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CUSTOMERS AS THE SOURCE OF INNOVATIONS IN CZECH WIRELESS TELECOMMUNICATIONS INDUSTRY

The paper presents the questionnaire survey results concerning consumer choices and preferences when it comes to mobile phones, their characteristics and usability. Results and insights from this survey may give mobile services providers and mobile phone developers useful information on how users can participate in product upgrade and product innovation in the context of wireless communications industry.

Keywords: mobile phone; customer preferences; wireless communications; Czech Republic; survey. JEL classification: O30; M10.

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КЛІЄНТИ ЯК ДЖЕРЕЛО ІННОВАЦІЙ У ГАЛУЗІ БЕЗДРОТОВОГО ЗВ'ЯЗКУ ЧЕСЬКОЇ РЕСПУБЛІКИ

У статті представлено результати опитування відносно споживчого вибору та клієнтських переваг при виборі мобільного телефону, його технічних характеристик та користування в цілому. Результати представленого опитування можуть надати мобільним операторам та розробникам нових мобільних телефонів корисну інформацію відносно того, яким чином залучити клієнтів до покращення продукту та розробки продуктових інновацій у контексті галузі бездротового зв'язку.

Ключові слова: мобільний телефон; споживчі переваги; бездротові комунікації; Чеська Республіка; опитування.

Рис. 1. Табл. 3. Літ. 18.

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КЛИЕНТЫ КАК ИСТОЧНИК ИННОВАЦИЙ В ЧЕШСКОЙ БЕСПРОВОДНОЙ ТЕЛЕКОММУНИКАЦИОННОЙ ОТРАСЛИ

В статье представлены результаты опроса касательно потребительского выбора и клиентских предпочтений в выборе мобильного телефона, его технических характеристик и пользования в целом. Результаты данного опроса могут предоставить мобильным операторам и разработчикам новых мобильных телефонов ценную информацию о том, как привлечь клиентов к улучшению продукта и разработке продуктовых инноваций в контексте отрасли беспроводной связи.

Ключевые слова: мобильный телефон; потребительские предпочтения; беспроводные коммуникации; Чешская Республика; опрос.

Introduction. Growing competition, convergence of various sectors and their overcapacity lead companies' management to focusing strategically on innovations. The result is usually long-term business growth and larger market share. Innovations can be considered from many different perspectives such as innovations novelty, stakeholders' participation in the creation of innovation (open innovation or closed one) introduction of innovations, obtaining market, emergence of innovation (stimulating elementary innovation and developing fundamental innovations) EU classification (technological and non-technological innovations) etc.

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The state must provide at least appropriate regulatory framework, which should guarantee intellectual property protection, and, secondly, create conditions to block plagiarism (Ushakov, 2016). Nowadays the state role can be in creating innovative culture at corporate, institutional, regional and national levels.

At the same time customer' position is changing. Customers' power grows while loyalty to brand and product decreases. Customers desire new experiences, they appreciate uniqueness, novelty, originality associated with utility. It is no longer enough to satisfy the needs of customers, it is though necessary to satisfy their desire or to surprise them. Nowadays customer becomes a co-creator of values.

It turns out that innovations realized by companies bring advantages for enterprises and customers as well. It is beneficial to implement the so-called "value innovation" that occurs when increasing value for customer accompanied by low business costs. This means that innovation is in conformity with utility value, price and costs.

Innovations should be introduced at the time when a company generates profit. It is too late to focus on innovations in case of crisis. Even if competences of a crisis manager vary, creation of innovations does not belong to crisis manager key activities (Mikusova, 2015). Innovations should be implemented continuously.

Permanent innovation activities and increasing number of benefits for customers can be found in wireless telecommunications networks. Many manufacturers in this industry forward huge financial resources in research and development and namely into fourth generation of wireless mobile telecommunications technology which enables faster data transfer rates and increasing benefits for mobile phones users. Increasing customer benefits are associated with greater variability of using cellular phones. The original function of mobile phones (communication between people), gradually scaled up and today it includes additional features such as listening to music, video, navigation etc.

Continuous innovation of mobile phones' functions make us think about the following questions: What do innovations realized by mobile phones manufactures bring to customers? What kind of benefits do customers expect from mobile phones? What are the shopping preferences of mobile users? The paper will bring in the possible answers.

This paper aims to map wireless telecommunications networks' in Czech Republic using the data from the Czech Statistical Office and at the same time, through questionnaire survey to determine the preferences of mobile phone users in Czech Republic considering the price, brand, operating system, audio-video specification, design and system properties.

Data matrix in XLS, calculation of frequency and analysis of differences in customer preferences as well as chi-square test have been used for evaluation.

Literature review. Innovation (Dyer et al., 2011; Herzog, 2011; Soucek, 2015) represents the process of searching for new ideas and subsequent development of these ideas into a usable form.

P. Drucker (1993) considered innovation as a specific entrepreneurs' tool by which changes are utilized in the form of opportunities for doing business in a different area or as another way of providing services.

J. Kosturiak and J. Chal (2008) looked at the issue of innovations from a different point of view, which is:

- the function (which can be improved, complemented or put into a new product), values (how to create a new or a different value);
- principle (how improve the old functions by a new principle or a new technical solution);
- design (how to change the product through design);
- product range (how to develop a new product, a new generation of the existing product or a new member of the existing product lines);
- evolution (what evolutionary trends can be expected);
- user (what new functions are offered to a user).

Innovations arise through realizing changes. The basic dimensions of changes, according to (Bessant and Tidd, 2009; 2014) means product innovation, process innovation, position innovation and innovation of the paradigm. At the same time, one of the latest research (Korab, 2016) which included 1144 SMEs showed significant determinants of innovation: research and development, investment in technology, improving quality of products, or participating in foreign markets. Moreover, bureaucratic obstacles for innovation and external determinants with adverse effects did not come through as important difficulties for innovative activities of SMEs.

Recently, a significant change of customer role can be seen in the framework of business innovation processes. Customers' importance increases in connection with innovation processes. Enterprises try to cooperate with customers earlier than at the time of product promotion and sale. Customer is engaged in the process of product development and product design. G. Tomek and V. Vavrova (2009) stated that the mentioned customer involvement can be considered as customer's integration in innovation process which means that customer is integrated into the process of new product ideas' creation and its evaluation across the entire innovation process. Thus, customer involvement in the innovation process enables obtaining information on the needs, preferences and wants of customers not before selling the product at a market, but much earlier – at the phase of product development already. The fact is that customer is not the only source of information about the product but customer is also part of solution.

J. Kosturiak and Z. Frolik (2006) supposed that realization of value innovation is necessary for ensuring long-term competitiveness and gaining competitive advantages. Costs reduction and process optimization are not sufficient for ensuring company competitiveness, but enterprise has to innovate not only by imitating the best practices, but by introducing new trends in the industry. J. Kosturiak and Z. Frolik (2006) pointed out that business innovation brings significant benefits not only for company, but also for its customers.

In this context, it is beneficial for businesses and consumers to realize value innovation at a time when increasing customer value is accompanied by low business costs. Innovation is in balance with utility value, price and cost. Innovation is mutually beneficial for company and its customer, as reflected in the value. Value for customer is determined as the difference between a sum of benefits and costs. Value for a company is represented by added value (margin contribution), which covers fixed costs and finances further development.

R. Vlcek (2002, 2008) has the same view on the issue of innovations. He is a proponent of the value approach theory. The value approach represents the category of

customer value as a criteria and creative principles in dealing with innovative activities. Innovations are the main tool of change with the aim of increasing value for customer.

The literature discussion shows that while implementing innovations in companies it is necessary to engage customers throughout the process to obtain accurate information about their desires, preferences and requirements. Thus can ensure the utility value is in accordance with price and cost.

The market for wireless telecommunications. According to the classification of Economic Activities (CZ-NACE) telecommunication activities are in Section J – Information and communication activities and activities related to wireless telecommunications network in the group 61.2.

Mobile phones are the most widespread information technology in Czech households. Simultaneously, Czech households have 5 times more mobile phones than landlines. In comparison with the EU (71%), Czech households have 4 times less fixed telephone lines. In 2013, in Czech Republic 97.5% of households had at least one mobile phone (according to the CSO) while only 19.5% of households were using a landline. At the end of year 2013 only 1% of households in Czech Republic had fixed telephone line, while 10 years ago quarter of all households had this type of line. Fixed telephone line today is mostly used by pensioners' households; in 2013 one quarter of pensioners households still had fixed telephone lines. Young families rarely own any fixed telephone line at all.

Only one household in 100 does not have any type of phone as such. 99% of households are equipped with mobile phones and state they have their own device, 11% of them use company's mobile phone (Figure 1).

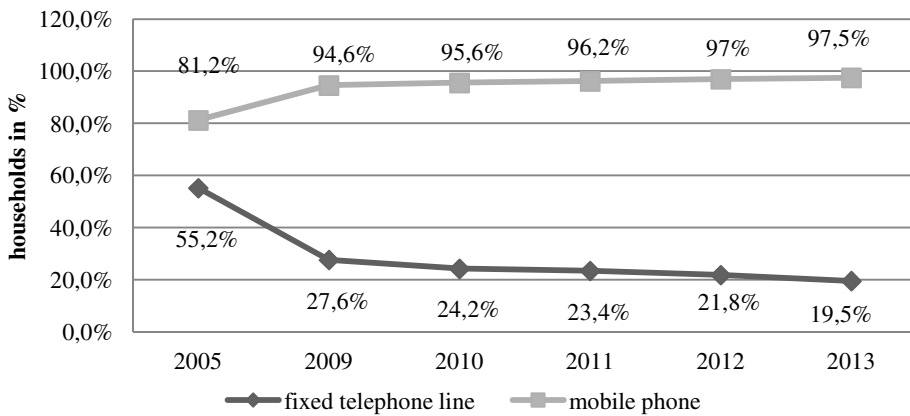


Figure 1. Households with mobile phones and with fixed telephone lines (Czech Statistical Office, www.czso.cz)

Fixed telephone lines can be found mostly in pensioners' households, on the other hand – mobile phone can be mostly found in the households of people in the productive age who use them for private purposes as well as for work. In the age category of 16 years and more men dominate. Mobile phones are mostly used by the users in the age group 25–34, most users are university graduates and from the eco-

conomic activity point of view the biggest number of mobile phone users is among students and then employees.

According to the payment mode SIM card users can be divided into two groups. The first group includes users with prepaid SIM cards, operating through credit recharge, and the other includes users using postpaid SIM cards with concluded contracts for the provision of services and payments according to the services actually used.

Customers with postpaid services have usually significantly higher spending and they are therefore more valuable customers for operators. Currently this group of customers is larger.

In Czech Republic the first generation of the mobile network (analogue) was launched in 1991. Services of this network were used only by a small number of persons because these services didn't offer a significant improvement in comparison with fixed telephone lines. Later in 1996 the second-generation mobile network (digital) by two operators (now O2 and T-Mobile) was introduced. In 2000 the third service provider Vodafone appeared.

In 1995 only 46,000 SIM cards were sold at Czech market but 3 years later there were already 1 mln SIM cards. Since 2008 the growth has been not so rapid, we can observe market saturation.

In 2012 in Czech Republic 14.5 mln of active SIM cards were used. At the time of mobile networks development, the number of active SIM cards was equal to the number of mobile phone users. Currently, one user may use more SIM cards simultaneously.

In 2013 mobile operators market was divided among 3 companies. According to the number of active SIM cards, the company O2 had 40% of market share, followed by T-Mobile with 36%, and then Vodafone with 24%.

Considering the international comparison of the number of active SIM cards per 100 residents, Czech Republic belongs to the countries with the highest expansion of mobile connections in the world. In 2004 in Czech Republic the number of SIM cards exceeded 100 per 100 inhabitants while in the USA the rate was 98/100, in China the rate was 81/100 and generally in 2012 the world's average rate is 86 SIM cards per 100 residents.

In 2013, 6.8 bln mobile users were in the world. While in developed countries the increase is slowing down due to market saturation, developing countries had an increase from 53% in 2005 to 78% in 2011.

Methodology of the questionnaire survey.

1. Survey objective. The main objective of our survey was to determine the preferences of mobile phone users in Czech Republic and to gain important information about innovative specifics of Czech cellular phone users. Experiences, opinions, attitudes and motives of the respondents were identified through the questions. Simultaneously, there have been used closed questions with variants of possible answers and the respondents were expected to mark the most suitable answer. Demographic questions were used for identification of the respondents.

The survey lasted 4 months. The results included 87 responses through the electronic survey (75 respondents) and random personal interviews (12 respondents). The electronic survey was realized through servers www.vyplnto.cz and www.surveio.com. Selection of the respondents for personal and electronic questionnaire survey was

preceded by using the sample survey in the form of simple random sampling. This is a direct selection with equal probabilities for all respondents.

2. Research sample description. The research group includes 87 anonymous respondents. All the respondents are mobile phone users. Other identification characteristics are as follows:

- Age category: the respondents were only in two age categories. The most represented age category (97.7%) is in the range of 15–49 y.o. and the rest of the respondents (2.3%) were 50–59 y.o.

- Gender: greater percentage of the respondents are women (65.5%) and smaller percentage is men (37.5%).

- Education: most of the respondents got secondary education with GCE (51.7%), followed by higher vocational and university education (42.5%). The smallest group of respondents is represented by primary education only (3.4%) or secondary education without GCE (2.3%).

- Size of residence: the largest group of respondents (51.7%) are living in a town with more than 50,000 residents, followed by the respondents (27.6%) living in towns with less than 50,000 residents.

3. Process and methods of gaining empirical data. For qualitative surveys personal interviews, observations, experiments or questioning techniques are usually used (Foret, 2008). The authors have chosen questionnaire and statistical method for data processing and evaluation as in (Chraska, 2007; Franke et al., 2012). For getting final results, the following steps were realized:

- Data access matrix in "MS Excel" (version 2010) was used for evaluation of the respondents' answers from the questionnaire survey.

- Frequencies: for preferences of mobile phone users (considering price, brand, operating system, audio-video specifications, design, and system properties) the frequency in absolute values and as % was used. For the results see Annex 1.

- Selection analysis was realized for assessment of possible differences in male and female parts of the monitored sample with regard to the price of a mobile phone, its construction and systemic properties. Pearson's chi-squared test (χ^2) was used for assessment. For the results see Annex 2.

Key results. The realized research probe showed significant specifics of Czech mobile phone user and his preferences considering price, brand, mobile operating system, audio-video specifications, structural and systemic specifications. The probe provided also the basic information about mobile operators and their selection by users.

The largest number of the respondents (26%) is willing to pay from 4000 to 7000 CZK for a new mobile phone. At the same time most of them believe that the price level of the offered mobile phones is based on phones' functional properties and brand. Chi-squared test shows that men and women do not have the same price preferences, see Annex 2. The null hypothesis (H_0 : Frequency of males and preferred price level are the same as the frequency and preferred price level of women) at the significance level of 0.05 was rejected. The test of independence implies there exists a difference between the price preferences of women (the preferred price is 4000–7000 CZK) and men (the preferred price is 7000 CZK and higher).

Mobile phone brand is considered by the majority of the respondents (64.4%) while purchasing a phone. The most favorite brand is Samsung, followed by Nokia and Apple. Mobile phones are mostly purchased in brick-and-mortar stores, not online. Users mostly prefer touchscreen cell phones (66.7% of the respondents) followed (with a longer distance) by phones with keypad (27.6%). 49.9% of the respondents use the majority of available applications in a mobile phone, nevertheless the second largest group of the respondents (37.9%) uses a mobile phone mainly for calling and sending SMS. Most respondents use phones for both private and work purposes. When choosing a new mobile phone operating system Android and from audio/video especially camera, MP3 player and built-in flash are preferred. In the area of structural and systemic specifications Wi-Fi, connecting with PC and Internet access are also preferred. Length of battery life, memory card slot and design are also important criteria of a newly purchased phone. Research probe's aim was also to determine the differences in the preferences of men and women with the respect to structural and systemic specifications of phones. Chi-squared test proved there is no difference in the preferences by gender. For 43.7% of the respondents an impulse for buying a new mobile phone is malfunction of the old one or missing functions or applications of the old mobile phone (35.6%). Changing the old phone for a new one is usually done after 3–5 years of use.

Most respondents use the services offered by the mobile operator T-Mobile, followed by O2 and Vodafone. When choosing a mobile operator the largest number of the respondents take into account price and quality. One third of the respondents consider price only. It follows that mobile phone users want mobile phone operators to deliver a good price–quality ratio. Czech respondents usually use services of the mobile operators for 5 or more years.

The findings from our research probe enable us create a preferential profile of a Czech user while purchasing a new mobile phone (Table 1).

Table 1. Preferential profile of the Czech cell phone user, authors'

| Selected features | Preferential profile of a Czech cell phone user |
|--|--|
| Preferred price level | 4000–7000 CZK (women), 7000 and higher (men) |
| Preferred operating system | Android |
| Preferred audio/video characteristics | camera |
| Preferred structure and systemic characteristics | Wi-Fi |
| Preferred additional features | Battery life |

Conclusion. Monitoring the data from the Czech Statistical Office on the market of wireless telecommunications networks shows that mobile phone is the most widely used information technology in Czech households. At the same time, the number of Czech households with a cell phone is up to 5 times higher than the number of households with a landline. It can be assumed that for Czech phone users cell phone is much more popular.

According to a user's preferential profile there exists the difference only for price and gender (women – 4000–7000 CZK, men – 7000 CZK and more), other factors are chosen equal. It means that nearly any Czech user prefers operating system

Android and camera. From the structural and system features the user chooses Wi-Fi and prefers longer battery life.

In the last 15 years customer preferences have significantly changed. The number of fixed telephone lines has decreased rapidly and at the same time customers use cell phones more actively. We can assume that in the following years customers' needs and wants will not change so rapidly but telephone operators should still monitor the situation at the market as well as customer preferences. Customer can provide very important information for future product innovations and can become a part of an innovation process in business.

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Annex 1. Questionnaire survey results, authors'

| Question | Answers | The absolute response rate | The relative response rate |
|--|---------------------------|----------------------------|----------------------------|
| What price would you be willing to pay for a new mobile phone? | less than 2000 | 10 | 11.5 |
| | 2000–3000 | 15 | 17.2 |
| | 3000–4000 | 17 | 19.5 |
| | 4000–7000 | 23 | 26.4 |
| | 7000 and more | 22 | 25.3 |
| Do you think that higher price of a mobile phone reflects more functional properties? | yes | 53 | 60.9 |
| | no | 24 | 27.6 |
| | I don't know | 10 | 11.5 |
| Do you think that the higher price of a mobile phone is associated with a certain brand? | yes | 24 | 27.6 |
| | no | 16 | 18.4 |
| | yes, please specify which | 47 | 54 |
| Is mobile phone brand important for you while purchasing a mobile phone? | yes | 57 | 65.5 |
| | no | 30 | 34.5 |

Conrination of Annex 1

| Question | Answers | The absolute response rate | The relative response rate |
|--|---|----------------------------|----------------------------|
| If brand is important for you while buying a mobile phone, please, specify which brand do you prefer (the maximum of 3 options)? | Alcatel | 1 | 1 |
| | Aligator | 1 | 1 |
| | Apple | 23 | 26 |
| | Blackberry | 2 | 2 |
| | HTC | 7 | 8 |
| | Huawei | 7 | 8 |
| | Mahone | 1 | 1 |
| | Nokia | 25 | 28.7 |
| | Panasonic | 1 | 1 |
| | Samsung | 28 | 32 |
| | Sony Ericsson | 10 | 11.5 |
| | LG | 0 | 0 |
| | Motorola | 4 | 5 |
| | other, please, specify which: | 6 | 6.9 |
| What kind of buying a mobile phone do you prefer? | order through the Internet and delivery through transportation services | 23 | 26.4 |
| | order through the Internet and pick up in a store | 20 | 23 |
| | purchase at a retail store | 44 | 50.6 |
| What type of a mobile phone do you prefer? | touchscreen | 58 | 66.7 |
| | keyboard | 24 | 27.6 |
| | clamshell phone | 3 | 3.4 |
| | telescopic | 2 | 2.3 |
| What do you use in your mobile phone? | I use most of applications mostly for calling/writing sms | 43 | 49.4 |
| | I use the media (radio, MP3, video) | 33 | 37.9 |
| | I use the media (radio, MP3, video) | 6 | 6.9 |
| | I use office applications (alarm clock, calendar, organizer) | 5 | 5.7 |
| What kind of operating system do you prefer? | Android | 54 | 62.1 |
| | Windows Phone | 10 | 11.5 |
| | Blackberry | 2 | 1.1 |
| | Symbian | 12 | 13.8 |
| | IOS | 9 | 10.3 |
| What kind of audio/video properties do you prefer when choosing a new mobile phone (the maximum of 3 options)? | autofocus | 23 | 26.4 |
| | camera | 60 | 68.9 |
| | HD video | 15 | 17.2 |
| | front camera | 4 | 4.6 |
| | internal flash | 33 | 37.9 |
| | MP3 play | 43 | 52.9 |
| | not important | 14 | 16.1 |

Continuation of Annex 1

| Question | Answers | The absolute response rate | The relative response rate |
|---|--|----------------------------|----------------------------|
| What other construction and systems properties do you prefer when choosing a new mobile phone (the maximum of 3 options)? | Internet access | 37 | 42 |
| | bluetooth | 14 | 16.1 |
| | Wi-Fi | 58 | 66.6 |
| | GPS module | 22 | 25.2 |
| | 3D phone | 2 | 2.3 |
| | PC connection | 44 | 50.6 |
| | NFC | 1 | 1.1 |
| | dual SIM | 7 | 8 |
| | screen size | 25 | 28.7 |
| | not important | 11 | 12.6 |
| What other properties do you prefer when choosing a phone (the maximum of 3 options)? | design | 38 | 43.7 |
| | color | 16 | 18.4 |
| | brand | 35 | 40.2 |
| | possibility of memory card | 42 | 48.3 |
| | jack 3,5 | 19 | 21.8 |
| | resistant construction | 22 | 25.3 |
| | battery life | 48 | 55.2 |
| | not important | 4 | 4.6 |
| How long do you use your mobile phone before you buy a new one? | until it stops functioning | 44 | 50.6 |
| | until we miss certain required functions on your phone | 33 | 37.9 |
| | when a new model comes to market | 10 | 11.5 |
| How often do you change your mobile phone? | every year | 1 | 1.1 |
| | every two years | 22 | 25.3 |
| | in 3–5 years | 46 | 52.9 |
| | more | 18 | 20.7 |
| Which mobile operator did you decide to use? | O2 | 28 | 32.2 |
| | Vodafone | 20 | 23 |
| | T-Mobile | 34 | 39.1 |
| | Bleskmobil | 0 | 0 |
| | Tesco Mobile | 0 | 0 |
| | U:fon | 0 | 0 |
| | Kaktus | 0 | 0 |
| | Lama Mobile | 0 | 0 |
| | Klokan mobil | 1 | 1.1 |
| | I dont decide on a particular mobile operator | 0 | 0 |
| another mobile operator, specify which one | 4 | 4.6 | |
| What is the most important aspect while choosing a new mobile operator? | price | 25 | 28.7 |
| | service quality | 8 | 9.2 |
| | both (price and quality) | 54 | 62.1 |
| How long have you been with your current operator? | up to one year | 10 | 11.5 |
| | 1–2 years | 4 | 4.6 |
| | 3–4 years | 13 | 14.9 |
| | 5 and more years | 60 | 69 |

Continuation of Annex 1

| Question | Answers | The absolute response rate | The relative response rate |
|--|--------------------------|----------------------------|----------------------------|
| For what purposes do you use a mobile phone? | work | 0 | 0 |
| | private purpose | 34 | 39.1 |
| | work and private purpose | 53 | 60.9 |
| Gender | man | 30 | 34.5 |
| | female | 57 | 65.5 |

Annex 2. Chi-square tests, authors'

| | Value | df | Asymp. Sig. (2-sided) |
|------------------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 8.241 ^{a)} | 4 | .083 |
| Likelihood Ratio | 8.265 | 4 | .082 |
| Linear-by-Linear Association | .699 | 1 | .403 |
| # of Valid Cases | 87 | | |

^{a)} 1 cells (10.0%) have expected count less than 5. The minimum expected count is 3.45.