
Internet Prosumer Activity Levels

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Maria Kocot¹, Damian Kocot²

Abstract:

Purpose: The aim of the article is to show the relationship between the activity of users on the Internet and the establishment of a pro-consumer system.

Design/Methodology/Approach: The article presents the essence, forms and scope of Internet prosumption. The role of the Internet in intensifying these processes was emphasized. The article uses the survey method. A statistical relationship was demonstrated between the activity of users on the Internet and the establishment of a pro-consumer system. The degree of activity in the Internet enhances prosumption processes. The respondents who displayed pro-consumer behavior in contacts with other users were active on the Internet. This knowledge helps bidders take effective measures to inspire pro-consumer behavior by buyers.

Findings: The article showed that the respondents who displayed pro-consumer behavior in contacts with other users were also active on the Internet. This knowledge helps bidders to take effective action to inspire pro-consumer behavior by buyers.

Practical Implications: This is very important information for bidders who, as research has shown, do not show high activity aimed at involving buyers in the marketing creation process. Sanitation of this area would allow modern enterprises to take advantage of the potential of online prosumers.

Originality/Value: The originality of the conducted research lies in the presentation of the relationship between the two parameters using the independence test χ^2 . An independence test χ^2 was used to verify hypotheses about the relationship between the two parameters describing the functions. They tried to show that prosumers with Internet activity (a sample of 100 people who declared daily activity on the Internet) establish a relationship with other users, i.e. the intensity of establishing contacts with other users depends on the degree of activity of the prosumer on the Internet.

Keywords: Presumption, prosumer, consumer, Internet, enterprise.

JEL Classification: I21, I23.

Paper Type: Research article.

¹University of Economics in Katowice, Katowice, ORCID: 0000-0001-5150-3765, maria.kocot@ue.katowice.pl;

²The same as in 1, ORCID: 0000-0001-9240-857X, damian.kocot@ue.katowice.pl;

1. Introduction

Modern economic reality has greatly modified the role of the consumer. He is no longer a passive user of goods and services. Thanks to the development of the Internet, it establishes relations with other consumers and bidders, acting as an Internet prosumer. Therefore, these entities should be treated as "creative agents" who become creators of "new knowledge" and ideas.

The aim of the article is to show the relationship between the activity of users on the Internet and the establishment of a pro-consumer system. The subject of the considerations will be to determine whether the level of prosumption depends on the degree of user activity on the Internet. It is also interesting to determine what proportion of the respondents engage in actions organized by enterprises via the Internet, becoming a co-creator of the offer. The hypothesis was formulated that the level of prosumption is a function of users' online activity. The results of scientific research, subjected to statistical processing, will support this statement. Therefore, the contribution of the article will be to demonstrate that the degree of activity in the Internet enhances prosumption processes, so that there is a directly proportional relationship: respondents displaying pro-consumer behavior in contacts with other users show activity on the Internet. At the same time, prosumer activity could not exist without the development of ICT (information and communication technologies).

2. Literature Review

2.1 The Problem and Genesis of Internet Prosumption – Theoretical Approach

In a world of booming economies, the growth of market activity necessitates a redefinition of the market role of consumers as users of products and services. As market participants, they increase their involvement in its functioning. Thus, they had a new market role and a wide range of functions, from purchasing, communication and creative functions (Gabriel and Others, 2015).

Customer expectations are also rising (Munodawafa, 2019). A typical customer demands personalized products because he has the possibility to influence and design a manufacturer's offer (Hanel and Others, 2020; Sallnäs and Björklund, 2020; García-Granero and Others, 2020). Today's consumers are not only perceived as consuming products and using services, but also as passive and succumbing participants in marketing activities. They are beginning to be involved in the category of business partners in the field of analysis, product and service and their marketing activities. They may also openly assess the level and quality of consumer service.

Consumers certainly need both individual approach and diversity (Rzepka, 2019). The consequence of this is that modern companies are willing to exchange

information with consumers (Matschke and Others, 2013; Martucci and Others, 2012; Veen and Others, 2020). The result is building a lasting partnership (Ritzer and Miles, 2019; Bond and Others, 2020).

Consumers, actively engaged in business tasks, participating in various activities depending on the company - consumers, participating in the transfer of knowledge and, as a result, sharing their knowledge, refers to as prosumers. On the other hand, the process by which prosumers can undertake selected activities in the area of products, services and activities of enterprises, and in addition, effectively share knowledge, is referred to as prosumption (Smyczek and Sowa, 2005).

The term prosumer was formulated in the literature of the subject in the 1980s by Toffler, where the prosumer was treated as a unit willing to take over some of the tasks previously performed by the producer (Toffler, 1997). Today, pro-sumption is widely considered. Consumption with smart characteristics is often analyzed. It is included in a wider set of various forms of buyer activity (Doligalski, 2013; Prahalad and Ramaswamy, 2004).

The term "prosumption" is shaped by a combination of two names: (pro-) "production" and (-sumption) "consumption". This phenomenon can therefore be interpreted as merging into a single process acts of consumption and production. This act leads to a complete blurring of the differences between them (Bywalec, 2010).

Prosumption should be considered as multidimensional phenomenon. They can be viewed from different points of view economic, sociological, managerial and technical. Undoubtedly, prosumption can be defined as a phenomenon that creates a new form of capitalist society, the so-called prosumer society. The economic perspective underlines the economic importance of prosumers (Baruk and Iwanicka, 2015; Bylok, 2015; Gajewski, 2009), from a managerial point of view, can be considered pro-consumer perception as part of the company's strategy to focus on cooperation processes with customers in the area of sales of consumer goods and services and production.

It is worth presenting the current achievements in the field of prosumption. Szul and Kieźel interpret prosumption in an innovative and product context (Szul, 2013; Kieźel, 2015) as a mutual and joint commitment of consumers and producers to the process of creating and improving products, resulting in the creation of communities with similar interests and working together on new solutions.

Other authors, on the other hand, propose a product approach (Toffler, 1980; Xie *et al.*, 2008; Bywalec, 2010; Cardier, 2010; Bylok, 2012). It means fully integrating consumption into the production, sales and distribution of a unit which combines the roles of consumer and producer, by producing products and creating a product to

meet the specific needs of the consumer, the possibility of being involved in its design.

The literature also highlights the innovative overtone of prosumption and the treatment of buyers as "creative agents", giving them innovation potential and creative capacity to participate in the process of open innovation. This interpretation enables the continuous growth of innovative creativity, the development of higher profits by reducing the cost of R&D departments and also by creating a user community (Izvercian and Potra, 2014; Free, 2013).

Prosumption is a creative process. Buyers are treated as creators of exchangeable value for others. Customization takes place by adding personalized value, then consuming the acquired items. Thus, a reserve of consumer experiences by buyers is created (Humphreus and Grayson, 2008; Prahalad and Ramaswamy, 2004; Cadwell *et al.*, 2014).

2.2 The Importance of the Internet in Intensifying Prosumption Processes

The Internet has become a convenient place for pro-consumer processes. Thus, the development of Internet prosumption was influenced by progressive technological changes (Maciaszczyk and Kocot, 2021). Access to Internet resources, often offered in the form of LTE (Long Term Evolution), has rapidly developed. There is a wide range of products in circulation with great capabilities, manifested by Internet access. Communication with the omission of physical contact becomes possible, so that the relationship between the consumer and the company takes place in real time (Bondos, 2013).

The consequence of this process is that companies are forced to create communication platforms, and these in turn become a source of the creativity of ideas (Trzciak, 2009). The importance of the Internet in the development of prosumption is underlined by the fact that today prosumers are mainly a generation of networks, which treats reality as an arena for creating, creating and exchanging innovative ideas. The new generation of online prosumers expresses a strong need for freedom of choice, adapting the offer to their needs. They are also characterized by individualization, the need for dialogue and entertainment, innovation and a tendency to make joint decisions (Tapscott and Williams, 2008).

This makes prosumption mainly interpreted in the literature of the subject as an Internet activity of buyers, taking advantage of the possibilities of the virtual network. The use of the Internet can therefore be regarded as a condition for the co-creation of an offer (Sowa, 2015). However, when cooperation between prosumers and bidders was widespread only on the Internet, recent advances in digital technologies have spread to the rest of the economy. Examples include digital manufacturing technologies, such as 3D printing and additive manufacturing, which guarantees end-users the prospect of crafting items. Practice shows that there have

already been many cases where users produce and sell improved versions of existing commercial products (Belk, 2014).

It should be added that some authors distinguish two forms of activity in the virtual network: presumption on the Internet and typical network participation. This view is explained by the fact that many of the activities involved in the exchange of information fall into the latter category. The condition for presumption remains the need to show commitment and creativity (Lii, 2011). Those entities that meet these conditions face a specific network of users, known as digitariate. Some authors take the view (Pręgowski and Juza, 2011) that users and prosumers cannot operate in parallel in a virtual network. They believe that modern web applications make users act as prosumers (Ritzer and Others, 2012). In the past, the media did not have such capabilities, while users were only taken as network participants.

Universal access to new digital technologies and the progressive digitization of life make it possible for consumers to communicate with other consumers but also with businesses. Consumers are happy to share their opinions about products and brands. The intensification of presumption is facilitated by rapid technological progress, as well as the development of telecommunications knowledge and infrastructure. It is also important that the nature of the content posted on the Internet is transformed. Initially, at the time of the so-called Web 1.0., the content of the message posted on the Internet was primarily shaped by the service provider, with limited possibilities for buyers and producers to interact via the network. The next stage, Web 2.0, brought Internet users the opportunity to co-author its content, and this in turn allowed for the disclosure of presumption attitudes.

Here we should refer to the studies of other authors (Ziembra *et al.*, 2016; Baruk, 2017; 2017; Jeremen *et al.*, 2016). Each of them pointed out that knowledge of the scope, determinant and nature of the presumptive activity could be an important indication for the tenderer.

It is also worth mentioning that there are also studies showing that there is a great potential of e-commerce in terms of activating prosumers to create new types of services and products. In this regard, it is worth referring to the research, showing that with the development of the e-commerce industry, prosumers demand new, high-quality organic products. Research has shown that the factors conditioning purchasing behavior, with appropriate analysis, constitute a stable foundation for the offer tailored to the needs and expectations of customers, resulting in an increase in the level of satisfaction with the purchase (Maciaszczyk and Kocot 2021).

Among the tools that make it possible to transmit content and messages between network users and entrepreneurs are cloud computing, social networks and portals, grid system, Wikipedia, services that allow you to share your resources and creations, tools for publishing and co-authoring slides and documents and

storing them in a virtual "cloud", a jointly built open source operating system, Second Life and Linux – free and other open source applications.

The results of research by other authors presented so far have clearly indicated that the internet network is an excellent channel of communication between prosumers and bidders. In the network, prosumers establish contacts with bidders on their own initiative. At the same time, the authors of the article note some research gaps which they intend to fill in in the future by conducting their own scientific research. And so: it would be interesting to examine the relationship between pro-consumer activity and the tenderer's introduction of innovations.

3. Methods and Materials

3.1 Methods

In order to achieve the research objective and to verify the hypothesis, primary studies were carried out. The survey method was used. It should be added that the relevant studies and the pilot studies preceding them have taken on a direct nature which required personal contact with the operators examined. The relevant studies were launched in the second quarter of 2019. The research continued in August 2020. During this period, an online questionnaire was sent to respondents (this form was chosen due to the ongoing coronavirus pandemic). CAWI (computer-assisted website interview) standards were used during the study. They were about basic studies.

The aim of the survey was to determine the scope of internet prosumption activity, understood as a study of the level of prosumption. The results of the surveys were developed using the SPSS Statistic program. An independence test χ^2 was used to verify hypotheses about the relationship between the two parameters describing the functions. The independence of the parameters was assumed as a zero hypothesis, while the dependency was defined by an alternative hypothesis. In each case, the significance level $p=0.05$ was assumed. A formula was used to determine the test value:

$$\chi^2 = \sum_{i=1}^k \sum_{j=1}^l \frac{(n_{ij} - \widehat{n}_{ij})^2}{\widehat{n}_{ij}}$$

where:

k- number of columns, i- corresponding column

l-number line, j- corresponding row

freedom= (k-1)*(l-1)

The χ^2 test is the most important non-vapor metric test. You can use the independence test to verify the hypothesis that there is no relationship between the

two qualitative or quantitative variables specified. No correlation analysis was carried out as the data were not figures, but merely an indication of elements having the same non-measurable characteristics. The independence test allowed to check whether there was a relationship between elements of the same characteristic, that is to say, whether there was an impact on the number of characteristics tested. The research was inspired by the studies by Baruk, Manczak and Sanak-Sosmowska (Baruk, 2015, pp. 40-51; Manczak, Sanak-Sosmowska, 2018, pp. 215-227).

The survey was conducted among 500 people who represent Polish final buyers (in 2019, 211 people were over-surveyed, and further, in 2020, as a continuation of previous studies). A further analysis included 450 questionnaires (so many were correctly completed). The research was aimed at people living in the Silesian voivodeship. The survey was divided into two parts: the metric and the research part. The metric contained sociodemographic data of the respondent (gender, age, occupation, education, professional activity). Respondents were classified as prosumers, that is, as persons who are prone to communication and networking, in order to describe products and brands on the Internet.

More than half of the respondents were women (57% of the total). In terms of age, the most numerous group were 26-35 year olds (36%). Young people under the age of 25 accounted for 34% of the total, respondents aged 36-40% are 19%. The rest were over the age of 45. The population studied included 36% of people with tertiary education (second and third degree), 14% with a bachelor's degree, 14% with an average, 18% with a professional and 18% with a primary. 80% of respondents worked professionally at the time of the survey.

3.2 Results and Discussion

The survey asked for a range of Internet prosumption activities. They were marked as prosumption level studies. Questions were asked:

- A. Are you willing to express your opinions and comments via the Internet (on the shop's website or on the forum)?*
- B. Are you willing to add comments to the opinions on the goods / services you use on the Internet?*
- C. Are you eager to read the opinions of other buyers on the Internet about the goods / services that you use or intend to use?*
- D. Do you contact producers via the Internet and on your own initiative, providing them with tips, thanks to which they can improve their products?*
- E. Do you contact manufacturers via the Internet and on your own initiative, asking them questions about the products you use or plan to use?*
- F. Do you often take part in actions organized by enterprises via the Internet, thanks to which you become a co-creator of the offer and its attributes?*

The results are presented in Table 1.

Table 1. *Prosumption level studies (results given in %)*

Forms of Internet prosumption	Definitely yes	Rather, yes	Neither yes nor no	rather not	Definitely not
A.	15	25	16	30	14
B.	10	25	30	20	15
C.	8	17	25	21	29
D.	5	15	45	25	5
E.	10	15	35	10	25
F.	5	10	35	25	25

Source: Own study based on studies carried out

According to the data presented in Table 1, only a small proportion of respondents are involved in activities organized by companies over the Internet, thus becoming a co-creator of the offer and its attributes. Therefore, the activity of creating an offer should be considered low. More active, respondents took to communicating with other consumers in order to express their opinions and comments and to get acquainted with the opinions of other users. Slightly lower activity was reported when communicating with manufacturers to give them their opinions or ask questions.

Of all the forms analyzed, respondents expressed the highest level of activity in relation to expressing their opinions via the Internet, mainly through forums. Unfortunately, there is no optimism about the relatively low level of activity in establishing relationships with producers regarding giving guidance so that they can improve their products.

It would also be worth considering the relationship between the occurrence of the phenomenon of prosumption and the amount of interactions between users. In the presented study, 68 people admitted that they definitely express their opinions on the offer on the Internet, and another 112 often do so. Therefore, according to the definition of Eden, 2017, which specifies the categories of prosumer, the respondents of this study can be described as prosumers.

An independence test χ^2 was used to verify hypotheses about the relationship between the two parameters describing the functions. They tried to show that prosumers with Internet activity (a sample of 100 people who declared daily activity on the Internet) establish a relationship with other users, i.e., the intensity of establishing contacts with other users depends on the degree of activity of the prosumer on the Internet.

Table 2 presents data on establishing relationships with other users and the degree of Internet activity. Table 3 is a table with theoretical values. The test of independence χ^2 consists in comparing the observed values (obtained in the study) with the theoretical values (calculated assuming that there is no relationship between the

variables). Large differences indicate the existence of dependencies between the variables. The test statistic was calculated using the formula given in point 4.1.

Data:

n -100 respondents who are active on the Internet every day

Connect with other users:

Yes – 58 prosumers

No – 42 prosumers

Degree of Internet activity:

Large (more than 5 hours per day) – 22 respondents

Average (from 2- 5 hours) – 40 respondents

Low (less than 2 hours) - 38 respondents

Table 2. Establishing relationships with other users and the degree of activity on the Internet

Connect with other users	Degree of Internet activity		
	Large	Medium	Low
yes	11	20	8
no	11	20	30

Source: Own study based on studies carried out.

Table 3. Establishing relationships with other users and the degree of activity on the Internet - table with theoretical values

Connect with other users	Degree of Internet activity		
	Large	Medium	Low
yes	8,580	15,600	14,820
no	13,420	24,400	23,180

Source: Own study based on studies carried out.

Test value:

$$X^2= 8,298$$

That is, at the level of relevance $p < 0.05$ it can be said that there is a relationship between the degree of activity on the Internet and establishing relationships with other users. These conclusions are consistent with those of other Authors (Baruk and Iwanicka, 2015). However, both the author's research and other researchers present only a fragment of the problem. It would therefore be worth presenting a multi-faceted analysis of the problem of online prosumption, including an analysis of the determinant of prosumptive activity.

4. Conclusions

Internet prosumers are constantly expanding their activity, becoming co-founders of products and services. It is therefore possible to observe their kind of modification of behaviour, clocked as a dynamic process. The desire to obtain an offer "tailored to

their individual needs" pushes them to enter into different types of relationships on the line between the consumer – the offeror and the consumer – the consumer. These links contribute to the creation of a platform for exchanging ideas, insights and suggestions, and these in turn enable the emergence of "new knowledge".

Therefore, in order to benefit from the skills and experience of an online prosumer, it would be necessary to ensure that conditions are created to encourage the involvement of consumers in the process of creating a marketing offer. It is not always the case that tenderers take effective measures to activate purchasers, which does not, in turn, allow their prosumer potential to be used efficiently.

The main contribution of the article was to demonstrate that the level of prosumption is a function of user activity on the Internet. This is indicated by the results of empirical studies subjected to statistical processing. The χ^2 independence test showed that there is a relationship between the level of Internet activity and establishing relationships with other users (Tables 2 and 3). This statement allows for a positive verification of the hypothesis adopted in this article. At the same time, the results of the conducted research answer the previously asked research questions.

It turns out that only a small number of people subjected to the research are involved in campaigns organized by the bidders via the Internet (which is clearly indicated by the research results presented in Table 1). Therefore, it makes it impossible for them to assume the role of a co-creator of the offer.

The article showed that the respondents who displayed pro-consumer behavior in contacts with other users were also active on the Internet. This knowledge helps bidders to take effective action to inspire pro-consumer behavior by buyers. This is very important information for bidders who, as research has shown, do not show high activity aimed at involving buyers in the marketing creation process. Sanitation of this area would allow modern enterprises to take advantage of the potential of online prosumers.

This statement is supported by the fact that the conclusions are consistent with the research of other authors (Eden, 2017; Ritzer and Miles, 2019; Ritzer, 2015; Baruk and Iwanicka, 2015; Wolny, 2013). These researchers showed unequivocally that in the era of the information society, the increase in prosumer behavior would not be possible without the development of ICT. The interactivity of modern media is conducive to the development of the phenomenon of prosumption. However, both the author's and other researchers' research presents only a fragment of the problem. Therefore, it would be worth presenting a multi-faceted analysis of the problem of Internet prosumption, including the analysis of the determinants of prosumption activity.

The degree of activity in the Internet intensifies prosumption processes. The respondents who displayed pro-consumer behavior in contacts with other users were

active on the Internet. Knowledge of the scope and determinants of the prosuming activity of buyers is an important hint for bidders. It allows them to take effective actions aimed at inspiring the pro-consumer behavior of buyers and the mutually beneficial use of the effects of cooperation with them.

The authors of this article, having a convergent position with Baruk and Iwanicka (2015) believe that the level of prosumption depends on the degree of user activity on the Internet. However, this relationship is not clear-cut and the problem should be explored. It is worth referring to the research by Baruk and Iwanicka (2015), according to which prosumers showed much more forms of activity in the absence of incentives from buyers to join marketing activities.

This phenomenon seems quite surprising and, in the opinion of the authors, should be thoroughly analyzed. However, it should be noted that the often spontaneous activity of prosumers, and even their dissatisfaction with the offer, is often the seed of innovation (it is worth quoting here research Eden, 2017). However, this fact certainly does not absolve the bidders from the necessity to increase their activity aimed at involving buyers in the marketing creation process. Especially that in the research conducted by the authors of the article, only a small part of prosumers take part in campaigns organized online by enterprises. And at this point there is a practical implication for bidders to intensify their activities in this area.

These problems may become an inspiration for further research. It would be interesting, for example, to examine the level of prosumption in terms of shaping the company's image or the impact of prosumers' activities on creating innovation.

5. Limitations

It should also be noted that the studies presented do not fully exhaust the issues related to the behaviour of online prosumers and do not fully demonstrate the conditions for prosumption. Continuing research into prosumers' online behaviour could differentiate their behaviour according to their age, gender, place of residence and education. Future research could also develop a topic related to the importance of the Internet in intensifying prosumption processes.

The studies carried out were not representative. The author of the article included only those who expressed a desire to respond and to whom she had access to the data in the research sample. The author therefore limited the study population to those he was able to identify and include in the sample.

Moreover, the tests were carried out in the Silesian Voivodeship, which may, to some extent, restrict the interpretation of the results. Especially that individual regions of Poland differ with each other in terms of access to broadband Internet. However, can this fact contribute to the intensification of prosumption processes? This question may become an interesting inspiration for future research.

6. Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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