**M-communication in information exchange about products –**

**an international comparison**

**Abstract**

The main objective of the paper is to identify the degree to which Social Networking Sites (SNSs) are used in communication related to gathering information about products via mobile devices (mobile communication). The research problem is presented in the context of Computer Mediated Communication theory (CMC).

In the realisation of main purpose an attempt has been made to answer two research questions: firstly, is there is a relationship between types of products and the frequency of gathering and conveying information about products via SNSs? Secondly, what role in this communication do mobile devices play? A comprehensive literature study is complemented with empirical research conducted in four countries – China, Poland, the United States and Turkey. Two research methods: PAPI (*Paper and Pen Personal Interview)* and CAWI (*Computer Assisted Web Interview*) were used in the empirical research.

The research showed a significant use of mobile devices (i.e. smartphones and tablets) in communication (gathering and conveying information about products) via SNSs, especially in relation to products such as electronic devices as well as clothes and footwear. Moreover, Kruskal-Wallis analysis demonstrated the differences among the countries. For example, in the Chinese group statistically significant correlations were observed in relation to desktop devices (in comparison to mobile devices).

**Keywords**: Mobile Communication, Computer Mediated Communication theory, Social Networking Sites

**JEL classification**: M31; M37; M21

**Komunikacja mobilna w wymianie informacji o produktach – porównanie międzynarodowe**

**Streszczenie**

Głównym celem artykułu jest identyfikacja stopnia wykorzystania serwisów społecznościowych w komunikacji związanej z gromadzeniem informacji o produktach przy zastosowaniu urządzeń mobilnych (komunikacja mobilna). Problem badawczy został przedstawiony w świetle teorii komunikacji internetowej.

W realizacji celu głównego dokonano próby odpowiedzi na dwa pytania badawcze: po pierwsze, czy istnieje związek pomiędzy rodzajami produktów a częstotliwością gromadzenia i przekazywania informacji o produktach za pośrednictwem serwisów społecznościowych oraz, po drugie, jaką rolę w tej komunikacji odgrywają urządzenia mobilne? Studia literaturowe zostały uzupełnione badaniami empirycznymi, które przeprowadzono w czterech krajach – w Chinach, Polsce, Stanach Zjednoczonych oraz Turcji. W badaniach empirycznych wykorzystano dwie metody badawcze: PAPI (*Paper and Pen Personal Interview)* i CAWI (*Computer Assisted Web Interview*).

Badania empiryczne pokazały duże wykorzystanie urządzeń mobilnych (tj. smartfonów oraz tabletów) w komunikacji (gromadzeniu i poszukiwaniu informacji o produktach) za pośrednictwem serwisów społecznościowych, szczególnie w odniesieniu po produktów jak urządzenia elektroniczne, a także odzież i obuwie. Ponadto analiza Kruskal-Wallis pokazała różnice pomiędzy krajami, np. w grupie chińskiej odnotowano statystycznie istotne oraz nawet silniejsze (w porównaniu z mobile) korelacje w stosunku do komputerów stacjonarnych.

**Słowa kluczowe:** komunikacja mobilna, teoria komunikacji internetowej, serwisy społecznościowe

1. **Introduction**

The growth of technology has changed peoples’ everyday lives. That said the development of business, marketing and electronics is user-directed (Lin, Lu, 2015). On the one hand, the growth of the Internet, and the possibilities it offers, play a significant role in the changes that are currently taking place. For example, Social Networking Sites (SNSs) enable fast and easy communication among people from even the most distant parts of the world (Carayannis et al. 2012; Borrero et al. 2014). The development of mobile devices that are frequently used for this type of communication is constantly contributing to even greater use of the Internet in various areas of life, e.g. gathering information in order to make purchasing decisions, improving knowledge levels, entertainment, and work (Ting et al. 2011; Mei et al. 2012; Kim et al. 2013; Borrero et al. 2014). The importance and rapid growth of mobile devices can be seen when we compare it to other communication forms in terms of the number of people that can be reached. After radio first appeared, it took 38 years for it to reach 50 mln listeners. In the case of television it was only 13 years (Skokan 2016). These inventions revolutionized the world and changed the way we live and they were certainly revolutions which, from the historical point of view, took place rapidly. However, in comparison to mobile technologies their pace was slow: it took only 7 years for mobile technology to reach 1.4 bln users (Skokan 2016). The mobile revolution started when smartphones first appeared. Smartphones functions as both a phone and computer and can be used at all times of the day and in many locations (Boateng 2011; Mei et al. 2012; Tan, Goh 2015). Due to these technological developments users have changed their behaviours and, conversely, the growth of the importance of mobile technology is a consequence of how the devices were changed and how users’ needs have changed (Persaud, Azhar 2012). Indeed, the process is an ongoing one. The amount of time users spend using mobile technologies is high and yet still increasing (Suki 2013; Kim et al. 2016). Data from 2016 shows that 51% of people worldwide use mobile devices, and 27% use SNSs via mobile devices and in 2016 a 17% year-on-year increase in SNSs use via mobile devices. The same report shows that 83% of Facebook users access their accounts on mobile devices (Kemp 2016).

The popularity and large scale of mobile device usages indicates new trends among users, which in turn can be effectively used by enterprises (Persaud, Azhar 2012). One of these is the rejection of traditional usage patterns of desktop computers or laptops, which are usually used for working, online shopping, and paying bills. The needs of mobile device users are completely different. According to a number of studies (Carayannis et al. 2012; Skokan 2016), the most important needs of such users are: finding new information as and when required, entertainment, and quick communication

The main purpose of this paper is to identify the degree to which SNSs are used on mobile devices in communication related to gathering information about products. The research problem is presented in the context of Computer Mediated Communication theory. Two research questions have been posited and answered: Firstly, is there a relationship between types of products and the frequency of gathering and conveying information about products via SNSs?, Secondly, what role do mobile devices play in this type of communication? A literature study is complemented with empirical research undertaken in four countries – China, Poland, the United States and Turkey. Analysis with the use of the Kruskal-Wallis test enabled identification of both similarities and differences among the surveyed respondents. The country were chosen as examples of `West` and `East` countries. The author of the paper wanted to investigate if the degree to which SNSs are used on mobile devices in communication related to gathering information about products is universal or it differs among countries.

1. **Literature overview**
	1. **Communication in the context of CMC theory**

Communication is the process of exchanging information between the sender and receiver through a specific channel (Gudykunst et al. 1988; Davies et al. 2016). In individual communication both sender and receiver are individual units exchanging a message via a communication channel and medium. In Computer Mediated Communication (CMC) theory the internet takes on the role of a medium in the interpersonal communication process (Walther 1996) and SNSs are internet tools used for communication amongst individuals who use that particular medium. They are not only able to write messages (e.g. Facebook and Twitter) but also to listen or record them (e.g. YouTube). The communication level and type differs according to the chosen medium (Walther 1996). CMC participants can transfer a message quickly, without direct cost and possibly to many receivers at the same time (Smith, Zook 2011: 11). In CMC theory the use of SNSs reduces personal influences and their effects in the communication process because it is not direct, but with using an Internet (Lin, Lu 2015). In relation to the context of this paper and CMC theory, both the sender and the receiver of the communication process are SNS users.

* 1. **SNSs as a tool in Computer Mediated Communication**

Kaplan and Haenlein (2010) write that SNSs are sets of applications technically and ideologically based on the foundations of Web 2.0. They enable the creation and exchange of content amongst their users. These key characteristics of SNSs are based on their function of connecting people and exchanging information about both private and professional lives.

The ways, means, and character of SNSs usage first of all depends on people’s needs. For example, the need to share one’s travel memories with friends may be met by using a website or communicator such as Facebook, Instagram, Snapchat or writing a blog (Nadkarni, Hofmann 2012; Ryan, Xenos 2011; Tan, Goh 2015). SNSs which connect people into networks of friends that share common features were the first such media and are continuously popular among users, e.g. Facebook or LinkedIn. By using them users can look for other users who are able to provide particular information, or help in searching for it (Schouten 2011; Ray 2014). Many people also use media that make it possible for them to express themselves, both textually (Twitter or blogs) or verbally through video recordings, e.g. YouTube, Vimeo, Periscope, and Snapchat. As well as producing messages users can access information placed there by other users (Schouten 2011; Nakagawa, Arzubiaga 2014; Kim et al. 2014; Hamid et al. 2015).

SNSs such as Facebook, YouTube or Twitter are also used for consumer purposes with regard to gathering and providing information about products and services (Tan, Goh 2015; Habibi et al. 2016; Erkan, Evans 2016). There is a great amount of research on the significance of SNSs in sharing information about products amongst users and expressing opinions about brands (Ting et al. 2011; Wallace et al. 2014). According to Kaplan and Haenlein (2011), in marketing theory the method of gathering and exchanging information from informal sources (e.g. friends, family, neighbours) via the internet is called electronic *Word of Mouth* (e-WoM). In that paper the focus is on communication and exchange of information about products among users via SNSs. E-WoM can be treated as a special type of CMC.

Up to now, there have only been a very few publications that provide cross-cultural comparisons among SNSs users and which present findings into the behaviours of exchange of information about products. Most studies are carried out by comparing individualistic and collectivistic countries because these values may, to a significant degree, diversify SNS usage. For example, Andersen et al. (2007) have compared SNS usage among young Danes (individualism) and Koreans (collectivism). The Danes more often used mobile phones to use access SNSs for entertainment purposes and communication, while Koreans mainly used SNSs for educational purposes. In another study, which looked into e-WoM communication on Internet forums and creation of e-WoM messages, Fong and Burton (2008) showed the differences between consumers from the United States (individualistic culture) and China (collectivistic culture). Their findings indicated that Americans more often convey information through e-WoM, whereas Chinese more often look for information rather than create it. The results of other projects also highlight the differences in the purpose of using SNSs by users who come from various cultural groups. In collectivistic countries SNS users focus on social interactions (building a network of friends, maintaining contacts with friends), while in individualistic countries SNS users concentrate more on personal development and finding information (Kim et al. 2011; Tsai, Men 2012; Hsu et al. 2015).

The results of the presented research indicate differences amongst users from different countries in terms of using SNSs for communicating, as well as conveying and gathering information about products or services. Therefore, hypothesis (H1) can be formulated, stating: *there are a variety of uses of SNSs for communication among users from the researched countries which is based on exchanging information about products.*

* 1. **Types of products which users exchange information about via SNS**

The method of searching for information about products depends on their type (type of product). People do not search for information online about all products. Particularly significant differences can be observed between B2C and B2B markets. Internet users, including SNSs users, search for information about B2C products much more often. However, this field is under-researched. In one paper, by Hansen and Jensen (2009), it was found that Internet users most often looked for information about clothes, footwear and broadly defined accessories. Similar results have been obtained very recent studies by Geissinger and Laurell (2016) and Shephard, Pookulangar, Kinley and Josiam (2016). The products which consumers most often look for information about on the Internet are definitely more expensive. The purchase of such products obviously translates into spending a larger sum of money and so making a decision can take more time (Harmancioglu et al. 2009). The Internet thus seems to be a good source to use when trying to find information about particular types of products and brands, as well as comparing them. In the case of FMCG (Fast Moving Consumer Goods) consumers make buying decisions quickly and do not need much information about them. Such findings can be seen in the work of one of the largest statistics portals, Statista, where the most popular types of products bought by Pinterest users were researched (Statista 2012). The results of the research show that Pinterest users most often bought clothes (39%), bags and jewellery (23%) and works of art (22%). Similar, international-scale, research into Pinterest has been carried out by Ernst & Young. In their publication entitled *Homo informaticus: how do digitals consumers behave online?* (2014) respondents were asked which categories of products they were looking for information about and what kinds of products they bought online. The generalized results of this study indicate that electronic goods (39%), clothes (38%), mobile phones (32%), and cars (10%) were the products that respondents most frequently either looked for information on, or bought, online.

Taking into account the above research, it can be stated that SNSs users most often exchange information on electronic goods (computers, laptops, tablets, smartphones) as well as clothes and footwear. Stemming from this, hypothesis (H2),statesthat: *the frequency of exchanging information about products via SNSs is related to their type. Users most often exchange information via SNSs about electronic goods, clothes and footwear.*

* 1. **Mobile SNS usage in the context of Computer Mediated Communication theory**

As recently as a few years ago, the main devices used for Internet access were desktop computers or laptops. Since then, the growth of technology has led to a significant change in methods of Internet access and, in turn, SNSs. First and foremost, this change regards the use of smartphones and tablets (Boateng 2011). The number of people using mobile devices in the analysed countries (Figure 1) indicate their importance. In many of the presented markets (Spain, Italy, Japan) the number of mobile users amounts to over 80% of population (Kemp 2016). The same study shows that SNS user levels are also high (Kemp 2016).

Figure 1. SNSs`s and mobile usage

Source: (Kemp 2016).

What are the reasons for such a significance of mobile devices being used to access SNSs? The answer is related to the possibilities offered to users by these devices. The basic factor is the fact that they enable prompt reaction to the activity of other users and the use of media at any time and in any situation (Kim et al. 2013; Okazaki, Mendez 2013). With smartphones people can not only communicate with others via phone calls or sending short text messages SMS (Tojib, Tsarenko 2012; Suki 2013; Kim et al. 2016; Tan, Goh 2015) but can also watch films and TV shows, play mobile games, and thanks to various applications they can be used for practicing sports and physical activity (e.g. measuring pulse, counting steps), reading magazines and books and many other activities (Mei et al. 2012; Nwagwu, Famiyesin 2016). Mobile devices, i.e. omnipresent smartphones, are now portable computers which fit into almost every pocket and their widespread use is also related to the fact that they are more affordable than laptops for the average consumer (Okazaki, Mendez 2013; Suki 2013; Kim et al. 2016).

The widespread use of mobile devices is also related to their application in SNS communication. This type of communication can be termed m-communication (mobile communication). In relation to the above analysis mobile devices are also used for searching for and conveying information about products via SNSs. To reiterate, one of the initial research questions refers to the interdependence between the frequency of exchanging information about products via SNSs and the type of device.

In order to answer the research question, a third hypothesis (H3 )can be formulated that *the type of device influences communication based on exchanging information about products among SNSs` users.*

1. **Methodology**
	1. **Measurement development and data collection**

Methodologically, this paper takes a deductive approach given that the aim is to verify the hypotheses formulated on the basis of the findings of other researchers. In the exploratory empirical study the authors used two research methods: PAPI (*Paper and Pen Personal Interview*) and CAWI (*Computer Assisted Web Interview*). Firstly, author used CAWI with online questionnaire as a research instrument filled out by the respondents themselves in order to collect fast responses. The main advantage of CAWI is time (shorter tome than PAPI) and cost (lower cost because of distribution of the questionnaire via Internet). But, the use of an online questionnaire has not produced great feedback, only 3.5% of all collected questionnaires. Secondly, the authors decided to use PAPI method in each market, which is more expansive and time consuming but it gave better results in the case of presented research.

The measurement instrument was a standardized questionnaire prepared for the purpose of this research. The element differentiating the research questionnaire in particular markets was the language. In Poland the Polish language was used, in China Chinese, in Turkey Turkish and in the American market English. In the preparation of the different versions of the questionnaire a back translation procedure was used in order to eliminate any mistakes stemming from linguistic, lexical or context differences (Craig, Douglas 2006).

The empirical data was gathered in 2016 and the total number of respondents surveyed in the four countries was 1246 (295 respondents from China, 296 from Poland, 395 from Turkey and 260 from United States). The data was collected by non-random sampling and designated research assistants gathered the questionnaires from the respondents in each market.

The differences in size between the groups researched and the sampling method that was applied influence interpretation of the results obtained which, in this case, should not be fully generalized for the population of the particular countries.

* 1. **Respondent profile**

The surveyed respondents in each country had all agreed to participate and stated they were willing to express their answers on how they use SNSs for work activities. The study was conducted among people of all ages and three age groups were distinguished: 15-20, 21-30, 31 or more (Table 1). In China, Poland and Turkey the respondents within the 21-30 age group were most numerous, whereas in the United States most participants belonged to the 15-20 age group. The smallest number of respondents was observed in the age group of 31 and more.

Table 1. Respondent profile (%)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **China** | **Poland** | **United States** | **Turkey** |
| **GENDER** |
| **Women** | 68.1 | 70.9 | 56.5 | 48.7 |
| **Men** | 31.2 | 27.7 | 43.1 | 49.7 |
| **No data** | 0.7 | 1.3 | 0.4 | 1.5 |
| **AGE** |
| **15 – 20 years** | 14.2 | 35.5 | 79.6 | 9.6 |
| **21 – 30 years** | 66.4 | 63.5 | 16.9 | 76.5 |
| **31 years and more** | 19 | 0.7 | 3.5 | 13.4 |

Source: own research.

Taking into account the diversity of the study group in terms of gender it should be emphasized that it is difficult to determine whether there is a significant dominance of any gender. In two countries gender parity in respondents was close e.g. the United States and Turkey). In the other two, China and Poland, a vast majority of users were women.

* 1. **Operationalisation of variables**

Variables were operationalized in three ways. Firstly, for checking the validation of H1 a Kruskal-Wallis test in order to identify whether there were differences among cultures in the method of communication via SNSs (C1, C2, C3, C4, C5). During pilot research conducted by the author of this paper, the respondents predominately pointed to the usage of SNSs according to: searching for information about different products (C1); asking friends/acquaintances for advice concerning the purchase of products (C2); asking other people (not only acquaintances) for advice concerning the purchase of products or brands (C3); recommending various products to other users which in their opinion were worth buying (C4); and placing appropriate information when the product they bought turned out to be of very low quality (C5). C1…C5 refer to types of communication via SNSs (gathering and exchanging information about products). These were identified during the test research where consumers indicated these activities as the most frequently performed via SNSs.

Secondly, to examine the relations between C1, C2, C3, C4, C5 and product categories, statistical Spearman indicators showing the interdependence/or its lack were analysed (H2). The following categories of products and services were assessed: mobile phones (P1), computers - laptops, tablets (P2); cars (P3); cosmetics (P4) and fashion - clothes and shoes (P5). The products categories were decided on the basis of literature review findings. Thirdly, Spearman correlation was used for identification of the relationship between devices - desktop/laptop (D1), smartphone (D2), tablet (D3) [Wong 2011] - SNS usage and method of communication (C1, C2, C3, C4, C5) (H3). The relationship between frequency of device (D1, D2, D3) usage and the category of products (P1, P2, P3, P4, P5) was also tested for.

In order to identify communication activities the respondents were asked to specify the frequency of which they performed them (*very often -1, often-2, from time to time-3, rarely-4, very rarely-5, never-6*) for particular statements (C1…C5). Cronbach`s Alpha was used (Table 2) for reliability analysis. Cronbach Alpha results confirmed that the proposed scale was a reliable tool for measuring.

Table 2. Cronbach’s alpha correlation

|  |  |
| --- | --- |
| **Variables** | **Cronbach s Alpha** |
| Communication (C)Products (P)Devices (D) | 0.7790.7080.722 |

Source: own research.

1. **Results**

In order to examine whether the respondents from the researched countries differed among each other in terms of the frequency of using SNSs to exchange information about products an analysis was performed with the use of a Kruskal-Wallis test (Table 3).

Table 3. Kuskal-Wallis test for SNSs usage for communication about products in researched countries

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sign of activity** | **Country** | **N** | **M** | **SD** | **r** | **H** | **p** |
|
| **C1:** I look for information about different products | Poland | 280 | 3.44 | 1.54 | 647 | **36.29** | **<0.001** |
| China | 277 | 3.20 | 1.47 | 601 |
| Turkey | 363 | 2.81 | 1.45 | 504 |
| US | 256 | 3.36 | 1.54 | 630 |
| **C2:** I ask friends/acquaintances for advice concerning purchase of a product | Poland | 276 | 3.50 | 1.53 | 570 | **36.88** | **<0.001** |
| China | 277 | 3.39 | 1.46 | 548 |
| Turkey | 369 | 3.48 | 1.59 | 561 |
| US | 259 | 4.11 | 1.53 | 702 |
| **C3:** I ask other people (not only my acquaintances) for advice concerning purchase of a product or brand | Poland | 281 | 3.98 | 1.59 | 598 | **69.28** | **<0.001** |
| China | 281 | 3.40 | 1.43 | 472 |
| Turkey | 368 | 4.01 | 1.68 | 605 |
| US | 260 | 4.51 | 1.45 | 712 |
| **C4:** I recommend various products which in my opinion are worth buying to other users | Poland | 287 | 4.27 | 1.55 | 615 | **41.30** | **<0.001** |
| China | 278 | 3.85 | 1.51 | 515 |
| Turkey | 368 | 4.07 | 1.61 | 564 |
| US | 259 | 4.63 | 1.54 | 693 |
| **C5:** I place appropriate information when the product I bought turns out to be of very low quality | Poland | 282 | 4.29 | 1.50 | 651 | **131.30** | **<0.001** |
| China | 278 | 3.15 | 1.64 | 433 |
| Turkey | 366 | 3.81 | 1.71 | 560 |
| US | 259 | 4.75 | 1.56 | 749 |

N - number of respondents M - mean

SD - standard deviation H - result of Kruskal-Wallis test

p - level of significance for K-W test r – medium rank

Source: own research.

The analyses showed statistically significant differences among the studied groups. For searching for information about various products (C1): H(3, N = 1176) = 36.29; p < 0.001 multiple comparisons demonstrated that people living in Turkey more often used SNSs in order to look for information than people living in Poland (p < 0.001), China (p = 0.002) and the United States (p < 0.001).

For asking friends/acquaintances for advice concerning purchase of a particular product (C2): H(3, N = 1181) = 36.88; p < 0.001, Kruskal-Wallis analysis showed that the respondents from the United States more rarely used SNSs for this than the respondents from Poland (p < 0.001), China (p < 0.001) and Turkey (p < 0.001).

For asking other people (not only friends/acquaintances) for advice concerning purchase of a particular product or brand (C3): H(3, N = 1190) = 69.28; p < 0.001 multiple comparisons showed that the respondents from China more often used SNSs for C3 than Polish (p < 0.001), Turkish (p < 0.001) and American (p < 0.001) respondents.

For recommending various products which are worth buying to other users (C4): H(3, N = 1192) = 41.30; p < 0.001 Kruskal-Wallis analysis showed that the respondents from the United States more rarely used SNSs for C4 than people living in Poland (p < 0.001), China (p < 0.001) and Turkey (p = 0.030). Furthermore, Chinese respondents more often use SNSs than Turkish for C4 (p = 0.002).

For warning others whether the product that had been bought had been of a very low quality (C5): H(3, N = 1185) = 131.30; p < 0.001 multiple comparisons demonstrated that the people from the United States more rarely use SNSs for C5 than people living in Poland (p = 0.005), China (p < 0.001) and Turkey (p < 0.001).

The respondents from China and Turkey use SNSs to the greatest degree both for gathering, as well as conveying, information about products. On the other hand, the American respondents were least likely to do so. The above analysis makes it possible to state that H1,which claimed that there are differences among users from the researched countries in using SNSs for communication which are based on exchanging information about products, is true.

Referring to the measurement of interdependencies between C1 …C5 and a type of product, Spearman correlation coefficients showed that there were statistically significant relationships between (p<0.05) all means of exchanging information about products and types of products (Table 4). However, the level of these indicators denotes the strength of the relation: the higher the Spearman coefficient, the stronger the relationship R=[-1;1]. Regardless of the country, the studied respondents most often look for information via SNSs (C1) about electronic goods (P2) as well as clothes and footwear (P5). In the Polish and American groups, information about cosmetics was also often gathered via SNSs. If they sought advice from their friends about buying a product (C2), respondents most often asked about clothes and footwear (P5), and in the Chinese group, also cosmetics (P4).

Table 4. Relationships between communication via SNSs and type of product – Spearman correlation\*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Communication** | **Products/****Symbol** | **China** | **Poland** | **United States** | **Turkey** |
| **R** | **R** | **R** | **R** |
| **C1** | **P1** | 0.280 | 0.214 | 0.216 | 0.145 |
| **P2** | **0.311** | **0.369** | **0.385** | **0.379** |
| **P3** | 0.240 | 0.191 | 0.273 | 0.160 |
| **P4** | 0.250 | **0.400** | **0.311** | 0.282 |
| **P5** | **0.391** | **0.422** | **0.444** | **0.388** |
| **C2** | **P1** | 0.255 | 0.189 | 0.236 | 0.236 |
| **P2** | 0.236 | 0.257 | 0.262 | 0.239 |
| **P3** | 0.208 | 0.223 | 0.229 | 0.157 |
| **P4** | **0.372** | 0.275 | 0.224 | 0.240 |
| **P5** | **0.306** | **0.361** | **0.377** | **0.386** |
| **C3** | **P1** | 0.216 | 0.220 | 0.259 | 0.288 |
| **P2** | 0.271 | 0.272 | 0.267 | 0.289 |
| **P3** | 0.290 | 0.173 | 0.290 | 0.205 |
| **P4** | 0.213 | 0.235 | 0.217 | 0.123 |
| **P5** | 0.256 | 0.226 | 0.211 | 0.177 |
| **C4** | **P1** | 0.224 | 0.233 | 0.215 | 0.261 |
| **P2** | 0.249 | 0.284 | 0.232 | 0.245 |
| **P3** | 0.213 | 0.225 | 0.258 | 0.206 |
| **P4** | 0.222 | 0.223 | 0.180 | 0.298 |
| **P5** | 0.254 | **0.330** | **0.388** | 0.231 |
| **C5** | **P1** | **0.310** | **0.360** | **0.324** | **0.367** |
| **P2** | 0.256 | **0.426** | 0.144 | 0.234 |
| **P3** | 0.271 | 0.281 | 0.242 | 0.245 |
| **P4** | 0.275 | 0.270 | 0.176 | 0.177 |
| **P5** | 0.229 | 0.277 | 0.205 | 0.197 |

R – Spearman correlation \*Correlation is significant at the *p*<0.05 level

Source: own research.

Respondents in all countries rarely sought advice from other SNS users about buying particular products (C3). The level of Spearman correlation coefficients was noted here as R<0.3, and therefore weak. The respondents also did not often recommend valuable products via SNSs (C4). Only in the Polish and American groups was correlation R>0.3 reached as far as clothes and footwear (P5) are concerned. They would more often warn others if the phone (C5, P2), and electronic goods in the Polish group (C5, P2), turned out to be poor quality. Analysis of the obtained results indicate that hypothesis 2 (H2), stating that *the users most often exchange information via SNSs about electronic goods, clothes and shoes,* is true.

When it comes to the nature of communication for exchanging information about products among SNS users, it is clear that mobile devices, such as smartphones, are preferred (Table 5) and analysis shows. the greatest number of statistically significant correlations for these devices (p<0.05 and p<0.01). In all the researched groups the more often the respondents used smartphones, the more often they looked for information about products (C1), sought advice from friends and other SNSs users (C2, C3), and recommended valuable goods (C4). In relation to C5 no statistically significant correlation was noted.

The high significance of desktop computers/laptops in the Chinese group also needs to be emphasized. Moreover, Spearman coefficient values for the Chinese group are higher in the case of desktop computers/laptops than smartphones. This indicates that there are much closer relationships between these devices and gathering and conveying information about products. Furthermore, using tablets is more often related to searching for information (C1) in the Chinese, Polish and American groups.

Table 5. Relationships between communication via SNSs and type of device – Spearman correlation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Communication** | **Devices** | **China** | **Poland** | **Turkey** | **United States** |
| **R** | **R** | **R** | **R** |
| **C1** | **D1** | **0.232\*\*** | 0.078 | 0.067 | 0.115 |
| **D2** | **0.147\*\*** | **0.124\*** | **0.205\*** | **0.254\*\*** |
| **D3** | **0.179\*\*** | **0.192\*** | 0.06 | **0.129\*** |
| **C2** | **D1** | **0.214\*\*** | 0.078 | 0.051 | 0.122 |
| **D2** | **0.158\*\*** | **0.119\*** | **0.172\*** | **0.200\*\*** |
| **D3** | 0.065 | **0.182\*** | 0.082 | 0.065 |
| **C3** | **D1** | **0.185\*\*** | 0.032 | 0.095 | 0.105 |
| **D2** | **0.129\*\*** | **0.137\*** | 0.030 | **0.208\*\*** |
| **D3** | 0.102 | 0.065 | 0.04 | 0.115 |
| **C4** | **D1** | **0.156\*\*** | **0.132\*** | 0.037 | 0.120 |
| **D2** | **0.134\*** | **0.133\*** | **0.140\*** | **0.152\*** |
| **D3** | 0.105 | 0.09 | 0.015 | 0.039 |
| **C5** | **D1** | 0.108 | 0.112 | -0.018 | 0.056 |
| **D2** | 0.069 | 0.016 | 0.120 | 0.1 |
| **D3** | 0.04 | 0.110 | 0.118 | 0.05 |

R – Spearman correlation

\*Correlation is significant at the level of *p*<0.05 \*\* Correlation is significant at the level of *p*< 0.01

Source: own research.

When comparing relationships between devices and the nature of communication via SNSs, the prevalence of smartphones and tablets (mobile devices) is obvious. Analysis of these correlations via Spearman coefficients showed that the third hypothesis (H3), that *a type of a device influences communication based on exchanging information about products among SNSs users,* is true.

Additionally, Spearman correlation coefficients were also used in order to identify detailed relationships between the type of device and the frequency of looking for information about products via SNSs (Table 6). The results confirm the above statements regarding the high significance of mobile devices in terms of using SNSs to search for information about mobile phones, electronic goods, clothes and shoes as well as cosmetics. The least interesting were cars, which may stem from the young age of most respondents. It is also worth highlighting that statistically significant correlations were also noted in the Chinese, Turkish and American groups in relation to desktop computers, as well as P1, P2, P4 and P5.

Table 6. Relationships between type of device and category of product – Spearman correlation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of product** | **Device** | **China** | **Poland** | **Turkey** | **United States** |
| **R** | **R** | **R** | **R** |
| **P1** | **D1** | 0.089 | 0.035 | **0.140\*\*** | 0.104 |
| **D2** | **0.169\*\*** | **0.169\*\*** | **0.197\*** | **0.212\*\*** |
| **D3** | **0.130\*** | **0.177\*\*** | 0.094 | **0.164\*\*** |
| **P2** | **D1** | **0.126\*** | 0.042 | **0.239\*\*** | **0.218\*** |
| **D2** | **0.150\*\*** | 0.061 | 0.104 | **0.210\*\*** |
| **D3** | **0.138\*** | **0.190\*\*** | **0.127\*** | **0.128\*** |
| **P3** | **D1** | 0.098 | -0.03 | 0.024 | 0.057 |
| **D2** | 0.059 | 0.037 | 0.103 | 0.117 |
| **D3** | **0.194\*\*** | 0.108 | **0.165\*** | **0.124\*** |
| **P4** | **D1** | **0.135\*** | 0.028 | -0.042 | 0.099 |
| **D2** | 0.103 | **0.199\*\*** | **0.142\*\*** | **0.256\*\*** |
| **D3** | 0.064 | **0.127\*** | **0.177\*\*** | **0.147\*** |
| **P5** | **D1** | **0.144\*** | 0.062 | -0.092 | **0.242\*\*** |
| **D2** | **0.134\*** | **0.155\*\*** | **0.164\*\*** | **0.303\*\*** |
| **D3** | **0.145\*** | 0.103 | **0.195\*** | **0.164\*** |

R – Spearman correlation

\*Correlation is significant at the level of *p*<0.05 \*\* Correlation is significant at the level of *p*< 0.01

Source: own research.

1. **Discussion and implications**

The Kruskal-Wallis analysis demonstrated differences among the studied groups in relation to the frequency of gathering and conveying information about products to SNSs users. This is most often done by the respondents from China and Turkey, while American respondents do this most rarely. These results show a convergence with cultural traits described as collectivistic and individualistic (Hofstede et al. 2010).According to Hofstede’s studies, Turkey and China are collectivistic countries (IDVChina=20, IDVTurkey=37) where behaviours focused on the group and not the achievements of an individual predominate (Hofstede et al. 2010). These characteristics were the basis for creating SNSs, thus networks of friends, exchanging and looking for information, etc. This is why the usage of SNSs for exchanging information about products is the most frequent in these countries. On the other hand people from individualistic cultures make individual decisions without the necessity to gather information or use advice. The highest level of individualism was found in the American group (IDVUS = 91). That is why the usage of SNSs for exchanging information about products is very rare here. The research confirms the earlier interdependencies distinguished by other researchers that people from collectivistic countries use relationships established via SNSs (Kim et al. 2011; Tsai, Men 2012; Hsu et al. 2015). The frequency of searching for information about products among friends via SNSs also indicates such behaviour.

In summary it should be stated that Internet users, especially younger users, like and appreciate mobile technology (Skokan 2016). Many young recipients cannot be now reached through traditional channels of communication and they can be found less and less frequently in front of their computers. Optimizing all activities in terms of mobile devices – from the distribution of content and its formats, to the process of selling, will be a challenge. This is confirmed by the statistics of the mobile industry where largescale usage of mobile devices (i.e. smartphones and tablets) m-communication has been noted (Mei et al. 2012; Tan, Goh 2015). This is also confirmed in the above research in four culturally different countries. What is interesting and surprising in the Chinese group is that statistically significant, or even stronger (in comparison to D2), correlations in relation to desktop computers (D1) were observed, showing that the Chinese use SNSs on desktop computers more often than smartphones. This information can be of great importance for the designers of both SNSs and other mobile applications (Nwagwu, Famiyesin 2016). Enterprises that use SNSs for marketing communication should consider, and invest in, mobile versions of their websites (Banerjee, Dholakia 2012), as well as creating mobile applications that can be used for marketing activities in foreign markets. Such apps are likely to be used by producers and sellers of electronic goods, mobile phones and manufacturers of clothes and footwear. The studies showed that the supporters of mobile devices most often search for information about these particular products via SNSs. Given the findings over the extent to which young consumers exchange information about products, applications regarding products targeted at young buyers should be of particular interest (Andersen et al. 2007; Banerjee, Dholakia 2012; Hamid et al. 2015). An emerging trend among mobile applications is development of various functions in mobile-only instant messaging apps such as Messenger, WhatsApp, WeChat, and Viber (Kim et al. 2016). These apps can now be used to order a taxi, pay for a service or order chosen products.

The results of the study also point to opportunities for the producers of particular goods such as electronic goods, mobile phones, cosmetics, and in particular clothes and footwear, when applying mobile advertising. An advertisement should be placed where its potential recipient will view it (Parreño et al. 2013; Kim et al. 2016; Nwagwu, Famiyesin 2016). According to a report by Business Insider, the most effective and most often used formats of mobile advertising are: display advertising, videos in SNSs and search engines. Display advertising and videos gain popularity the fastest due to their resemblance to desktop advertisements and the largest number of advertisers choose this type of advertising. Advertisements in search engines and on SNSs are the most profitable mobile advertisements in many countries, e.g. the USA. Advertisements in applications also work much better than on mobile websites. The global CTR (Click-Through Rate) for advertisements in applications is 0.56% while on mobile websites - it is 0.23% (Hoelzel 2015).

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