, 1990, 1991) agree on such potential interrelations between the dimensions of usage and offer some statistical evidence of such relationships. For instance, they show (Ram and Jung, 1990) that variety in functional usage is highly correlated with situational usage. Their hypothesis on such relationships is that the more the product is used in a wide variety of occasions, the more the functional usage may be needed. Ram and Jung (1991: 405) similarly state that:

"*This is not surprising because an individual who uses multiple functions, features of the product, and uses the product in a variety of usage situations, is likely to enjoy a high usage frequency*"

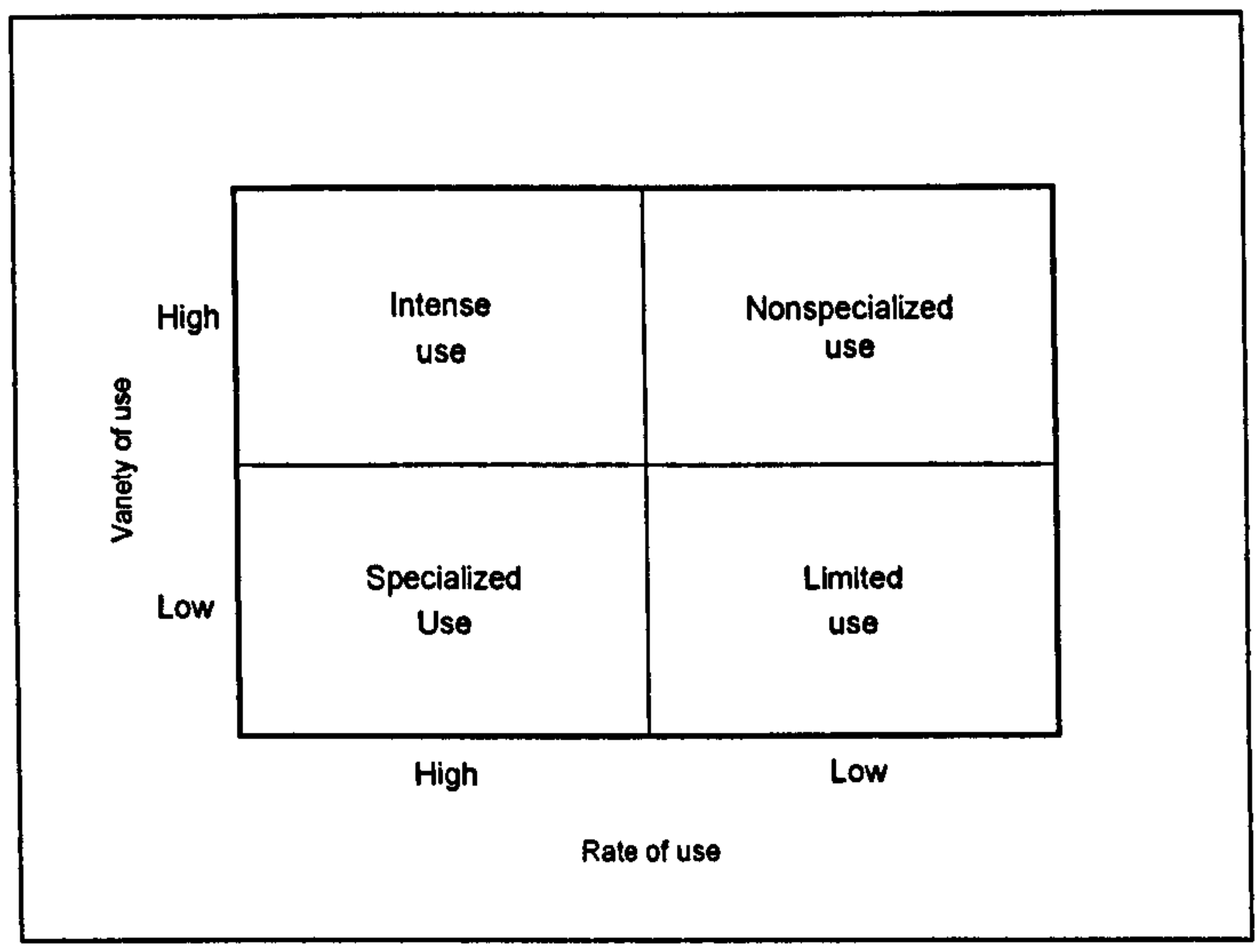
But the potential overlap does not seem to be a problem to these authors. Indeed, the different dimensions can be treated as distinct in any attempt to understand how those factors influence usage or in any attempt to understand the outcomes of usage (Ram and Jung, 1991; Shih and Venkatesh, 2004). For instance Ram and Jung (1989) investigate the relationships between the different dimensions of usage and other constructs such as product involvement and use innovativeness. Ridgway and Price (1994) also define relationships between the dimensions of usage and use innovativeness. Ram and Jung (1991) investigate how the three different dimensions of product usage influence customer satisfaction. Shih and Venkatesh (2004) empirically define the relative importance of the different individual and social factors of each aspect of usage. In all of these surveys, each usage dimension was surveyed distinctly and was reported to have a specific impact. For example, Ram and Jung (1989) empirically showed that use innovativeness has a strong impact on variety and a more moderate impact on use frequency. Shih and Venkastesh (2004) also empirically demonstrated that certain factors, such as communication with other

users of a product, positively impact usage variety, while other factors such as product experience affect both variety and frequency.

- **From dimensions to patterns of usage**

Despite the potential overlap of the different dimensions of usage, researchers propose to formalize usage patterns by cross-matching these dimensions. Ram and Jung (1990) and Ridgway and Price (1994) remind us that the dimensions of usage can be considered as a manifestation of different types of customer needs. Shih and Venkatesh (2004) remind us that variety of use implies more complex behaviour than frequency of use and requires a higher cognitive effort. Consequently, Shih and Venkatesh (2004) suggest combining frequency and variety to define a fourfold typology of use. To achieve this goal, they divide each dimension into two sub-dimensions. Variety of use is divided into "high variety" and "low variety"; while rate[4] of use is divided into "high rate" and "low rate" (see figure 3).

Figure 3: Typology of uses (adapted from Shih and Venkatesh, 2004)



[4] In their study on use diffusion patterns, the authors employ the phrase "usage rate" or "rate of use" that they define as "*the time a person spends using the product during a designated period of time*". This definition is related to the definition of "usage frequency" offered by Ram and Jung (1991).

This typology reveals four categories of usage. Intense use and limited use describe extreme situations. While intense use can be hypothesized as leading to greater levels of loyalty and satisfaction (Shih and Venkatesh, 2004; Hennig-Thurau et al., 2005), limited use may correspond to product disadoption (Shih and Venkatesh, 2004). Specialized use may correspond to routinized usage (Ram and Jung, 1990). Non-specialized use may reveal variety-seeking behaviour (Ram and Jung, 1990; Ridgway and Price, 1994) and may describe usage based on trial and error (Shih and Venkatesh, 2004).

To analyse factors explaining usage as well as the outcomes of usage, one has to decide whether this typology is better than the distinct analysis of each dimension (usage frequency and usage variety). An answer emerges from the study by Shih and Venkatesh (2004). Their research hypotheses concern each dimension, while their analysis and conclusion rely on the four types of customer uses. In other words, such typology is probably more appropriate for synthesizing results than for measuring usage. As suggested by Shih and Venkatesh (2004: 69): "*the fourfold typology is a constructive way to visualize the market*".

2.2.3 Relationships between knowledge, skills and dimensions of product usage

As explained earlier, the main objectives of customer education are to provide customers with product-usage related skills and to enhance product usage. Positive relationships between education, skills and usage can be considered. In particular, the acquisition of consumption-related skills can help customers to unlock the value embedded in the product. Now, the literature on surveys which have empirically established relationships between the acquisition of knowledge and skills and the different dimensions of product usage is reviewed.

- **A limited number of academic studies on the topic**

Very few studies have highlighted relationships between the dimensions of product usage and the dimensions of customer skills. One plausible reason is given by Ram and Jung (1990: 68):

"*Perhaps, due to an implicit assumption that consumers are likely to use the features/functions of a product soon after purchase, and there is little to be learned from studying post-purchase consumption*"

In these surveys, no research has provided measures of customer education. In most cases, academics have surveyed the impact of specific educational events, such as usage instructions or lectures. Moreover, the surveys do not systematically exploit all the dimensions of customer skills and product usage. Indeed, the choice of the dimensions depends on the context of the research or of the product category which is surveyed.

- **Knowledge and skills as drivers of enhanced product usage**

As expected, studies analyzing relationships between education, knowledge/skills and usage dimensions reveal the positive relationships between knowledge/skills and product usage. Mittal and Sawhney (2001) have empirically shown that usage frequency of electronic information products and services increases for people trained on this product category compared to people who are not trained. They have also shown that providing customers with both basic process knowledge (*how to use the product*) and basic content knowledge (*information residing in the product*) is the most effective strategy to ensure high levels of usage. Mittal and Sawhney (2001) also acknowledge that one limitation of their study is that measures of usage tap into only one dimension.

Shih and Venkatesh (2004) sought to analyse the determinants of home technology use diffusion. They empirically demonstrated that external communication intensity pertaining to the product leads to a higher variety of use. They also showed that exposure to targeted media is related to both usage variety and usage frequency. Finally, they demonstrated that a higher intensity of communication with other product users leads to a higher variety of use. The aforementioned determinants of product usage do not formally represent customer education, but are in some ways similar to customer education. For example, communication with other users can be assimilated to interactive instructional methods. In each situation, the acquisition of

knowledge or the ability of customers to better understand the product seems to be the consequence of both external communication and the drivers of usage.

Thus, the authors urge companies to move away from conventional promotional strategies towards more creative approaches. They implicitly suggest developing customer education:

"*When a new product that is capable of fulfilling multiple tasks is introduced into the market, conditions must be created that enable higher variety of use and higher rate of use. [...] our research suggests that to encourage such usage behaviour, it is important to disseminate use knowledge and to nurture use-based learning*" (Shih and Venkatesh, 2004: 70)

Similarly, Ram and Jung (1994:65) suggest that:

"*For high-tech products such as computers that have the potential for multiple uses, the marketer should [...] educate consumers on how to achieve and enjoy the usage variety by designing user-friendly manuals, conducting product demonstrations, etc.*"

- **Product usage as a driver of the acquisition of knowledge and skills**

These different studies reveal that consumer learning has a positive effect on product usage behaviour. Actually, discussions in the literature about relationships between skills and product usage show that there could be a loop (Hennig-Thurau et al., 2005): while an increase of skills may lead to a higher intensity of product usage, higher levels of product usage may also lead to skills acquisition. The latest phenomenon has been defined as "*learning from experience*" (Hoch and Deighton, 1989) or "*product experience*" (Hoch, 2002). Mittal and Sawhney (2001: 10) demonstrated that a well structured initial learning experience impacts product experience and finally the level of product usage:

"*A well structured learning experience engenders high initial usage. Higher usage, in turn, sets up a positive feed-back loop. As consumers use the product more, they develop more content and process knowledge leading to even higher usage*"

Actually, these findings are related to a topic which was already discussed in section 2.1.2 about the assessment of knowledge and skills. Many authors agreed that product usage is not a relevant driver of consumer knowledge (Brucks, 1985; Selnes and Gronhaug, 1986; Cole et al., 1986; Rao and Monroe, 1988). According to these researchers, knowledge may be developed without usage while usage may not lead to an increase level of knowledge (Rao and Monroe, 1988).

So, in the context of this study, the investigation will be limited to the main idea that customer education can lead to an increase of knowledge and skills and thus to enhanced product usage.

With respect to this study, no studies, except the one conducted by Ram and Jung (1991), used the three-dimensional conceptualization of product usage. Thus, it will be relevant to measure how customer education affects each of these dimensions.

This section has presented the conceptualization of product usage as both a two-dimensional construct (usage frequency and usage variety) and a three dimensional construct (usage frequency, usage function, usage situation). Given its relevance in explaining satisfaction, the three-dimensional construct will be retained for the field study. Existing research on the relations between education, knowledge/skills and usage, as well as the need for further investigation into the topic has also been highlighted.

2.3 CUSTOMER SATISFACTION

As explained earlier, satisfaction is an antecedent of loyalty and profit (Fornell, 1992; Anderson and Sullivan, 1993; Jones and Sasser, 1995; Rust et al., 1995; Reicheld, 1996; Mittal and Anderson, 2000). Consequently this study should concentrate on satisfaction and forego loyalty. So, the relationships between customer education and customer satisfaction will be explored. This study assumes that both the increase of knowledge / skills and a more intensive usage of the product are two important consequences of customer education and two determinants of customer satisfaction. Since the objective is to quantitatively measure these relationships, the concept of satisfaction must be now defined. Giese and Cote (2000: 1) underline the difficulty of such an exercise because of the "*wide variance in the definitions of satisfaction*". Similarly, Oliver (1997: 13) concedes that "*everyone knows what [satisfaction] is, until asked to give a definition. Then it seems, nobody knows*".

The ambition is not to challenge existing debates on the definitions of satisfaction. An overview of the concept is proposed. The appropriate definition that complies with the context of the study is proposed. In the first section (section 2.3.1), the main definitions of satisfaction are discussed. The similarities and discrepancies between these definitions are investigated. The analysis of the antecedents of satisfaction (part 2.3.2) refers to the evaluative process which leads to satisfaction. Notably, the core dominant paradigm, called the "*expectancy disconfirmation*" paradigm (Oliver, 1977, 1980, 1981) will be presented. Finally, the actual relationships between knowledge/skills and satisfaction as well as the relationships between product usage and satisfaction will be investigated (part 2.3.3).

2.3.1 Definitions of satisfaction

Before analyzing the definitions of satisfaction, it is important to note that discrepant terms are used interchangeably in the literature, such as "*consumer satisfaction*", "*customer satisfaction*" or simply "*satisfaction*". One explanation of the variation of

terms is provided by Yi (1990) who observed that definitions of satisfaction depend on the focus of the study. Some studies refer to satisfaction with respect to a product (Churchill and Surprenant, 1982). Other studies refer to consumption experience (Oliver, 1980, 1981; Westbrook and Reilly, 1983), to purchase decision experience or to satisfaction with the salesperson or with the store. But Giese and Cote (2000) concede that the use of different terms does imply specific differences in the way the concept of satisfaction is apprehended. In this study, the term "*customer satisfaction*" will be used.

- **Usual definitions of satisfaction**

Table 9 presents two types of definitions of satisfaction. Most of these definitions are considered as references in marketing literature. Other definitions, such as those by Garbarino and Johnson (1999) or Giese and Cote (2000), offer perspectives which complete traditional visions of satisfaction.

A first common characteristic is that satisfaction is an outcome resulting from a consumption experience (Howard and Sheth, 1969; Hunt, 1977; Oliver, 1981; Day, 1984; Anderson et al., 1994; Oliver, 1997) and notably from a post-purchase consumption experience (Churchill and Surprenant, 1982; Westbrook and Reilly, 1983; Westbrook, 1987; Tse and Wilton, 1988; Fornell, 1992; Oliver, 1997).

Definitions also position satisfaction as an evaluation. Consequently, Yi (1990) observed that definitions of satisfaction could be subdivided into two categories. The first category presents the evaluation as an outcome or a response (Howard and Sheth, 1969; Oliver, 1981; Westbrook and Reilly, 1983; Cadotte et al., 1987; Oliver, 1997; Giese and Cote, 2000) while other definitions refer to evaluation as a process (Hunt, 1977; Engel and Blackwell, 1982; Day, 1984).

The third common point refers to the relative character of satisfaction. Satisfaction depends on prior expectations or prior beliefs of consumers (Hunt, 1977; Oliver, 1981; Engel and Blackwell, 1982; Day, 1984; Tse and Wilton, 1988; Oliver, 1997). In this respect, the evaluation process relies on a comparison between the actual consumption experience and initial beliefs or expectations (Oliver, 1977, 1980, 1981).

Table 9: Usual definitions of satisfaction

References	Definition of satisfaction	Nature of the response	Nature of the experience
Howard and Sheth (1969)	"The buyer cognitive state of being adequately or inadequately rewarded in a buying situation for the sacrifices undergone" (p.145)	Cognitive	*Not defined*
Hunt (1977)	"An evaluation rendered that the experience was at least as good as it was supposed to be" (p.459)	Cognitive and affective	Consumption experience
Oliver (1981)	"A summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's priori feelings about the consumption experience" (p.27)	Cognitive	Acquisition and consumption experience
Churchill and Surprenant (1982)	"Conceptually, an outcome of purchase and use resulting from the buyer's comparison of the rewards and costs of the purchase relative to anticipated consequences. Operationally similar to attitude in that it can be assessed as a summation of satisfactions with various attributes" (p.493)	Cognitive	Acquisition (purchase) and consumption experience
Engel and Blackwell (1982)	"An evaluation that the chosen alternative is consistent with prior beliefs with respect to that alternative" (p.501)	Cognitive	Purchase experience
Westbrook and Reilly (1983)	An emotional response to the experiences provided by and associated with particular products or services purchased, retail outlets, or even molar patterns of behaviour such as shopping and buyer behaviour, as well as the overall marketplace (p. 256)	Affective	Consumption (specifically at the post-purchase stage)
Day (1984)	"The evaluative response to the current consumption event...the consumer's response in a particular consumption experience to the evaluation of the perceived discrepancy between prior expectations (or some other norm of performance) and the actual performance of the product perceived after its acquisition" (p.496).	Cognitive	Consumption experience
Cadotte, Woodruff and Jenkins (1987)	"feeling developed from an evaluation of the use experience" (p. 305).	Affective	Consumption experience

Westbrook (1987)	"Global evaluative judgment about product usage/consumption" (p. 260)	Affective	Consumption
Tse et Wilton (1988)	"The consumer's response to the evaluation of the perceived discrepancy between priori expectations and the actual performance of the product as perceived after its consumption" (p.204)	Cognitive	Consumption
Fornell (1992)	"An overall post-purchase evaluation" (p.11)	Cognitive	Post-purchase
Anderson, Fornell et Lehmann (1994)	"An overall evaluation based on the total purchase and consumption experience with a good or service over time" (p.54)	Cognitive	Cumulative (= relational)
Oliver (1997)	"Satisfaction is the consumer's fulfilment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfilment, including levels of under- or over-fulfilment" (p.13)	Cognitive and affective	consumption
Garbarino and Johnson (1999)	The authors distinguish transaction-specific satisfaction from overall (or cumulative) satisfaction: "transaction specific customer satisfaction is an immediate post-purchase evaluative judgment or an affective reaction to the most recent transactional experience with the firm" (p 71). "overall satisfaction is a cumulative construct, summing satisfaction with specific products and services of the organization and satisfaction with various facets of the firm such as the physical facilities" (p 71)	Cognitive and affective	Post-purchase (in the the case of transaction specific satisfaction) Overall evaluation (cumulative satisfaction)
Giese and Cote (2000)	The authors propose a general definitional framework of consumer satisfaction: 'Consumer satisfaction is: A summary affective response of varying intensity. [...] with a time-specific point of determination and limited duration [...] directed toward focal aspects of product acquisition and/or consumption." (p 15)	Affective	Acquisition and consumption

To conclude, there is a general consensus in the literature on the following key aspects of satisfaction. Satisfaction is considered as a summary psychological state, sometimes described as "*non observable*" (Aurier and Evrard, 1998) which follows a consumption experience. This psychological state is the result of an evaluation process undertaken by consumers with respect to their consumption experience. The evaluation process takes the form of a comparison between the actual performance of a product and the consumer's prior expectations. This process refers to the expectancy disconfirmation model (Oliver, 1981) analysed in section 2.3.2.

Despite this consensus, three important debates exist in the literature. A first debate examines the nature of the evaluation. Consumer satisfaction has been conceptualized as either a cognitive or affective/emotional response. A second debate pertains to the timing of response. Two perspectives are considered in the literature: transaction-specific satisfaction (which occurs after a specific consumption experience) and cumulative satisfaction (which refers to the overall consumption experience over time). The third debate deals with the discriminant validity of satisfaction compared with closed concepts. These debates have an impact on the understanding and conceptualization of satisfaction. Therefore each of them is presented hereafter.

- **Satisfaction as a cognitive and / or affective concept**

Three schools of thought can be distinguished about the exact nature (cognitive or affective) of satisfaction. Early definitions exclusively considered satisfaction to be a cognitive construct (Howard and Sheth, 1969; Hunt, 1977). Another path of research asserts that satisfaction is exclusively an affective construct (Westbrook and Reilly, 1983; Cadotte et al., 1987; Garbarino and Johnson, 1999; Giese and Cote, 2000). The last approach considers satisfaction as both a cognitive and affective construct (Westbrook, 1987; Oliver, 1997; Fournier and Mick, 1999).

<u>Satisfaction as exclusively cognitive</u>

Historically, satisfaction has been conceptualized as a cognitive construct. This vision clearly appears in the definition proposed by Howard and Sheth (1969: 145)

which refers to "*the buyer cognitive state of being*" or in the definition of Hunt (1977: 459) which evokes "*an evaluation rendered that the experience was at least as good as it was supposed to be*". In this case, satisfaction results from a comparison between the consumers' perception of product performance and their expectation level. For instance, Engel and Blackwell (1982) refer to "A*n evaluation that the chosen alternative is consistent with prior beliefs with respect to that alternative*".

Tse and Wilton (1988: 204) define satisfaction as:

"*The consumer's response to the evaluation of the perceived discrepancy between prior expectations and the actual performance of the product as perceived after its consumption*"

This assertion reminds us that the evaluation process relies only on cognitive elements and casts any affective aspects aside. This theoretical perspective refers to seminal work carried out by Oliver on the expectancy disconfirmation paradigm (1977, 1980).

<u>Satisfaction as exclusively affective</u>

Fournier and Mick (1999: 6) asserted that:

"*Research within customer satisfaction paradigm has probably underrepresented the emotional aspects of satisfaction and that the further study of affective satisfaction modes could play a promising corrective role*"

This statement underlines that the solely cognitive nature of satisfaction was challenged by defenders of the affective approach. Actually, this path of research was developed by psychologists who considered satisfaction as an emotion.

Thus, Westbrook and Reilly (1983: 256) proposed to define satisfaction as:

"A*n emotional response to the experiences provided by and associated with particular products or services purchased, retail outlets, or even molar patterns of*

behaviour such as shopping and buyer behaviour, as well as the overall marketplace"

Cadotte et al. (1987: 305) referred to a "*feeling developed from an evaluation of the use experience*". The affective nature of this definition is supported by results of the study carried out by the author. Westbrook (1987) examined consumer affective responses to consumption experience and established that good and bad feelings represent two dimensions of affective response to products in use. The author also demonstrated that these two dimensions relate directly, and in the expected direction, to product satisfaction judgments. Giese and Cote (2000) proposed a general definitional framework for satisfaction and also asserted that satisfaction is an affective construct. Their definition is a result of thirteen group interviews and twenty-three personal interviews with consumers. Giese and Cote (2000) observed during these interviews that 77,3% of group interview responses and 64% of individual interviews responses specifically used affective terms to describe satisfaction. Thus, Giese and Cote (2000: 15) proposed to define satisfaction as "*a summary affective response of varying intensity*".

<u>Satisfaction as both cognitive and affective</u>

If the debate on the cognitive or affective nature of satisfaction is still rife (Giese and Cote, 2000), many researchers tend to agree that satisfaction is the result of both aspects.

Westbrook (1987: 267) observed that:

"*Satisfaction judgments are determined not only by ex-post cognitive semantic comparison processes as typically assumed, but also by additional processes involving the retrieval and integration of relevant product-related affective experiences*"

Similarly, Garbarino and Johnson (1999: 71) integrated the cognitive and affective dimensions in their definition of satisfaction:

"*An immediate post-purchase evaluative judgment or an affective reaction to the most recent transactional experience with the firm*"

Oliver (1993) studied consumer satisfaction with automobiles and satisfaction with course instruction. He empirically demonstrated that disconfirmation effects, as well as positive and negative emotions, were related to satisfaction. Fournier and Mick (1999) investigated consumer satisfaction in the domain of technological products. They highlighted that satisfaction is related to both cognitive and emotional dimensions.

If satisfaction results from both cognitive and affective processes, no clear consensus exists on the relationships between both dimensions. For instance, Oliver (1997: 319) observed that the "*hybrid cognition-emotion*" is not well described in the literature.

<u>The status of satisfaction in the context of this study</u>

In the context of this study, the question of whether the impact of customer education on satisfaction relies on cognitive, affective or cognitive-affective processes should be discussed. Evidence from the literature shows that most researchers suspect a cognitive response. Customer education provides knowledge and skills that help customers to develop a more conscious judgment about the product. This conscious evaluative judgment could be influenced by a better level of product awareness (Meer, 1984; Noel et al., 1990) and by a better level of consumer ability to use a product. Similarly, Dankens and Anderson (2001) assert that satisfaction is related to the more efficient use of the product. Hennig-thurau (2000) seems to defend the cognitive approach of satisfaction, but this author also refers to emotional response. He empirically demonstrated that customer education leads to higher emotional commitment. However, he did not relate this result to any measurement of satisfaction.

Thus, in the study satisfaction will be mostly considered as a cognitive response.

- **Transaction-specific and cumulative satisfaction**

As explained, satisfaction has been historically conceptualized as the evaluation of a specific consumption experience (Hunt, 1977; Oliver, 1981; Day, 1984). More recently, satisfaction has also been defined as an overall evaluation based on the total purchase and consumption experience of a good or service over time (Fornell, 1992). The first approach refers to transaction-specific satisfaction, while the latter refers to cumulative satisfaction. These two conceptualizations of satisfaction are presented hereunder.

Transaction-specific satisfaction

Most research related to transaction-specific satisfaction focuses on the analysis of the antecedents and consequences of satisfaction at an individual level (Oliver, 1980, Westbrook, 1980). Different reasons justify the advantages of the analysis of transaction-specific satisfaction. First, the analysis of a specific transaction is necessary to understand the satisfaction formation process (Vanhamme, 2002). Then, satisfaction is a function that comes from the discrepancy between the consumer's prior expectations and his/her perceived consumption experience. As expectations can evolve over time, the analysis should take place over a short period (Iacobucci et al., 1994). For these different reasons, the transactional vision of satisfaction has been largely adopted, even in longitudinal studies (LaBarbera and Mazurski, 1983; Bolton and Drew, 1991; Richins and Bloch, 1991; Mittal et al., 1999).

Cumulative satisfaction

An opposite vision of transaction-specific satisfaction is the cumulative satisfaction that Garbarino and Johnson (1999: 71) defined as:

"*A cumulative construct, summing satisfaction with specific products and services of the organization and satisfaction with various facets of the firm such as the physical facilities*"

Oliver (1997: 15) specifies that cumulative satisfaction focuses on the consumer's accumulated satisfaction of many occurrences of the same experience. Most research dealing with cumulative satisfaction focuses on the long-term effects of satisfaction on corporate performance (Fornell, 1992; Anderson et al., 1994; Fornell et al., 1996; Oliver, 1997). Therefore, cumulative satisfaction has been widely used in nation-wide satisfaction barometers such as the American Customer Satisfaction Index (ACSI) or the Swedish Customer Satisfaction Index (SCSI). One objective of these barometers is to measure the quality of the goods and services as experienced by customers (Fornell et al., 1996). Fornell et al. (1996: 7) specified that:

"*An individual firm's ACSI represents its served market –its customer's- overall evaluation of total purchase and consumption experience*"

Finally, these two visions are complementary, but differ in their objectives. Anderson and Sullivan (1993) demonstrated the discriminant validity of transaction-specific and cumulative satisfaction. Transaction-specific satisfaction focuses on the consumer's evaluation of a specific consumption experience at an individual level. Cumulative satisfaction focuses on aggregated experiences of consumers at individual levels or on a firm's aggregate customer experience (Oliver, 1997).

<u>The status of satisfaction in the context of the study</u>

For the purpose of the study, a choice must be made between these two approaches to satisfaction. In the literature on customer education, both approaches are relatively balanced. Some studies focus on the impact of customer education on satisfaction related to the consumption/usage of a specific product (Meer, 1984; Honebein, 1997; Goodman et al., 2001; Hennig-Thurau et al., 2005). Other researchers hypothesize that education will impact the different experiences customers have with the product manufacturer over time. Their studies fall within the scope of cumulative satisfaction (Hennig-Thurau, 2000; Dankens and Anderson, 2001; Duymedjan and Aubert, 2003).

However, as the study refers to the analysis of potential drivers of satisfaction (customer education, knowledge/skills and product usage) and its impact on the

satisfaction formation process, the focus is clearly on transaction-specific satisfaction.

- **Distinction between satisfaction and closed concepts**

Satisfaction being a complex and multi-dimensional construct, Oliver (1997: 18) observed that there is a need to:

"*Disentangle the confusion of terms surrounding satisfaction by pursuing it as a central concept in the myriad of responses that consumers might make to consumption events*"

Actually, the risks of confusing satisfaction and three related constructs – attitude, perceived quality and perceived value – are demonstrated in the literature. Hereafter, satisfaction and each of the aforementioned constructs are therefore compared.

<u>Satisfaction and attitude</u>

Latour and Peat (1979) asserted that satisfaction and attitude are closely related, because both concepts refer to an "*evaluation response*" to a product.

They shed doubt on the discriminant validity of satisfaction by asserting that:

"G*iven that attitude and satisfaction are both evaluative responses to products, it is not clear whether there are any substantive differences between the two. In fact, it may be more parsimonious to consider satisfaction measures as post-consumption attitude measures*" (Latour and Peat, 1979: 434)

Another source of confusion arises from the nature of the evaluation itself. Usual definitions (Engel et al., 1990) stress that attitude encompasses three components, namely cognitive, affective and conative components. Satisfaction also encompasses cognitive and affective dimensions.

Although the sense of the two concepts seems relatively close, three differences have been highlighted in the literature. Firstly, satisfaction is related to a (or to several)

consumption experience(s), which is not necessarily the case for attitude (Evrard, 1993). The second distinction is related to the formation process. Satisfaction relies on comparison between a consumer's prior expectation and the actual performance of a product (Oliver, 1980). Oppositely, attitude is not related to comparative judgments.

Finally, attitude has been recognized as stable over time (Rokeach, 1968), while satisfaction evolves over time as a function of customer expectations and customer perceptions of product performance (Oliver, 1980; LaBarbera and Mazursky, 1983; Bolton and Drew, 1991).

Satisfaction and perceived quality

Perceived quality, or *subjective quality*, refers to consumers' perception of quality. Zeithaml (1988) defined perceived quality as the consumer's judgment about an entity's overall excellence or superiority. This definition reveals similarities between satisfaction and perceived quality. Ngobo (1997) noticed that the concepts are used interchangeably in the literature. Some accepted this choice (Rust and Zahorik, 1993; De Ruyter et al., 1998; Zeithaml, 2000). For instance, Rust and Zahorik (1993: 193) acknowledged that: "*we tend to use the terms 'service quality' and 'customer satisfaction' almost interchangeably*".

However, several distinctions have been proposed in the literature. Oliver (1997) highlighted five key distinctions (see table 10)[5].

The first major distinction is that satisfaction is experiential while perceived service quality is independent of any consumption experience. The second distinction is that perceived quality is based on attributes which can be consensually defined as relevant and common to any specific product/ service quality evaluation. Oppositely, a satisfaction judgment relies on attributes specific to each individual. The third distinction is that satisfaction has both cognitive and/ or affective aspects.

[5] Even if not clearly mentioned in this table, the term quality refers, according to the author, to perceived quality (Oliver, 1997:165).

Oppositely, perceived quality is solely a cognitive response. As a fourth distinction, Oliver (1997) considered that few conceptual antecedents of perceived quality were known, whereas satisfaction was known to be influenced by many cognitive and affective processes. Finally, according to Oliver (1997), satisfaction is transaction-specific whereas perceived quality is a long-term phenomenon.

Table 10: Differences between quality and satisfaction (Oliver, 1997)

Comparison dimension	Quality	Satisfaction
Experience dependency	None required; can be externally or vicariously mediated	Required
Attributes / dimensions	Specific to characteristics defining quality for products or services (e.g., four C's of a diamond)	Potentially all attributes or dimensions of products or services (e.g., setting of a diamond)
Expectation / standard	Ideals, excellence	Predictions, norms, needs, etc.
Cognitive / affective	Primarily cognitive	Cognitive and affective
Conceptual antecedents	External cues (e.g., price, reputation, various communication sources)	Conceptual determinants (e.g., equity, regret, affect, dissonance, attribution)
Temporal focus (short- versus long-term)	Primarily long-term (overall or summary)	Primarily short term (transaction or encounter-specific)

Satisfaction and perceived value

Probably because the concept of perceived value is more recent than that of attitude and perceived quality, only a handful of studies examine the distinction between satisfaction and perceived value. But current definitions of perceived value lead to potential confusions with satisfaction. Customer perceived value has been defined as the "*consumers' overall assessment of the utility of a product based on perceptions of what is received and what is given*" (Zeithaml, 1988: 14)[6]. Oliver (1997: 28)

[6] Zeithmal and Bitner (2003:491) have also adapted the definition of customer perceived value to the specific context of services: "*consumers' overall assessment of the utility of a service based on perceptions of what is received and what is given*".

defined the same concept as *"a judgment comparing what was received (e.g. performance) to the acquisition costs (e.g. financial, psychological, effort)"*.

Although the two concepts seem relatively close, three discrepancies have been highlighted in the literature. Firstly, perceived value is purely cognitive and does not encompass any affective response (Oliver, 1997). Secondly, perceived value is not necessarily related to any consumption experience (Vanhamme, 2002). Finally, even though the two constructs rely on comparisons, the standards are different. Many authors summarized customer perceived value as a trade-off between perceived benefits and costs (Kotler, 2003).

To conclude, satisfaction has been clearly distinguished from attitude, perceived quality and perceived value. These distinctions justify the discriminant validity of the satisfaction construct.

- **Working definition of customer satisfaction**

With regard to the study, customer satisfaction is defined as a psychological summary state resulting from a product usage experience. This definition expresses the transaction-specific and the cognitive nature of satisfaction in this study.

2.3.2 The expectancy disconfirmation paradigm

The "*expectancy disconfirmation paradigm*" (also termed "*disconfirmation of expectations paradigm*") developed by Oliver (1977, 1980, 1981) has been acknowledged by academics as a major contribution in understanding the antecedents of satisfaction.

For instance, Tse et al. (1990: 180) concede that:

"Studies focusing upon the antecedents of satisfaction have produced strong support for the expectancy-disconfirmation paradigm across a wide variety of products"

In this section, the disconfirmation paradigm will be presented. Such a paradigm is important to the study, as it describes a cognitive model of satisfaction, consistent with the working definition of satisfaction which was chosen. Then, the limitations of such a model, as highlighted in the literature, will be discussed.

- **The expectancy disconfirmation model**

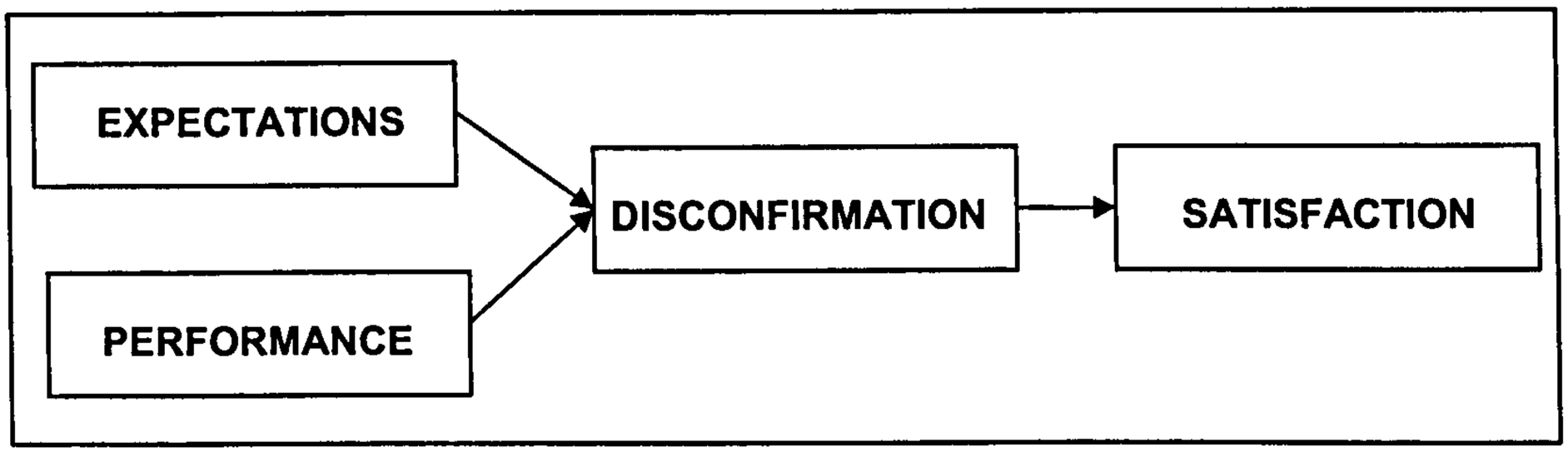
Early research on the satisfaction formation process was attributed to Cardozo (1965). This researcher carried out a laboratory experiment and empirically established that both the effort spent in acquiring a product and the expectations concerning that product influenced satisfaction. Studies carried out by Olshavsky and Miller (1972) and Anderson (1973) completed Cardozo's research by analyzing the effects of expectations on perceived performance. Olshavsky and Miller (1972) empirically demonstrated the existence of the *assimilation* and *contrast* effects. If performance globally corresponds to expectations, consumers minimize the actual differences (assimilation effect). If performance is significantly superior to expectations, consumers tend to exaggerate the discrepancy (contrast effect).

These initial works stressed that satisfaction relies on a comparison process. Then, academic works from researchers such as Oliver (1977) and Latour and Peat (1979) confirmed the major role of expectations and also revealed the importance of the expectancy disconfirmation in the satisfaction formation process.

On the basis of early research, Oliver (1980, 1981) formalized the "*expectancy disconfirmation paradigm*" a cognitive model of the antecedents of satisfaction (see figure 4). According to Oliver (1980, 1981), the expectancy disconfirmation model relies on expectations, performance, and the outcomes of their comparison, namely disconfirmation. Oliver (1980, 1981) recognized that the expectancy disconfirmation model relies, from a conceptual point of view, on Helson's adaptation-level theory (1964; quoted by Oliver) which claimed that individuals perceived stimuli only while adapting to an adapted standard:

"*Judgments of stimuli are affected by prior experience with the general class of objects (the adaptation level) and the discrepancy perceived between the new stimulus and previously determined levels*" (Oliver, 1981: 88)

Figure 4: The expectancy disconfirmation paradigm (adapted from Oliver, 1980)



In this model, three states of disconfirmation exist which depend on the comparison between perceptions of performance and initial expectations: (1) disconfirmation is positive when performance exceeds expectations; (2) disconfirmation is negative when performance is below expectations; (3) zero disconfirmation happens when performance is equal to expectations. Even though positive disconfirmation and negative disconfirmation are both clearly related to a subsequent level of satisfaction, the outcome is more confusing for zero disconfirmation. Many authors consider that zero disconfirmation refers to a "*zone of indifference*" (Woodruff et al., 1983). This zone of indifference surrounds a performance range that is acceptable to the consumer. Notwithstanding the fact that the concept is intuitively appealing; Oliver (1997: 113) noted that "*unfortunately, little research exists to guide researchers on identifying the existence and limits of indifference zone*". Thus, such a concept will not be considered in this study.

Finally, the expectancy disconfirmation model reminds us that satisfaction is the consequence of a consumption experience. It stresses the major role of disconfirmation, both as a result of the comparison between expectations and performance and as a direct antecedent of satisfaction.

Despite its wide acceptance, the expectancy model has come under broad criticism. A first limitation deals with the role of disconfirmation in the satisfaction formation process. A second limitation refers to standards used to define expectations. A third

limitation relies on the mainly cognitive orientation of this model. These limitations are discussed hereafter.

- **Limitations related to the role of disconfirmation**

The *expectancy disconfirmation model* considers that the satisfaction formation process necessarily undergoes disconfirmation. However, the literature challenges the hypothesis that disconfirmation plays the role of a full mediator.

Actually, Oliver (1997) reviewed studies which criticized the expectancy disconfirmation model and deduced that six different model variations could be identified (see table 11).

Table 11: Possible Expectancy Disconfirmation Model Outcomes (Oliver, 1997)

Significant Coefficients or Findings	Model Variation
Expectation only	Expectation (assimilation) model
Performance only	Raw performance model
Disconfirmation only	Disconfirmation (contrast) model of fully mediated expectation and performance effects
Expectation and performance	Non comparative expectation and performance model
Expectation and disconfirmation	Expectancy disconfirmation model with fully mediated performance
Performance and disconfirmation	Performance and disconfirmation model with fully mediated expectations
Expectation, disconfirmation and performance	Full expectancy disconfirmation with performance model

Among them, the "performance only model" has been observed for durable goods. For such a product category, Tse and Wilton (1988), Bolton and Drew (1991) and Patterson (1993) empirically demonstrated that satisfaction is directly explained by performance and that disconfirmation has little influence on satisfaction.

Other studies showed that the direct effects of performance and/or expectations happened in tandem with disconfirmation (Swan and Trawick, 1981; Bearden and Teel, 1983; Oliver and De Sarbo, 1988; Patterson, 1993). For instance Patterson (1993: 456) observed that "*product performance is related to satisfaction through the intervening construct of disconfirmation, but it is also directly linked to satisfaction*".

- **Limitations related to the comparison standards**

In the *expectancy disconfirmation* model, Oliver (1980, 1981) considers that expectations are the comparison standard used by consumers. Oliver (1981: 33) asserted that:

"*It is generally agreed that expectations are consumer-defined probabilities of the occurrence of positive and negative events if the consumer engages in some behaviour*"

Oliver (1997: 69) also observed that the use of the term "*expectations*" in his model has been contested because it implies that only expectations can be a standard of comparison. Oliver (1997: 69) conceded that the term "*expectations*" should be understood in the broad sense of the "*prediction of future events*" and could integrate terms such as "*hope*" or "*wishes*".

Actually, different types of standards have been proposed in the literature. Tse and Wilton (1988) referred to "*pre-consumption standards*". Woodruff et al. (1983) referred to "*norms*", a sort of reasonable vision based on prior experiences of consumers. To Swan and Trawick (1981) the standard can be the "*ideal*".

Finally, the use of comparison standards may depend upon the product-category (Cadotte et al., 1987). Swan and Trawick (1981), Tse and Wilton (1988) and Fournier and Mick (1999) also observed that customers use more than one comparison standard.

- **Limitations related to the cognitive orientation of the expectancy disconfirmation model**

This limitation has already been underlined in section 2.3.1 "d*efinitions of satisfaction*". The cognitive vision of satisfaction has been criticized. One path of research argues that satisfaction is an affective construct (Westbrook and Reilly, 1983; Cadotte et al., 1987; Garbarino and Johnson, 1999; Giese and Cote, 2000). Satisfaction has also been considered as both cognitive and affective (Westbrook, 1987).

To conclude, the *expectancy disconfirmation* paradigm is the dominant paradigm in satisfaction literature, even though this model has been criticized. Model variations suggested by Oliver (1997) show that the model can be adapted to different conceptual situations.

2.3.3 Knowledge, skills and product usage as drivers of satisfaction

Two key aspects which emerged from the definition of satisfaction are that (1) satisfaction is a post-consumption evaluation and (2) satisfaction results from a comparison process between expectations and performance. Tse et al. (1990) reminded us that a consumer can attribute product performance discrepancy (whatever that discrepancy may be, positive or negative) to the product itself, to the consumption situation (e.g. situational influences), to the consumer himself (e.g. inexperience) or to prior beliefs. One consequence is that product usage probably influences satisfaction. Similarly, another assumption is that product-usage related knowledge and skills will influence a consumer's degree of satisfaction. The lack of research on these issues has been highlighted by Dick et al. (1995) who urged researchers to focus on the analysis of consumption-related issues and particularly on product usage-related consumer learning.

In the literature on customer education, one assumes that an increase in skills will lead to better levels of satisfaction with a product (Honebein, 1997; Roush, 1999; Aubert and Humbert, 2001; Hennig-Thurau et al., 2005). Similarly, studies on

customer education defend the idea that enhanced product usage will lead to increased customer satisfaction (Honebein, 1997; Goodman et al., 2001). However, to my knowledge, no empirical evidence supports these hypotheses.

- **Product usage related knowledge and skills as drivers of satisfaction**

A first finding which emerges from the literature is that an increase in the level of knowledge and skills leads to a higher perception of product performance. Hennig-Thurau et al. (2005) theorized that applying product usage related knowledge and skills can contribute to an improved assessment of the product's performance by the customer, which eventually leads to higher satisfaction with the product. Relationships between customers' skills and product performance have been empirically demonstrated by Hennig-Thurau (2000). This researcher demonstrated that an increase of usage-related skills led to higher levels of the customer's product-related perception. Similarly, de Ruyter and Bloemer (1997) demonstrated that perceived service quality is positively influenced by subjective knowledge.

A second finding is that the level of knowledge and skills may not only influence performance, but may also influence expectations. De Ruyter and Bloemer (1997) recall that knowledge accumulated through experience and information-search helps customers to express strong and stable expectations (*i.e. manifest expectations*) which are in line with product performance. This vision is consistent with that of Alba and Hutchinson (1987) who observed that consumers with a strong knowledge base are better problem-solvers than novice consumers and perform more efficient information searches.

This implies, according to de Ruyter and Bloemer (1997: 45):

"*A positive relation between knowledge and satisfaction with the product in the end. A consumer knows what to expect and does not look for any additional information that might disconfirm his or her expectations*"

One limitation of the aforementioned results is that the knowledge and skills described in the studies do not specifically encompass usage-related issues. The

handful of studies which exclusively address this topic empirically demonstrated that an increase of usage related knowledge and skills led to higher satisfaction. Jones et al. (2003) demonstrated that customer understanding of instruction has a positive influence on customer satisfaction, mainly because consumers encountered fewer problems using products or services. Goodman et al. (2001) obtained similar results: consumers who received care instructions with a technical product (flooring) expressed a significantly higher level of satisfaction and complained significantly less. Bitner et al. (1997) also concluded that providing customers with necessary usage-related skills led to greater satisfaction.

- **Product usage as a driver of satisfaction**

As explained earlier, product usage has been conceptualized as a multidimensional construct. Although various studies referred to two dimensions, usage frequency and usage variety (Ram and Jung, 1990), the three-dimensional conceptualization (usage frequency, usage function, usage situation) developed by Ram and Jung (1991) is more relevant for this study.

One important finding that emerged in the literature is that the intensive usage of a product is a driver of satisfaction (Shih and Venkatesh, 2004). Shih and Venkatesh (2004) demonstrated that intense usage, characterized by high frequency and high variety of usage, resulted in higher levels of satisfaction. Oppositely, limited usage (low frequency and low variety) led to lower levels of satisfaction. Shih and Venkatesh (2004) hypothesized that intense usage led to higher levels of product performance and higher discrepancies between performance and initial expectations:

"*When usage behaviour approaches intense use, the actual usage is likely to exceed prior expectations and thus lead to higher product satisfaction*" (Shih and Venkatesh, 2004: 63)

This suggestion is consistent with Bolton and Lemon's (1999) findings in the context of services. These researchers established that usage is an antecedent of satisfaction and that the relation is dynamic. Satisfaction with services results from a comparison between the actual usage of the service and normative usage expectations. Another

assumption is that intense usage reveals the product's capabilities (e.g. functionalities) and reinforces the usability of the product. Both capability and usability are proven to be related to consumer satisfaction (Kekre et al., 1995).

A second finding that emerged from the literature is that the different dimensions of product usage have a specific impact on satisfaction. Ram and Jung (1991) established that usage frequency and usage situation have a strong impact on satisfaction. Their approach is unusual. They hypothesized that each dimension of usage has corresponding judgments of disconfirmation which, in turn, influence satisfaction. They measured that usage disconfirmation, in parallel with performance disconfirmation, had an effect on satisfaction. Finally, they acknowledged that the exact status of usage disconfirmation was not clear:

"*We have not investigated whether usage disconfirmation has only a direct influence on satisfaction or whether it additionally mediates the relationship between performance and satisfaction*" (Ram and Jung, 1991: 410)

A third finding is that usage and satisfaction are highly correlated and inter-related. Downing (1999) empirically demonstrated that usage can be considered as a proxy of satisfaction. Downing (1999) also discussed the direction of the relationship between the two constructs. This author quoted a study from Barudi et al. (1986) in which the authors established that satisfaction led to greater usage of a product. Similarly, Bolton and Lemon (1999) demonstrated that usage is both an antecedent and a consequence of satisfaction.

Even though the aforementioned findings depict positive relationships between product usage and customer satisfaction, the intensity of such relationships remains to be discussed. As explained earlier, Shi and Venkastesh (2004) observed that intense usage leads to a high level of satisfaction and that limited usage leads to low levels of satisfaction. But the authors are concerned with the lack of clear findings for intermediary situations, namely "*specialized use*" (high frequency, low variety) and "*non-specialized use*" (low frequency, high variety). Ram and Jung (1991) also conceded that the impact of usage dimensions depends on the product surveyed. Usage frequency has a significant impact on satisfaction for VCRs, microwave ovens

and food processors. Usage situation has a significant impact on personal computers and cameras. For these reasons, Ram and Jung (1991: 410) concluded that "*further research is needed to investigate the relative importance of the three dimensions of usage across other products and product classes*".

Another question concerns the role of usage functions on satisfaction. The positive and negative effects of product features are discussed in the literature. Recently, Thompson et al. (2005) empirically demonstrated that too many features can make a product overwhelming for consumers and then difficult to use. A first reason is that adding features has a negative effect on the consumers' ability to use them. The second reason is that consumers can make negative inferences about novel attributes (Mukherjee and Hoyer, 2001). In particular, the cognitive effort required to accumulate the knowledge necessary to use new features may negatively impact consumers' willingness to use a product. Thompson et al. (2005) concluded that satisfaction is a function of product usability. This conclusion is consistent with the study, in so far as customer education can help to achieve the goal of better product usability.

In this section, customer satisfaction was defined as a psychological summary state resulting from a product usage experience. This definition expresses the transaction-specific and the cognitive nature of satisfaction in this study. This definition also suggests that satisfaction results from a comparison between the customer's perception of product performance and initial expectations. Customer satisfaction is a unique construct and can be clearly distinguished from related concepts such as attitude, perceived quality or perceived performance.

Existing research that hypothesized or demonstrated the existence of two drivers of satisfaction which are relevant to this study (product-usage related customer knowledge/skills and product usage) has also been highlighted.

2.4 CONCLUSIONS AND IMPLICATIONS FOR THE RESEARCH QUESTION

The literature makes a threefold contribution towards understanding and conceptualizing the different outcomes of customer education.

1- Definitions of each concept, namely product-usage related knowledge and skills, product usage and customer satisfaction, have been proposed. Even though the concepts of usage-related knowledge and customer satisfaction have been largely studied in the marketing literature, the other concepts, usage-related skills and product usage, have received less attention. For these reasons, working definitions which are relevant to this study have been proposed.

2- The current state of research on the relationships between customer education and its outcomes has also been highlighted. The effects of customer education on customer satisfaction rely on two mechanisms. The first mechanism refers to knowledge and skills acquisitions. The second mechanism refers to the evolution of product usage. However, no quantitative study has been carried out on the topic. That could justify the need for further investigation.

3- The analysis of the aforementioned mechanisms requires a clear measurement of each construct. The key dimensions of the outcomes that must be taken into account in any effort to measure these concepts have been identified. Indeed, three dimensions of product usage (usage frequency, usage function and usage situation) and two dimensions of product-usage related knowledge and skills (level and attribution) should be analysed in this study.

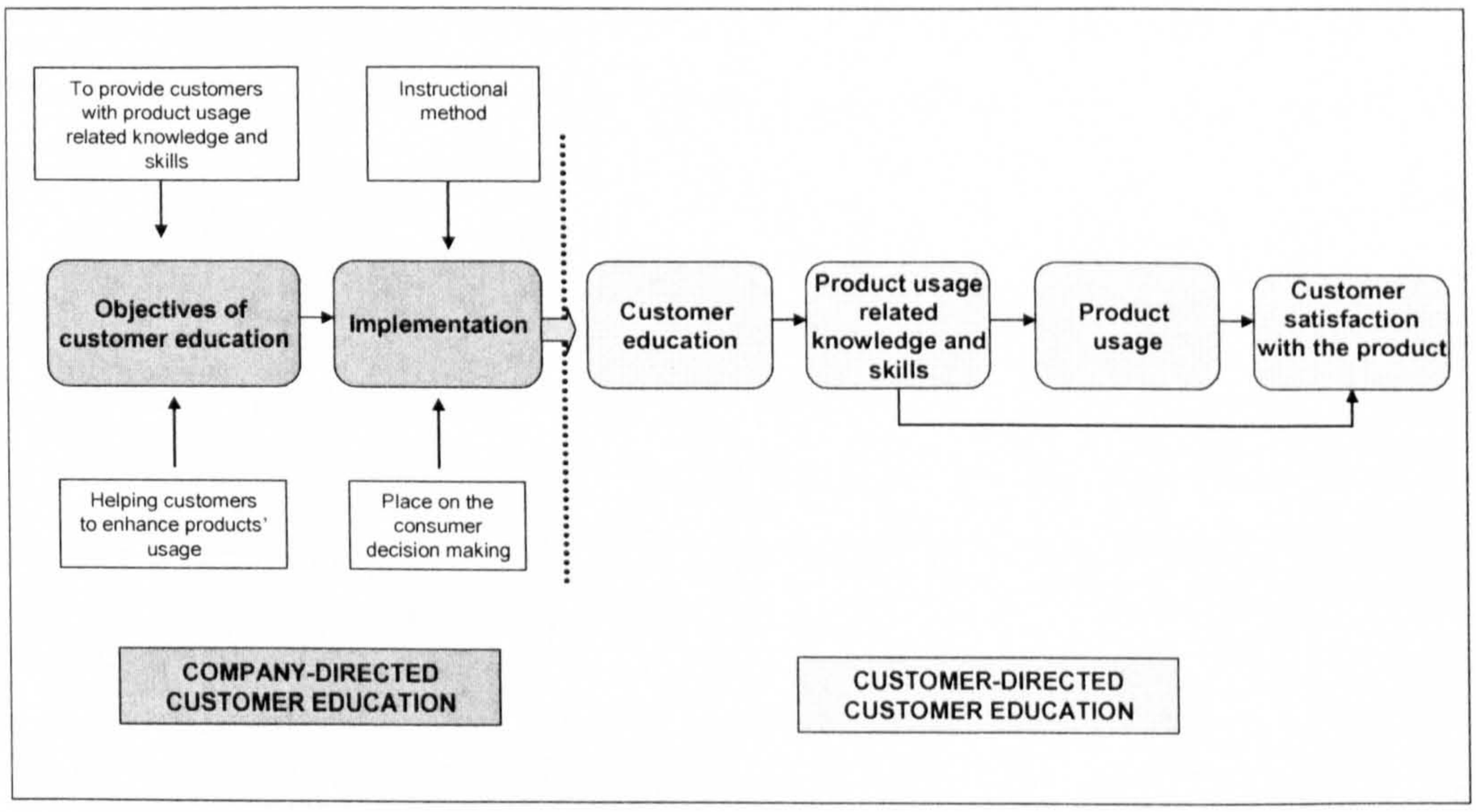
These findings as well as findings from the first part of the literature review allow proposing, in the next section, a global conclusion in which the perspectives for the further steps of this study are exposed.

CONCLUSION OF PART 1: LITERATURE REVIEW

Previous research and outcomes on customer education led to many conclusions that could guide subsequent research. Hereunder, the global framework for customer education that summarizes key findings of the literature review is summarized. Then, the limitations of the research on customer education are underlined. Finally, the research question is delineated and specified.

Literature on customer education is unbalanced: while most studies on customer education aim to explain the concept of customer education, little research has been undertaken to understand and/or measure its effect on consumer behaviour. Previous research on customer education has helped to design the "global framework for customer education" (see figure 5). This figure reminds us that the company-directed view of customer education refers to the development process of customer education in companies. Current research on this perspective mainly deals with defining customer education objectives and key implementation aspects such as the choice of instructional methods for customer education.

Figure 5: General framework for customer education



The second part of the framework summarizes the potential outcomes of customer education on consumer behaviour and on satisfaction. The literature review offered the perspective that such outcomes exist. However, no empirical validation has been provided to date.

The main reason is that most research on customer education is exploratory and consequently qualitative. Thus, no quantitative measures of the outcomes of customer education have been carried out. Another reason is the lack of reliable and valid measures of customer education. Churchill (1979: 67) reminds us that "*the first step in the suggested procedure for developing better measures involves specifying the domain of the construct*". In the first part of the literature review, the perspective that customer education could be defined as "*the global effort of company-sponsored, product-usage related education perceived by customers*" has been put forward. But no measures of such a construct exist.

For these reasons, it is suggested to conduct in the second part of the work an empirical investigation that shall allow providing quantitative evidence of the effects of customer education.

PART 2:

RESEARCH HYPOTHESES, MEASURES AND RESULTS

INTRODUCTION

The findings of the literature review brought to design the framework of this research. Actually, the shortcomings identified in the literature concern (1) the absence of a reliable and valid measure of customer education, (2) the absence of quantitative evaluation of the impact of customer education on knowledge/skills acquisition, product usage and customer satisfaction.

In order to bridge this gap, the second part of this work is devoted to formulating the research hypotheses and carrying out an empirical investigation that will measure the effects of customer education.

The second part is divided into two chapters (chapters 3 and 4).

Chapter 3 presents research hypotheses that are based on theoretical considerations. These hypotheses investigate the different mechanisms of customer education – customer satisfaction relationships.

Chapter 4 explains how the experimentation is carried out, which measures are undertaken and what the results are. Details are provided on the empirical investigation, specifically about the partnership with Nikon France. Then, the development of a reliable and valid measure of customer education is detailed. Finally, the results of the hypothesis-testing are presented.

The organization of the second part is presented in figure 6.

Figure 6: Organization of part 2, "*research hypotheses, measures and results*"

RESEARCH QUESTIONS

(1): Does customer education influence customer satisfaction?
(2): If yes, then by which mechanisms and under which conditions is this influence exerted?

PART 2 "RESEARCH HYPOTHESES, MEASURES AND RESULTS" fills the gaps identified in the literature on customer education: (1) the absence of a reliable and valid measure of customer education, (2) the absence of quantitative evaluation of the impact of customer education

RESEARCH HYPOTHESES (CHAPTER 3)

Framework:

Design of the research model

Research hyptoheses

Contributions of chapter 3:
- The research model and 12 research hypotheses are formulated
- The hypotheses describe the different mechanisms of the customer education – customer satisfaction relationships and specify the role of (1) product usage related knowledge and skills and (2) product usage

MEASURE AND RESULTS (CHAPTER 4)

Framework:

Characteristics of the empirical study

Scale development and validation

Testing the hypotheses

Contributions of chapter 4:
- A reliable and valid scale to measure customer education is developed
- The hypotheses are tested that confirm and complete the initial assumptions made on the impact of customer education on customer satisfaction

The different findings of PART 2 bring new knowledge on customer education and its outcomes.

CHAPTER 3:
RESEARCH HYPOTHESES

The literature review has guided me towards the definition of a set of research hypotheses. In fact, based on evidence from the literature, a model has been built (section 3.1). Then, a set of hypotheses is presented. The hypotheses are built upon theoretical considerations and are related to measuring the mechanisms that explain if and how customer education has an impact on customer satisfaction (section 3.2).

3.1 DESIGN OF THE RESEARCH MODEL

From a methodological point of view, the model aims to determine the degree of association between a predictor variable, customer education, and a criterion variable, customer satisfaction. Such a model relies on the definition of mediating variables and moderating variables (Baron and Kenny, 1986) which better explain the effects of customer education on customer satisfaction. Both mediators and moderators are third variables of the model whose respective roles and properties are conceptually distinguished. These distinctions are specified hereafter.

Mediators are variables which explain how effects between the predictor and the criterion variable occur (Baron and Kenny, 1986). Baron and Kenny (1986: 1173) explain that mediation represents "*the generative mechanism through which the focal independent variable is able to influence the dependant variable of interest*". The same authors (Baron and Kenny, 1986: 1176) specify that "*a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion*".

Moderating variables have been defined by Sharma et al. (1981: 291) as "*one which systematically modifies either the form and/or strength of the relationship between a predictor and a criterion variable*". According to Baron and Kenny (1986), a

moderator can be either a quantitative or a qualitative variable. Such variables can enhance or reduce the influence of an independent variable on the criterion variable.

In marketing literature, moderators began to arouse interest when researchers observed that traditional validation models, which only take mediation into account, did not provide a comprehensive understanding of the phenomenon studied (Sharma et al., 1981). Baron and Kenny (1986) specify that moderators are surveyed when unexpectedly weak or when inconsistent relations between a predictor and a criterion variable are observed.

Now that these issues have been clarified, the existence and role of mediators and moderators in the model will be discussed.

3.1.1 Mediating variables of the model

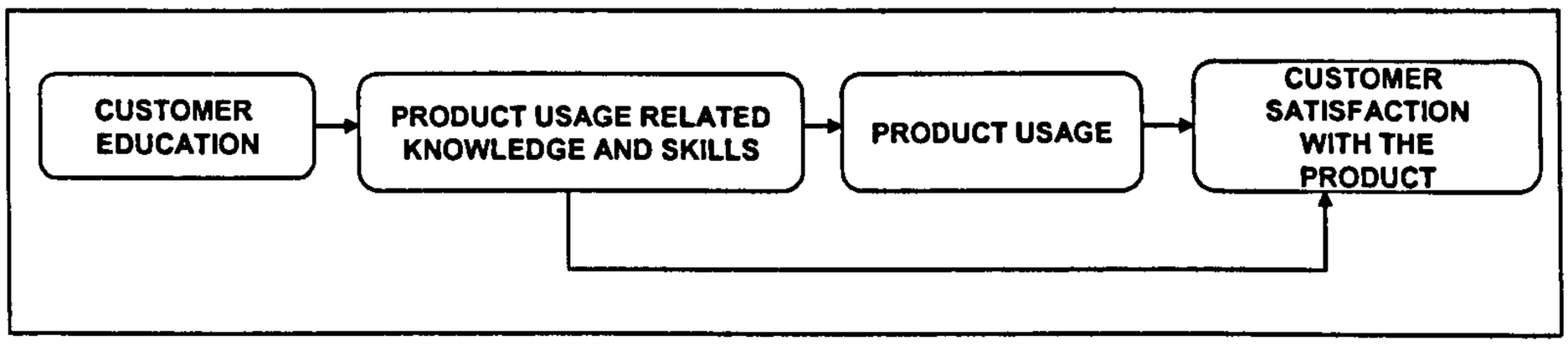
The findings drawn from the literature review bring to suggest that two variables can mediate the relationships between customer education and customer satisfaction. One of the mediators concerns product usage. The second mediating variable refers to product usage related knowledge and skills.

Indeed, previous research tended to establish relationships between customer education, customer skills and product usage (Bitner et al., 1997; Mittal and Sawhney, 2001; Wood and Lynch 2002; Jones et al., 2003). One limitation of these studies is that customer education is not measured globally but through certain components such as usage instructions (Jones et al., 2003) or training sessions (Mittal and Sawhney, 2001). Other studies have also partially defined relationships between customer skills, product usage and satisfaction (Ram and Jung, 1991; Downing, 1999; Shih and Venkatesh, 2004). For instance, Shih and Venkatesh (2004) put forward the perspective that encouraging usage behaviours (increasing frequency and variety of use) through usage-based learning could improve levels of satisfaction.

In order to address the limits of existing literature, the different effects of mediation will be measured.

Obviously the two mediators are not at the same level in the model. The literature review shows that product usage is a consequence of knowledge and skills acquired through customer education. As suggested by Baron and Kenny (1986), a causal chain that explains how customer education influences customer satisfaction can be established (see figure 7).

Figure 7: Causal chain between customer education and customer satisfaction



The acquisition of knowledge and skills can directly mediate the relationships between customer education and satisfaction (De Ruyter and Bloemer, 1997; Hennig-Thurau, 2000; Jones et al., 2003). For instance, Hennig-Thurau et al. (2005) proposed that simply being aware of how to use a product's features will have a positive effect on its satisfaction. According to these authors, this implies that the customer need not necessarily use the newly acquired product expertise.

3.1.2 The focus on a specific moderator: product category expertise

In order to understand the reasons behind the focus on customer expertise with the product category, the concept must be first defined.

Consumer behaviour literature suggests that prior product knowledge can influence the way consumers process new information about a product (Wood and Lynch, 2002). In particular, two components of prior knowledge, familiarity and expertise, may affect information processing (Alba and Hutchinson, 1987). In this context, Alba and Hutchinson (1987: 411) proposed to define expertise as "*the ability to perform product-related tasks successfully*".

Research indicates that expertise can refer to product category expertise. One reason is proposed by Maheswaran (1994). The author asserts that consumers classify products into categories and apply organized prior knowledge about the category to evaluate new products. Thus, researchers such as Spence and Brucks (1997), Raghubir and Corfman (1999) or Wood and Lynch (2002) refer to expertise as the amount of domain-specific knowledge acquired through experience or training.

In this study, the moderating role of product-category expertise will be investigated for one particular reason. Customer education aims to enhance customer expertise with a specific product (Honebein and Cammarano, 2005). So, the question must be raised of the moderating influence of initial product category expertise on the acquisition of expertise about a particular product and on the way people use the product and are satisfied with it. If the initial expertise is not taken into consideration, the risk exists of not clearly understanding the precise nature of the relationships between customer education and product usage related knowledge and skills and other outcomes. A measurement bias may also occur.

Existing research established contradictory findings about the role of expertise in consumers' learning ability, especially for new product learning. On the one hand, expert consumers seem to be more capable of learning new information than novices. The reasons are related to more automated thinking processes and a better ability to categorize information and identify relevant information (Johnson and Russon, 1984; Alba and Huntchinson, 1987). On the other hand, researchers have demonstrated that expertise can be a curse in new product learning (Wood and Lynch, 2002). Wood and Lynch (2002) underlined three major disadvantages of expertise. The first disadvantage is related to the overconfidence of experts. Consumers may think that they know more than they actually do (Spence and Brucks, 1997; Alba and Hutchinson, 2000). The second disadvantage of expertise is the use of inappropriate inference rules that expert consumers have learned in prior experiences with the product category. Finally, Wood and Lynch (2002) also suggest that expert consumers tend to recall problem solutions rather than re-compute them because they assume they know the solution. The consequence is that experts are liable to misjudge their ability to recall an accurate solution.

Given that results are conflicting with respect to the moderating role of expertise in consumer learning, a complementary empirical test is suggested. This approach will thus contribute to the discussion on the role of expertise.

Now that the research model has been proposed, the research hypotheses will be formulated. Beforehand however, the definition of the different variables, included in the research model and hypotheses, are recalled. Table 12 summarizes the definitions deduced from the literature review.

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Table 12: Variables and their operationalization in the empirical study

Variable	Operationalisation of the variable in the study	Nature of the measure
CUSTOMER EDUCATION	**CUSTOMER EDUCATION:** the global effort of company-sponsored, product-usage related education perceived by customers.	Subjective
PRODUCT USAGE RELATED KNOWLEDGE AND SKILLS	**LEVEL OF PRODUCT USAGE RELATED KNOWLEDGE AND SKILLS:** the amount of product-usage related knowledge and skills that customers possess	Subjective
PRODUCT USAGE	**PRODUCT USAGE:** the way consumers actually use a specific product. Three distinct dimensions will be measured: Dimension 1: **USAGE FREQUENCY:** how often the product is used, regardless of the product functions used, or the different applications for which the product is used Dimension 2: **USAGE SITUATION:** the different applications for which a product is used, and the different situations in which a product is used regardless of either usage frequency or usage function Dimension 3: **USAGE FUNCTIONS:** the extent to which the product features/functions are utilized by consumers, regardless of how often the product is used	Subjective Subjective Subjective
CUSTOMER SATISFACTION WITH THE PRODUCT	**CUSTOMER SATISFACTION:** a summary psychological state resulting from a product usage experience	Subjective
CUSTOMER EXPERTISE WITH THE PRODUCT CATEGORY	**CUSTOMER EXPERTISE OF THE PRODUCT CATEGORY:** the amount of product category knowledge acquired before the purchase and the usage of a specific product within the product category.	Subjective

3.2 RESEARCH HYPOTHESES

3.2.1 Impact of customer education on knowledge and skills acquisition (H1)

No specific measure has been performed in previous research to determine the nature and intensity of relationships between customer education and the level of product-usage related knowledge and skills. But some studies (Goodman et al., 2001; Mittal and Shawney, 2001; Wood and Lynch, 2002; Jones et al., 2003) have provided closed evidence of these relationships even though they do not deal directly with customer education. Indeed, most of these research studies focus on one particular aspect of customer education, such as product instructions or training activities:

- Jones et al. (2003) empirically demonstrated that customers gain product-related skills from a good level of understanding of product instructions.
- Mittal and Shawney (2001) also provided empirical evidence that training sessions positively impact the acquisition of consumption-oriented skills.
- Similarly, Goodman et al. (2001) demonstrated that the use of product guides and brochures can lead to higher levels of consumer skills.
- Wood and Lynch (2002) showed that new product information and usage instructions positively impact the level of knowledge of this new product.

Despite the specificity of these works, it can be inferred from previous research that providing customers with product usage-focused education will help them to acquire consumption oriented knowledge and skills. Consumers will be exposed to information and training initiatives, learn about the product and gain, or perceive they gain, knowledge, intellectual and motor skills related to product usage. So:

H1 The more the consumer perceives he has been educated about the usage of a product by the product manufacturer, the more he thinks he is knowledgeable and skilled on this product.

3.2.2 Impact of product usage related knowledge and skills on product usage (H2 to H4)

These hypotheses deal with relationships between the level of product usage-related knowledge and skills and the actual usage of the product. As mentioned in the literature review, the three dimensions of product usage defined by Ram and Jung (1991) will explored: usage frequency, usage situation and usage function. Even though the aforementioned research (see Hypothesis 1) stresses that customer education may improve the level of product usage related knowledge and skills (Mittal and Sawhney, 2001; Wood and Lynch, 2002; Jones et al., 2003), a few complementary academic studies describe relationships between the level of knowledge and skills and the dimensions of product usage. This research advocates the importance of giving customers "*use-based learning*" opportunities (Shih and Venkatesh, 2004: 70).

3.2.2.1 Product usage related knowledge and skills and usage frequency (H2)

Mittal and Sawhney (2001) showed that the initial learning experience has a positive impact on the usage rate of electronic information products and services (usage rate depicts frequency of usage in their study). The authors empirically explain that the increase in usage frequency is dependent on both content learning (nature of information contained in the product or service) and on process learning (explaining how to use the product). In the field of services, Bitner et al. (1997) have empirically shown that customers who gained knowledge and skills related to the usage of a service (loss weight program in their survey) evidenced more active and more regular participation in the service production. Through education, customers more clearly understand their role in service production as well as potential outcomes, and consequently agree to participate more frequently. Another assumption proposed by Bolton and Lemon (1999) is that customer usage frequency increases providing that customers understand the value of usage.

Since very few empirical surveys have depicted the relationships between the level of product usage related knowledge and skills and usage frequency, it is suggested to replicate this measure. This replication will shed light on such relationships in the specific sector of consumer electronics and in the particular context of the French market. Thus, the hypothesis is:

H2 The more the consumer perceives he is knowledgeable and skilled in the usage of a product, the higher the usage frequency of the product

3.2.2.2 Product usage related knowledge and skills and usage situation (H3)

Shih and Venkatesh (2004) show that external communication (including help-lines, online chat groups or third-parties) and exposure to specialized magazines, have a positive impact on variety of use ("*intense use*" or "*non-specialized use*"). In their study, variety is mainly related to usage situations (they analyse the activities covered by computer use). Through external communication sources, consumers acquire knowledge, discover, try and adopt new usage situations for the product. Similarly, Ram and Jung (1991) suggest that the scope of product usage can be increased by heightening consumer awareness through customer education initiatives such as seminars or brochures.

From the aforementioned works, it can be arguably suggested that the level of product usage related knowledge and skills will have a positive impact on the usage situation.

The more customers are explained the different usage situations of the product, the more they may acquire knowledge and skills that allow them to vary these usage situations. Niedercorn (2005) gave a clear illustration in the digital camera market. According to the author, the main issue for product manufacturers is actually to educate customers not only to take pictures (one specific usage situation) but also to incite them to exploit these pictures by printing them or storing them on a computer, etc. (other usage situations).

So, the hypothesis is:

H3 The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage situation of the product

3.2.2.3 Product usage related knowledge and skills and usage function (H4)

Through education, product manufacturers deliver information on product features and usage instructions that can incite customers to experience the product (Antil, 1988). Jones et al. (2003) have empirically demonstrated that usage instruction manuals provide consumers with knowledge and skills that allow them to experience fewer problems related to usage. Ram and Jung (1990) postulate that tools such as user-friendly manuals allow consumers to learn about product features and functions. Finally Hennig-thurau (2000) suggests that the acquisition of consumption-related knowledge helps the customer to understand and discover the specificities of a product. Recent evidence has been provided by Thompson et al. (2005). These researchers explain that difficulties in apprehending and understanding the multiple features of a product can decrease usage function.

It can be inferred from this research that education may help customers to better discover and understand the features of products. The knowledge and skills customers perceive they have gained through education will incite them to use the features of the product.

Thus:

H4 The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage function of the product

3.2.3 Impact of product usage related knowledge and skills on satisfaction (H5)

A few studies have sought to verify that the more customers are skilled and knowledgeable about the usage of a product, the more they are satisfied with this product.

- Jones et al. (2003) empirically established that customer understanding of usage instructions has a positive impact on customer satisfaction.
- Hennig-Thurau (2000) showed that an increase in customer skills increases customer satisfaction with the product and the product-related perception of quality.
- De Ruyter and Bloemer (1997) obtained similar results. They empirically demonstrated that customers with stronger knowledge report higher levels of perceived quality, a concept which is closely related to customer satisfaction (Cronin and Taylor, 1992; Zeithaml, 2000).

Since there is little empirical evidence of the relationships between the level of customer skills and customer satisfaction, it is suggested to replicate the measure for the case of post-purchase and product-usage related skill acquisition and in the context of the French market. The assumption is that skilled customers are more satisfied with their product. Some reasons have been given to explain such relationships: Kekre, Krishnan and Srinivasan (1995) empirically verified that, for software products, skilled consumers find the product more easy-to-use and thus are more satisfied. Another interesting suggestion was put forward by Hennig-Thurau et al. (2005). The authors suggest (without testing this hypothesis) that the customer's mere awareness of being able to use additional features could have a positive effect on his/her satisfaction with the product. So:

H5: The higher the level of customer knowledge and skills about product usage, the higher the level of customer satisfaction with the product

3.2.4 Impact of product usage on satisfaction (H6 to H8)

Existing research has established positive relationships between product usage and customer satisfaction with the product. Bolton and Lemon (1999) and Downing (1999) empirically established that usage and satisfaction are highly correlated. Similarly, Bitner et al. (1997) showed that the level of customer participation in the service process (customer usage of the service) has a significant impact on satisfaction.

Even though these general relationships have been established, there is a need to more precisely understand the respective impact of the three dimensions of product usage (usage frequency, usage situation and usage function) on consumer satisfaction with the product.

Very few measures have been taken to this effect, but relations are visibly contingent:

- Shih and Venkatesh (2004) established that relationships between usage and satisfaction are clear in extreme situations (low rate – low variety or high rate-high variety) but are more difficult to define in other cases (low rate-high variety or high rate-low variety).
- Ram and Jung (1991) determined that dimensions of usage which affect satisfaction vary across products. For example, they established that for cameras and personal computers, usage situation strongly influences satisfaction.

So, as expressed by Ram and Jung (1991: 410), there is a need to replicate these surveys: "*Further research is needed to investigate the relative importance of the three dimensions of usage across other products and product classes*".

Despite the limitations of previous research, usage frequency, usage situation and usage function will probably all have a positive impact on satisfaction. Satisfaction is a judgment about a product or service feature, or about the product or service itself

(Oliver, 1997). So, a high rate of product usage, a high usage situation and a high usage function can help consumers to better appreciate the performance of the product or to have more realistic expectations about the product (Jones et al., 2003). Consequently, with regard to the expectation-disconfirmation paradigm, a high level of perceived product performance or realistic expectations may lead to a higher level of satisfaction. So:

H6 The higher the frequency of usage of the product, the higher the level of customer satisfaction with the product

H7 The higher the level of usage situation of the product, the higher the level of customer satisfaction with the product

H8 The higher the level of usage function of the product, the higher the level of customer satisfaction with the product

3.2.5 Research hypotheses about the moderating role of customer expertise (H9 and H10)

As explained earlier, existing research on the moderating role of customer expertise of a product category has revealed conflicting results. Moreover, the research topic is at an early stage. No specific study has defined how such a moderator could modify the force and/or the direction of the relationships between customer education and its outcomes. Thus, two streams of exploratory investigation are suggested. One hypothesis is related to the moderation of the relationship between customer education and the level of product-usage related knowledge and skills. The second hypothesis aims to determine the moderation between product usage and customer satisfaction with the product.

3.2.5.1 Moderation of the relationship between customer education and knowledge/skills (H9)

In fact, studies about expertise lead researchers to distinguish expert consumers from novice consumers (Alba and Hutchinson, 1987). Experts differ from novices in the

amount, content and organization of their knowledge (Mitchell and Dacin, 1996; Aurier and Ngobo, 1999). Results from a study carried out by Wood and Lynch (2002) were already mentioned which show that learning information on new products may be negatively moderated by expertise. Indeed, experts already have a high level of product category usage-related skills. According to Johnson and Auh (1998), expert customers award less importance to the search for external information. As suggested by Wood and Lynch (2002), they may be less sensitive to the educational efforts of the product manufacturer. They will also probably attribute their ability to use the product to themselves as opposed to the product manufacturer. This suggestion can also be related to Hoch's findings (2002) that personal experience with a product makes people believe that they know more about a product than they actually do. So, to learn about a product (Hoch and Deighton, 1989), consumers with strong experience may rely more on their own experience than on third-party education.

So it can be presumed from previous research that the impact of customer education on the level of customer skills will be negatively moderated by expertise. Customers who already have a high level of prior knowledge on the product category may be less interested than novices in receiving education on their newly purchased product. They may prefer to trust themselves and rely on their prior experience to use the product. In this respect, they may not link their level of product usage related knowledge and skills to customer education.

Thus:

H9: The higher the product-category expertise of a consumer, the lower the impact of customer education on the level of product usage related knowledge and skills

3.2.5.2 Moderation of the relationship between product usage and customer satisfaction (H10)

In a recent study, Thompson et al. (2005) investigated the relationships between the number of features of consumer electronics and the consumers' perceptions of product capability and usability. They empirically showed that the product's usability decreases when the number of features increases. These findings are related to research carried out by Mukherjee and Hoyer (2001) which shows that novel attributes of high-complexity products have a negative impact on product evaluation. The main reason given by Mukherjee and Hoyer (2001: 463) concerns the negative learning-cost inferences: "*since knowledge acquisition requires cognitive effort, attributes of high complexity products (including novel attributes) should be associated with high-learning costs and vice-versa*".

Thompson et al. (2005) also showed that expertise within the product category influences consumers' perceptions of products' capabilities and usability. First, experts are more able to understand the product's characteristics and discriminate important from non important features. Experts are also more able to use the different product features than novices.

By extension, the impact of the different dimensions of product usage on the evaluation of the product may be differently moderated by the initial expertise of customers within the product category. Indeed, Thompson et al.'s (2005) findings indicate that for novices, the first difficulty in using a product is to understand/use the different features of the product. Thus, the impact of usage function on satisfaction is more important for novices than for experts. In parallel, experts learn more rapidly and also perform product related tasks more rapidly (Alba and Hutchinson, 1987; Spence and Brucks, 1997). Thus, the impact of usage situations and usage frequency on satisfaction is probably more important for experts than for novices. Such people may be more satisfied when they discover new usages and consequently when they spend more time using their products. Thus:

H10a The higher the degree of customer expertise, the higher the impact of usage frequency on customer satisfaction with the product

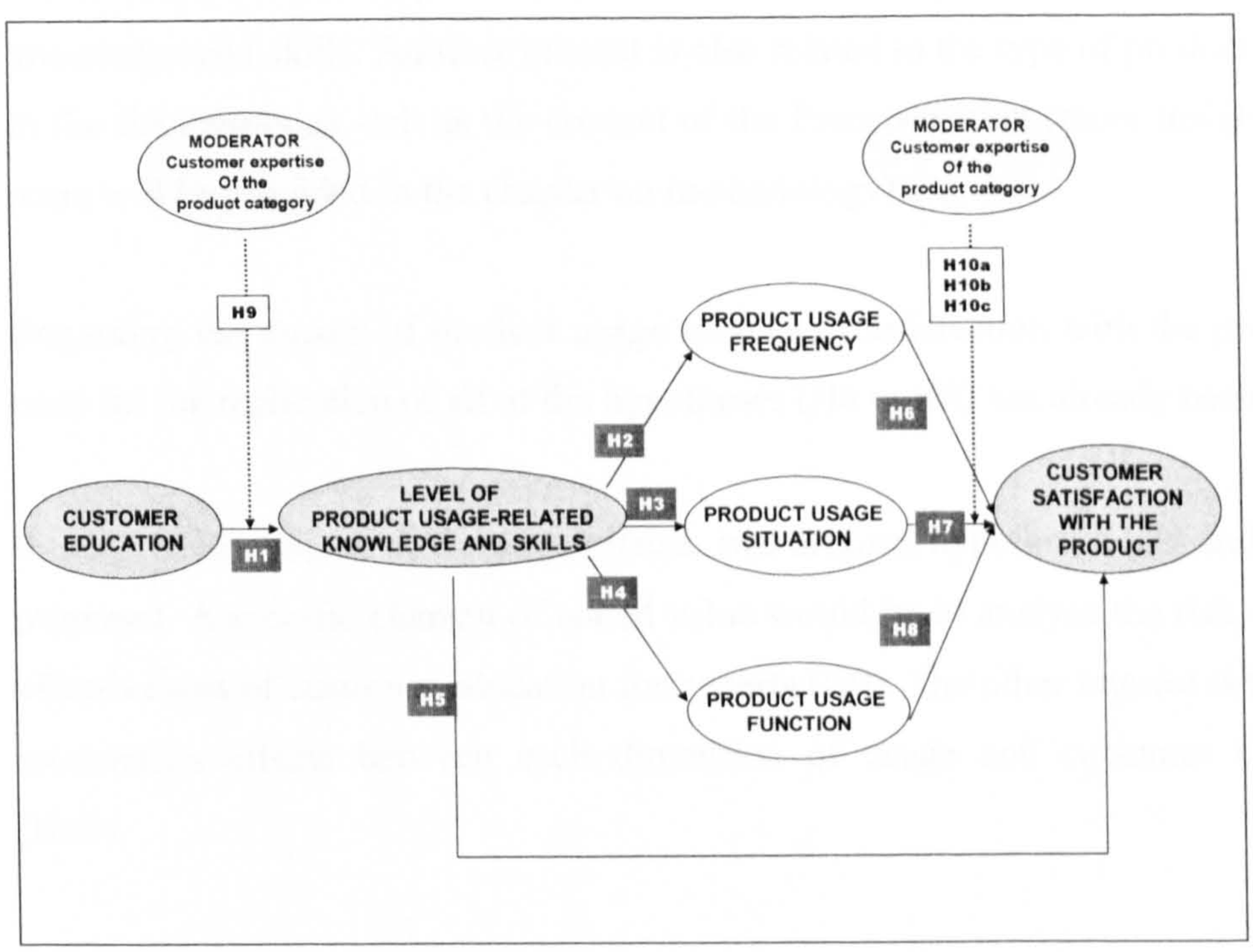
H10b **The higher the degree of customer expertise, the higher the impact of usage situation on customer satisfaction with the product**

H10c **The lower the degree of customer expertise, the higher the impact of usage function on customer satisfaction with the product**

3.3 CONCLUSIONS ON THE RESEARCH HYPOTHESES

Figure 8 presents the global overview of the research model and the research hypotheses.

Figure 8: Research model and the hypotheses



The merit of this research model is twofold. On the one hand, original hypotheses are proposed. On the other hand, replications of already tested hypotheses are integrated into the model. In this case, the need for replication has been justified.

Regarding the impact of customer education on product usage related knowledge and skills, H1 is tested for the first time. This is due to the unique definition of the "customer education" construct as well as the lack of research on the outcomes of customer education.

Regarding the impact of product usage related knowledge and skills on the dimensions of product usage, H2 is a replication, whereas H3 and H4 are considered as original. A first reason underpinning this claim is that the delimitation relies on the

definition of knowledge and skills in the study which are related to usage. The other reason is that these hypotheses aim to cover the three dimensions of product usage simultaneously.

Regarding the impact of product usage related knowledge and skills on customer satisfaction with the product, H5 is a replication of previous research. The specific added-value of this hypothesis is to consider post-purchase and usage-related knowledge and skills. Another interest is also related to the type of product surveyed in the field study as well as the context of the French market (more insights on this point will be provided in the chapter on methodology).

Regarding the impact of product usage on overall satisfaction with the product, the need for the replication of all of the hypotheses (H6 to H8) has already been justified.

Finally, to investigate moderation effects, two original hypotheses (H9 and H10) are proposed. A specific element of added value would be to analyse the risk of the non effectiveness of customer education for experts (H9). The other interest is to propose moderation effects between each dimension of usage and customer satisfaction (H10).

Table 13 presents the summary of the research hypotheses.

Table 13: Summary of the research hypotheses

H	RELATIONSHIP STUDIED IN THE HYPOTHESES	FORMULATION OF THE HYPOTHESES
H1	Impact of customer education on the level of product usage related knowledge and skills	The more the consumer perceives he has been educated about usage of the product by the product manufacturer, the more he thinks he is knowledgeable and skilled on this product
H2	Impact of the level of product-usage related knowledge and skills on product usage frequency	The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage frequency of the product
H3	Impact of the level of product-usage related knowledge and skills on product usage situation	The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage situation of the product
H4	Impact of the level of product-usage related knowledge and skills on product usage function	The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage function of the product
H5	Impact of the level of product-usage related knowledge and skills on customer satisfaction with the product	The higher the level of customer knowledge and skills about product usage, the higher the level of customer satisfaction with the product
H6	Impact of product usage frequency on customer satisfaction with the product	The higher the frequency of usage of the product, the higher the level of customer satisfaction with the product

H	RELATIONSHIP STUDIED IN THE HYPOTHESES	FORMULATION OF THE HYPOTHESES
H7	Impact of product usage situation on customer satisfaction with the product	The higher the level of usage situation of the product, the higher the level of customer satisfaction with the product
H8	Impact of product usage function on customer satisfaction with the product	The higher the level of usage function of the product, the higher the level of customer satisfaction with the product
H9	Moderating role of customer expertise of a product category on the relationship between customer education and the level of product usage related knowledge and skills	The higher the product-category expertise of a consumer, the lower the impact of customer education on the level of product usage related knowledge and skills
H10a	Moderating role of customer expertise of a product category on the relationship between product usage frequency and customer satisfaction with the product	The higher the degree of customer expertise, the higher the impact of usage frequency on customer satisfaction with the product
H10b	Moderating role of customer expertise of a product category on the relationship between product usage situation and customer satisfaction with the product	The higher the degree of customer expertise, the higher the impact of usage situation on customer satisfaction with the product
H10c	Moderating role of customer expertise of a product category on the relationship between product usage function and customer satisfaction with the product	The lower the degree of customer expertise, the higher the impact of usage function on customer satisfaction with the product

CHAPTER 4:
MEASURES AND RESULTS

Now that the research framework has been presented, the different variables defined and the research hypotheses introduced, the data analysis and the statistical validation of the hypotheses will be addressed in Chapter 4. An overview of the fieldwork study (section 4.1) is first proposed. More specifically, the partnership established with Nikon France is presented. It provides details on the data collection process. Then, the development of reliable and valid measurement scales of the modelled variables is addressed (section 4.2). One of the major aspects of section 4.2 is the development and validation of the scale to measure customer education. Methodological and/or statistical evidence of the relevance of the different scales used in the study are also provided. In section 4.3 the hypotheses are tested and results discussed. Finally, the chapter is concluded (4.4).

4.1 CHARACTERISTICS OF THE EMPIRICAL STUDY

In order to test the research hypotheses, a quantitative empirical study is carried out. The literature review helped to determine the relevant scope of investigation with respect to research question. In particular, the aim was to study customer education and its effects in the specific context of products with multiple-features. Such products induce important learning costs for consumers (Ram and Jung, 1990; Thompson et al., 2005). Thus, the role of customer education must be understood, both from a theoretical and managerial perspective. It has also been arguably decided to focus on post-purchase usage education. Usage has been presented as a source of value created by customers (Wikström, 1996a; Prahalad and Ramaswamy, 2004). But academics noted that little research had been carried out on usage and urged that such a stream of investigation be developed (Ram and Jung, 1990; Raju et al., 1995; Hennig-Thurau et al., 2005).

As the study represents the first attempt to measure customer education and its outcomes, it has been decided to reduce the scope of investigation and to control the effect of different exogenous variables. One is the cultural context. The maturity of customer education may depend on the country. The instructional methods also differ. For example, Aubert and Ray (2005) recall that customer education is more developed in the USA than in France and that web-based instructional methods are also more common in the USA. So, the focus is on the French market. The second delimitation concerns the nature of the product category surveyed. The case of digital cameras is investigated. This product category matches the theoretical requirement of multiple features. Finally, it has been decided to limit the investigation to one specific brand, specifically in order to control the bias of brand equity.

Based on these delimitations, a partnership with Nikon France has been established. The reasons underpinning this partnership are presented hereafter.

4.1.1 A partnership with Nikon France

The French digital camera market is very dynamic. According to the market research company GFK[7], 4.800.000 digital cameras were sold in 2005. This represents a growth of 20% compared to the previous year (4.000.000 digital cameras sold in 2004). The market was valued at 1200 million euros for 2005, similar to that of 2004. According to the market research company IPSOS[8], 46% of French households declared that they owned a digital camera in 2005 (18% in 2003; 30% in 2004) and 43% declared having used their digital camera during the last 6 months.

Nikon is one of the key actors on the French market. The company's turnover reached 178 million euros in 2004[9].

[7] Source: Panel « Digital Cameras 2005 » (confidential document provided by Nikon)

[8] Source : « Baromètre photo API/IPSOS : les tendances 2005 » (confidential document provided by Nikon)

[9] Source : Nikon

At least two reasons justify the relevance of the partnership with this company.

One reason is that the range of Nikon digital cameras is vast and covers the different market segments. One segment features the easy-to-use compact cameras. The other segment represents bridge and reflex cameras, usually reserved for more advanced users. The advantage of this segment range is that the sample will thus include customers with varying degrees of education, expertise, knowledge and skills and usage patterns related to their cameras.

The second reason lies in the actual effort Nikon France devotes to educating its customers. Besides offering traditional forms of education to its customers (user guide, technical support through the website or by phone, product demonstrations), the company has also initiated an original and unique approach on the French market: the Nikonschool.

Created in 2002, the Nikonschool is a training centre that organizes and sells different types of lectures, seminars and workshops on a wide variety of topics related to digital camera usage. Each training session is dedicated to one specific level of expertise (novice/intermediate/expert). The Nikonschool has trained more than 2500 individuals since 2002[10]. Including Nikonschool participants in the sample ensures a large variance of education types for this study.

So Nikon gave the opportunity to interview their customers. The questionnaire was created in collaboration with the marketing team with whom the relevance of the questions and the items of the different scales has been discussed. Then, Nikon facilitated the data collection process by providing a sample of their customers (see details in section 4.1.2) and offering a gift to each interviewee. Finally, Nikon's marketing team shared its vision of the results. This discussion contributed to a deeper understanding of the managerial implications of the research.

[10] Source: Nikon

4.1.2 Data collection

4.1.2.1 An exploratory qualitative study

In order to prepare the quantitative survey, an exploratory qualitative study has been conducted. The key objective was to analyse the customers' understanding of customer education. A second important objective was to define or refine the pool of items of the different scales used to measure customer education and its outcomes. This step is important in the development of the scales (Churchill, 1979).

Since the aiming was to uncover the motivations, practices, beliefs and attitudes on the topic of customer education, probing interviews seemed to be the most appropriate method (Evrard et al., 1993). Thus 15 one-hour personal interviews with users of digital cameras were carried out. In order to ensure a large variance of expertise on digital cameras and customer education habits, the sample has been divided into two sub-groups. One contained people with a high level of familiarity and expertise of digital cameras (6 people). The other included consumers with low levels of familiarity and expertise (9 people). All interviewees had bought a digital camera within the previous eight months.

To conduct the discussion, an interview guide was prepared. Following the recommendations made by Giannelloni and Vernette (2001), the interviews were divided in four phases. In phase 1 "introduction", the following topics were discussed with the interviewees: (1) experience, familiarity and expertise on digital photo and digital cameras and (2) description of the digital camera bought and the reasons for purchasing it.

In phase 2 "subject centring", discussions concerned: (3) the motivations and actual usage of the digital cameras; (4) the characteristics of usage – frequency, function, situation; (5) the difficulties encountered in product usage; (6) the satisfaction with the product. In phase 3, dedicated to giving deeper insight to the key topic, discussions were about (7) the means by which the customer had been educated on digital camera usage; (8) their understanding of customer education (9) their expectations regarding the development of customer education initiatives and (10) their self-report of knowledge and skill evolutions.

Finally, in phase (4) "conclusion", the interview was closed by discussing the customers' other experiences of education as well as their general expectations regarding the digital camera market.

Among the different findings that helped to define the items of the different scales used in the quantitative phase, it emerged that the concept of customer education remained relatively difficult for customers to apprehend. Thus, in the quantitative phase, it was important to verify that the relevant items were clearly defined and that an appropriate survey technique was chosen.

4.1.2.2 The quantitative study

- **Survey technique**

The quantitative study aimed to collect the data needed for the research. Within the framework of the partnership, Nikon France added some questions relating to the topic but that did not directly target the research (for example, relating to the levels of satisfaction of NIKONSCHOOL participants). Consequently, a total of 103 variables resulted from the wide diversity of questions featured in the questionnaire.

Given the diversity of the questions and the length of the questionnaire, interviewer-based survey techniques were preferred as opposed to self-administered methods. The presence of interviewers also helped to increase the control of the data collection environment and monitor the quality and quantity of the data collected (Malhotra and Birks, 2006).

The ideal survey method would have been in-home face-to-face interviews. However, the cost and the time needed to perform this type of data collection dissuaded from adopting this solution.

Thus, a telephone interview technique was chosen. This solution was effectively more realistic insofar as the questionnaire only involved close-ended questions and telephone interviews encourage interactivity between the interviewer and the interviewee.

- **Questionnaire design**

In order to record accurate and relevant information, the questionnaire had to avoid influencing the answers. Great care was taken in wording and ordering the questions (Evrard et al., 1993; Malhotra and Birks, 2006).

First a relevant questionnaire that respected these constraints was created. Plain and unambiguous words were used. Then, clear and unbiased questions were formulated. It was also important to avoid implicit assumptions, generalizations and estimations. Finally the questions had to be both positively and negatively connoted in order to control bias resulting from item formulation (Ray, 1985; Flynn and Goldsmith, 1999).

To control the quality of the questionnaire, a pre-test on 10 interviewees was carried out. The actual conditions of the data collection were reproduced. Interviewers were asked to highlight any problems they found in the questionnaire. Following this initial test, the formulation of 5 items, which appeared to be unclear or ambiguous, was modified. The new version was tested on 10 other interviewees in order to verify the relevance of these modifications.

The questionnaire is presented in appendix 3.

- **Sampling**

As explained earlier, the objective was to have a large variance of education and initial expertise. This variance would allow measuring the impact of customer education on its outcomes. So, a sample of customers who had bought and actually owned a Nikon digital camera was created. An important proportion of the sample was supposed to have followed a training session at the Nikonschool (to increase the variance related to customer education).

Nikon France provided a listing of 600 customers who attended a Nikonschool seminar and 8000 other customers. In each sub-sample, participants were chosen at random. The ambition was to build a sample where half of the participants were

former Nikonschool attendants. Due to the limited number of people and the difficulties encountered in contacting them, the sub-sample represented 42% of the total sample.

Between 300 and 350 people had to be interviewed. This size seemed appropriate for structural equation modelling (a statistical technique that shall be further employed for hypothesis-testing) and circumvented the statistical bias related to either small or large samples (Hair et al., 1998). In actual fact, 330 consumers were interviewed. 321 valid questionnaires were maintained in the data analysis.

- **Survey fieldwork**

The field study took place between October 26, 2005 and December 15, 2005.
Seven interviewers were recruited and trained to conduct the data collection process. Indeed the interviewers were taught how to make the initial contacts, ask questions (with neutrality and by respecting the initial formulation) and to properly record the answers and close the interview.
The interviewers were supervised on a daily basis during the first two weeks of the data collection process and then once a week thereafter. Their work was evaluated by reading the completed questionnaires. In the event of missing data or unclear information, the questionnaire was rejected.

To conclude, the partnership with Nikon gave the opportunity to conduct a study on a sensitive market and to explore a real situation of customer education provided by a company on its market. In the following sections, the data are analysed in order first to check the validation of the scales developed in the quantitative study (section 4.2). Then, the research hypotheses are tested (4.3).

4.2 SCALE DEVELOPMENT AND VALIDATION

A researcher who needs scales for his/her study has two options. The first approach consists in using a scale which has already been validated by previous research. When this is not possible or inappropriate, the second option is to develop and validate a specific scale. The development and validation of scales addresses the crucial need for measurement quality in marketing (Flynn and Pearcy, 2001) and is supposed to require "*considerable technical expertise*" (Malhotra and Birks, 2006: 311).

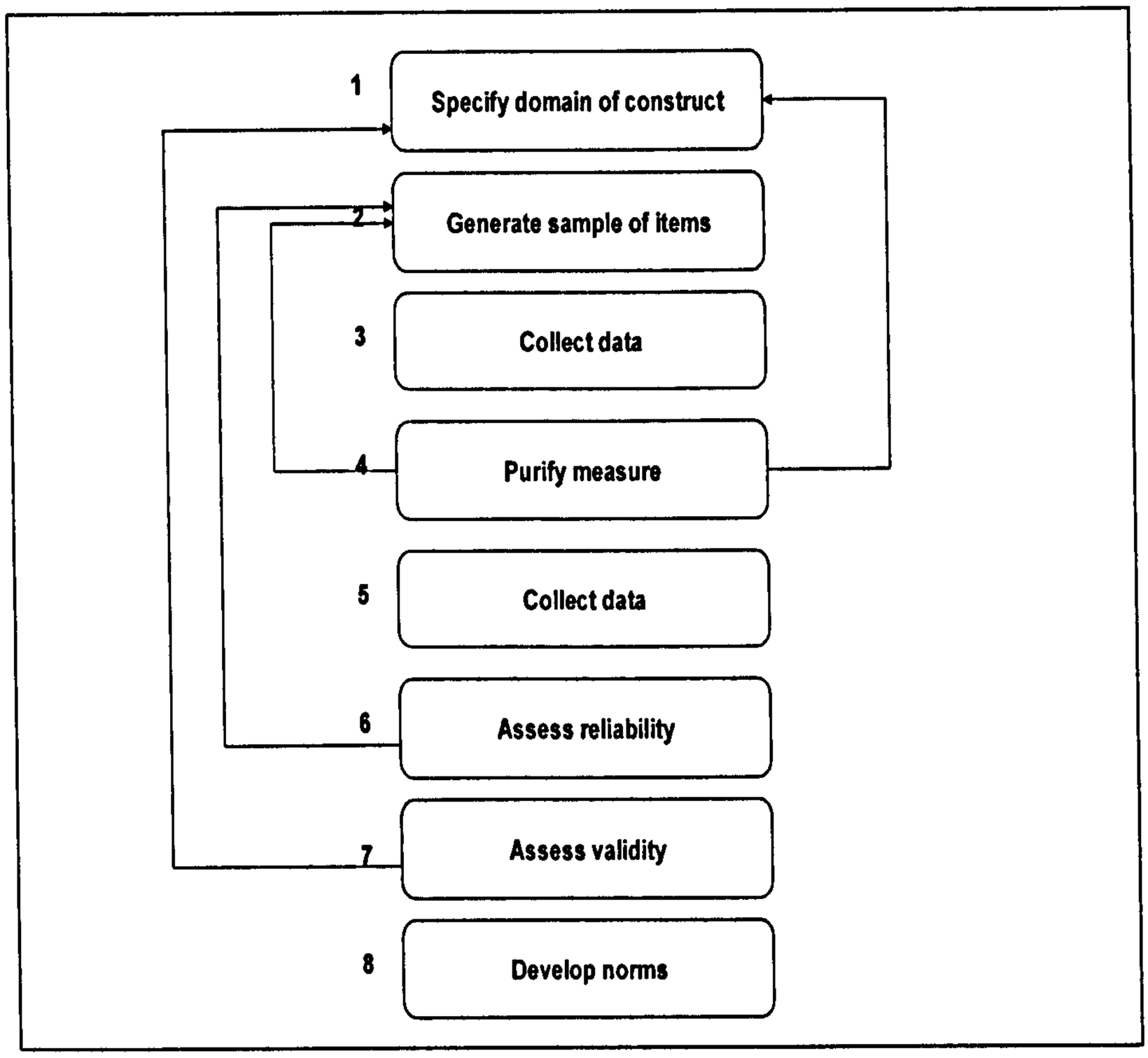
One of the contributions of the study is thus the development and validation of an original scale to measure customer education. The methodology used for this purpose is presented in section 4.2.1. The results are unveiled in section 4.2.2. Scales to measure the product-usage related level of knowledge and skills as well as to measure the customer expertise within a product category (section 4.2.3).

The study also relies on scales which have already been validated by previous research. These scales, used to measure product usage and satisfaction, are presented in section 4.2.4. The development and validation of the scales was to have some consequences with respect to the formulation of the hypotheses. These consequences will be discussed in section 4.2.5

4.2.1 Methodology for the development and validation of scales

In order to create an original scale to measure customer education, the approach suggested by Nunally (1967), developed by Churchill (1979) and updated by Gerbing and Anderson (1988) was adopted. This procedure is generally known as "*the Churchill paradigm*". The Churchill paradigm provides a method for reliable and valid scale development that relies on eight steps (see figure 8). This procedure was designed for the development of multi-item scales. According to Churchill (1979), multi-item scales are better than single-item scales. In particular, reliability tends to increase whereas measurement error is inclined to decrease.

Figure 8: Procedure for developing better measures (Churchill, 1979)



In step 1 "*specify domain of construct*", Churchill urges researchers to clearly delineate the construct they are studying and to that effect, strongly suggests that the relevant literature be analysed accurately. Step 2 "*generate sample of items*" aims to propose items which capture the domain specified in step 1. Churchill (1979) reminds us that exploratory research methods such as literature searches or qualitative surveys are relevant techniques to generate an appropriate set of items. After completing step 3 "*data collection*", researchers must purify the measure (step 4 "*purify the measure*"). This step aims to maintain the items which really belong to the domain of the concept and to remove inappropriate items. After a second data collection (see step 5 "*collect data*"), researchers proceed with step 6 "*assess reliability*". Reliability has been defined (Malhotra and Birks, 2006: 313) as "*the extent to which a scale produces consistent results if repeated measurements are made on the characteristics*".

The objective of step 7 is to "*assess the validity*". Malhotra and Birks (2006: 313) define validity as "*the extent to which a measurement represents characteristics that exist in the phenomenon under investigation*". Finally, step 8 "*develop norms*" aims to develop norms which will help provide more accurate analyses by comparing individual scores to these norms.

Among the eight steps suggested by Churchill, six steps were used in the study. Steps 5 and 8 were omitted. Two reasons explain this approach.

Regarding a second data collection (step 5)

Churchill (1979) suggests developing the measure (step 1 to 4) and then recommends applying this measure to a new sample in order to determine both the reliability and the validity (step 5 to 8). Flynn and Pearcy (2001) recognize that collecting two or more sets of data is indeed preferable to guarantee the generalization of the research. But, the authors also concede that in many studies they reviewed, a single sample was used.

As already explained, this study is a first attempt to measure customer education and its outcomes. So, the investigation was limited to this quasi exploratory context. Consequently, a single quantitative study was carried out. From a purely practical point of view, time and funding for data collection were also limited.
The further generalization of this work would need replications. Thus, there is a need for new data collections which will be discussed in the conclusions. And, throughout this research, the claim made by Flynn and Pearcy (2001: 413) must be considered: "*Still, in recognizing the constraints of funding, we must be careful of claims of a scales' performance where there has not been replication*".

Regarding the development of norms (step 8)

As Churchill explained (1979: 72), "*norm quality is a function of both the number of cases on which the average is based and their representativeness*". Given that this study is the first to measure customer education, norms cannot be developed.

4.2.2 Development and validation of the customer education scale

4.2.2.1 The specification of the domain of construct

The objective of this step was to accurately define the concepts studied, particularly by means of a literature review. Chapter 1 "*customer education*" helped to comply with this requirement. The literature review helped to propose a definition of the concept of customer education. A pilot qualitative study was also undertaken. Users of digital cameras were invited to explain in detail the way they were educated about their digital cameras. Through in depth discussions, 15 interviewees gave account of their own understanding of customer education.

4.2.2.2 The creation of a sample of items

The objective of this step was to generate an initial pool of scale items which captured the specified domain. In the literature review, scales to measure customer education were not found. However, the scales developed by Hennig-Thurau (2000) to measure the communication of customer skills provided a first insight. Also, literature dealing with exploratory research on customer education was useful at this stage to determine how consumers can perceive customer education (Meer, 1984; Honebein, 1997; Dankens and Anderson, 2001).

Our qualitative study with 15 interviewees was crucial to complete and confirm the pool of items. Finally, and in order to consolidate their formulation, these items were discussed with Nikon's marketing and customer education experts.

A pool of seven items was obtained. They are based on both the definition of customer education presented in the literature review and the description of the concept resulting from the consumer interviews.

These items are presented in table 14. Given that the study was conducted in France, both the original formulation and a possible translation are presented. The first

column specifies the variable number given to each item in the statistical analysis. These variable numbers will be further used in order to simplify the presentation of the results.

Table 14: Initial pool of items to measure customer education

	Original formulation of the item in French	Translation of the item into English
V38	Nikon fait des efforts importants pour me former à l'utilisation de mon APN (*)	Nikon invested a lot of effort in teaching me how to use my digital camera
V39	Une autre marque m'aurait moins bien formé que Nikon à l'utilisation de mon APN	Another brand would have invested less effort than Nikon in teaching me how to use my digital camera
V40	Nikon a tout mis en œuvre pour m'aider à bien utiliser mon APN	Nikon did all it could to help me use my digital camera well
V41	Nikon est une marque qui forme bien ses clients à l'utilisation de leur APN	Nikon is a brand that educates its clients well in the usage of their digital camera
V42	Nikon ne forme pas ses clients, elle leur vend des produits (item inversé)	Nikon does not educate its clients, it sells them its products (inversed item)
V43	Nikon ne m'a rien appris sur mon APN (item inversé)	Nikon taught me nothing about my digital camera (inversed item)
V44	Sans Nikon, je ne saurais pas utiliser mon APN	If it weren't for Nikon, I wouldn't know how to use my digital camera

(*: APN is the French abbreviation of digital camera)

4.2.2.3 Data collection

The data collection procedure is presented in section 4.1.2. 321 consumers were interviewed in the quantitative phase. A five-point, Likert-type response format (strongly disagree to strongly agree) was employed for the items related to the measure of customer education.

4.2.2.4 The purification of measure

The fourth step consisted in purifying the measure. It aimed to maintain the items which really belonged to the domain of the concept and to remove inappropriate items.

To reach this goal, a principal components factor analysis was carried out. Factor analysis is a statistical technique usually employed for scale development. The generic objective is to define whether the various items that are intended to represent the concept of customer education actually fulfil this purpose.

- **Results of the initial exploratory factor analysis**

A first exploratory analysis including all of the variables representing customer education (V38 to V44) was carried out.

Factorability of the data

The first step in the analysis was to check the factorability of the data. Two complementary tests are usually run to verify factorability: the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and the Bartlett's test of sphericity. The KMO indicates that partial correlations between variables are small, which means that the variables strongly contribute to the construction of a common factor. The KMO must be superior to 0,800. Bartlett's test of sphericity is used to test the null hypothesis that variables are uncorrelated. If the significance level is small, the null hypothesis is rejected, which hence confirms that the variables are factorable. The results below (see table 15) show that the data are factorable.

Table 15: KMO and Bartlett test of the 7-item customer education factor analysis

KMO measure of Sampling Adequacy		,845
Bartlett's Test of Sphericity	Approx. chi-Square	712,091
	df	21
	Significance	,000

Estimation of communalities

Communalities help to determine how the variables contribute to the creation of the factor(s). From a statistical point of view, the communality is an estimate of the proportion of variance of the variable which is shared with other variables in the correlation matrix. Usually, only variables with a communality superior to 0,500 will be kept.

The results presented in table 16 show that V39 and V44 do not contribute properly to the construction of the factor(s). Thus, the initial factor analysis was abandoned at this stage to begin a second one with 5 variables. V39 and V44 were removed. V43 was kept because its score was closer to 0,500.

Table 16: Communalities of the 7-item customer education factor analysis

	Initial	Extraction
V38	1.000	,596
V39	1.000	9,872E-02
V40	1.000	,679
V41	1.000	,763
V42	1.000	,511
V43	1.000	,486
V44	1.000	,174

Extraction method: Principal Component Analysis

- **Results of the second exploratory factor analysis (after deletion of V39 and V44)**

Factorability of the data

The results below (see table 17) show that the data are factorable. KMO is superior to 0,800. Bartlett's test of sphericity shows that the null hypothesis on the non-correlation of the variables is rejected.

Table 17: KMO and Bartlett test of the 5-item customer education factor analysis

KMO measure of Sampling Adequacy		,830
Bartlett's Test	Approx. chi-Square	668,255
Of Sphericity	df	10
	Significance	,000

Estimation of communalities

Table 18 shows that all the communalities are superior to 0,500. The different variables contribute satisfactorily to the creation of the factor(s).

Table 18: Communalities of the 5-item customer education factor analysis

	Initial	Extraction
V38	1.000	,598
V40	1.000	,693
V41	1.000	,785
V42	1.000	,525
V43	1.000	,501

Extraction method: Principal Component Analysis

Dimensionality

Five factors, or dimensions, were initially created (see table 19). There remained to determine the optimal number of factors that should be retained for the analysis. This

operation was particularly important. The number of factors kept indicates the number of underlying dimensions of the scale.

Table 19: Variance explained in the 5-item customer education factor analysis

	Initial Eigenvalues			Extraction Sums of squared loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3,101	62,023	62,023	3,101	62,023	62,023
2	,654	13,088	75,112			
3	,547	10,934	86,046			
4	,458	9,155	95,200			
5	,240	4,800	100,000			

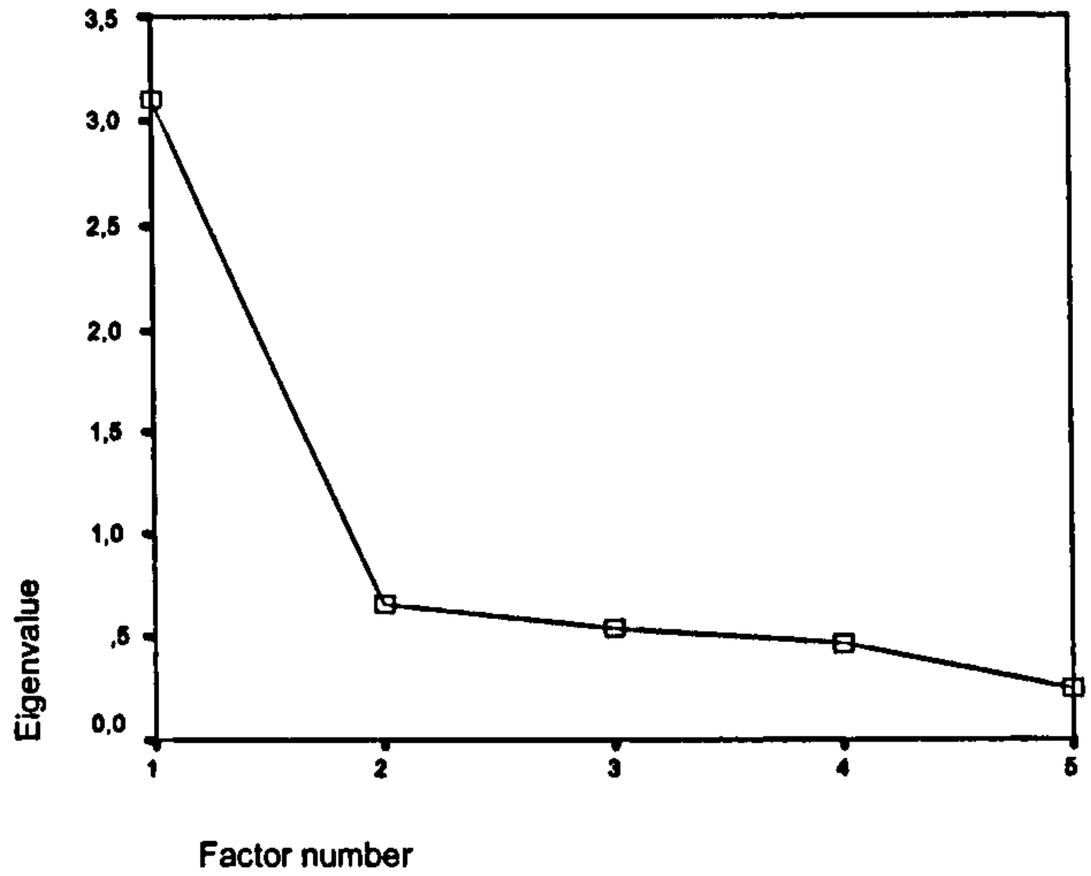
Different procedures confirm that only one factor should be taken into account. One common method is the Kaiser criterion (1960). The other method is the scree-test proposed by Cattel (1966).

The rule defined by Kaiser (1960) is to retain only those factor(s) whose eigenvalues(s) is/are superior to 1. This means that such factor(s) explain(s) more variance than a single variable. As witnessed in table 19 (see above), only one factor should be retained. Its eigenvalue is 3,101 and the percentage of variance explained by the factor is 62%, i.e. superior to the usual threshold of 50%.

The scree-test (Cattel, 1966) is a graphic method whereby the eigenvalues associated with each extracted factor are presented. When the graph begins to level off, the additional factor explains less variance than a single variable (figure 9). It happens just after Factor 1. So, the Cattel scree-test suggests that only one factor should be retained.

To conclude, the uni-dimensionality of customer education has been defined. The result is coherent with the expected structure.

Figure 9: Cattel scree-test of the 5-item customer education factor analysis



- **Results of the confirmatory factor analysis**

Confirmatory factor analysis was used to confirm whether the hypothesized factor structure established in the exploratory factor analysis actually fits the initial set of data.

In table 20, the fit indices that Hu and Bentler (1998) recommend when the model fitting procedure relies on the "*Maximum Likelihood*" estimation are presented. The Maximum Likelihood Estimation is relevant when the sample size is below 400. This applies to the study with a sample size of 321. The GFI and AGFI proposed by Jöreskog and Sörbom (1989) have also been added because of their popularity in the scientific community. Moreover, testing the model with various fit indices was a safe way to confirm the quality of adjustment.

This table shows a highly acceptable quality of adjustment. The different indices reveal that the one-dimensional structure suggested by the exploratory factor analysis is confirmed to have good model fit.

Table 20: Fit indices of the purified 5-item customer education factor analysis

Indices	Results	Usual heuristic
Steiger-Lind RMSEA	0,064	< 0,060
SRMR	0,029	< 0,050
Jöreskog GFI	0,986	> 0,900
Jöreskog AGFI	0,957	> 0,900
NNFI (Bentler-Bonett Non Normed Fit Index)	0,980	Close to 1 and ideally superior to 0,950
CFI (Bentler comparative fit index)	0,990	Close to 1 and ideally superior to 0,950

To conclude, exploratory and confirmatory factor analyses allowed to define a 5-item scale that measured customer education. These items have been shown to reflect one unique underlying construct. The reliability of the scale will be now assessed.

4.2.2.5 The assessment of reliability

In order to assess the reliability of the customer education scale, two measures were used: Cronbach's Alpha (1951), also termed coefficient alpha, and Jöreskog's Rhô (1971).

- **Cronbach's Alpha**

Cronbach's Alpha aims to measure the internal consistency reliability of a scale. Thus, it indicates if a set of items can be considered to measure a single latent variable. The Alpha coefficient ranges in value from 0 to 1. The closer the coefficient is 1, the more consistent the scale. Conversely, a score close to 0 indicates weak internal consistency. In practice, the assessment of the Cronbach's Alpha relies on heuristics (Peterson, 1994). A score superior to 0,800 is recommended in a confirmatory context. A score of 0,700 is sufficient in the context of this study, which is an exploratory context (Nunally, 1978).

In the study, the coefficient Alpha matches this theoretical requirement. The exact score is 0,841 (table 21).

- **Jöreskog's Rhô**

One weakness of Cronbach's Alpha is its sensitivity to the number of items that forms the scale. Jöreskog's Rhô overcomes this limitation. The interpretation is relatively similar to the coefficient alpha: when Rhô is close to 1, it reveals that the scale is consistent and thus reliable. Oppositely, a score close to 0 indicates a poor level of reliability.

In the study, Joreskôg Rhô amounts to 0,847 (table 21). This score substantiates the analysis that the 5-item scale to measure customer education is satisfactorily reliable.

Table 21: Cronbach's Alpha and Jöreskog's Rhô of the customer education scale

Coefficient	Results	Heuristic
Cronbach's Alpha	0,841	> 0,800
Jöreskog's Rhô	0, 847	> 0,800

4.2.2.6 The assessment of validity

The previous steps enabled to produce a purified and internally consistent scale. Albeit necessary, consistency does not suffice to ensure the validity of the construct (Nunally, 1967; Churchill, 1979) and therefore other statistical approaches must be used. Different types of validity must be discussed: content validity, construct validity (convergent and discriminant validity) and criterion validity.

- **Content validity**

According to Malhotra and Birks (2006: 315), content validity is a "*subjective but systematic evaluation of the representativeness of the content of a scale for the measuring task at hand*". In the study, it refers to the extent to which the measure

represents all facets of the concept of customer education. No statistical indicator measures this validity.

Content validity depends on the attention paid by the researcher to the specification of the construct domain. In complement, great care must be taken when identifying and formulating the items. It should be noted that every effort has been made to meet these requirements. The existing literature on customer education as well as literature from complementary fields was reviewed. Then, an exploratory qualitative study was carried out to better apprehend the customer-oriented vision of customer education. These two initial steps helped to formulate the items. A pre-test of the quantitative survey was also carried out in order to ensure that items were coherent and understandable.

Moreover, all of the items reveal high levels of communality: all are superior to 0,500 and three out of the five items are equal or superior to 0,600 (see table 18).

In conclusion, the objective of content validity has been reached.

- **Construct validity**

Construct validity was defined by Peter (1981) as the extent to which operationalization measures the concept that is supposed to be under measurement.

To assess construct validity, Campbell and Fiske (1959) suggest analyzing both convergent and discriminant validity.

According to Bagozzi and Yi (1991: 427), convergent validity is "*the degree to which multiple attempts to measure the same concept are in agreement*" while discriminant validity "*is the degree to which measures of different concepts are distinct*".

Convergent validity

When different measures of the same construct exist, one common method used by researchers is the multi-trait multi-method approach. This approach measures the correlations obtained with the different scales used. Unfortunately, this method cannot be used because no other measures of customer education exist.

Bagozzi and Yi (1991) propose that two levels of convergent validity can be assessed: weak evidence for convergent validity and strong evidence for convergent validity.

Bagozzi and Yi (1991: 433) consider that weak evidence for convergent validity is ensured when "*the factor loading on a measure on interest is statistically significant*". Table 22 shows that this condition is satisfied in the model. All the relationships are significant with p-value < 0,001.

Table 22: Customer education model estimates

	Parameter Estimate	Standard Error	T Statistic	P-value
(customer education)-1->[Var38]	0,698	0,033	21,341	0,000
(customer education)-2->[Var40]	0,807	0,025	32,343	0,000
(customer education)-3->[Var41]	0,908	0,019	47,321	0,000
(customer education)-4->[Var42]	0,604	0,039	15,420	0,000
(customer education)-5->[Var43]	0,584	0,040	14,428	0,000

Strong evidence for convergent validity is usually assessed through an approach suggested by Fornell and Larcker (1981). The method consists in calculating the variance shared by the measured concept with its items. This indicator is usually termed the ρ cv. If the ρ cv is inferior to 50%, it means that the latent variable (the concept) shares less than 50% of its variance with its items. In this case, measurement errors explain the greater part of the variance. Oppositely, if the ρ cv is superior to 50%, the latent variable shares more than 50% of its variance with the items. Measurement errors explain less than 50% of the variance. Thus, it is considered that strong evidence for convergent validity is ensured when the ρ cv is

superior to 50%. In the study the ρ cv = 53,30%. Thus strong evidence of convergent validity was provided.

Discriminant validity

Malhotra and Birk (2006: 315) suggest that discriminant validity is useful in assessing "*the extent to which a measure does not correlate with other constructs from which it is supposed to differ*".

Based on this definition, the analysis of discriminant validity was not applicable in the study because the objective was not to compare the customer education scale to another construct from which it should differ.

- **Criterion validity**

Criterion validity is usually ensured at the hypotheses validation stage: the criterion validity is ensured if the research hypotheses are verified. It would implicitly mean that the measure of customer education runs as theoretically expected.

4.2.2.7 Conclusion

With regard to previous developments, the 5-item scale to measure customer education has satisfactory psychometric properties, even though discriminant and criterion validity were not determined. The scale reveals a one-dimensional construct.

4.2.3 Development and validation of the other multi-item scales

The same procedure was applied to assess the scales for product-usage related knowledge and skills and for customer expertise within a product category. As regards the data collection (step 3 of the Churchill paradigm), the characteristics of

the quantitative survey are detailed in section 4.1.2. and recalled in section 4.2.2.3. So, it is not necessary to dwell any further on this point.

4.2.3.1 Product-usage related knowledge and skills

The detailed statistical results related to the validation of this scale are presented in appendix 1.

- **The specification of the domain of construct**

In the literature review, a comprehensive overview of the domain of the construct related to knowledge and skills was provided. The concepts of both knowledge and skills were defined, their importance for marketing theory analysed and their meaning in the specific context of product usage stressed. The different measures were also highlighted to conclude that a subjective measure of knowledge and skills was most suitable.

- **The creation of a sample of items**

To create the sample of items, the existing literature on the topic was screened, notably on the subjective measure of knowledge and skills. Most of the scales identified dealt only with the measurement of subjective knowledge (Rao and Monroe, 1988; Park et al., 1992; Raju et al., 1995; Cordell, 1997; Flynn and Goldsmith, 1999). In addition, only a few studies in the marketing field dealt with the measure of skills (Hennig-Thurau, 2000). Such research was exploited in order to define a set of items so as to measure both knowledge and skills related to product usage and adapted to the French context. As done for customer education, the qualitative phase was exploited in order to detail, complete and refine these items. These items were also reviewed by the Nikon team.

This work led to define an initial pool of 10 items that are presented in table 23.

Table 23: Initial items to measure the product usage related knowledge and skills

	Original formulation of the item in French	Translation of the item into English
V46	Je connais bien les différentes fonctionnalités de mon APN (*)	I know the different functions of my digital camera well
V47	Je sais bien utiliser mon APN	I know how to use my digital camera well
V48	Je sais faire de bonnes photos avec mon APN	I know how to take good photos with my digital camera
V49	Mon APN me paraît plus simple à utiliser maintenant que lors de mes premières utilisations de cet APN	My digital camera seems easier to use now than when I first used it
V50	Je connais bien le fonctionnement de mon APN	I know how my digital camera works
V51	J'ai beaucoup appris sur le fonctionnement de mon APN depuis que je l'ai acheté.	I have learnt a lot about how my digital camera works since I bought it
V52	Il me reste beaucoup à apprendre pour utiliser pleinement mon APN	I still have a lot to learn in order to fully use my digital camera
V53	Je me sens plus compétent que la plupart des autres utilisateurs de cet APN	I feel that I am more proficient with my digital camera than most users
V54	Mon APN reste trop compliqué pour moi	My digital camera is still too complicated for me
V55	Je sais beaucoup mieux utiliser mon APN maintenant qu'au moment de l'achat	I know how to use my digital camera better now than when I bought it

(*: APN is the French abbreviation of digital camera)

- **The purification of the measure**

A seven-item scale

First an exploratory factor analysis including the ten variables was made. The result of the KMO test (0,828) was satisfactory and Bartlett's sphericity test was significant. However, three variables suffered from low communalities (V48:0,330; V53: 0,339 and V54: 0,385). So, a second exploratory factor analysis with seven variables was carried out. In this case, the KMO was close to 0,800 (0,774) and Bartlett's sphericity was significant, so the data were factorable. The communalities of all variables were superior to 0,500.

A two-dimensional construct

In order to determine the dimensionality of the construct the method recommended by Kaiser (1960) was first applied. Two factors were retained, each with eigenvalues superior to 1 (dimension 1: 2,917; dimension 2: 1,898). The Cattel scree-test (1966)

confirmed this conclusion. Finally, the two factors constituted 68,791 % of the variance of the model, which is satisfactory.

Understanding the two dimensions

In order to understand the meaning of each dimension, the component matrix was analyzed. This matrix indicates which variable contributes to the construction of the different factors. To identify the meaning of each dimension, the variable that closely correlated to the dimension were retained.

Table 24: Component matrix of the 7-item knowledge and skills factor analysis

	Component	
	Factor 1	Factor 2
V46	,794	-,339
V47	,802	-,324
V49	,499	,633
V50	,818	-,232
V51	,599	,612
V52	,464	-,546
V55	,389	,742

Concerning dimension 1, V46, V47 and V50 were closely correlated to the factor. V52 was also retained because it contributed more to this dimension than to dimension 2.
Dimension 1 summarized "*the actual know-how of customers*". By means of these different items, customers expressed their actual degree of knowledge and skills (V46, V47, V50) as well as their skills' shortage (V52).

Dimension 2 (V49, V51, V55) summarized "*the feeling of progress*". Items related to this dimensions allowed consumers to express their progress since the purchase or the early usage of the digital camera.

This structure is an important finding of the study, because it stresses two distinct and complementary dimensions related to the acquisition of knowledge and skills. The first dimension can be considered as static (know-how) while the second seems more dynamic (progress). In fact, compared to existing studies (Raju et al., 1995; Flynn and Goldsmith, 1999), the second dimension unveiled in the study is novel.

- **The results of the confirmatory factor analysis**

The results of the confirmatory factor analysis confirmed that the two-dimensional structure of the construct fitted the initial set of data. Regarding dimension 1, all the criteria except RMSEA were compliant with the threshold indicated in the literature. For dimension 2, only the SRMR was calculated. The others indicators could not be estimated because of the absence of degrees of freedom. This limitation is explained by the number of items contained in dimension 2.

So, the quality of adjustment is acceptable and that the two-dimensional construct of the product usage related knowledge and skills has a good model fit.

- **The assessment of reliability**

Cronbach's Alpha and to Jöreskog's Rhô were used to assess the reliability of the scale. These indicators were calculated for each dimension. For dimension 1, the Cronbach's Alpa was superior to 0,700 and close 0,800 (= 0,792). Jöreskog's Rhô was superior to 0,800 (= 0,830). For dimension 2, both Cronbach's Alpa and Jöreskog's Rhô were superior to 0,700 and close to 0,800 (respectively 0,781 and 0,783). According to Nunally (1978), these results are satisfactory in an exploratory context.

- **The assessment of validity**

<u>Content validity</u>

As explained earlier, attention was paid to delineate the domain of construct and to define the items. The different variables of the model had high communalities (all were superior to 0,500 and 6 out of 7 communalities were equal or superior to 0,650). Thus, content validity was satisfactorily ensured.

<u>Construct validity</u>

As explained earlier, discriminant validity need not be studied in our context.

Regarding convergent validity, the model matched the two requirements of weak and strong levels of convergence proposed by Bagozzi and Yi (1991). Regarding the weak evidence of convergent validity, relationships between the concept measured and the variables included in such measure should be significant. This was actually the case with a p-value < 0,001. The strong evidence of convergent validity is also verified, because ρ cv = 55% for dimension 1 and ρ cv = 54,8% for dimension 2.

Criterion validity

Our measure originally combined the measure of both knowledge and skills. Moreover such a measure is related to product usage. Given that scales measuring similar constructs do not exist, the criterion validity cannot be studied.

- **Conclusion**

The validation procedure of the scale in measuring the level of product usage related knowledge and skills provided satisfactory psychometric qualities. One important result was that two dimensions of the construct were revealed. The consequences are presented in section 4.2.5.

4.2.3.2 Customer expertise with the product category

The detailed statistical results related to the validation of this scale are presented in appendix 2.

- **The specification of the domain of construct**

As explained in chapter 3, expertise within a product category was defined in the marketing literature (Spence and Brucks, 1997; Raghubir and Corfman, 1999; Wood and Lynch, 2002) as domain specific knowledge acquired through experience and training. However, a specific scale measuring product category expertise does not appear to have been generalized. The scale designed by Flynn and Goldsmith (1999) refers mainly to subjective knowledge about a domain. Raghubir and Corfman

(1999) measured expertise through a two-item index created from self-report measures made by consumers. Mitchell and Dacin (1996) also used self-report measures of knowledge. Maheswaran (1994) mixed a self-report measure of category-expertise and an objective knowledge test. Finally, Aurier and Ngobo (1999) developed a scale to measure subjective expertise but applied it to a single product category, wine. None of these studies were carried out in the context of consumer electronics.

Thus, it was decided to develop and validate a scale relevant to the study.

- **The creation of a sample of items**

In order to create a pool of items, the scales and the items mentioned in the previous paragraphs were analysed. Special care was taken to follow the recommendations made by Aurier and Ngobo (1999: 572) to capture the different facets of consumer subjective expertise, i.e. "*global feeling of expertise, expertise relative to others, expertise regarding choice, consumption, and to the ability to advise other buyers*".

As for previous scales, the qualitative study helped to complete the investigation on items. The different items are presented in table 25.

Table 25: Initial items to measure the level of product category expertise

	Original formulation of the item in French	**Translation of the item into English**
V12	Les APN, c'est un sujet sur lequel je me sens compétent	I feel that I am competent in the subject of digital cameras
V13	Je pense que j'en sais assez sur les APN pour être confiant lorsque j'achète ce type de produit	I think that I know enough about digital cameras to feel confident when I buy this type of product
V14	Je ne connais pas grand-chose aux APN	I don't know much about digital cameras
V15	Je sais comment évaluer la qualité d'un APN	I know how to judge the quality of a digital camera
V16	Dans mon entourage, je suis considéré comme un expert des APN	My family and friends consider that I am an expert in digital cameras
V17	Je sais évaluer si le prix d'un APN est justifié ou non	I know whether or not the price of a digital camera is justified
V18	Je connais la plupart des nouveautés dans le domaine des APN	I am aware of most of the new features of digital cameras
V19	En comparaison à la plupart des autres utilisateurs, je connais peu de choses aux APN	Compared with most users, I know very little about digital cameras

(*: APN is the French abbreviation of digital camera)

- **The purification of the measure**

A 5-item scale

An initial exploratory factor analysis was carried out. Even though the factorability of the data is shown (KMO = 0,890 and Bartlett's test significant), the different communalities are below the usual threshold of 0,500. Thus, the analysis was not pursued and V17 (communality = 0,414), V18 (0,382) and V19 (0,446) were removed.

The second exploratory factor analysis also revealed that data were factorable (KMO = 0,826 and Bartlett's test significant). All the communalities were superior to 0,500.

A one-dimensional construct

Both the Kaiser criterion and the Cattel scree-test indicated that only one factor should be retained in the analysis. As this factor constitutes more than 60% of variance (60,233%), this decision can be considered as satisfactory.

- **The results of the confirmatory factor analysis**

On the whole, the different indices showed that the quality of adjustment is satisfactory in an exploratory context. The only exception is the RMSEA which is slightly superior to the threshold of 0,06.

- **The assessment of reliability**

Cronbach's Alpha (0,828) and Jöreskog's Rhô (0,835) were superior to the threshold of 0,800. The reliability of the scale is thus confirmed.

- **The assessment of validity**

Content validity

Similar observations can be made to those drawn from the two scales assessed previously. The literature search enabled to delineate the domain of construct. So, content validity is thus ensured.

Construct validity

As for the previous scales, the focus was on **convergent validity**. Regarding the weak evidence for convergent validity, the results showed that the different variables were significantly related to the concept measured (p-value < 0,001). Strong evidence for convergent validity was also shown, because the ρ cv = 61%.

- **Conclusion**

According to the different statistical or methodological evidences provided above, the scale developed to measure customer expertise within a product category has good psychometric properties and can be used to test the research hypotheses.

4.2.4 Other scales

4.2.4.1 Product usage

In the literature review, the conceptualization of product usage offered by Ram and Jung (1990, 1991) was described. The measure of product usage encompasses either two distinct dimensions (Ram and Jung, 1990) or three distinct dimensions (Ram and Jung, 1991). In the context of the study, three dimensions (usage frequency, usage situation and usage function) are more suitable because they capture more facets of product usage.

In table 26, the measures of the three dimensions of product usage developed by Ram and Jung (1990, 1991) are presented.

Ram and Jung (1990, 1991) measured both past and present usage frequency and usage function. This approach specifically addressed one of their particular research questions (the evolution of product usage through time). The study does not harbour this ambition. Thus, the current formulation will be used.

Regarding usage situations, the list of situations is specific to the product surveyed. Thus, during the qualitative phase and through discussions with Nikon, a lot of attention was paid to defining a comprehensive set of items depicting usage situations of digital cameras. Sixteen items were formulated.

Finally, the willingness to use such a scale was also justified by the interesting psychometric properties shown by Ram and Jung (1990, 1991), especially a satisfactory discriminant validity between the different dimensions.

Table 26: Measurement of product usage (Ram and Jung, 1990, 1991)

Dimension	Formulation of the question
Usage frequency	1- On average, how often have you used this product since you bought it? 2- At present, how often do you use this product? *"1: more than once a day; 2: once a day; 3: a few times a weak; 4: once a week; 5: once a month; 6: less than once a month"*
Usage function	1- What proportion of the total features (function keys) of your product did you try immediately after acquiring it? 2- What proportion of the total features (function keys) of your product have you used since you acquired it? *"1: all of them; 2: most of them; 3: about half of them; 4: a little less than a half; 5: a few of them; 6: very few"*
Usage situation	A score of 1 given each usage situation.

4.2.4.2 Customer satisfaction

The literature review revealed that many definitions of customer satisfaction have been put forward (Giese and Cote, 2000; Vanhamme, 2002). Especially, satisfaction

has been defined as both a cognitive and an affective concept. Transaction-specific and cumulative visions of satisfaction have also been debated. In this study, satisfaction is considered as a cognitive response (section 2.2.3.). This approach relied on the expectancy disconfirmation paradigm (Oliver, 1980).

Thus, an evaluative-cognitive measure of customer satisfaction was arguably chosen, and notably a disconfirmation measure (Aiello et al., 1977; Oliver, 1980; Swan et al., 1981; Hausknecht, 1990).

According to Oliver (1997) and Hausknecht (1990), different types of scale formulation exist. The 5-item scale proposed by Aiello et al. (1977), presented in table 27, is used in this study.

Table 27: Evaluative measure of consumer satisfaction (Aiello et al., 1977)

Degree of satisfaction				
Much more than I expected	Somewhat more than I expected	About what I expected	Somewhat less than I expected	Much less than I expected

Finally, the choice of a mono-item scale must be commented. Debates in literature favour multi-item scales, because they have better psychometric qualities (Churchill, 1979). However, researchers in the field of satisfaction have shown that mono-item scales present sufficient psychometric properties (LaBarbera and Mazursky, 1983; Yi, 1990; Kekre et al., 1995). Thus a mono-item scale can be used in the study.

4.2.5 Implications for the formulation of the research hypotheses

In this section, it has been shown that the different scales developed have satisfactory psychometric qualities. Other scales have also been validated by previous research. Thus, the different scales can be used to test the hypotheses.

The scale to measure product usage related knowledge and skills is a two-dimensional construct. In the test of the research hypotheses relating to this construct (H1, H2, H3, H4, H5, H9), the results shall be detailed for each of the two dimensions. This is an opportunity to more accurately explain and discuss the results related to these hypotheses.

4.3 TESTING THE HYPOTHESES

This section aims to measure whether the research model and the research hypotheses are valid. The principles of the statistical modeling technique, namely Structural Equation Modeling, are first presented (4.3.1). Then, the results related to the overall goodness-of-fit of the research model are presented (4.3.2). In section 4.3.3, the results of the hypotheses H1 to H8 are unveiled which deal with the "customer education – customer satisfaction" relationships and include the mediating role of product usage and customers skills. The hypotheses H9 and H10 related to the moderating role of customer expertise with a product category are further tested (4.3.4). Finally, the results are synthesized and discussed (4.3.5).

4.3.1 Statistical methodology: Structural Equation Modeling

Structural Equation Modeling (or SEM) is a statistical modeling technique that tests the relationships between one or more independent variables and one or more dependent variables. This modeling technique has been arousing the interest of marketing researchers in Europe for nearly twenty years for at least two reasons. First, SEM measures the causal relationships between theoretical constructs built upon latent variables. Second, compared to traditional statistic methods, such as regression, SEM models can simultaneously estimate many inter-related dependency relationships. It thus ensures better levels of statistical estimations. These reasons brought to choose this technique to test the research hypotheses.

In order to implement Structural Equation Modeling properly, different steps are recommended (Hair et al., 1998; Roussel et al., 2002). In the context of the research, these steps are (1) developing a theoretically based model; (2) constructing a path diagram of causal relationships; (3) converting the path diagram into a set of structural equations and specifying the measurement model; (4) defining the conditions for SEM implementation; (5) evaluating and interpreting the results.

Tasks (1) and (2) have already been carried out in the previous chapters. The SEPATH module of STATISTICA 7 software was used in order to perform task (3). The implementation conditions of the SEM models applied in the study is presented hereafter (4). These specifications condition the analysis of the core results (5) presented in sections 4.3.2, 4.3.3 and 4.3.4.

- **Implementation conditions of SEM models**

Two crucial aspects of SEM implementation must be discussed because they can bias the results: the question of the sample size and the assumption of multivariate normality. The correlation matrix was used as the analyzable data in the SEM model to ensure the comparison between the different coefficients of the model.

The sample size

No specific criteria exist that define the appropriate size of samples used in SEM procedures. However, two related types of discussions generally arise: the threshold size of the sample and the estimation procedure to be used.

Hulland et al. (1996) review the discussions on the sample size and conclude that most researchers recommend a sample size of at least 100 individuals, but that the size of 200 seems better for complex models. Roussel et al. (2002) also remind us that a sample of more than 400 or 500 individuals may damage the quality of adjustment. Hair et al. (1998) also suggest defining a ratio of 5 or 10 individuals per estimated parameter. The sample size complied with these recommendations.

The sample size also influences the choice of estimation procedure. The *Maximum Likelihood* (ML) estimation method was used. It is generally recommended for an average sample size of 200 individuals. Other potential estimation methods were *Generalized Least Squares* (GLS) and *Asymptotic Distribution Free* (ADF). GLS was rejected because it would probably be unusable in the case of complex models and could lead to unsatisfactory results (Hu and Bentler, 1995). ADF was rejected because this method is recommended for very large samples, which was not the case in the study.

The ML estimation method was therefore the best choice for the research. However, from a theoretical point of view, ML is used only if a multivariate normal distribution of the variables is shown. This point is discussed hereafter.

The assumption of multivariate normality

Hulland et al. (1996: 185) explain that the use of non-normal data can produce several errors, such as "*severely biased standard estimates*" or "*erroneous chi-square value*". However, despite the fact that the normal distribution of the data is required to implement the ML estimation method, the assumption of multivariate normality is difficult to measure from a practical point of view (Roussel et al., 2002).

To overcome this difficulty, a "*bootstrap*" procedure was used. This method consists in creating an important number of random sub-samples from the initial sample of the survey. Sample distribution parameters were obtained as opposed to single parameters. If the results encountered after the bootstrap procedure are relatively similar to the results encountered in the initial sample, it implies that the results are not dependent on the data distribution. In this case, the assumption of multivariate normality need not be verified.

In order to consolidate the results, two successive bootstrap procedures were run. The first bootstrap (called *bootstrap A* in further results related to hypothesis-testing) was based on the creation of 300 random sub-samples of 321 customers, as usually recommended. Then, to dig even deeper, a bootstrap (*bootstrap B*) based on 300 random samples of only 150 customers was already made.

Now that these points have been clarified, the results of the SEM analysis will be presented.

4.3.2 Overall goodness-of-fit of the structural model

The overall goodness-of-fit of the model reveals the quality of adjustment of the model to the data. To assess the quality of adjustment, a researcher must refer to several indices. Albeit frequently reported, the Chi-square (χ^2) was not used in the study because it is strongly dependent on the sample size and, in practice, does not constitute a good fit index (Roussel et al., 2002).

The criteria proposed by Hu and Bentler (1998) and Jöreskog and Sörbom (1989) that are relevant for the ML estimation method were used.
Thus, besides the heuristics usually employed, the following criteria were taken into account:

- The GFI (*Goodness of Fit Index*) and the AGFI (*Adjusted Goodness of Fit Index*) introduced by Jöreskog and Sörbom (1989). The AGFI attempts to adjust the GFI for the complexity of the model by taking into account the number of parameters which have been estimated. GFI and AGFI should be superior to 0,900.
- CFI (*Comparative Fit Index*) and the NNFI (*Non Normed Fit Index*). These indices should be close to 1 and ideally superior to 0,950 to judge the model fit as satisfactory.
- Population Gamma Index. This criterion should be superior to 0,950
- BL 89 (*Bollen's Rho*). This criterion should also be superior to 0,950
- RMSEA (*Root Mean Square Error of Approximation*). This criterion shows how close the approximation of the model is to the real model. Small RMSEAs reveal that approximation is satisfactory. A RMSEA below 0,060 is required.
- SRMR (*Standardized Root Mean Square Residual*). This criterion measures the residuals, i.e:. the difference between the initial data and the results of the model. SRMR should be less than 0,050.

Table 28 presents the goodness-of-fit indices measured in the model. These indices must match the requirement formulated through the usual heuristics. Also, the overall convergence of the different indicators is recommended.

Table 28: Goodness-of-fit indices of the model

Indices	Results	Usual heuristic
GFI	0,940	> 0,900
AGFI	0,914	> 0,900
CFI	0,955	Close to 1 and ideally superior to 0,950
NNFI	0,943	Close to 1 and ideally superior to 0,950
Population Gamma Index	0,974	> 0,950
BL 89	0,879	> 0,950
RMSEA	0,047	< 0,060
SRMR	0,066	< 0,050

The indices presented above confirm that the quality of adjustment of the model to the data is satisfactory. With the exception of the SRMR, which is slightly higher than the heuristic, and the BL 89, which is slightly below the threshold, all the indices show that the model fit is adequate.

This result is important in the context of the research: it provides clear evidence that the theoretical model of the outcomes of customer education drawn from the literature review fits the empirical data.

From an analytical point of view, the fact that the overall goodness-of-fit of the model to the data is satisfactory, means that the relationships (i.e.: the hypotheses) are, on the whole, relevant to reproduce the initial data.

So, it is now possible to analyse which hypotheses are empirically supported.

4.3.3 Validation of the hypotheses

To validate the different relationships of the research model, two categories of results must be presented.

The first category refers to the statistical significance of the relationship analysed. First, the correlation[11] measure is presented, which indicates the strength of the relationship between the predictor and the explained variable. This correlation is associated with its significance level (p-value). This level was established with a risk level of 0,05.

The correlation scores obtained after the two bootstrap procedures[12] are also presented. For each bootstrap, the average correlation score obtained and the mean square (labelled "s") are verified.

The second category refers to the practical significance measured through the R^2. R^2 measures the part of the explained variable which is actually explained by the model.

4.3.3.1 Impact of customer education on knowledge and skills acquisition (H1)

H1 was originally formulated as follows: "*the more the consumer perceives he has been educated about the usage of a product by the product manufacturer, the more he thinks he is knowledgeable and skilled on this product*".

The scale validation phase concluded that "the product usage related knowledge and skills" construct is two-dimensional. Dimension 1 summarizes "*the actual know-how of customers*", while dimension 2 refers to '*the feeling of progress*". It has also been concluded that it is important to analyse the two dimensions separately in the hypotheses. From a statistical point of view, it can lead to higher level of significance

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[11] According to general practice, this correlation should be labelled γ when it concerns a relation between an endogenous and an exogenous variable and β for a relation between two endogenous variables

[12] The "*bootsrap A*" procedure was carried out on 300 random samples of 321 customers. The "*bootstrap B*" refers to 300 random samples of 150 customers.

of the relationships. From a theoretical point of view, it is liable to explain and depict more accurately the effects of customer education on customer skills.

For these reasons, separate measure the impact of customer education on each dimension of customer skills was carried out. Table 29 presents the results of the impact of customer education on "*the actual know-how of customers*". Table 30 focuses on the relationships between customer education and "*the feeling of progress*".

Table 29: Impact of customer education on the actual know-how of customers

Statistical significance	Practical significance
Correlation $\gamma = 0,218$ (p-value<0,000)	$R^2 = 0,093$
After bootstrap A: $\gamma = 0,206$ and s= 0,084	
After bootstrap B: $\gamma = 0,216$ and s= 0,122	

Table 30: Impact of customer education on the feeling of progress

Statistical significance	Practical significance
Correlation $\gamma = 0,199$ (p-value < 0,001)	$R^2 = 0,078$
After bootstrap A: $\gamma = 0,192$ and s= 0,075	
After bootstrap B: $\gamma = 0,203$ and s= 0,107	

The results presented above show that customer education and the two dimensions of customer skills are positive and significant (p-value < 0,001). The two bootstrap (A and B) procedures reinforce these results. For each relationship studied, the correlations obtained after bootstraps remain close to the initial correlations γ and the mean squares remain relatively low.

The R^2 measures indicate a satisfactory level of practical significance without being very high. It can perhaps be explained by the fact that only one independent variable has been modelled.

So, H1 is supported.

The impact of customer education is slightly stronger on the actual know-how of customers (dimension 1) than on the feeling of progress (dimension 2). One plausible interpretation is that, first and foremost, customer education has an impact on the customer's self-perceived expertise with his product. A second effect is that customers acknowledge that their expertise increased through customer education.

The analysis of H1 will be enhanced by the analysis of the moderating role of customer expertise with the product category (section 4.3.4.1).

4.3.3.2 Impact of product related knowledge and skills on product usage (H2 to H4)

This section concerns hypotheses H2 to H4 which analyse the relationships between customer skills and each dimension of product usage. The results of each dimension of customer skills are presented.

- **Validation of H2**

H2 was formulated as follows: "*The more the consumer perceives he is knowledgeable and skilled in the usage of a product, the higher the usage frequency of the product*". Tables 31 and 32 present the related statistics.

Table 31: Impact of "the actual know-how of customers" on usage frequency

Statistical significance	Practical significance
Correlation β= 0,200 (p-value< 0,000)	R^2 = 0,110
After bootstrap A: β = 0,190 and s= 0,066	
After bootstrap B: β = 0,189 and s= 0,082	

Table 32: Impact of "the feeling of progress" on usage frequency

Statistical significance	Practical significance
Correlation β=0,122 (p-value<0,05)	R^2 = 0,110
After bootstrap A: β = 0,122 and s= 0,060	
After bootstrap B: β = 0,121 and s= 0,091	

The results presented above show that the two dimensions product usage related knowledge and skills significantly (p-value < 0,05) and positively influence usage frequency. The bootstrap procedures confirm these results. Finally, the R^2 measure indicates a satisfactory level of practical significance.

So, H2 is supported.

From an analytical point of view, dimension 1 of customer skills has the strongest impact on usage frequency, even though the second dimension also significantly contributes to the understanding of usage frequency. Finally, the perceived ability of customers to use a product explains 11% (see R^2) of the degree of product usage frequency.

- **Validation of H3**

H3 concerns the relationships between customer skills and usage situations: "*the more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage situation of the product*". Tables 33 and 34 present the detailed results for each dimension of customer skills.

Table 33: Impact of "the actual know-how of customers" on usage situation

Statistical significance	Practical significance
Correlation β= 0,017 (p-value>0,05)	R^2 = 0,003
After bootstrap A: β = 0,014 and s= 0,058	
After bootstrap B: β = 0,012 and s= 0,091	

Table 34: Impact of "the feeling of progress" on usage situation

Statistical significance	Practical significance
Correlation β= -0,032 (p-value>0,05)	R^2 = 0,003
After bootstrap A: β = -0,029 and s= 0,069	
After bootstrap B: β= -0,024 and s= 0,099	

According to the statistics presented above, the two dimensions of customer skills do not influence usage situations (p-value>0,05).

So, H3 is not supported.

This result is unexpected and will be discussed in section 4.3.5. It will offer some explanation as to the theoretical, methodological or managerial implications.

- **Validation of H4**

The H4 hypothesis addressed the relationships between customer skills and usage function: "*The more the consumer perceives he is knowledgeable and skilled on the usage of a product, the higher the usage function of the product*". Tables 35 and 36 present the detailed results of this hypothesis.

Table 35: Impact of "the actual know-how of customers" on usage function

Statistical significance	Practical significance
Correlation β= 0,499 (p-value<0,000)	R^2 = 0,460
After bootstrap A: β = 0,484 and s= 0,097	
After bootstrap B: β = 0,484 and s= 0,112	

Table 36: Impact of "the feeling of progress" on usage function

Statistical significance	Practical significance
Correlation β= 0,110 (p-value < 0,05)	R^2 = 0,460
After bootstrap A: β = 0,104 and s= 0,061	
After bootstrap B: β = 0,118 and s= 0,092	

The results presented above show that the actual know-how of customers (table 35) significantly and positively influences usage function. The correlation β shows the strength of the relationship. The impact of the feeling of progress (table 36) remains significant with a risk of 0,05 but is relatively low (correlation β = 0,110).

So, the two relationships are significant and the bootstrap procedures confirm these results.

Finally, the R^2 is very high (46%). From an analytical point of view, it implies that the number of functions that customers use is practically and highly related to their skills.

So, H4 is supported.

- **Comments on H2 to H4**

To conclude the analysis of H2, H3 and H4, striking relationships have been highlighted between customer skills and the two dimensions of product usage, usage function and usage frequency. Usage function is the dimension which is the most impacted by customer skills, notably the actual know-how of customers.

4.3.3.3 Impact of product related knowledge and skills on satisfaction (H5)

This section concerns hypothesis H5: "*The higher the level of customer knowledge and skills about product usage, the higher the level of customer satisfaction with the product*". Tables 37 and 38 present the detailed results for each dimension of customer skills.

Table 37: Impact of "the actual know-how of customers" on satisfaction

Statistical significance	Practical significance
Correlation β= 0,055 (p-value>0,05)	R^2 = 0,1923
After bootstrap A: β = 0,061 and s= 0,084	
After bootstrap B: β = 0,063 and s= 0,122	

Table 38: Impact of "the feeling of progress" on satisfaction

Statistical significance	Practical significance
Correlation β=0,281 (p-value<0,000)	R^2 = 0,1923
After bootstrap A: β = 0,266 and s= 0,073	
After bootstrap B: β = 0,273 and s= 0,090	

The results are contrasted. The statistics in table 37 reveal that the relationship between the actual know-how of customers and customer satisfaction is not significant (p-value>0,05). Conversely, table 38 shows that the feeling of progress has a strong and positive impact on satisfaction. The bootstrap procedures confirm these results.

Thus, H5 is partially supported.

4.3.3.4 Impact of product usage on satisfaction (H6 to H8)

This section concerns hypotheses H6 to H8 which address the relationships between product usage and customer satisfaction with the product.

- **Hypothesis 6**

H6 refers to the relationship between usage frequency and customer satisfaction: "*The higher the frequency of usage of the product, the higher the level of customer satisfaction with the product*". The results are presented in table 39.

Table 39: Impact of usage frequency on customer satisfaction with the product

Statistical significance	Practical significance
Correlation β= 0,077 (p-value<0,10)	R^2 = 0,1923
After bootstrap A: β = 0,075 and s= 0,057	
After bootstrap B: β = 0,069 and s= 0,079	

With a risk of 0,05, the results presented above show that usage frequency has no direct impact on customer satisfaction. However, with a risk level of 0,10, this hypothesis is supported. The correlation β is very low, showing that the relationship remains weak.

Thus, H6 is supported, but with a p-value< 0,10.

- **Hypothesis 7**

H7 deals with the influence of usage situation on customer satisfaction: "*The higher the level of usage situation of the product, the higher the level of customer satisfaction with the product*". The results are presented in table 40.

Table 40: Impact of usage situation on customer satisfaction with the product

Statistical significance	Practical significance
Correlation β= 0,039 (p-value>0,05)	R^2 = 0,1923
After bootstrap A: β = 0,038 and s= 0,057	
After bootstrap B: β = 0,042 and s= 0,087	

The statistics presented above show that no clear evidence of relationships between usage situation and usage function has been shown (p-value>0,05).

Thus, H7 is rejected.

- **Hypothesis 8**

H8 concerns the relationships between usage function and customer satisfaction: "*The higher the level of usage function of the product, the higher the level of customer satisfaction with the product*". Table 41 sets forth the key statistics.

Table 41: Impact of usage function on customer satisfaction with the product

Statistical significance	**Practical significance**
Correlation β= 0,023 (p-value>0,05)	R^2 = 0,1923
After bootstrap A: β = 0,021 and s= 0,063	
After bootstrap B: β = 0,020 and s= 0,094	

The conclusion here is similar to those drawn for H6 and H7. The relationship is not significant (p-value>0,05).

Thus, H8 is rejected.

- **Comments on the results of H6, H7 and H8**

Undoubtedly, these results are surprising and unexpected. Both the conceptual and empirical studies reviewed in part 1 "literature review" were inclined to show that positive relationships exist. Thus, these results will be discussed in the section 4.3.5 and possible explanations will be debated.

But beforehand, the mediating role of customer expertise must be analysed. In fact, one plausible reason for the weak relationships between usage and satisfaction is that customer expertise with the product category fully moderates this relationship. This hypothesis (H10) will be verified hereafter, specifically in section 4.3.4.2.

4.3.4 Validation of the moderating role of customer expertise

In this section, the methodology employed to test the research hypotheses related to the moderating role of customer expertise will be presented. The results obtained will be unveiled.

The procedure drawn up and recommended by Baron and Kenny (1986) was respected. These two researchers stated that:

"*the statistical analysis must measure and test the differential effect of the independent variable on the dependent variable as a function of the moderator*" (Baron and Kenny, 1986: 1174).

The procedure depends on the nature of the moderating variable. In the study, the moderator was measured by means of a multi-item scale (see section 4.2.3.2). It is a one-dimensional construct. As such, customer expertise with the product category takes the form of a continuous variable.

When the moderator is a continuous variable, the first step of the procedure suggested by Baron and Kenny (1986) is to translate the continuous variable into a categorical variable. According to common practice, the degree of product category expertise was dichotomized from the median. Two groups of expertise were obtained, successively called "*lower product category expertise*" and "*higher product category expertise*".

The second and last step of the procedure consists in determining, for each group, the correlation and the significance level of the relationship between the predictor and the explained variable. By comparing the results obtained for the "*lower product category expertise*" and "*higher product category expertise*", the existence of moderation effect can be shown.

To perform this task, Baron and Kenny (1986) recommended using Structural Equation Modelling. So the multi-group analysis of the SEPATH module was used.

The size of each group prompted to use the ML adjustment method. In order to respect the multivariate normality condition, a bootstrap procedure was used. Only bootstrap B (300 random samples of 150 customers) was conducted. Bootstrap A (300 random samples of 321 customers) was not relevant is this case, since the actual size of each group (lower expertise / higher expertise) was less than 300.

4.3.4.1 Moderation of the relationship between customer education and knowledge/skills (H9)

H9 was initially formulated as follows: "*The higher the product-category expertise of a consumer, the lower the impact of customer education on the level of product usage related knowledge and skills*".

In order to provide a more accurate analysis, this hypothesis had to take into account the two-dimensional structure of product usage related knowledge and skills.

Actually, existing research (Johnson and Auh, 1998; Wood and Lynch, 2002) tended to show that expert consumers are less sensitive to external information than novice consumers. However, Wood and Lynch (2002) also further specified that the interest of experts for external information depends on the degree of innovation they perceive in the information delivered. Implicitly, expert consumers are mainly interested in the improvement of their personal expertise, while novices simply want to learn how to use the product they have bought.

In the context of the study, it may imply that customer education has a stronger impact on the actual know-how (dimension 1 of customers skills) for novice consumers, and that customer education has a stronger impact on the feeling of progress (dimension 2 of customers skills) for expert consumers. Thus, H9 has finally been formulated as follows:

-H9a: The lower the product-category expertise of a consumer, the higher the impact of customer education on the actual know-how of customers

-H9b: The higher the product-category expertise of a consumer, the higher the impact of customer education on the feeling of progress of customers

- **Validation of H9a**

Table 42 presents the statistical results for both groups of product category expertise.

Table 42: Moderation of product category expertise on the "customer education – actual know-how" relationship

Statistical significance	Practical significance
Group 1 "lower expertise"	
Correlation $\gamma = 0,171$ (p-value <0,05)	$R^2 = 0,058$
After bootstrap B: $\gamma = 0,161$ and s= 0,119	
Group 2 "higher expertise"	
Correlation $\gamma = 0,144$ (p-value<0,10)	$R^2 = 0,041$
After bootstrap B: $\gamma = 0,132$ and s= 0,137	

The results of group 1 show that customer education and customers' actual know-how are significantly and positively related (p-value <0,05). The correlation γ is satisfactory. The practical significance is not very high but remains acceptable. As mentioned previously, this level of R^2 can be explained by the existence of a single independent variable in the model.

The results of group 2 provide less evidence of relationships between customer education and the actual know-how of consumers. These results are confirmed by a t-test on the averages observed in the bootstraps (t = 2,03, p-value <0,05).

So, bearing these observations in mind, H9a is supported.

- **Validation of H9B**

Table 43 presents the key statistics related to hypothesis H9b.

Table 43: Moderation of product category expertise on the "customer education – feeling of progress" relationship

Statistical significance	Practical significance
Group 1 "lower expertise"	
Correlation $\gamma = 0,068$ (p-value >0,05)	$R^2 = 0,009$
After bootstrap B: $\gamma = 0,057$ and s= 0,101	
Group 2 "higher expertise"	
Correlation $\gamma = 0,277$ (p-value<0,001)	$R^2 = 0,148$
After bootstrap B: $\gamma = 0,256$ and s= 0,109	

The results of the two groups are clearly contrasted.

In group 1, the relationship is not significant (p-value>0,05). In group 2, customer education significantly and positively influences the customers' feeling of progress (p-value< 0,001)

Thus, H9b is supported

4.3.4.2 Moderation of the relationship between product usage and customer satisfaction (H10)

Three sub-hypotheses were formulated, each of them focusing on a specific aspect of product usage.

- **H10a**

Hypothesis H10 was formulated as follows: "*The higher the degree of customer expertise, the higher the impact of usage frequency on customer satisfaction with the product*". The results are presented in table 44.

Table 44: Moderation of product category expertise on the "usage frequency – customer satisfaction" relationship

Statistical significance	Practical significance
Group 1 "lower expertise"	
Correlation β= -0,017 (p-value>0,05)	R^2 = 0,271
After bootstrap B: β = -0,014 and s= 0,077	
Group 2 "higher expertise"	
Correlation β= 0,113 (p-value<0,10)	R^2 =0,256
After bootstrap B: β = 0,113 and s= 0,083	

The results of group 1 reveal the absence of significant relationships between usage frequency and customer satisfaction (p-value>0,05). Regarding group 2, the relationship has an acceptable level of significance (p-value<0,10).

Thus, H10a is supported.

- **H10b**

The results of H10b "*The higher the degree of customer expertise, the higher the impact of usage situation on customer satisfaction with the product*" are presented in table 45.

Table 45: Moderation of product category expertise on the "usage situation – customer satisfaction" relationship

Statistical significance	Practical significance
Group 1 "lower expertise"	
Correlation β= -0,027 (p-value>0,05)	R^2 = 0,271
After bootstrap B: β = -0,025 and s= 0,080	
Group 2 "higher expertise"	
Correlation β= 0,145 (p-value<0,05)	R^2 = 0,252
After bootstrap B: β = 0,135 and s= 0,091	

The situation is relatively similar to the one described for H10a. No evidence of relationship between usage situation and satisfaction can be determined in group 1 (p-value>0,05). In group 2, the relationship is significant (p-value<0,05).

Thus, H10b is supported.

- **H10c**

H10c was formulated as follows: "*The lower the degree of customer expertise, the higher the impact of usage function on customer satisfaction with the product*". The statistics are presented in table 46.

Table 46: Moderation of product category expertise on the "usage function – customer satisfaction" relationship

Statistical significance	Practical significance
Group 1 "lower expertise"	
Correlation β= 0,169 (p-value<0,05)	R^2 = 0,271
After bootstrap B: β = 0,160 and s= 0,090	
Group 2 "higher expertise"	
Correlation β= 0,023 (p-value>0,05)	R^2 = 0,252
After bootstrap B: β = 0,020 and s= 0,094	

In group 1, usage function has a positive influence on customer satisfaction (p-value<0,05). In group 2, the p-value clearly reveals the non significance of the relationship.

Thus, H10c is supported.

- **Comments on H10a, H10b, H10c**

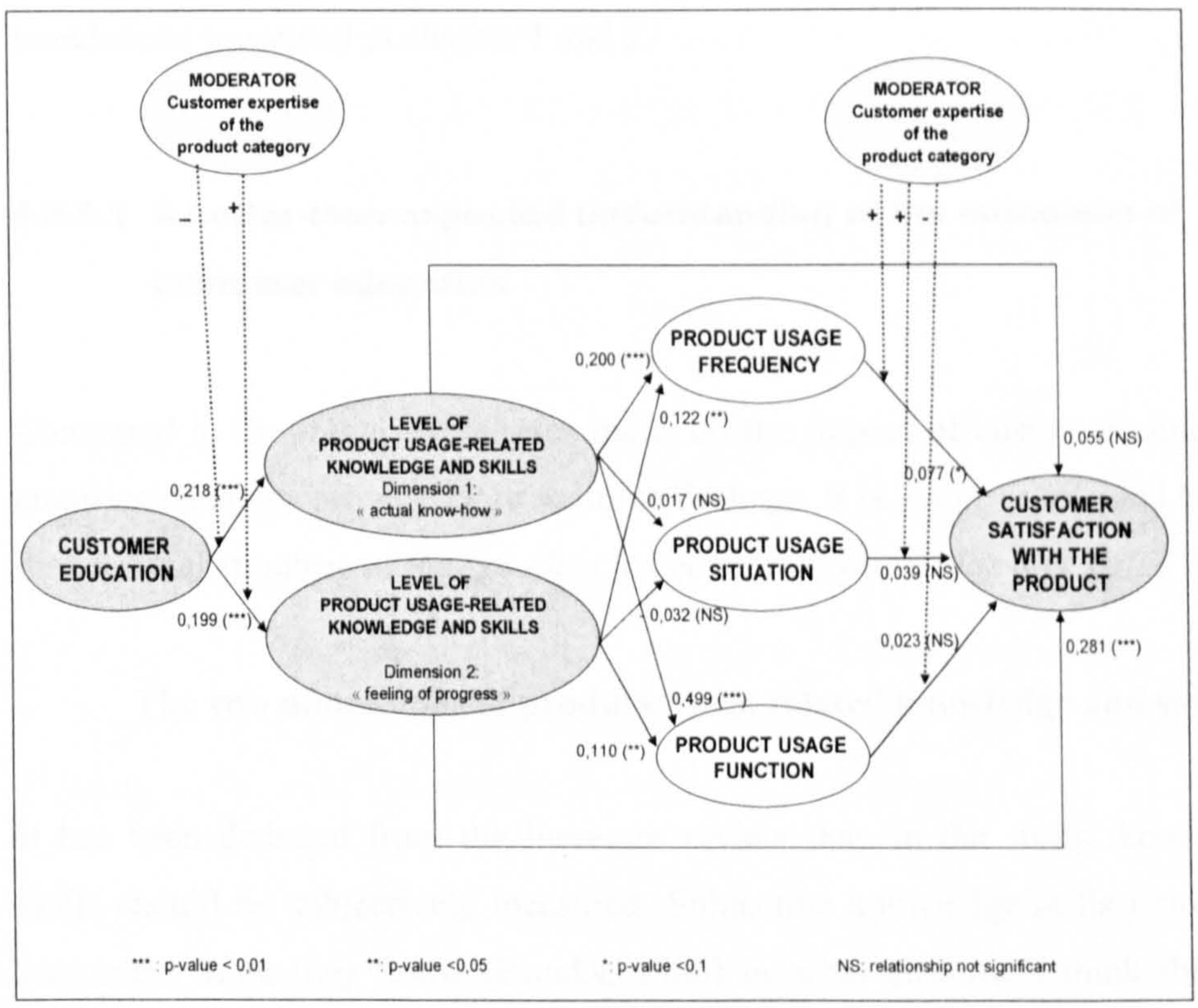
The results of the H10 hypotheses are extremely interesting because they provide one explanation as to the absence or weakness of direct relationships between product usage and customer satisfaction (see H6 to H8). In fact the statistics tend to show that customers with a low level of expertise increase their satisfaction when they increase the number of product features they use. For expert consumers, satisfaction is driven first by the variety of usage situations (correlation β = 0,145) and then by frequency (correlation β = 0,113).

4.3.5 Summary and discussion

In this last section, the results of the hypothesis-testing will be discussed. Twelve hypotheses were proposed in chapter 3. Thirteen hypotheses were finally tested, after dividing H9 into H9a and H9b. Nine hypotheses were fully supported, one was partially supported and three were rejected. Most of the rejected hypotheses concerned the relationships between product usage and customer satisfaction.

The diagram below presents a summary of the research model and the relationships measured through the Structural Equation Modelling procedure (figure 10).

Figure 10: Summary of the main results



The first research question, as formulated in the introduction, concerned the existence of the impact of customer education on customer satisfaction. This begs the question as to whether satisfaction is influenced by customer education. The empirical investigation provides a positive answer to this question. One indicator is that the overall quality of the model is satisfactory and fits the data. Another

indicator is the R^2 of customer satisfaction in the model. Actually, R^2=0,1943[13]. It reveals that a substantial proportion of the customer satisfaction variance is explained by the model.

Our second research question concerned the mechanisms through which, and the conditions under which, the influence of customer education is exerted on customer satisfaction. The analysis of the key results leads to discuss three categories of findings. One is related to a better-than-expected understanding of the outcomes of customer education, mainly thanks to the two-dimensional structure of customer skills. The second is related to the lack of impact of customers' skills on product usage situation. The last category of results is related to the absence or to the weakness of direct relationship between product usage and customer satisfaction. These unexpected findings shall be discussed in the light of the theoretical foundations presented in chapter 1 and 2.

4.3.5.1 A better-than-expected understanding of the outcomes of customer education

Compared to the initial hypotheses made on the impact of customer education, the empirical findings provide more accurate findings. It is mainly explained by the two-dimensional structure of the "*product usage related knowledge and skills*" construct.

- **The two dimensions of product usage related knowledge and skills**

It has been deduced from the literature review that, in the study, knowledge and skills should be subjectively measured. Subjective knowledge/skills represent what customers think they know (Brucks, 1985) or what customers think they can do. Subjective knowledge/skills are considered in the literature to be a combination of the consumers' knowledge/skills and of their self-confidence in their knowledge/skills (Park and Lessig, 1981; Raju et al., 1995).

[13] This result is presented in the practical significance of each hypothesis test related to customer satisfaction

Thus, for the purpose of the study, product usage related knowledge and skills has been defined as "*the level of product-usage related knowledge and skills customers declare themselves to have*".

Even though the working definition may be close to existing ones, the operationalization of this concept, defined from the pilot qualitative study, is finally different. Existing studies (Raju et al., 1995; Flynn and Goldsmith, 1999) measure knowledge or skills at a specific point of time. In the study, consumers express their knowledge/skills both at a specific point of time (dimension 1: actual know-how) but also relatively (dimension 2: feeling of progress). This implies that the second dimension is original with respect to other studies.

One assumption is that the context of the study has influenced customers. Technical products, such as digital cameras, require high learning commitments from the consumers to discover the features and properly use the product (Mukherjee et al., 2001; Thompson et al., 2005). As a consequence, it may be important for customers to recognize that they know how to use the product but also that their skills have increased since the first usage of the product.

A second plausible reason is related to the field study. The customers interviewed in the sample were well aware of the education policy developed by Nikon. 42% of these customers had attended at least one face-to-face training session at the Nikonschool. Thus, Nikon customers may have been more eager to recognize that they had improved their skills. As such, the second dimension of customers' skills ("feeling of progress") becomes more natural in this context.

Whatever the reason, it is important to observe that the two-dimensional structure of product usage related knowledge and skills gave a better explanation of the effects of customer education.

- **Two distinct mechanisms of customer education impact have been identified**

Each dimension of skills plays a different mediating role in the research model. The first dimension "*actual know-how of customers*" mediates the relationship between customer education and product usage but has no direct influence on customer satisfaction. In complement, the "*feeling of progress*" dimension has less influence on the relationships between customer education and customer skills but it is a direct mediator of the customer education - customer satisfaction relationship.

Results regarding dimension 1: actual know-how of customers

The impact of customer education on the actual know-how is significant ($\gamma = 0{,}218$, p-value < 0,000). The impact of actual know-how on product usage is significant for product usage function and frequency. More specifically, there is a strong impact on the usage function ($\beta = 0{,}499$, p-value < 0,000). This level of impact of customer skills on usage function may be explained by the fieldwork. Nikon provides technical education that focuses on the products and their features.

Results regarding dimension 2: feeling of progress

The second dimension "feeling of progress" is a direct mediator between customer education and customer satisfaction. Customer education has a significant impact on the feeling of progress ($\gamma = 0{,}199$, p-value < 0,01). The feeling of progress has a strong and significant impact ($\beta = 0{,}281$, p-value < 0,01) on satisfaction.

This result confirms the suggestion made by Hennig-Thurau et al. (2005) whereby simply being aware of the fact that he/she can be more skilled with a product has a positive effect on the consumer's satisfaction with a product.

- **The moderating role of product category expertise has been precisely determined**

As already explained, hypothesis H9 was divided into H9a and H9b in order to more precisely analyse the moderating role of product category expertise on the relationship between customer education and each dimension of customer skills.

Results show that the effect of customer education is stronger on actual know-how for novices. For experts, customer education has a stronger effect on the feeling of progress.

Such results shed complementary light on the differences between novices and experts that are highlighted in the literature. The two categories of customers differ in the amount, content and organization of their knowledge (Mitchell and Dacin, 1996; Aurier and Ngobo, 1999). Contradictory findings on experts were presented in the literature (Wood and Lynch, 2002). While some researchers advocate that experts are better learners than novices (Johnson and Russo, 1984); other researchers argue that experts may be poor learners (Johnson and Auh, 1998; Wood and Lynch, 2002).

Compared to existing literature, the study does not examine the conditions for learning, but contributes new knowledge about the consequences of the learning process with respect to customer education. The results show that experts and novices express the outcomes of customer education differently. Novices are more aware of the acquisition of know-how while experts are more aware of their skills improvement.

This result may be related to the fact that experts are already highly knowledgeable and skilled with a product. They are more capable of distinguishing what they have learnt (Alba and Hutchinson, 1987). Consequently, they are more able to identify their own skills improvement. Novices do not have the same goal. Thompson et al. (2005) remind us that such consumers are less able to perform product-usage related tasks. Thus, acquiring the necessary skills to know how to use a product is probably an important achievement for novices.

To conclude, the aforementioned results show that the two-dimensional construct of product usage related knowledge and skills present a strong interest both from a conceptual and a managerial point of view.

From a conceptual point of view, each dimension of customer skills is a mediator between customer education and either product usage (dimension 1) or customer satisfaction (dimension 2). These results thus refine previous knowledge.

From a managerial point of view, the findings indicate that each dimension of customer skills has a specific levering effect on customer "performance". It also seems that the customers' perception of learning is segmented as a function of initial product category expertise. For novices, the impact of customer education should be measured as the acquisition of know-how, while for experts it should be measured through knowledge/skills improvement.

4.3.5.2 The non significance of relationships between customer skills and usage situation

The results show that customer skills, whatever the dimension, "actual know-how" or "feeling of progress", have no impact on usage situation (relationship between dimension 1 and usage situation: $\beta = 0{,}017$, p-value $> 0{,}05$; relationship between dimension 2 and usage situation: $\beta = -0{,}032$, p-value $> 0{,}05$).

Looking back at the literature, very few studies addressed the analysis of the relationships between customer knowledge/skills and usage situation (Ram and Jung, 1991; Shi and Venkatesh, 2004). In these studies, skills and usage situations were positively associated. This observation leads to suggest two potential reasons for the non significance of the relationships in the study.

- **An assumption related to the methodology**

According to the recommendations drawn from existing research on product usage (Ram and Jung, 1990, 1991) and to the working definition of usage situation ("*the*

different applications for which a product is used and the different situations in which a product is used regardless of either usage frequency or usage function") usage situation has been measured through a number of different situations. The list of usage situations was based on the exploratory study and on the discussions with Nikon experts.

This approach led to define a list of usage situations which depicts usual usage situations. Moreover, perhaps the way it was measured, which has been defined according to previous studies (Ram and Jung, 1990, 1991), did not allow to sufficiently apprehend the depth of the usage situations. Nor did it allow to measure the variance of usage situation as a function of knowledge and acquired skills. For instance, one usage situation concerns video editing with a digital camera. The data collection enabled to measure whether customers apply this usage situation but it did not enable to distinguish the degree of expertise in such a usage situation. In this respect, the data collection on usage situation may suffer from "*the performance paradox*" described by Spence and Brucks (1997). According to these authors, the task environments studied in the literature are often defined in such a way that skilled customers have insufficient latitude to demonstrate their superiority.

- **An assumption related to the scope of the study**

The absence of an impact of customer skills on usage situations may also be explained by the nature of customer education provided by Nikon. The products are multi-featured digital cameras. This implies that the education relies first on technical functioning. User manuals, training sessions or any other instructional events are mainly dedicated to helping the customers to adopt the product and its features. Less evidence of educational events related to usage situations have been found.

4.3.5.3 The non significance of relationships between product usage and customer satisfaction

Existing literature tended to suggest that positive relationships may exist between product usage and satisfaction. However, as mentioned earlier, few empirical studies were carried out and concluded that results are contingent (Ram and Jung, 1991; Shih and Venkatesh, 2004). In the study, the direct impact of product usage on satisfaction is not verified. The relationships between usage function, usage situation and satisfaction are not significant. The impact of usage frequency is significant but is very weak ($\beta = 0,077$). The main reason, which has been shown in the empirical experimentation, is the moderation effect of product category expertise.

The statistical results tend actually to show that customers with a low level of expertise increase their satisfaction when they increase the number of product features they use ($\beta = 0,169$, p-value<0,05). For expert consumers, satisfaction is driven first by the variety of usage situations ($\beta = 0,145$, p-value <0,05) and then by usage frequency ($\beta = 0,113$, p-value<0,10).

These findings are indeed stimulating given that no previous study has clearly illustrated such a phenomenon. However, the results seem consistent with similar findings on expertise. Thompson et al. (2005) explain that experts are more able to use each product feature than novices. Thus, experts may not draw their satisfaction from the usage of product functions but from more elaborate usage situations and from the time they spend using their product.

4.4 CONCLUSIONS ON THE MEASURE AND RESULTS

The fourth chapter of this study presented how the empirical experimentation was conducted and how the research hypotheses were tested. The statistical approach implemented relied on Structural Equation Modelling techniques.

The implementation of SEM enabled first to develop a reliable and valid scale to measure customer education. This scale relied on 5 items. These items were initially elaborated from the literature review and from the exploratory qualitative study. The SEM procedure allowed to determine the one-dimensionality of the scale and to demonstrate its reliability and validity.
The same procedure was applied to develop and validate a scale to measure product usage related knowledge and skills and product category expertise.

A second important result of SEM was the overall adjustment of the structural model to the data. The statistical indices recommended in the literature were used to show that the model-fit was highly satisfactory in the study. This result means that the hypothesized relationships were relevant to reproduce the data.

Then, the last step consisted in validating the research hypotheses. Nine out of thirteen hypotheses were totally supported and one partially supported. Three hypotheses were rejected. Specifically, the direct relationships between product usage and customer satisfaction were not verified, essentially owing to the total moderating role of product category expertise.

To conclude, the field experimentation was helpful to confirm and to enrich the hypotheses drawn from the literature. A structural model of customer education and its outcomes was defined. It is presented in figure 11 (for convenience, the moderators are not featured on this figure). The summary of the research hypotheses and their validation is presented in table 47.

Figure 11: The structural model of customer education and its outcomes

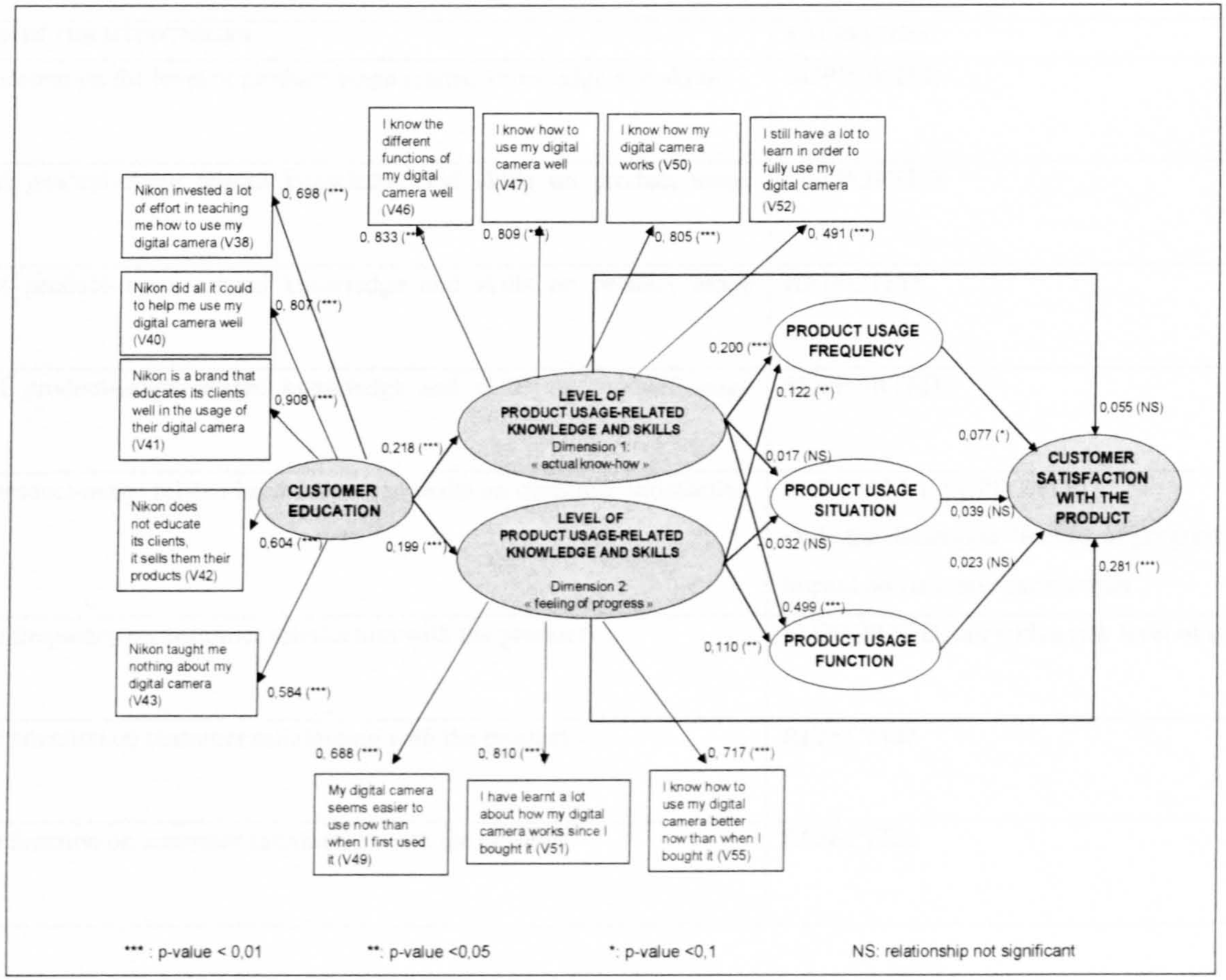


Table 47: Research hypotheses and their validations

H	RELATIONSHIP STUDIED IN THE HYPOTHESES	VALIDATION
H1	Impact of customer education on the level of product usage related knowledge and skills	SUPPORTED
H2	Impact of the level of product-usage related knowledge and skills on product usage frequency	SUPPORTED
H3	Impact of the level of product-usage related knowledge and skills on product usage situation	REJECTED
H4	Impact of the level of product-usage related knowledge and skills on product usage function	SUPPORTED
H5	Impact of the level of product-usage related knowledge and skills on customer satisfaction with the product	PARTIALLY SUPPORTED Only the dimension "feeling of progress" of customer skills has an impact on customer satisfaction
H6	Impact of product usage frequency on customer satisfaction with the product	SUPPORTED, but with a risk level of 0,10.
H7	Impact of product usage situation on customer satisfaction with the product	REJECTED
H8	Impact of product usage function on customer satisfaction with the product	REJECTED

H	RELATIONSHIP STUDIED IN THE HYPOTHESES	FORMULATION OF THE HYPOTHESES
H9a	Moderating role of customer expertise of a product category on the relationship between customer education and the actual how-how of customers (dimension 1 of product usage related knowledge and skills)	SUPPORTED
H9b	Moderating role of customer expertise of a product category on the relationship between customer education and the feeling of progress of customers (dimension 2 of product usage related knowledge and skills)	SUPPORTED
H10a	Moderating role of customer expertise of a product category on the relationship between product usage frequency and customer satisfaction with the product	SUPPORTED
H10b	Moderating role of customer expertise of a product category on the relationship between product usage situation and customer satisfaction with the product	SUPPORTED
H10c	Moderating role of customer expertise of a product category on the relationship between product usage function and customer satisfaction with the product	SUPPORTED

CONCLUSION OF PART 2: RESEARCH HYPOTHESES, MEASURES AND RESULTS

The first part of the research aimed to provide a better conceptual understanding of customer education and its outcomes. One important limitation drawn from the literature review was the absence of empirical and quantitative validation of such outcomes. Thus, it was proposed to fill this gap in the second part of the work.

Specifically, it led to define and to empirically test a set of research hypotheses. In the third chapter, these hypotheses were formulated. In the fourth chapter, the context of the empirical experimentation was set out and the methodology employed for hypothesis-testing was detailed. The results of the investigation were also presented.

The empirical findings of the study can be classified in two categories. One category refers to scale development, the other to the definition of a model of the outcomes of customer education.

The development of a scale to measure customer education is an important achievement of the work. It was the initial condition to further measure the outcomes of customer education. The 5-item scale that was developed revealed strong psychometric properties.

The definition of the model of customer education outcomes brings an important contribution to research on customer education. It reveals that customer education contributes to an increase in customer satisfaction. Specifically, it highlights the importance of product usage related knowledge and skills as a mediating variable between customer education, product usage and satisfaction. The results also reveal the importance of initial product category expertise as a moderating variable, the role of which is crucial to the understanding of the relationships between product usage and satisfaction.

CONCLUSION

In the "*Research priorities 2004-2006: a guide to MSI research program and procedures*" the Marketing Science Institute (2004) recalls that improving the cost-effectiveness of marketing actions is a key priority of marketing research. In parallel, It also important to recall that Meer (1984) and Hennig-Thurau et al. (2005) observed that hardly any research has been carried out on customer education. Such research should be developed.

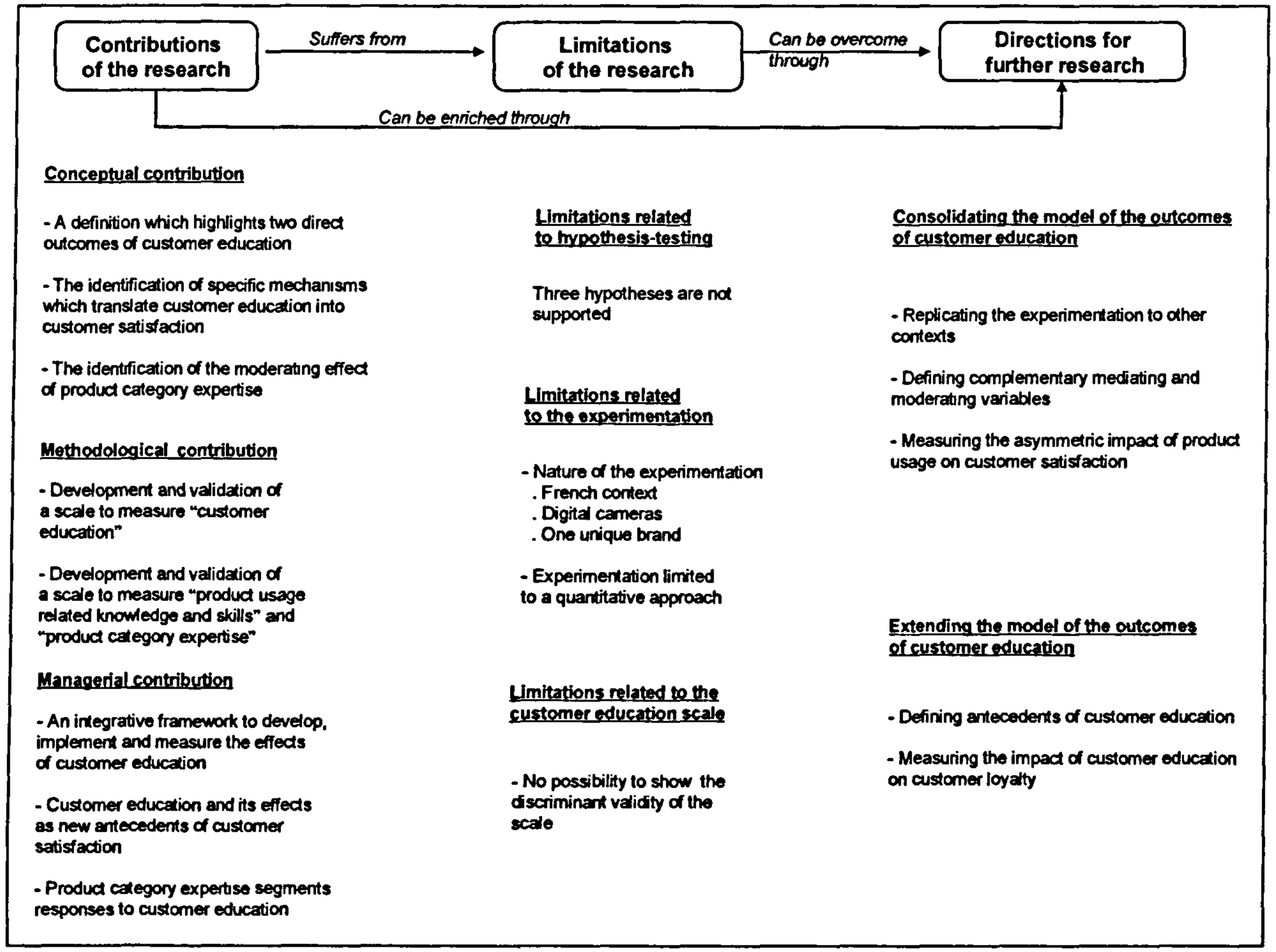
This work is at the crossroads of these two priorities. It consisted in defining if and how customer education, as a marketing input, is profitable for companies. This topic was theoretically supported. More specifically, the new dominant logic for marketing (Vargo and Lusch, 2004) highlights the new research perspective that corporate performance could increase if customer performance increases. A few existing studies assert that customer education can increase customer performance and company performance. Their weakness is that they provide hardly any empirical evidence of the effectiveness of customer education.

In this context, it was crucial to analyse and understand the impact of customer education on customer satisfaction, one key dimension of company performance.
The research questions were formulated as follows:

"Does customer education influence customer satisfaction of a product? If yes, then by which mechanisms and under which conditions is this influence exerted?"

The key contributions of the research are presented hereafter, in light of the research questions. Then, the limitations of the work are stressed. Finally, the directions for further research on customer education are explored. An overall view of the key conclusions is presented in figure 12.

Figure 12: An overview of key conclusions



CONTRIBUTIONS OF THE RESEARCH

In this research, clear evidence has been provided that customer education positively impacts on customer satisfaction and that specific mechanisms explain such effects. Three distinct types of contribution of the work can be distinguished: theoretical, methodological, and managerial contributions.

- **Theoretical contribution**

A definition which highlights two direct outcomes of customer education

Academic research on the topic is emergent. Hence, one important contribution of the work is the conceptual exploration of customer education from a marketing theory perspective.This work has not been undertaken before.

Specifically, the literature on customer education was cross-referenced with literature from different marketing topics: consumer behaviour, services marketing, marketing management, innovation marketing, and customer satisfaction. Instructional design literature was also explored to complete the understanding of customer education.

This groundwork enabled to propose a customer-oriented definition of customer education that highlights the direct outcomes of customer education:

"*the global effort of company-sponsored, product usage related education perceived by customers. Through education, the customer increases his knowledge and skills and performs better with product*".

This definition clarifies the role of customer education. It completes and or / synthesizes most definitions proposed in the literature such as the ones from Meer (1984) or Honebein (1997).

In particular, the definition highlights two direct outcomes of customer education identified in the literature review. One refers to the acquisition of product usage

related knowledge and skills, the other deals with product usage. The focus on these two direct outcomes that depict customer performance is also an important achievement of the work.

The identification of specific mechanisms which translate customer education into customer satisfaction

To bridge the gap in customer education research, the relationships between customer education and customer satisfaction were determined and tested. The empirical validation showed that such relationships are significant. To that effect, an original model was proposed which contributes to the understanding of the effects of customer education.

One important finding concerns the role of product usage-related knowledge and skills. This variable plays a moderating role on the relationship between customer education and customer satisfaction. But customer skills also play the role of mediator between customer education and product usage. In this respect, the experimentation confirms that, as the literature supposed, product usage related knowledge and skills is a central variable of the model.

It has also been originally shown that product usage related knowledge and skills is a two-dimensional construct, each dimension playing a specific role in the model. This important result shows the necessity to consider these two dimensions in further research pertaining to the outcomes of customer education.

Regarding the role of product usage, it has unexpectedly been determined that it does not have a direct influence on customer satisfaction. This result is explained by the moderating role of product category expertise.

The identification of the moderating effect of product category expertise

The effects of customer education on customer satisfaction are moderated by product category expertise. Partial moderation takes place in the customer education –

customer skills relationships, while total moderation is shown between product usage and satisfaction.

This result is also important. It contributes new knowledge on product category expertise. It also urges further reflection on the role of personal variables in such models.

- **Methodological contribution**

Development and validation of a scale to measure customer education

As explained in the literature review, the absence of quantitative measures of the effects of customer education could be explained first by the absence of a scale to measure customer education.

In this research this gap has been filled. A 5-item scale was developed which measures customer education as defined in the literature review. This scale presents highly satisfactory psychometric qualities in terms of reliability and validity.

Attention was given to fomulating items that were not specifically related to the product category surveyed. Thus, fellow researchers are invited to further test this scale in order to ensure its generalisation.

Development and validation of scales to measure (1) product usage related knowledge and skills and (2) product category expertise

The same principle as above was applied to developing scales to measure (1) product usage related knowledge and skills and (2) product category expertise. This work was necessary because no existing scale was consistent with the purpose and the context of the study.

Two multi-items scales were obtained (7 items for product usage related knowledge and skills and 5 items for product category expertise) with satisfactory levels of reliability and validity.

The development of the scale to measure customers' skills was particularly purposeful. As explained before, two dimensions were identified which roles in the understanding of the effect of customer education were crucial.

- **Managerial contribution**

Our study provides answers to companies that are contemplating the true worth of customer education and the conditions for optimising its effects. Different types of answers are proposed hereafter.

An integrative framework to develop, implement and measure the effects of customer education

Through the empirical experimentation and also through the literature review, an integrative framework to develop, implement and measure the effects of customer education was provided. This managerial contribution is important for any company interested in customer education.

First, the specific objectives of customer education were clarified and compared to the battery of marketing actions usually used by firms. Customer education is above all dedicated to developing customers' skills and making them intense users of products. This is one way of increasing satisfaction.

Second, a framework to implement customer education was provided. Specifically, an original taxonomy of instructional methods for customer education was proposed, which can help companies to understand the advantages and limitations of each method.

Third, a framework of the customer education outcomes was proposed. A method for measuring customer education and its impact that companies can appropriate and replicate was developed.

Finally, and this is the most important managerial contribution of the work, empirical evidence that customer education is profitable for companies was provided.

Conditions under which the positive effects are optimum were also identified. These last points are detailed hereafter.

Customer education and its effects as new antecedents of customer satisfaction

In the French context and for the digital camera market, the study provides empirical evidence that customer education positively impacts on customer satisfaction. As such, new determinants of customer satisfaction have been identified. This result is strongly significant: more than 19% of the variance of customer satisfaction is explained, in the model, by customer education.

This effect is mainly explained by the customers' perception of their skills improvement (dimension 2 of customer skills). Product usage is also a determinant of satisfaction, but these effects are conditioned by customer expertise.

Defining new antecedents of satisfaction and increasing satisfaction is at the heart of corporate strategy because it induces long-term effects on loyalty and profit (Oliver, 1997). In this respect, customer education can directly contribute to such objectives.

Product category expertise segments customer responses to customer education

Certain mechanisms of customer education effects are partially or totally conditioned by product category expertise.

Specifically, the impact of customer education on product usage related knowledge and skills differ. For customers with lower degrees of expertise, customer education has an impact on actual know-how. For customers with a higher degree of expertise, customer education has an impact on the feeling of progress.

Product category expertise also moderates the relationships between product usage and customer satisfaction. For customers with lower degrees of expertise, usage function has an impact on satisfaction. For customers with higher degrees of expertise, satisfaction is related to usage frequency and usage situation.

These results show that product category expertise is a segmentation variable that should be taken into account in any customer education initiative. This segmentation should lead companies to implement customer education that is specific to each group (novice customers / expert customers).

Specifically, the core topics of educational programs can be different. The study unveils that novices are more influenced by educational programs oriented towards product features, while experts seem more interested in usage situation topics.

Ways of assessing the impact of customer education should also been appreciated differently. Companies must ensure that novices have acquired a threshold level of skills, specifically regarding the product features. For experts, the assessment should be more oriented towards a feeling of progress and usage situations.

LIMITATIONS OF THE RESEARCH

As explained, the measure of the impact of customer education is the first which has been carried out in an academic context. Thus, the research presents the defects of its youth. Actually, three types of limitation should be highlighted. One is related to the hypothesis-testing, the other to the experimentation; and the last to the development of the customer education scale.

- **Limitations related to hypothesis testing**

A set of hypotheses was formulated that appeared to be supported by existing literature on the topic. However, three of the thirteen hypotheses were not supported by the empirical testing. If such findings are *per se* interesting, it is also important to wonder why such unexpected results were obtained.

Regarding the non significance of the relationship between customer skills and usage situations, different reasons are plausible.

One reason is that the way usage situation has been measured did not differentiate the degree of usage situation as a function of the level of customer expertise. Another reason could be related to the scope of the study. Education provided by Nikon

mainly aimed to increase usage function, not usage situations. So in this context, the absence of the impact of skills on usage situation may not be surprising.

The non significance of relationships between product usage and customer satisfaction (two hypotheses not supported) was actually not expected. Existing studies tended to show the strength of such relationships. The main reason which has been empirically identified is the total moderation effect of product category expertise.

Other reasons which were not identifiable in the study must also be considered. One interesting stream of investigation is offered by an emerging approach on customer satisfaction measurement, the asymmetric measurement approach (Mittal et al., 1998; Anderson and Mittal, 2000). It asserts that certain attributes do not have a linear impact on satisfaction. It could mean for instance that intense usage may not increase satisfaction, and that low usage may not lead to dissatisfaction. As this approach is novel, it will be developed in the implications for further research.

- **Limitations related to the experimentation**

<u>A unique experimentation in a specific context</u>

The scope of the experimentation has been reduced to isolate the effects of one independent variable, customer education, on its outcomes. The study was limited to the French market to avoid any cultural bias. The investigation was restricted to one particular product category, digital cameras. Finally, the specific case of Nikon's customers was analysed.

These choices lead to two types of weaknesses.

With regard to current criticism on scale development (Flynn and Pearcy, 2001), the absence of replication is the first weakness. The development of a scale to measure customer education was initiated and the mechanisms of customer education effects on customer satisfaction were identified. This work must be pursued and developed.

Another weakness of the experimentation is that results may have been influenced by the context of the empirical study. The results analysis gives some indication of this possibility. For instance, the assumption has been made that the impact of customer education on usage function is stronger than on usage situation or on usage frequency due to the nature of education provided by Nikon (technical and product-oriented education).

Undoubtedly, follow-up studies and replications are needed to support any claims of performance with respect to the structural model. The research had the merit of building a structural model and performing an initial experimentation. This work should be challenged by launching complementary studies. This point is underlined in the section "implications for future research".

A dominant quantitative approach

Our experimentation relies mainly on a quantitative survey on a large sample of customers. The quantitative data collection process was conscientiously prepared by conducting an initial qualitative survey. However, qualitative techniques were not used thereafter.

This is actually a limitation of the study. Specifically, in the model, the relationships between usage and customer satisfaction are not significant. Even though this result is explained by the moderating role of product category expertise, other reasons may exist. A complementary qualitative approach, through individual interviews or focus groups could have helped us. Once again, this comment is an opportunity for further exploration of the outcomes of customer education.

- **Limitations related to the customer education scale**

The scale which was developed and validated to measure customer education presents highly satisfactory psychometric properties.
However, still with the ambition of working towards the improvement of this scale, the five items encompass 62% of the variance of the customer education construct.

Albeit satisfactory, this result also reveals that other items can be added. To achieve this goal, replications of the work are once again suggested.
Further research must also be undertaken to analyse the discriminant validity of the customer education scale.

Finally, the comments relating to the customer education scale also apply to the two other scales developed and validated in the study.

To conclude this section, such limitations do not detract from the significance of the findings but provide platforms for future research. This topic is discussed hereafter.

IMPLICATIONS FOR FUTURE RESEARCH

We propose two complementary paths of investigation.

The first approach would be to consolidate the research model proposed in the study. It should disguise the limitations presented above. It could consist in finding complementary mechanisms that would enhance the understanding of the relationships between customer education and customer satisfaction.

The second approach would be to extend the research model beyond the present research topic. It could involve defining the antecedents of customer education. It could also consist in analyzing the consequences of customer education on other dimensions of corporate performance, such as customer loyalty.

The two streams of research are detailed hereafter.

- **Consolidating the model of the outcomes of customer education**

We have shown that the model is relevant in depicting the relationships between customer education and customer satisfaction. However, this model should be reinforced by replicating the experimentation. The model can also be completed by identifying complementary mediating/moderating variables. Finally, an emergent

paradigm of satisfaction measurement could be applied to re-investigate the relationships between product usage and customer satisfaction.

Replicating the experimentation to other contexts

The discussion on the limitations of the study leads to conclude that replications are indeed necessary. Specifically, further empirical investigation could help refine the scale and then validate the construct to a larger extent. It could also provide both practitioners and academics with a generalisation of the model of customer education outcomes.

Complementary investigations could focus on other categories of multi-featured products, such as digital audio players, DVD recorders, digital assistants or mobile phones for instance. One contribution would be to demonstrate that results are not dependent on the type of product surveyed.

Investigations could also involve multi-brands, which would help in identifying the role of brand equity in the outcomes of customer education. Finally, further empirical testing could be carried out in an international context. It would help in providing evidence of the impact of cultural differences in the customer education outcomes model.

Defining complementary mediating and/or moderating variables

In the study, the analysis of product category expertise sheds light on the advantages of integrating personal variables (i.e. which measure specific individual customer traits) in the model.
Thus, investigating the role of two personality traits often used in marketing literature, use innovativeness and product involvement, is proposed.

Use innovativeness has been defined by Ridgway and Price (1994: 69) as:

"*Variety seeking in product use*" or as "*consumer's receptivity/attraction to and creativity with using products in new ways*"

Price and Ridgway (1983) suggest that use innovativeness could manifest itself by the use of previously adopted products in a novel way or by the usage of currently owned products in a variety of ways.

Product involvement is another personality trait which is specific to a product. Mitchell (*1979: 195*) defines involvement as the "*amount of arousal or interest in a stimulus object or situation*". Rothschild (1984: 217) expands this definition to:

"A state of motivation, arousal or interest. This state exists in a process. It is driven by current external variables (the situation; the product; the communications) and past internal variables (enduring; ego; central values). Its consequents are types of searching, processing and decision making."

These definitions offer an interesting perspective for investigating whether usage innovativeness and product involvement play a mediating or a moderating role in the model of customer education outcomes. According to the definition of use innovativeness, one can arguably imagine that customer education positively influences use innovativeness.

Use innovativeness may also increase usage. In this case, use innovativeness could play the role of a mediator in the model. But, the hypothesis that use innovativeness is a moderator can also been drawn. The more people are innovative, the more they will apply ideas or suggestions from a customer education program. Conversely, for consumers with low use innovativeness, customer education may not impact product usage.

Similar propositions can be made on the mediating or moderating role of product involvement. As involvement refers to the motivation for, the arousal for, or the interest in a product, customer education can enhance product involvement and product involvement may lead to higher levels of skill acquisition or higher levels of product usage (mediation effect). It is also plausible that the more consumers are involved in a product, the more customer education will have the expected impact on product usage (moderation effect).

Actually, product involvement and use innovativeness are probably not the only variables that should be analysed with a view to defining complementary moderation/mediation effects. These are only propositions that will be further investigated.

Measuring the asymmetric impact of product usage on customer satisfaction

Regarding the analysis of the relationships between satisfaction and its antecedents, the measure relied on the dominant "*expectation disconfirmation*" paradigm. An underlying assumption of this paradigm is that the relationships between the attribute-level performance and customer satisfaction are linear.

A challenging view which emerged recently considers that the relationship can be asymmetric (Mittal et al., 1998; Anderson and Mittal, 2000). This means that customer satisfaction and customer dissatisfaction are two different concepts. Each attribute has a specific impact on satisfaction and dissatisfaction.

This approach could be relevant to the model, specifically to complete the understanding of the relationship between product usage and satisfaction. The non significance of the relationships has been explained by the moderating effect of product category expertise. Investigation could also be carried out to define whether product usage has an asymmetric effect on customer education.

An asymmetric effect of usage on satisfaction could mean that intense usage does not necessarily lead to satisfaction. This vision is indeed interesting, because it could add a complementary explanation to the model with respect to the absence of a direct relationship between usage and satisfaction.

So, further research could address the potential asymmetric relationship between usage and satisfaction. This work would rely on different measurement scales and methods (Ray and Gotteland, 2005) which are not available in the study. However, due to the importance of such an approach in completing the model, this stream of research will be further explored.

- **Extending the model of the outcomes of customer education**

This last section goes beyond the current research topic. It evokes broader ideas that would expand the research model. One proposition would be to identify the antecedents of customer education. The other proposition would be to investigate another potential consequence of customer education: customer loyalty.

Defining antecedents of customer education

In the study, customer education has been measured through customer perceptions. However, the antecedents of customer education were not explored. This analysis could be carried out in at least two different ways: personal consumer traits and the company's actual customer education initiatives.

The analysis from a consumer perspective could involve investigating which personal traits are antecedents of customer education. According to existing studies on customer education, one can assume that some variables are worth analyzing, specifically motivation to learn (Honebein, 1997), product involvement or perceived risk (Aubert and Ray, 2005).

Regarding the company perspective, one can investigate the relationships between the actual effort of customer education and its consequences in terms of the customers' perception. One approach would be to measure the relative impact of each educational action (user guide, training session, etc.) on the perceived effort of education. An important dimension to take into account is the perceived pedagogical quality (Hennig-Thurau et al., 2005). Financial data such as the customer education budget could also been taken into account.

As explained, these propositions are broad ideas that should be honed down by researchers interested in the topic.

Extending the analysis of the outcomes to loyalty

We justified the fact that the study focuses on satisfaction as a key outcome of customer satisfaction. As already mentioned, loyalty is a potential outcome of customer education (Meer, 1984; Honebein, 1997; Dankens and Anderson, 2001). Unfortunately, no empirical evidence exists on the impact of customer education on customer loyalty. To this effect, a longitudinal study can be conducted, which, over a given period of time, would analyse the relationships between customer education, customer satisfaction and customer loyalty. An important stream of literature exists on the relationships between customer satisfaction and customer loyalty (Fornell, 1992; Anderson and Sullivan, 1993; Jones and Sasser, 1995; Mittal and Anderson, 2000; Fornell et al., 2006), which would be helpful in designing an extended research model.

Our model can for instance be completed by adding attitudinal variables, such as trust or commitment, whose role on loyalty have already been suggested in the literature on customer education (Hennig-Thurau, 2000). Such a study could reinforce the interest of practitioners for customer education.

Obviously, the research study is far from perfect. The work which has been initiated must continue. Other experimentations must be undertaken, debate with peers must be launched, etc. in order to provide more accurate answers to marketing managers and contribute more to academic knowledge on the topic. Finally, I hope that this research has stimulated the interest of academics for customer education and that many scholars will adopt the topic.

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APPENDIXES

APPENDIX 1: MEASURE OF THE LEVEL OF PRODUCT USAGE RELATED KNOWLEDGE AND SKILLS

- **Initial exploratory factor analysis (all the items)**

Factorability of the data (KMO and Bartlett' tests)

KMO measure of Sampling Adequacy		,828
Bartlett's Test of Sphericity	Approx. chi-Square	1066,506
	df	54
	Significance	,000

Estimation of the communalities

	Initial	**Extraction**
V46	1.000	,666
V47	1.000	,738
V48	1.000	,330
V49	1.000	,650
V50	1.000	,674
V51	1.000	,719
V52	1.000	,441
V53	1.000	,339
V54	1.000	,385
V55	1.000	,700

Extraction method: Principal Component Analysis

- **Purified exploratory factor analysis**

Factorability of the data (KMO and Bartlett' tests)

KMO measure of Sampling Adequacy		,774
Bartlett's Test of Sphericity	Approx. chi-Square	826,956
	df	21
	Significance	,000

Estimation of the communalities

	Initial	Extraction
V46	1.000	,745
V47	1.000	,748
V49	1.000	,650
V50	1.000	,723
V51	1.000	,734
V52	1.000	,513
V55	1.000	,702

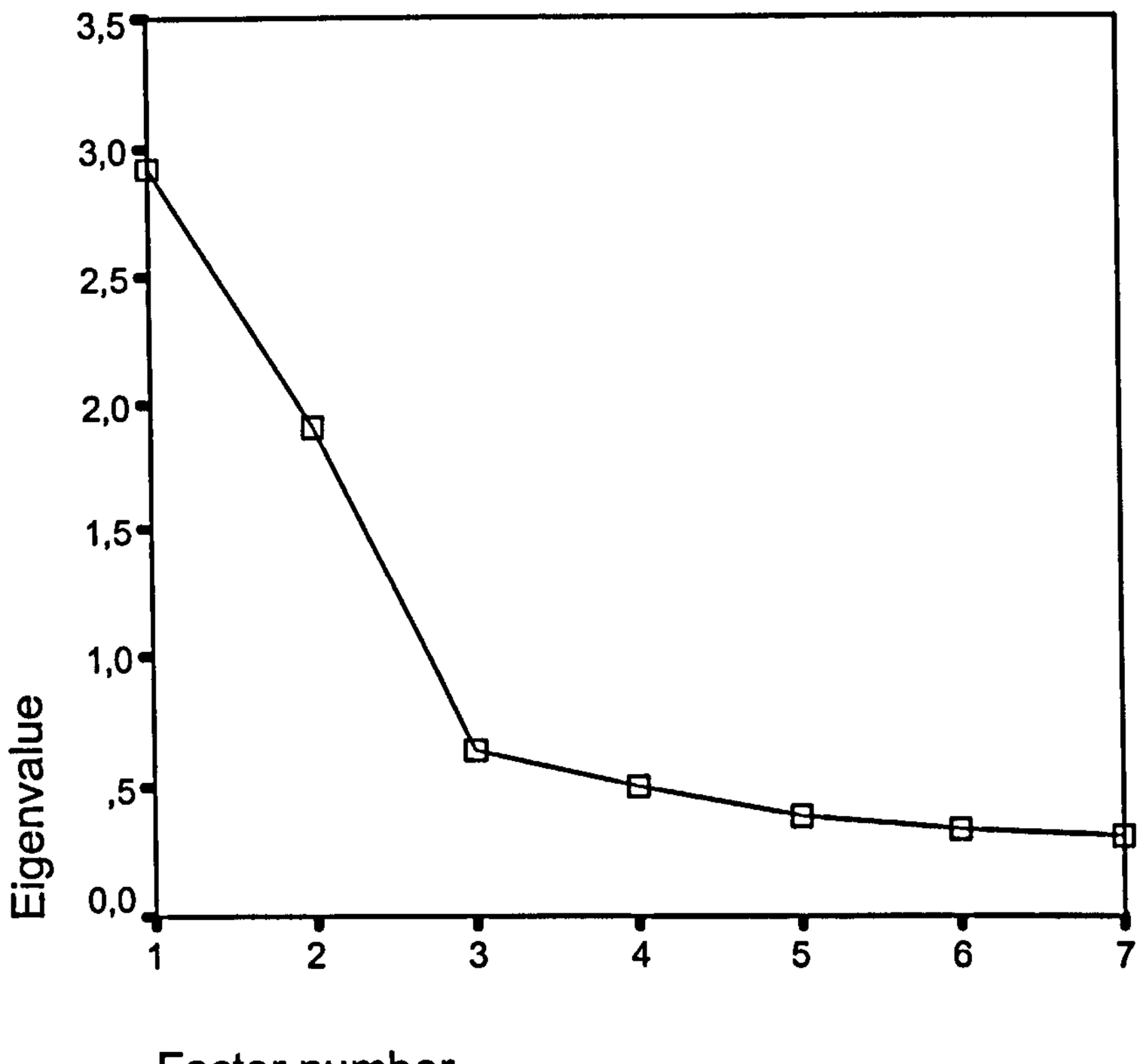
Extraction method: Principal Component Analysis

Dimensionality

Variance explained

	Initial Eigenvalues			Extraction Sums of squared loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2,917	41,674	41,674	2,917	41,674	41,674
2	1,898	27,117	68,791	1,898	27,117	68,791
3	,643	9,192	77,984			
4	,508	7,250	85,234			
5	,391	5,587	90,821			
6	,331	4,731	99,552			
7	,311	4,448	100,000			

Cattel scree-test



Component matrix

	Component	
	Factor 1	Factor 2
V46	,794	-,339
V47	,802	-,324
V49	,499	,633
V50	,818	-,232
V51	,599	,612
V52	,464	-,546
V55	,389	,742

- **Confirmatory factor analysis**

Indices	Results Factor 1	Results Factor 2	Usual heuristic
Steiger-Lind RMSEA	0,078	Not calculated (no df)	< 0,060
SRMR	0,021	1,37E-011	< 0,050
Jöreskog GFI	0,991	Not calculated (no df)	> 0,900
Jöreskog AGFI	0,954	Not calculated (no df)	> 0,900
NNFI (Bentler-Bonett Non Normed Fit Index)	0,977	Not calculated (no df)	Close to 1 and ideally superior to 0,950
CFI (Bentler comparative fit index)	0,992	Not calculated (no df)	Close to 1 and ideally superior to 0,950

- **Reliability**

Coefficient	Results Factor 1	Results Factor 2	Heuristic
Cronbach's Alpha	,7916	,7806	> 0,800
Jöreskog's Rhô	,83	,7835	> 0,800

- **Validity**

<u>Weak evidence for convergent validity</u>

Dimension 1

	Parameter Estimate	Standard Error	T Statistic	P-value
(SKILLS DIMENSION 1)-1->[Var46]	0,833	0,026	32,598	0,000
(SKILLS DIMENSION 1)-2->[Var47]	0,809	0,027	30,185	0,000
(SKILLS DIMENSION 1)-3->[Var50]	0,805	0,027	29,767	0,000
(SKILLS DIMENSION 1)-4->[var52]	0,491	0,047	10,408	0,000

Dimension 2

	Parameter Estimate	Standard Error	T Statistic	P-value
(SKILLS DIMENSION 2)-1->[Var49]	0,688	0,041	16,907	0,000
(SKILLS DIMENSION 2)-2->[Var51]	0,810	0,038	21,164	0,000
(SKILLS DIMENSION 2)-3->[Var55]	0,717	0,040	17,945	0,000

Strong evidence for convergent validity

ρ cv (dimension 1) = 55%

ρ cv (dimension 2) = 54,8%

APPENDIX 2: MEASURE OF CUSTOMER EXPERTISE WITHIN A PRODUCT CATEGORY

- **Initial exploratory factor analysis (all the items)**

Factorability of the data (KMO and Bartlett' tests)

KMO measure of Sampling Adequacy		,890
Bartlett's Test of Sphericity	Approx. chi-Square	888,652
	df	28
	Significance	,000

Estimation of the communalities

	Initial	**Extraction**
V12	1.000	,617
V13	1.000	,574
V14	1.000	, 559
V15	1.000	,547
V16	1.000	,514
V17	1.000	,414
V18	1.000	,382
V19	1.000	,446

Extraction method: Principal Component Analysis

- **Purified exploratory factor analysis**

Factorability of the data (KMO and Bartlett' tests)

KMO measure of Sampling Adequacy		,826
Bartlett's Test of Sphericity	Approx. chi-Square	563,207
	df	10
	Significance	,000

Estimation of the communalities

	Initial	Extraction
V12	1.000	,673
V13	1.000	,627
V14	1.000	,612
V15	1.000	,578
V16	1.000	,522

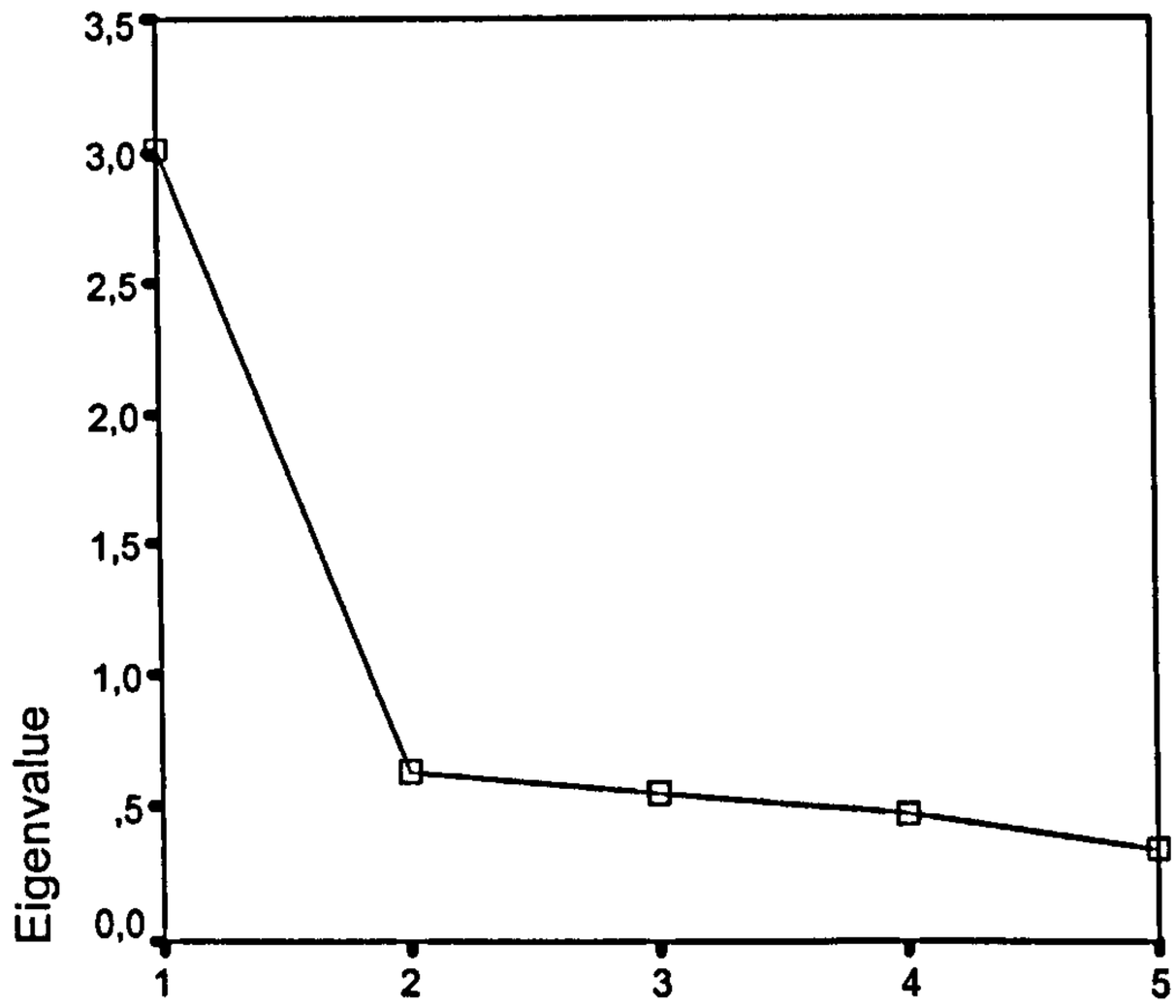
Extraction method: Principal Component Analysis

Dimensionality

Variance explained

	Initial Eigenvalues			Extraction Sums of squared loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3,012	60,233	60,233	3,012	60,233	60,233
2	,627	12,540	72,773			
3	,548	10,959	83,733			
4	,471	9,424	93,157			
5	,342	6,843	100,000			

Cattel scree-test



- **Confirmatory factor analysis**

Indices	Results	Usual heuristic
Steiger-Lind RMSEA	0,099	< 0,060
SRMR	0,0317	< 0,050
Jöreskog GFI	0,975	> 0,900
Jöreskog AGFI	0,924	> 0,900
NNFI (Bentler-Bonett Non Normed Fit Index)	0,938	Close to 1 and ideally superior to 0,950
CFI (Bentler comparative fit index)	0,969	Close to 1 and ideally superior to 0,950

- **Reliability**

Coefficient	Results	Heuristic
Cronbach's Alpha	0,828	> 0,800
Jöreskog's Rhô	0,835	> 0,800

- **Validity**

Weak evidence for convergent validity

	Parameter Estimate	Standard Error	T Statistic	p-value
(PRODUCT CAT EXPERTISE)-1->[Var12]	0,773	0,031	25,224	0,000
(PRODUCT CAT EXPERTIS3)-2->[Var13]	0,723	0,034	21,392	0,000
(PRODUCT CAT EXPERTIS3)-3->[Var14]	0,723	0,034	21,366	0,000
(PRODUCT CAT EXPERTISE)-4->[Var15]	0,689	0,036	19,052	0,000
(PRODUCT CAT EXPERTISE)-5->[Var16]	0,638	0,040	16,146	0,000

Strong evidence for convergent validity

ρ cv = 61%

APPENDIX 3: QUESTIONNAIRE

(See next page)

QUESTIONNAIRE n° |__|__|__|

Nom de l'enquêteur :	Date de réalisation de l'entretien : Heure de début : Heure de fin : Durée de l'entretien : |_____| minutes

Nom et téléphone de la personne interviewée	Nom Téléphone N° identification sur fichier

Enquêteur : présenter l'objectif de l'étude tel que décrit ci-dessous :

1- Je m'appelle (**********) et je travaille au sein de Grenoble Ecole de Management. Nous réalisons avec Nikon un travail commun d'étude sur l'utilisation que font les consommateurs de leur appareil photo. L'objectif est de chercher toute piste d'amélioration possible dans ce domaine.

2- Cet entretien dure environ 10 à 15 minutes.

3- Nous allons parler ensemble de l'utilisation que vous faites de votre appareil photographique numérique Nikon. Pour cela, je souhaite vous poser quelques questions. Si vous possédez un ou plusieurs appareils photographiques numériques de la marque NIKON, nous nous intéresserons **au dernier appareil acheté.**

Critère de contrôle	
L'interrogé possède-t-il au moment de l'enquête un **APN de la marque NIKON**	**NON ➔ STOP INTERVIEW**
Le répondant a participé à un ou plusieurs stages organisé(s) par la Nikonschool.	1- Oui 2- Non

VOTRE APPAREIL PHOTOGRAPHIQUE NUMERIQUE NIKON

1- Vous utilisez cet APN NIKON depuis
(Enq : 1 seule réponse possible)

1. moins de 3 mois
2. 3 mois à moins de 6 mois
3. 6 mois à moins d'un an
4. 1 an à moins de 2 ans
5. 2 ans ou plus
6. NSP

2- Quel nombre d'APN possédez-vous ou avez-vous possédés au total, quelle que soit la marque

|_____| appareils photos numériques

3- (si n>1 à la Q2) et parmi ces APN, quel nombre d'APN de la marque NIKON possédez-vous ou avez-vous possédés ?

|_____| appareils photo numériques de la marque NIKON

4- Cet APN Nikon (ou votre dernier APN) est
(Enq : 1 seule réponse possible) :

1. Un achat que vous avez fait vous même
2. Un cadeau que l'on vous a fait
3. Autre situation, précisez _____
4. NSP

5- (Enq : poser la question uniquement si 1 en Q4, sinon allez directement à Q6) Vous avez acheté cet appareil :
(Enq : 1 seule réponse possible)

1. Dans une grande surface (Carrefour, Auchan, etc.)
2. Dans une grande surface spécialisée en électronique, électroménager, image (Fnac, Darty, etc.)
3. Dans un magasin spécialisé en photo
4. Par Internet (quelle que soit l'enseigne du commerçant)
5. Autres, précisez _____
6. NSP

6- Votre APN Nikon est un appareil :
(Enq : 1 seule réponse possible)

1. Compact numérique
2. Reflex numérique
3. NSP

7- Pouvez-vous nous préciser, si vous le connaissez, le nom de cet APN
(*par exemple « Coolpix 4800 »*)
(Enq : Notez le nom ou cocher directement dans la liste proposée ci-dessous)

/_____/

COMPACT				**REFLEX**
1	COOLPIX P2		1	D50
2	COOLPIX P1		2	D70s
3	COOLPIX S4		3	D2X
4	COOLPIX S3		4	D2Hs
5	COOLPIX L101		5	D70
6	COOLPIX L1		6	D2H
7	COOLPIX 8800		7	D1H
8	COOLPIX 8400		8	D1X
9	COOLPIX 8700		9	D1
10	COOLPIX 7900		10	D100
11	COOLPIX 5900		11	Autres, précisez: _____
12	COOLPIX 5700			
13	COOLPIX 5600			
14	COOLPIX 5400			
15	COOLPIX 5200			
16	COOLPIX 5000			
17	COOLPIX S2			
18	COOLPIX S1			
19	COOLPIX 4600			
20	COOLPIX 4500			
21	COOLPIX 4300			
22	COOLPIX 4200			
23	COOLPIX 4100			
24	COOLPIX SQ			
25	COOLPIX 3700			
26	COOLPIX 3500			
27	COOLPIX 3200			
28	COOLPIX 3100			
29	COOLPIX 2500			
30	COOLPIX 2200			
31	COOLPIX 2100			
32	COOLPIX 2000			
33	COOLPIX 995			
34	COOLPIX 885			
35	COOLPIX 775			
36	COOLPIX 990			
37	COOLPIX 880			
38	Autres, précisez: _____			

8- Vous utilisez cet APN :
(Enq : 1 seule réponse possible)

1. Le plus souvent pour vos loisirs
2. Le plus souvent pour votre travail
3. Dans les deux cas
4. NSP

9- Etes-vous membre du club des Nikonistes?
(Enq : 1 seule réponse possible)

1. Oui
2. Non
3. NSP

VOUS ET LA PHOTOGRAPHIE NUMERIQUE EN GENERAL

10- En moyenne, combien de photos numériques faites-vous par mois à l'aide de votre APN ?

|_____| photos

11- Depuis combien d'années pratiquez vous la photographie numérique ?

|_____| années

Parlons maintenant de votre pratique des *APN en général*. Pour chacune des phrases suivantes, vous me direz si vous êtes d'accord ou non. Vous donnerez une note allant de 1 « pas du tout d'accord » à 5 « tout à fait d'accord », les notes intermédiaires servant à nuancer votre jugement.(Enq : lire chaque note et sa signification)

	1	2	3	4	5	
	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	NSP
Q12- Les APN, c'est un sujet sur lequel je me sens compétent	1	2	3	4	5	*
Q13- Je pense que j'en sais assez sur les APN pour être confiant lorsque j'achète ce type de produit	1	2	3	4	5	*
Q14- Je ne connais pas grand-chose aux APN	1	2	3	4	5	*
Q15- Je sais comment évaluer la qualité d'un APN	1	2	3	4	5	*
Q16- Dans mon entourage, je suis considéré comme un expert des APN	1	2	3	4	5	*
Q17- Je sais évaluer si le prix d'un APN est justifié ou non	1	2	3	4	5	*
Q18- Je connais la plupart des nouveautés dans le domaine des APN	1	2	3	4	5	*
Q19- En comparaison à la plupart des autres utilisateurs, je connais peu de choses aux APN	1	2	3	4	5	*

	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutot d'accord	Tout à fait d'accord	NSP
Q20- J'utilise mon APN de manière créative	1	2	3	4	5	*
Q21- Je suis vraiment curieux de savoir comment mon APN fonctionne	1	2	3	4	5	*
Q22- Je suis à l'aise lorsque j'utilise mon APN d'une manière nouvelle (= différente de d'habitude)	1	2	3	4	5	*
Q23- J'ai une utilisation plus variée de mon APN que la plupart des autres utilisateurs	1	2	3	4	5	*
Q24- Je fais souvent des essais avec mon APN	1	2	3	4	5	*

	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	
	1	2	3	4	5	NSP
Q25 Les APN sont des produits qui comptent vraiment beaucoup pour moi	1	2	3	4	5	*
Q26- J'accorde une importance particulière aux APN	1	2	3	4	5	*
Q27- J'aime particulièrement parler des APN	1	2	3	4	5	*
Q28- Je suis particulièrement intéressé par les APN	1	2	3	4	5	*
Q29- Je me sens particulièrement attiré par les APN	1	2	3	4	5	*
Q30- Le seul fait de me renseigner sur les APN est un plaisir	1	2	3	4	5	*

VOTRE FORMATION A L'UTILISATION DE VOTRE APN NIKON

Nikon propose différents moyens pour vous *apprendre à utiliser* votre APN. Pour chacun, vous me direz si vous les avez utilisés ou non. Vous donnerez une note allant de 1 « jamais » à 5 « très souvent »
(Enq : lire à l'interviewé chaque note et sa signification)

	1	2	3	4	5	
	Jamais	Rarement	De temps en temps	Souvent	Très souvent	NSP
Q31- Le mode d'emploi de votre APN Nikon	1	2	3	4	5	*
Q32- Les menus interactifs de votre APN Nikon	1	2	3	4	5	*
Q33- Le service de support technique de Nikon	1	2	3	4	5	*
Q34- Le Site Web de Nikon « *nikon.fr* »	1	2	3	4	5	*
Q35- Les Stages de formation proposés par Nikon	1	2	3	4	5	*
Q36- Les démonstrations d'APN réalisées par Nikon (dans les salons, comme le Nikon Pro Tour)	1	2	3	4	5	*
Q37- Les revues Nikon (Nikon news, Nikon Pro, Nikon next)	1	2	3	4	5	*

Enquêteur : synthétiser maintenant en lisant la phrase suivante : « Les différents moyens que nous venons d'évoquer – le mode d'emploi, les menus de l'APN, le support technique, le site Web, les stages de formation, les démonstrations et les revues Nikon – constituent ***l'effort de formation que propose Nikon à ses clients pour leur apprendre à utiliser un APN***.

Parlons maintenant de cet effort fourni par Nikon pour vous apprendre à utiliser votre APN. Pour chacune des phrases que je vais vous citer, vous me direz si vous êtes d'accord ou non. Vous donnerez une note allant de 1 « pas du tout d'accord » à 5 « tout à fait d'accord » (Enq : lire à l'interviewé chaque note et sa signification)

	1	2	3	4	5	
	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	
Q38- Nikon fait des efforts importants pour me former à l'utilisation de mon APN	1	2	3	4	5	*
Q39- Une autre marque m'aurait moins bien formé que Nikon à l'utilisation de mon APN	1	2	3	4	5	*
Q40- Nikon a tout mis en œuvre pour m'aider à bien utiliser mon APN	1	2	3	4	5	*
Q41- Nikon est une marque qui forme bien ses clients à l'utilisation de leur APN	1	2	3	4	5	*
Q42- Nikon ne forme pas ses clients, elle leur vend des produits	1	2	3	4	5	*
Q43- Nikon ne m'a rien appris sur mon APN	1	2	3	4	5	*
Q44- Sans Nikon, je ne saurais pas utiliser mon APN	1	2	3	4	5	*

Q45- Quelle est votre satisfaction globale à l'égard de la formation que vous a fournie Nikon sur l'utilisation de votre APN. Vous donnerez une note allant de 1 « pas du tout satisfait » à 10 « tout à fait satisfait », les notes intermédiaires servant à nuancer votre jugement

Pas du tout satisfait									Tout à fait satisfait
1	2	3	4	5	6	7	8	9	10

VOTRE CONNAISSANCE DE VOTRE APN NIKON

Parlons maintenant de l'utilisation de votre APN Nikon. Pour chacune des phrases que je vais vous citer, vous me direz si vous êtes d'accord ou non. Pour cela, vous donnerez une note allant de 1 « pas du tout d'accord » à 5 « tout à fait d'accord » (Enq : lire à l'interviewé chaque note et sa signification)

	1	2	3	4	5	
	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	NSP
Q46- Je connais bien les différentes fonctionnalités de mon APN	1	2	3	4	5	*
Q47- Je sais bien utiliser mon APN	1	2	3	4	5	*
Q48- Je sais faire de bonnes photos avec mon APN	1	2	3	4	5	*
Q49- Mon APN me paraît plus simple à utiliser maintenant que lors de mes premières utilisations de cet APN	1	2	3	4	5	*
Q50- Je connais bien le fonctionnement de mon APN	1	2	3	4	5	*
Q51- J'ai beaucoup appris sur le fonctionnement de mon APN depuis que je l'ai acheté.	1	2	3	4	5	*
Q52- Il me reste beaucoup à apprendre pour utiliser pleinement mon APN	1	2	3	4	5	*
Q53- Je me sens plus compétent que la plupart des autres utilisateurs de cet APN	1	2	3	4	5	*
Q54- Mon APN reste trop compliqué pour moi	1	2	3	4	5	*
Q55- Je sais beaucoup mieux utiliser mon APN maintenant qu'au moment de l'achat	1	2	3	4	5	*

	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	NSP
Q56- C'est surtout grâce à Nikon que je sais utiliser mon APN	1	2	3	4	5	*
Q57- C'est surtout grâce à mon entourage que je sais utiliser mon APN	1	2	3	4	5	*
Q58- C'est surtout grâce à moi-même que je sais utiliser mon APN	1	2	3	4	5	*
Q58- C'est surtout grâce à d'autres utilisateurs que je sais utiliser mon APN	1	2	3	4	5	*
Q60- C'est surtout grâce au vendeur que je sais utiliser mon APN	1	2	3	4	5	*

Q61- Imaginons maintenant que vous deviez dire, sur une échelle de 0% à 100%, quel pourcentage de votre formation à l'utilisation de votre APN vous attribuez à Nikon. Quel serait ce pourcentage ?

|_____| %

VOTRE UTILISATION DE VOTRE APN NIKON

Q62- Avec quelle fréquence utilisez-vous votre APN?
(Enq : lire à l'interviewé chaque note et sa signification)

1	2	3	4	5	6
Moins d'une fois par mois	Une fois par mois	Une fois par semaine	Quelques fois par semaine	Une fois par jour	Plus d'une fois par jour

Q63- Combien de fonctions de votre APN avez vous utilisées depuis son achat ?
(Enq : lire à l'interviewé chaque note et sa signification)

1	2	3	4	5	6
Très peu de fonctions	Quelques fonctions	Un peu moins de la moitié des fonctions	Environ la moitié des fonctions	La plupart des fonctions	Toutes les fonctions

Pour chaque application que je vais vous citer, vous me direz si vous les avez utilisées ou non. Vous donnerez une note allant de 1 « jamais » à 5 « très souvent »
(Enq : lire à l'interviewé chaque note et sa signification)

	1	2	3	4	5	
	Jamais	Rarement	De temps en temps	Souvent	Très souvent	NSP
Q64- Faire des photos en mode automatique	1	2	3	4	5	*
Q65- Faire des photos en mode manuel (ex : réglage de la vitesse d'obturation)	1	2	3	4	5	*
Q66- Faire des photos avec les programmes semi-automatiques proposés (mode scènes : portrait, nuit, macro, sport, etc.)	1	2	3	4	5	*
Q67- Faire des vidéos avec mon APN	1	2	3	4	5	*
Q68- Regarder sur mon APN les photos que j'ai prises	1	2	3	4	5	*
Q69-Imprimer les photos directement depuis mon APN	1	2	3	4	5	*
Q70- Transférer mes photos sur mon ordinateur depuis mon APN	1	2	3	4	5	*
Q71- Regarder les photos sur mon écran d'ordinateur	1	2	3	4	5	*
Q72- Imprimer les photos depuis mon ordinateur	1	2	3	4	5	*
Q73- Regarder les photos sur ma télévision	1	2	3	4	5	*
Q74- Retoucher mes photos sur mon ordinateur	1	2	3	4	5	*
Q75- Faire développer mes photos	1	2	3	4	5	*
Q76- Faire des diaporamas / des montages	1	2	3	4	5	*
Q77- Mettre les photos sur un site internet	1	2	3	4	5	*
Q78- Envoyer mes photos par email	1	2	3	4	5	*
Q79- Participer à un concours photo	1	2	3	4	5	*

VOTRE SATISFACTION CONCERNANT VOTRE APPAREIL PHOTOGRAPHIQUE NIKON

Q 80- D'une manière générale, quelle est votre satisfaction vis-à-vis de votre APN Nikon ? Pourriez-vous me donner une note allant de 1 « pas du tout satisfait » à 4 « tout à fait satisfait »

1	2	3	4
Pas du tout satisfait	Plutôt pas satisfait	Plutôt satisfait	Tout à fait satisfait

Q 81- Comment vous sentez-vous vis-à-vis de votre APN Nikon ? (Pourriez-vous me donner une note allant de 1 « furieux » à 7 « enchanté »)

1	2	3	4	5	6	7
Furieux	Pas content	En grande partie insatisfait	Mitigé, ni satisfait, ni insatisfait	En grande partie satisfait	Content	Enchanté

Q82 - Et par rapport à vos attentes initiales, cet APN est finalement :

1	2	3	4	5
Bien moins bon	Moins bon	Comme attendu	Meilleur	Bien meilleur

VOTRE STAGE A LA NIKONSCHOOL

Q83- Avez-vous déjà suivi un stage de formation à la Nikonschool, centre de formation de Nikon à Paris?
(Enq : 1 seule réponse possible)

1. Oui, un stage
2. Oui, deux stages ou plus
3. Non, jamais
4. NSP

Q84- Quelle était la date de ce stage (ou bien du dernier stage si vous en avez suivi plusieurs)?
(Enq : noter précisément l'intitulé de ce stage)

MOIS |_____| ANNEE |_____|

Q85- Quel était le thème de ce stage (ou bien du dernier stage si vous en avez suivi plusieurs)?
(Enq : noter précisément l'intitulé de ce stage)

|_____|

Q86- Quel était le niveau de ce stage ?
(Enq : 1 seule réponse possible)

1. Initiation
2. Perfectionnement
3. Expert
4. NSP

Q87- Le stage que vous avez suivi faisait suite à
(Enq : 1 seule réponse possible)

1. Un cadeau
2. Un achat personnel
3. Un achat professionnel dans le cadre de la formation continue
4. NSP

Q88- Comment avez-vous connu la Nikonschool ?

(Enq : 1 seule réponse possible)

1. Par mon entourage, mes amis
2. Sur le site Web de Nikon
3. Dans la presse
4. Par une publicité
5. Autre, précisez .....
6. NSP

Je vais maintenant vous poser quelques questions sur votre stage à la Nikonschool. Pour chacune des phrases que je vais vous citer, vous me direz si vous êtes d'accord ou non. Pour cela, vous donnerez une note allant de 1 « pas du tout d'accord » à 5 « tout à fait d'accord »

	1	2	3	4	5	
	Pas du tout d'accord	Plutôt pas d'accord	Ni pas d'accord, ni d'accord	Plutôt d'accord	Tout à fait d'accord	NSP
Q89- Ce stage m'a été utile	1	2	3	4	5	*
Q90- L'approche pédagogique m'a plu	1	2	3	4	5	*
Q91- Depuis le stage, j'utilise mon APN plus souvent	1	2	3	4	5	*
Q92- Depuis le stage, j'utilise plus de fonctions de mon APN	1	2	3	4	5	*
Q93- Depuis le stage, j'utilise mon APN de manière plus variée	1	2	3	4	5	*
Q94- J'envisage de faire d'autres stages à la NikonSchool	1	2	3	4	5	*
Q95- Depuis le stage, j'envisage d'acheter un appareil plus perfectionné	1	2	3	4	5	*
Q96- Grâce à ce stage, j'ai davantage envie d'utiliser des produits Nikon	1	2	3	4	5	*
Q97- Grâce à ce stage, j'ai davantage confiance dans les produits Nikon	1	2	3	4	5	*
Q98- Grâce à ce stage, j'ai davantage confiance dans la marque Nikon	1	2	3	4	5	

Q99- Quelle est votre satisfaction à l'égard de votre stage à la Nikonschool. Vous me donnerez une note allant de 1 « pas du tout satisfait » à 10 « tout à fait satisfait », les notes intermédiaires servant à nuancer votre jugement

Pas du tout satisfait									Tout à fait satisfait
1	2	3	4	5	6	7	8	9	10

VOTRE PROFIL

Q100- Age

1. Moins de 25 ans
2. 25 à 39 ans
3. 40 à 49 ans
4. 50 ans et plus
5. Ne se prononce pas

Q101- Genre

1. Homme
2. Femme

Q102- Votre métier (enquêteur : noter en toute lettre, puis recoder en CSP)

Metier : |_____|

CSP :

1. Agriculteurs exploitants
2. Artisans, commerçants et chefs d'entreprise
3. Cadres et professions intellectuelles supérieures
4. Professions Intermédiaires
5. Employés
6. Ouvriers
7. Retraités
8. Autres personnes sans activité professionnelle

Q103- Quel est votre niveau d'études? (1 seule réponse possible)

1. Niveau BEPC
2. Niveau CAP/BEP
3. Niveau Bac (général ou professionnel)
4. Niveau Bac+2
5. Niveau> bac + 2

MERCI DE VOTRE CONTRIBUTION, Souhaitez-vous ajouter quelque chose au sujet de votre APN, de son utilisation ou de la formation fournie par Nikon ?