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Cross-channel information search and patterns of consumer electronics purchasing

Tomasz S. Szopiński^a , Katarzyna Bachnik^b  and Robert Nowacki^a 

^aUniversity of Economics and Human Sciences in Warsaw, Warsaw, Poland; ^bHult International Business School, San Francisco, CA, USA

ABSTRACT

Consumers diversify the sources where they seek information about goods and services as well as the places where they make a purchase. To a great extent, the choice between online and off-line channels is determined by the qualities of the products that are sought, the frequency of purchasing them, and the pace of technological changes that the needed goods undergo. Consumer familiarity with a particular channel matters as well. The aim of the article is to verify whether a customer's characteristics (age, gender, technical skills, technical education) influence the way consumers buy consumer electronics. The article focuses on radio and television equipment, computers, and mobile phones. The main point of interest is the differences during the information search and purchasing stages. The paper reports on the survey results conducted among 741 respondents. The analysis showed that the subjective perception of the respondents' own technical skills as well as their gender diversify the way electronics are purchased. A non-linear relationship has been discovered between the risk involved in filing a warranty claim on electronics purchased via the Internet and the way of buying these products.

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Consumer electronics; online channel; channel switching; cross channel purchasing behavior; consumer shopping motivations

1. Introduction

Consumers search for product and service information in various places, and so they also end up purchasing them in various places. At every stage of the decision-making process, they navigate between online and offline channels. A consumer can start their purchase transaction in one channel and complete it in another channel. According to some reports, 70% of consumers globally have intentionally collected information about electronics online before purchasing them offline. 35% of these people are European consumers, while 12% of purchases in personal electronic devices (i.e. laptop/tablet and mobile phone) are carried out by showrooming processes (Arora & Sahney, 2017; Flavián, Gurrea, & Orús, 2016; PwC, 2015). The number

CONTACT Tomasz S. Szopiński  szopinski@vizja.pl

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increases enormously in the case of Poland, where 80% of the people who buy home appliances, radios and television equipment in traditional stores first seek information about these products on the Internet (Opiniac.com, 2015). The ability to switch between channels allows consumers to “exploit the benefits of each channel (the ability to search for product information online during brand selection, with instant pickup in a store), while avoiding costs (travel costs to collect information during brand selection, paying shipping charges for online orders, and risks involved with post-purchase dissatisfaction resulting in a complaint) inherent in each channel” (Chatterjee, 2010). Consumers are willing to switch between channels, and prioritizing them, first of all, depends on their various motivations (Flavián et al., 2016) and, second, on their expectations regarding a product’s benefits. These benefits are related to:

- channel characteristics (perceived as the advantages of a given channel) (Maçik, Mazurek, & Maçik, 2012; Verhoef, Neslin, & Vroomen, 2007),
- consumer characteristics (including gender and past experiences connected with using the product/service (Brown, Pope, & Voges, 2003), and
- product characteristics (Daunt & Harris, 2017).

Consumer electronics is a separate case, due to the fact that these are usually expensive products which consumers buy rather rarely. Purchasing an inappropriate model usually entails considerable financial losses for the consumer as well as emotional stress due to one’s varying levels of involvement, defined by the extent a particular product is important for the customer (Bachnik, 2016). In their efforts to cope with mixed emotions, consumers are either driven towards or inhibited from making purchases online and/or offline (Penz & Hogg, 2011). There is great diversity in the purchasing behaviors of various generations. The demographic and psychographic characteristics of millennials and older generations influence their perceptions of product categories and attitudes toward particular channels. What differs among them is the extent of using technical devices and their level of technical skills. Rapid technological changes cause relevant information to be very important when purchasing electronics. On top of all this, one can identify gender differences in technophobia, understood as anxiety and fear leading to the avoidance of technology (Kotzé, Anderson, & Summerfield, 2016).

The purpose of the article is to verify whether a customer’s traits (gender, technical skills, and technical education) influence the way they buy consumer electronics. The article focuses on radio and television equipment, computers, and mobile phones (the authors ruled out home appliances). The main point of interest here is differences in the information search and purchasing stages. Although the topic of cross-channel behavior is being researched for some time already, the authors feel there is still a research gap to be filled. There is no clear-cut answer to the question about the extent to which the offline and online channels are substitutes or complement each other, which leads to achieving more gains (Avery, Steenburgh, Deighton, & Caravella, 2012; Falk, Schepers, Hammerschmidt, & Bauer, 2007; Kumar & Venkatesan, 2005; Maçik, 2015; Verhoef et al., 2007). Since Poland sets trends in the region, understanding the interdependencies between channels in this country may

clarify the benefits and risks associated with establishing our business presence in the region, in particular on channels. Our findings will benefit companies in the consumer electronics industry by helping them adjust their marketing strategies and pinpoint the key touchpoints with consumers. Greater accessibility to desired channels, simplicity in obtaining product information, and closing purchasing transactions would constitute clear benefits for the consumers as a result of a company's actions.

Taking all of the above into consideration, the presented analysis covers the following research questions:

- Can technical skills and education as well as a trait such as gender diversify the way electronics are purchased by consumers?
- Is the way of purchasing the same for the three groups of electronic products enumerated above?
- What is the influence of the perception of problems and possible complaints on the probability of buying electronics online?

The research hypotheses presented in the latter part of the paper derive from the research questions. The article begins with a literature review concerning consumers' attitudes towards the phenomenon of cross-channel shopping for consumer electronics. Next, the article presents a description of the research sample and the hypotheses, followed by a description of the research results. Finally, there is a discussion of the results and conclusions.

2. Theoretical framework

2.1. The framework depicting channels and variables influencing channel benefits

Our analysis of the way of purchasing radio and television equipment, computers and mobile phones was based on two dimensions. These relate to the source of information about goods (namely, where consumers search for product information) and the place of purchase (where they make purchasing transactions), which represent two stages in the consumer decision-making process. At every stage, one can actually operate online or offline. When combining these two dimensions, a matrix of four models arises: (1) searching for information on the Internet and buying in a real store; (2) searching for information on the Internet and buying in an online store; (3) searching for information in a real store and buying in a real store; (4) searching for information in the real store and buying through an online store.

Consumers have the possibility to freely and easily switch between channels at various stages of the purchasing process, including the stage of seeking information about products and making a purchase. They look at the channels and expect benefits that may be rooted in a channel per se, the product and/or for themselves as customers.

Analyzing individual channels takes into consideration such factors as convenience (that can be quantified as, e.g., the distance from a store when it comes to an offline channel), saving time, and rushing to close a transaction (time pressure may be a

factor that increases the probability of making an online purchase). According to Overby and Lee (2006) as well as Chocarro, Cortiñas, and Villanueva (2013), these variables act in favor of buying online. Brown et al. (2003) talk about convenience as the dominant factor. The ease and comfort of using a channel (familiarity) are also noteworthy. In accord with Morganosky's (1986) understanding, it can be defined as "seeking to accomplish a task in the shortest time with the least expenditure of energy." Levin, Levin, and Heath (2003) conclude that some utilities for shopping can be better used on the Internet and others in the offline mode. For instance, the selection process and quick access to information are easier on the Internet rather than offline. On the other hand, a traditional store offers the possibility of direct contact with the seller and to touch the product (Flavián et al., 2016; Reid, Ross, & Vignali, 2016).

The significance of these utilities varies for different consumers in the context of purchasing diversified product categories. The phenomena of showrooming and webrooming are becoming increasingly more popular. The first consists in consumers visiting stationary stores with the intention of learning about the qualities of a product in order to buy it through an Internet-based store later (Kalyanam & Tsay, 2013); the second makes it possible for consumers to seek information about goods and services on the Internet and then buy the product in a stationary store (Fernández, Pérez, & Vázquez-Casielles, 2018). According to Kalyanam and Tsay (2013), there is no unequivocal definition for these terms, since both showrooming and webrooming are ambiguous. Some use the term showrooming to describe situations where consumers look at the goods in a stationary store to later buy a product in the online store of the same seller. Others define showrooming and webrooming as situations where the buyer examines the product on one channel to later buy it through another channel from a seller offering a better price.

An example may be the definition of showrooming proposed by Mehra, Kumar, and Raju (2013). They refer to showrooming as a free ride. The consumer uses the stationary store as a place where they examine a product in order to later buy it from an Internet seller who offers lower prices yet at the same time does not provide the possibility to see the product in a stationary store. Both webroomers and showroomers seek different utilities on different stages of the purchasing process. High online search costs affect showrooming negatively. Time pressure that consumers face when shopping is negatively associated with their propensity to showroom (Gensler, Neslin, & Verhoef, 2017). Webroomers focus more on the attributes directly related to the product. Showroomers focus more on the attributes related directly to the seller (Fernández et al., 2018). One of the determinants for webrooming is a consumers' lack of trust (Arora & Sahney, 2017).

The key factor that determines choosing between an online and offline channel during the stage of seeking information and making a purchase is the type of product (Akalamkam & Mitra, 2017; Brown et al., 2003; Cheema & Papatla, 2010; Frasquet, Mollá, & Ruiz, 2015). The same consumers may be buying various goods through different channels or the same item through various channels. Cheema and Papatla (2010) claim that the usefulness of Internet sources of information on goods decreases as consumer Internet experience increases. For consumers who are experienced in using the Internet, offline Internet sources become more important. They

claim that the Internet is largely anonymous, which helps scammers attract their victims. Purchasing electronics is particularly loaded with the risk of buying the wrong item (Maciejewski, 2010). At the same time, the ease of comparing the prices of goods or services via the Internet helps people save money. Forsythe and Shi (2003) show that online purchasing entails various dimensions of risk. Trojanowski (2014) claims that the advantage of an expert store over other stores is particularly visible with TV purchases. When buying a TV through the Internet, the buyers will have more trouble evaluating it (unless they have evaluated it in a stationary store earlier). As far as purchasing this product is concerned, there is still the risk of filing a warranty claim on a product, which lowers the usability score of an Internet store.

Phau and Meng Poon (2000) analyzed the qualities of goods and services that prompt consumers to buy them via the Internet in Singapore and singled out the three dimensions of their factors: the amount of expenditure and frequency of purchases, the degree of tangibility, and the possibility to diversify products or services. The argument goes that, if products and services are sold at a low price, they are often bought, have intangible value, at the same time can be diversified freely, and so they are more often purchased online. Rohm and Swaminathan (2004) developed a typology of clients buying online and offline based on the propensity to purchase goods online. They singled out four groups of consumers: convenience shoppers, variety seekers, balanced buyers, and store-oriented shoppers.

2.2. Consumer electronics and consumer profile

Consumer electronics is a specific type of product category. The choice of a product category is intentional and guided by three assumptions:

firstly, that consumer electronics is an infrequent but priced purchase (short life cycle plus expensive/costly),

secondly, that it is high involvement purchase (dissatisfaction pairs with great financial loss);

thirdly, that the consumer's range of technical skills/competences is more important here than in case of other product categories.

Based on the above, switching between channels could provide different benefits to consumers (e.g. making purchases online could lower the associated risk in the form of increased satisfaction and financial savings, but it entails other risk categories, like using post-purchase warranties). Purchases via the Internet are cost-effective, yet this depends on the consumer, namely, how they perceive the Internet as a purchasing channel and how competently they use it. The characteristics of electronics, such as the possibility to learn about search characteristics before a purchase, the influence of rapid technological progress, and a low frequency of purchasing allow consumers to switch from the online to the offline channel throughout the purchase process (Van Baal & Dach, 2005). Technically savvy online consumers exhibit more of a “bricks-to-clicks” than a “clicks-to-bricks” purchasing cycle (O'Reilly & Marx, 2011).

Wang, Song, and Yang (2013) offered a classification of products that takes into consideration two dimensions: the degree of consumer involvement in the purchase

process and the extent to which the consumer can familiarize themselves with the qualities of the product before making a purchase. Consumer electronics, along with books and CDs, belong to the category of “search products,” which means that they are characterized by a high level of consumer involvement in the purchasing process.

Each of the discussed categories of electronic equipment poses different logistical challenges for their manufacturers and suppliers. For example, the requirements for the storage or transport of large-size TVs are different than for mobile phones. This can also affect customer convenience related to the way one buys various types of equipment. RTV equipment and computers require a different range of value-added services. Often customers expect the service of bringing equipment into the house, or for someone to assemble and configure it on site. In the case of mobile phones, people can take advantage of additional services, such as transferring data from an old device to a new one at the seller’s premises. In relation to the above, the authors analyzed the purchasing ways for each of the groups of equipment separately.

The choice of the channel through which a consumer makes a purchase is equally dependent on the type or category of the product and on the buyer’s socio-demographic traits (Woo, Ahn, Lee, & Koo, 2015). Assessing each channel can be different for consumers varying in age, gender, and frequency of purchasing a particular product (Chocarro et al., 2013; Yang & Lester, 2005). In effect, their preferences whether to go online, offline or switching between them in any direction when searching for and purchasing products or services can be different.

According to Bain and Rice (2006), one of the most significant traits that influences the perception of technology is gender. Women exhibit higher levels of risk-aversion; they have higher cognitive-processing than men when considering purchasing high-technology products (Kotzé et al., 2016). Gender influences the perception of comments on the Internet and these are more likely to influence the purchasing decisions of women (Bae & Lee, 2011), their perception of online shopping (Garbarino & Strahilevitz, 2004), and behaviors on Internet auctions. This is manifested through a different degree of aversion to risk or the fact that men and women purchase dissimilar products on the Internet (Hou & Elliott, 2016). Hence, the authors put forward the following research hypotheses:

H_{1a} – Respondent gender diversifies the way of buying radio and television equipment.

H_{1b} – Respondent gender diversifies the way of buying IT equipment.

H_{1c} – Respondent gender diversifies the way of buying mobile phones.

Involvement is closely related to technical competences. What is more, a consumer’s range of technical skills and competences is also hugely important, as it enables them to make informed and rational purchasing decisions. Higher technical competences should make the decision-making process faster and smoother. Knowledge about the Internet as a purchasing channel and ease of using the Internet, which significantly diversifies various generations, translates directly into the ease of obtaining information about these products and creating a situation that is close to information symmetry. Some argue that the quest for self-affirmation in terms of decision expertise and thrift are crucial factors influencing consumer shopping orientations on cross-channel usage (Balasubramaniam, Raghunathan, & Mahajan, 2005; Chatterjee,

2010). Self-affirmation of expertise is the degree to which a consumer feels capable of skillfully choosing the finest available product (Brucks, 1985). It is more likely that such subjective expertise will allow consumers to be confident when making a decision, take credit for it or experience satisfaction afterward.

This is the reason why consumers striving for self-affirmation of expertise prefer channels that open up the greatest possibility for using their perceived expertise (Chatterjee, 2010). Technical education is understood for the sake of this research as a part of the demographic description of a consumers' profile, indicating they have completed a post-high-school curriculum offered by a college, school or university, with a technical specialization (such as applied sciences or modern technologies). Based on the relevant literature, authors proposed three hypotheses on the correlations between technical skills and behaviors manifested during the purchase of electronic products:

H_{2a} – Having technical education diversifies the way of buying radio and television equipment.

H_{2b} – Having technical education diversifies the way of buying IT equipment.

H_{2c} – Having technical education diversifies the way of buying mobile phones.

H_{3a} – The perception of one's technical skills diversifies the way of buying radio and television equipment.

H_{3b} – The perception of one's technical skills diversifies the way of buying IT equipment.

H_{3c} – The perception of one's technical skills diversifies the way of buying mobile phones.

Research conducted by Balon (2015) on the behavior of Polish consumers in the field of filing complaints shows that they are reluctant to complain because of their previous experience. Poles believe that this is a long-term and frustrating process. An important criterion when making a decision about filing a complaint is the price and distance to the store where the complaint should be made. Electronic equipment is expensive and susceptible to damage during transport. Therefore, in the authors' opinion, problems with complaints may be demotivating factors for purchasing electronic equipment over the Internet. The respondents were asked to respond to the following statements:

"I usually don't buy RTV equipment over the Internet because I'm afraid of trouble if I have to make a complaint."

"I usually don't buy computer hardware over the Internet because I'm afraid of trouble if I have to make a complaint."

"I usually don't buy a mobile phone over the Internet because I'm afraid of trouble if I need a make a complaint."

A factor that reduces the fear of having to return electronic equipment may be buying a high quality and reliable model. For this, one needs technical knowledge regarding the current market offer. The authors of the article put forward these three research hypotheses:

H_{4a} – The perception of one's technical skills influences the likelihood (risk) of filing a warranty claim about audio and video equipment purchased via the Internet.

H_{4b} – The perception of one’s technical skills influences the likelihood (risk) of filing a warranty claim about IT equipment purchased via the Internet.

H_{4c} – The perception of one’s technical skills influences the likelihood (risk) of filing a warranty claim about mobile phones purchased via the Internet.

3. Methods

The answers of the respondents were collected between April and November of 2018 from a questionnaire posted on the Internet. In order to encourage potential respondents to take part in the survey, invitations were sent out and paid advertising was used through one of the biggest Internet services operating in Poland, Onet.pl, which also offers free e-mail accounts. Furthermore, in order to find respondents, information about the survey was published on Facebook.com. Group administrators of the service sent out information to members with a link to a website where the questionnaire was published as well as a request to fill it out. The answers of 741 respondents from all over Poland underwent analysis. The respondents answered questions about buying consumer electronics, including radio and television equipment, computers, and mobile phones. Women constituted 57.4% of the respondents and men accounted for 42.6%. The age ranges according to the percentage of respondents were as follows: 15–18 (2.2%), 19–24 (34.8%), 25–29 (13.8%), 30–39 (23.2%), 40–49 (12.7%), and 50–59 (6.7%). The last group containing people aged over 60 comprised 6.6% of the respondents. Among all the respondents, 35% had a technical education and 65% had a non-technical education.

Our analysis of the way of buying radio and television equipment, IT equipment, and mobile phones was based on the two dimensions mentioned in the previous section: the source of information about goods and the place of making a purchase. Hence, four ways of buying a product were singled out and marked with the following symbols:

SIBR – searching for information on the Internet – buying in the real store

SIBI – searching for information on the Internet – buying in the online store

SRBR – searching for information in the real store – buying in the real store

SRBI – searching for information in the real store – buying in the online store.

People who purchased goods in other ways (e.g., ordering goods on the phone from a consultant) could select the AW option. People who did not purchase equipment could choose the response No_Act. The table below shows that as far as radio and television equipment, IT equipment, and mobile phones are concerned, our respondents sought information on the Internet first and then bought equipment in a traditional store (the SIBR option). In order to identify the correlations between the variables being examined, the authors chose the non-parametric chi-square test, Kruskal–Wallis test, and an analysis of linear regression.

Table 1. Distribution of responses regarding the way of buying electronics.

	Radio and television equipment		IT equipment		Mobile phones	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
SIBR	307	41.4	332	44.8	255	34.4
SIBI	166	22.4	180	24.3	218	29.4
SRBI	84	11.3	62	8.4	47	6.3
SRBR	105	14.2	69	9.3	85	11.5
AW	29	3.9	59	8.0	99	13.4
No_Act	50	6.7	39	5.3	37	5.0

4. Results

The first relationship analyzed concerned respondents' gender and their way of buying electronics. The table below illustrates correlations between a respondents' gender and the way of purchasing electronics divided into radio and television equipment, IT equipment, and mobile phones. For each type of equipment, there are statistically significant correlations between the respondents' gender and the way of purchasing electronics. The critical significance level was lower than 0.05. Gender diversified two ways of buying: SIBR and SIBI.

The number of people in Tables 1 and 2 differs because people who stated that they did not buy the analyzed types of equipment were not included in the analysis. There were too few of them and too many cells with a small number remained. This, in turn, meant that the results of the chi-square test would be unreliable.

For each equipment type, meaning radio and television, IT equipment, and mobile phones, women sought information on the Internet and then bought equipment in offline stores more often than men. In turn, men more often than women looked for information on equipment on the Internet and also bought it there. Hypotheses H_{1a} , H_{1b} , and H_{1c} were confirmed.

The second relationship under analysis concerned having completed a technical education and the way of purchasing electronics. During the analysis, no correlations were found between having a technical education and the way of purchasing radio and television equipment ($\text{Chi}^2 = 5.267$; $\text{df} = 5$; $p = 0.384$). There was also no correlation found between having a technical education and the way of purchasing IT equipment ($\text{Chi}^2 = 1.179$; $\text{df} = 5$; $p = 0.947$) or mobile phones ($\text{Chi}^2 = 4.027$; $\text{df} = 5$; $p = 0.546$). Hypotheses H_{2a} , H_{2b} , and H_{2c} were not confirmed.

The third relationship we analyzed concerned the perception of one's technical skills and the way of purchasing electronics. The task of each respondent was to evaluate their own technical skills on a 0–5 scale, where 0 meant very poor technical skills and 5 meant very good technical skills. Table 3 contains a juxtaposition of correlations between technical skills and the way of purchasing particular types of equipment. For each of the three types of electronics, statistically significant correlations have been found between one's perception of their technical skills and their way of purchasing equipment. As far as radio and television equipment is concerned, the highest evaluation of personal skills was offered by the people who declared to be using SRBI as the way of buying. As far as IT equipment and mobile phones are concerned, the highest evaluation of one's technical skills was given by the people who declared to use it for buying through SIBI. As regards radio and television equipment

Table 2. Analysis of the relationship between the gender of the respondents and the way of purchasing particular types of equipment (Chi-square test).

	Female		Male		Test value	Df	Critical significance level	V-Cramer coefficient
	N	%	N	%				
Radio and television equipment								
SIBR	189 _a	48.8%	118 _b	38.8%	13.083 ^a	4	0.011	0.138
SIBI	76 _a	19.6%	90 _b	29.6%				
SRBI	44 _a	11.4%	40 _a	13.2%				
SRBR	64 _a	16.5%	41 _a	13.5%				
AW	14 _a	3.6%	15 _a	4.9%				
IT equipment								
SIBR	211 _a	53.7%	121 _b	39.2%	30.080 ^a	4	0.000	0.207
SIBI	70 _a	17.8%	110 _b	35.6%				
SRBI	37 _a	9.4%	25 _a	8.1%				
SRBR	42 _a	10.7%	27 _a	8.7%				
AW	33 _a	8.4%	26 _a	8.4%				
Mobile phones								
SIBR	177 _a	43.9%	78 _b	25.9%	31.706 ^a	4	0.000	0.212
SIBI	96 _a	23.8%	122 _b	40.5%				
SRBI	24 _a	6.0%	23 _a	7.6%				
SRBR	49 _a	12.2%	36 _a	12.0%				
AW	57 _a	14.1%	42 _a	14.0%				

Each letter in the subscript represents a subset of the category of gender. The proportions of which column do not differ significantly from each other at the level of 0.05.

and mobile phones, the lowest evaluation of one's technical skills was offered by the people who did not use the Internet to buy or search for information about electronics. Hypotheses H_{3a} , H_{3b} , and H_{3c} were confirmed.

The next relationship under examination was concerned with one's perception of their technical skills and the risk of filing a warranty claim about electronics purchased via the Internet. Table 4 contains a juxtaposition of the relationship between technical skills and the likelihood or risk of filing a warranty claim about different types of equipment purchased via the Internet. Significant correlations have been discovered between the respondents' technical skills and their concerns about purchasing electronics (such as radio and television, IT, and mobile phones) via the Internet. Hypotheses H_{4a} , H_{4b} , and H_{4c} were confirmed. In each of these three electronics groups, the lowest evaluation of one's technical skills was offered by the people who could not decide if they had concerns connected with buying electronics online or not.

The authors decided to analyze the degree to which consumers' likelihood of filing a warranty claim about electronics purchased on the Internet influence their way of buying. To this end, based on the responses obtained in the survey, three linear regression functions were reconstructed to show how the risk of filing a warranty claim about radio, television and IT equipment and mobile phones influence their way of buying these products. The first function illustrates the correlation between declared intentions to file a complaint about radio and television equipment and the way of buying. The dependent variable was the way of buying radio and television equipment, which was marked with the following symbol: "RTV_SIBR/SIBI". Two groups with the highest number of responses were selected for analysis, and those came out to over 63% of all the responses: first I read information about products

Table 3. Analysis of the relationship between technical skills and the way of purchasing particular types of equipment (Kruskal-Wallis test).

	N	Average rank	Test value	Df	Critical significance level
Radio and television equipment					
SIBR	307	357.12	17.137	4	0.002
SIBI	166	361.46			
SRBI	84	368.09			
SRBR	105	277.67			
AW	29	323.19			
IT equipment					
SIBR	332	346.46	19.589	4	0.001
SIBI	180	389.58			
SRBI	62	329.43			
SRBR	69	368.14			
AW	59	267.40			
Mobile phones					
SIBR	255	355.18	9.945	4	0.041
SIBI	218	377.14			
SRBI	47	355.52			
SRBR	85	304.42			
AW	99	331.19			

Table 4. Analysis of the relationship between technical skills and the likelihood (risk) of filing a warranty claim regarding particular types of equipment (Kruskal-Wallis test).

	N	Average rank	Test value	Df	Critical significance level
Radio and television equipment					
Fears do not occur	369	399.87	14.628	2	0.001
No opinion	127	340.09			
There are concerns	245	343.54			
IT equipment					
Fears do not occur	375	398.11	13.968	2	0.001
No opinion	140	332.13			
There are concerns	226	350.10			
Mobile phones					
Fears do not occur	382	403.55	20.097	2	0.000
No opinion	124	330.03			
There are concerns	235	339.71			

and brands on the Internet (e.g., on forums, websites, etc.), then I choose a particular model (or several), and then I buy it in a offline store (which was marked with “RTV_SIBR”); and I first read information about products and brands on the Internet, then I choose a particular model (or several), and then I buy it online (“RTV_SIBI”). The reference value was the answers of respondents who seek information about radio and television equipment on the Internet, however, they buy an item in a stationary store – “RTV_SIBR.”

The independent variable was the declarations of the respondents about their intention to file a warranty claim about radio and television equipment and its influence over the way of buying such equipment. To this end, the respondents were asked to provide their opinion about the following statement: “I usually do not buy radio and television equipment via the Internet because I am worried about troubles arising from the necessity to file a complaint.” The respondents’ answers were organized into three groups: I am worried about problems with complaints about radio and television equipment (RTV_comp_yes); I am not worried about problems with complaints about radio and television equipment (RTV_comp_no); I have no opinion

Table 5. Regression analysis between the likelihood (risk) of filing a warranty claim about radio and television equipment and the way they are purchased.

Model	R	R square	Adjusted R square	Std. error of the estimate	
	.408 ^a	0.167	0.164	0.43234	
Anova ^b					
Model	Sum of squares	df	Mean square	F	Sig.
Regression	21.586	2	10.793	57.741	.000 ^a
Residual	107.853	577	0.187		
Total	129.440	579			
Coefficients ^b					
Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std. error	Beta	t	
(Constant)	0.264	0.046		5.703	0.000
RTV_comp_no	0.249	0.053	0.263	4.731	0.000
RTV_comp_yes	-0.175	0.056	-0.174	-3.136	0.002

^aPredictors: (constant), RTV_comp_yes, RTV_comp_no.

^bDependent variable: RTV_SIBR/SIBI.

about this (RTV_comp_no_opi). Regarding the independent variable, the reference value was the answer: I have no opinion about this. Table 5 presents the regression analysis between the likelihood (risk) of filing a warranty claim about radio and television equipment and the way of buying such equipment.

Table 5 shows that the adjusted coefficient is $R^2 = 0.164$. The risk of filing a warranty claim account for this way of buying radio and television equipment is at 16.4%. People who intend to file a warranty claim about radio and television equipment via the Internet have a 17.5% lower chance of seeking information about radio and television equipment on the Internet and simultaneously buying it there than people who have no opinion about problems with complaints. However, people who have no problems with complaints have nearly a 25% higher chance of seeking and then buying radio and television equipment via the Internet than people who have no opinion about problems with complaints.

The second regression function illustrates the correlation between a declared intention to file a warranty claim about IT equipment and the way of buying products. The dependent variable was the way of buying IT equipment, which was marked with the following symbol: "IT_SIBR/SIBI." Two groups with the highest number of responses were selected for analysis, and these included over 69% of all the responses: first I read information about products and brands on the Internet, then I choose a particular model (or several), and then I buy it at a stationary store (which was marked by "IT_SIBR"); I first read information about products and brands on the Internet, then I choose a particular model (or several), and then I buy it online ("IT_SIBI"). The reference value was respondents' answers, those who seek information about IT equipment on the Internet, yet they buy an item in a stationary store – "IT_SIBR."

The independent variable was declarations of the respondents about the likelihood (risk) of filing a warranty claim about IT equipment and its influence over their way of buying such equipment. To this end, the respondents were asked to provide their opinion about the following statement: "I usually do not buy computers on the

Table 6. Regression analysis between the likelihood (risk) of filing a warranty claim about IT equipment and the way they are purchased.

Model	R	R square	Adjusted R square	Std. error of the estimate	
	.403 ^a	0.162	0.160	0.43228	
Anova ^b					
Model	Sum of squares	df	Mean square	F	Sig.
Regression	22.759	2	11.380	60.898	.000 ^a
Residual	117.352	628	0.187		
Total	140.111	630			
Coefficients ^b					
Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std. error	Beta	t	
(Constant)	0.215	0.045		4.798	0.000
IT_comp_no	0.285	0.050	0.301	5.647	0.000
IT_comp_yes	-0.131	0.055	-0.127	-2.392	0.017

^aPredictors: (constant), IT_comp_yes, IT_comp_no.

^bDependent variable: IT_SIBR/SIBI.

Internet because I am worried about problems with filing a necessary warranty claim.” The respondents’ answers were organized into three groups: I am worried about the process of filing a warranty claim about IT equipment (IT_comp_yes); I am not worried about the process of filing a warranty claim about IT equipment (IT_comp_no); I have no opinion about this (IT_comp_no_opi). Regarding the independent variable, the reference value was the answer: I have no opinion about this. Table 6 presents the regression analysis between the likelihood (risk) of filing a warranty claim about IT equipment and the way of buying such equipment.

Table 6 shows that the adjusted coefficient is $R^2 = 0.160$. Intentions to file a warranty claim account for the way of buying IT equipment was 16.0%. People who are likely to file a warranty claim about IT equipment via the Internet have a 13.1% lower chance of seeking information about IT equipment on the Internet and simultaneously buying it there than people who have no opinion about the process of filing a warranty claim. Yet, people who have no problems with filing complaints have a 28.5% higher chance of seeking and then buying IT equipment via the Internet than people who have no opinion about the process of filing a warranty claim.

The third regression function illustrates the correlation between the likelihood (risk) of filing a warranty claim about a mobile phone and the way of buying such equipment. The dependent variable was the way of buying a mobile phone, which was marked by using the following symbol: “TEL_SIBR/SIBI.” Two groups with the most numerous answers were selected for the analysis: first I read information about products and brands on the Internet, next I choose a particular model (or several), and then I buy it in a stationary store (which was marked by “TEL_SIBR”); I first read information about products and brands on the Internet, next I choose a particular model (or several), and then I buy it online (“TEL_SIBI”). The reference value was the respondents’ answers who seek information about mobile phones on the Internet, however, they buy an item in a stationary store – “TEL_SIBR.”

However, the independent variable included the intentions of the respondents to file a warranty claim about mobile phones and their influence over the way of buying

Table 7. Regression analysis between the likelihood (risk) of filing a warranty claim about mobile phones and the way they are purchased.

Model	R	R square	Adjusted R square	Std. error of the estimate	
	.435 ^a	0.189	0.187	0.44789	
Anova ^b					
Model	Sum of squares	df	Mean square	F	Sig.
Regression	27.750	2	13.875	69.165	.000 ^a
Residual	118.761	592	0.201		
Total	146.511	594			
Coefficients ^b					
Model	Unstandardized coefficients		Standardized coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	0.324	0.044		7.295	0.000
TEL_comp_no	0.295	0.051	0.294	5.826	0.000
TEL_comp_yes	-0.201	0.057	-0.178	-3.519	0.000

^aPredictors: (constant), TEL_comp_yes, TEL_comp_no.

^bDependent variable: TEL_SIBR/SIBI.

such equipment. To this end, the respondents were asked to provide their opinion about the following statement: “I usually do not buy mobile phones via the Internet because I am worried about the process of filing a warranty claim.” The respondents’ answers were organized into three groups: I am worried about problems with filing a warranty claim about mobile phones (TEL_comp_yes); I am not worried about the process of filing a warranty claim about mobile phones (TEL_comp_no); I have no opinion about this (TEL_comp_no_opi). Regarding the independent variable, the reference value was the answer: I have no opinion about this. Table 7 presents the regression analysis between the likelihood (risk) of filing a warranty claim about mobile phones and the way of buying such equipment.

Table 7 shows that the adjusted coefficient is $R^2 = 0.187$. The likelihood (risk) of filing a warranty claim accounts for the way of buying mobile phones by 18.7%. People who are likely to file a warranty claim about a mobile phone purchased via the Internet have more than a 20% lower chance of seeking information about mobile phones on the Internet and simultaneously buying them there than people who have no opinion about the process of filing a warranty claim. On the other hand, people who are more likely to file such a warranty claim have a 29.5% higher chance of seeking and then buying mobile phones via the Internet than people who have no opinion about the process of filing a warranty claim.

5. Discussion of the results

The scale and scope of cross channel information search and purchase behaviors differ across studies. Our paper adds to this discussion. It verifies whether customer traits (gender, technical skills, technical education) influence the way consumers buy consumer electronics. From the four hypotheses posed, three were confirmed.

Hypotheses H1a, H1b, and H1c were confirmed. For each equipment type: radio, television and IT equipment and mobile phones, women sought information on the Internet and then bought equipment in stationary stores more often than men. In

turn, men more often than women looked for information about the equipment on the Internet and bought it there.

Hypotheses H_{2a}, H_{2b}, and H_{2c} were not confirmed. A technical education did not diversify the way of buying electronics, but perceived skills did. Technical education is an objective variable in contrast to skills, which are acquired not only through a formal education but market experience and practice as well. A large proportion of the respondents are young people who study and are in the course of completing their education. A student taking a technical course in information technology, for example, is not formally educated yet, but they already possess these skills. The authors were worried that the young age of a large part of the respondents and their lack of education may disrupt the results of the correlation analysis. They calculated the correlations between being technically educated and the way of buying radio and television equipment, IT equipment, and mobile phones by excluding people aged 15–18, 19–24, and 25–29 from the analysis. Despite this fact, there was still no correlation between a technical education and the way of buying radio and television equipment, IT equipment, and mobile phones.

Hypotheses H_{3a}, H_{3b}, and H_{3c} were confirmed. In each of these three groups of electronics, the lowest evaluation of one's technical skills was offered by the people who could not decide if they had concerns connected with buying electronics online or not. Hypotheses H_{4a}, H_{4b}, and H_{4c} were also confirmed. A correlation between the likelihood (risk) of filing a warranty claim and the way of buying electronics was found. A non-linear relationship was discovered between the likelihood (risk) of filing a warranty claim about electronics purchased via the Internet and the way of buying. It turns out that how respondents perceive the process of filing a warranty claim has an asymmetrical influence on the probability of purchasing electronics in a particular way. This asymmetry is observable in people who declare to be worried about the process of filing a warranty claim and in the group that declares no such concerns. In the first group, the increase in the probability of looking for and buying electronics online is greater than a decrease in this probability in the second group. Managers of electronics stores should focus on people who search for information about consumer electronics on the Internet and then buy such products in stationary stores. People who have no negative opinion on the process of filing a warranty claim and buy goods in stationary stores are an opportunity for the managers to turn them into Internet-based clients.

The findings contribute to understanding the cross-channel shopping behavior regarding consumer electronics. They show the need for companies in the industry to reconsider their presence in online and offline channels. These organizations are given ways to prioritize channels, such as providing expected information and post-purchase benefits that are received in a simple, transparent and reliable manner. Our findings also indicate the significance of designing the complaint process to be a factor influencing customer perception of purchasing safety and suppliers' or producers' reliability.

These research results provide useful information for advertisers of electronic equipment. Knowing the personal traits that affect the way people purchase equipment, they can better match the ad to specific audiences. Advertisers can use these features to

define ads, e.g. on Facebook.com. This provides great opportunities in defining the characteristics of different groups of recipients (Venkatadri, Lucherini, Sapiezynski, & Mislove, 2019). For example, in a message directed to women on Facebook.com, advertisers of electronic equipment may encourage them to visit stationary stores. In turn, messages directed to men can emphasize the possibility of ordering the goods without leaving home. When diversifying the message, they can also take into account the technical knowledge about consumers. Advertisers can define a consumer who has technical knowledge as a person who visits certain thematic groups or raises issues related to electronic equipment in their communications.

Knowing that anticipating possible problems with a complaint or refund for equipment bought through the Internet has an asymmetrical impact on the likelihood of buying electronic equipment via the Internet, advertisers can educate customers more effectively. In particular, they should reach customers who do not have a definite opinion on any problems related to complaints on equipment purchased electronically via the Internet.

6. Limitations and further research

First, the authors have disregarded the significance of a brand as a factor determining purchasing preferences through online-offline channels (Rangaswamy & Van Bruggen, 2005). The significance of brands is understated in terms of customer loyalty, thus a company's revenues and profitability (Leingpibul, Broyles, & Kohli, 2013). Brands generate emotions that influence involvement levels, but the article does not determine whether brands have greater or lesser importance when buying consumer electronics in comparison to other product categories. This line of thought requires further research studies. It may also deepen the understanding of other benefits related to a channel, consumer and product characteristics (such as the frequency of purchasing and familiarity with a channel) that were mentioned in the paper but were not part of the core research.

Second, the article takes a narrow perspective by focusing on radio and television equipment, computers, and mobile phones. From the point of view of practical appliances, it would be interesting to learn about consumers' ways of buying other types of goods. We would also like to see how men and women use the Internet in the process of searching for information on other goods as well as when buying them. It would be interesting to find out if consumers' likelihood (risk) of filing a warranty claim about various groups determines their way of buying to an equal extent.

It would also be interesting to extend the scope of the analyzed issues to other variables characterizing purchasing processes, such as the frequency of making purchases, previous experience with the product being purchased, the information and purchasing channel used, or simply knowing the communication channel and the place of purchase, as well as others' ability to influence someone. Each of these variables can affect the studied issues in different ways.

Due to the fact that the research was conducted via the Internet, there was a greater chance that people who use the Internet in the process of searching for and buying electronic equipment were in the group of respondents. People from the SIBR


and SIBI groups were most numerous. In the course of the analysis, we could present the most amount of information about these two groups. If the same survey were to be carried out offline, there is a chance that the group that does not use the Internet in the process of searching for or buying electronic equipment (SRBR) would be much more numerous. We could then treat this group as a reference and once again designate the regression functions showing the relationship between the perception of potential problems with complaints about electronic equipment and how to buy equipment. At the same time, when conducting survey studies offline, older people have a better chance of being in the group of respondents. We could then examine the relationship between age and how people buy electronic equipment.

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ORCID

Tomasz S. Szopiński  <http://orcid.org/0000-0002-9314-1886>

Katarzyna Bachnik  <http://orcid.org/0000-0002-5768-2896>

Robert Nowacki  <http://orcid.org/0000-0001-7380-0672>

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