

Consumer Engagement in Business Process Innovation: Cases of the Firms Operating in the ICT Sector

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Consumer involvement in the innovation process is a rising trend as companies are looking for new growth streams. This paper focuses on consumer engagement in business process innovation in the information and communication technology (ICT) sector. The main objective is to identify how ICT firms engage consumers in business process innovation. The research approach is built on the literature on consumers' innovation and prosumption, whereas the empirical part is based on case studies of Apple, Google, and Microsoft. This paper demonstrates business processes in which consumers are engaged to create innovation, ways of consumers' engaging in business process innovation, and incentives encouraging consumers to engage in such innovation. The results show that ICT firms are active players in the field of consumers' innovations. The analyzed firms pay a lot of attention and make a lot of effort to obtain consumers' innovations. The results show that they employ different ways of consumers' engagement in innovation activities, especially in reviewing and designing products. They use consumers' innovations for their business process development as well. Nonetheless, our results show that consumers' innovations concern mainly BP 2.0 Develop and Manage Products and Services. ICT firms offer many incentives for consumers; however, our study proves that intangible incentives embracing social media services are most often offered to consumers. The results obtained can be helpful for both – the ICT and other sectors. They can show them how they can get the best out of consumers' involvement for creating business process innovation.

Keywords: consumer engagement, consumer innovation, incentives, business processes.

Zaangażowanie konsumentów w kreowanie innowacji procesów biznesowych: przypadki firm działających w sektorze ICT

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Firmy coraz częściej do kreowania innowacji biznesowych włączają konsumentów. Głównym celem artykułu jest identyfikacja zaangażowania konsumentów do tworzenia innowacji procesów biznesowych w firmach z sektora technologii informacyjno-komunikacyjnych (ICT). W badaniach wykorzystano krytyczną analizę literatury dotyczącej innowacji, innowacji konsumenckich i prosumpcji oraz studia przypadków trzech firm

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z sektora ICT, to jest Apple, Google i Microsoft. Analizie poddano procesy biznesowe, w które angażowani są konsumenci, aby kreować innowacje, sposoby angażowania konsumentów w tworzenie innowacji oraz zachęty wspierające to zaangażowanie. Wyniki badań pokazują, że analizowane firmy z sektora ICT podejmują różnorakie działania, aby angażować konsumentów w kreowanie innowacji. Najczęściej wykorzystują one konsumentów do oceny i projektowania produktów na potrzeby doskonalenia procesu BP 2.0: Rozwój produktów i usług oraz zarządzanie nimi, oferując w zamian wiele zachęt. Badanie dowodzi jednak, że najczęściej są to zachęty niematerialne związane z zaproszeniami w mediach społecznościowych. Uzyskane wyniki mogą być pomocne dla firm – nie tylko z sektora ICT, lecz także innych sektorów – w lepszym zrozumieniu jak włączyć konsumentów w tworzenie innowacji procesów biznesowych.

Słowa kluczowe: zaangażowanie konsumentów, innowacje konsumenckie, zachęty, procesy biznesowe.

JEL: D12, D83, M21, O31, O35

1. Introduction

In the increasingly competitive economy, innovation has been widely regarded as a driving force for economic growth and competitive advantages of firms (Chen, Yin, & Mei, 2018). Business success depends on innovative activities which result in better and richer products (services and goods) and processes (Edwards-Schachter, 2018). Traditionally, innovation has been carried within firms' boundaries, whereas developments in information and communication technology (ICT) have made it easy for firms to engage their consumers in an innovation process (Kiezel, 2015; Ma, Lu, & Gupta, 2019). There is a growing consensus that firms need to change and adapt their business models in order to appropriate value from a consumer innovation (Seran & Izvercian, 2014; Svensson & Hartmann, 2018). Instead of the unidirectional model of producer innovation to consumer consumption, consumer innovation depends upon the active engagement of "prosumers" – consumers who are also producers (Ritzer & Jurgenson, 2010; Tapscott & Williams, 2006). Such consumers can participate in the design process, rapid prototyping, interaction, and user testing as innovators, and as lead users (Robert, Maldar, Taraghi, & Seffah, 2019).

As von Hippel (2017) stated, a consumer innovation is defined as a functionally novel product or process, developed by consumers at private cost during their unpaid discretionary time. A consumer innovation can occur when consumers change a product or process as well as develop a new product or process to improve the benefit they derive from it (Gault, 2016).

A series of studies in various countries have confirmed that consumer innovation is a quite widespread activity (Franke, Schirg, & Reinsberger, 2016). Empirical research has shown that millions of consumers engage in developing and modifying products to serve better their own needs (de Jong, von Hippel, Gault, Kuusisto, & Raasch, 2015). Given the scale and importance of innovation by consumers, it is clearly important to improve the understanding of the phenomenon and learn how consumers can be

engaged in an innovation process by firms and how firms may utilize consumer innovations for improving their products and processes (Stock, von Hippel, & Gillert, 2016).

The innovation theory examines in detail the nature and variety of innovation, *inter alia*, consumer innovation (e.g. Chen, Yin, & Mei, 2018, Edwards-Schachter, 2018; von Hippel, 2017), as well as strategies and policies for business model innovation also embracing consumer innovation (e.g. Hacklin, Björkdahl, & Wallin, 2018; Robert, Maldar, Taraghi, & Seffah, 2019). The extant studies on consumer innovation mainly focus on the frequency of end-user innovation (e.g. de Jong et al., von Hippel, Gault, Kuusisto, & Raasch, 2015; Franke, Schirg, & Reinsberger, 2016; von Hippel, Ogawa, & de Jong, 2011), factors influencing firms' implementation of consumers' innovation (de Jong, Gillert, & Stock, 2018; Kiezel, 2015; West & Bogers, 2013) and on-line consumer communities on creation of innovation (Di Gangi & Wasko, 2009; Ma, Lu, & Gupta, 2019; Piller, Ihl, & Vossen, 2012).

Although the concept of consumer innovation is widely explored, Yordanowa (2018) stated that two basic and simple but, at the same time, crucial questions were left unanswered: (1) how exactly can consumers be utilized in innovation development in a systematic way and (2) how can companies access and attract consumers to utilize them in their innovation development? Overall, our review also indicates that such issues should be explored in order to provide firms with some guidelines and approaches supporting the development of their innovativeness.

Considering these gaps, this paper examines consumer engagement in business process innovation in firms of the ICT sector. Firms operating in the ICT sector have been chosen because they were pioneers in launching consumers' innovation communities (Li, Kankanhalli, & Kim, 2016; Rose & Furneaux, 2016). For example, Dell introduced many consumer innovative ideas for launching new options for its personal computers (Di Gangi & Wasko, 2009), whereas Salesforce.com enhanced its customer relationship management (CRM) software by building new features adopted from its consumer innovation community, such as the mobile platform CRM (Li, Kankanhalli, & Kim, 2016). In this regard, it can be supposed that ICT firms have extensive experience in the field of adopting consumer innovation and their consumer innovation projects can be an example to follow for other firms.

The main objective of this paper is to identify how ICT firms engage consumers in business process innovation. We aim to answer the following research questions:

RQ1: What are the ways of consumers' engagement in innovation activities?

RQ2: What are the business processes in which consumers' innovation can be utilized?

RQ3: What are the incentives encouraging consumers to engage in innovation activities?

By answering these research questions, we address the issue of consumer engagement in business process innovation in firms, especially ICT firms.

The paper is structured as follows: in the next section, we discuss the study's theoretical background. Then we outline our methodology and present the empirical findings. At the end we stress the contribution of this study, propose implications for further research and practice as well as indicate research limitation and future works.

2. Literature Background

2.1. Ways of Consumers' Engagement in Innovation Activities

Two categories of consumers were identified by Bryant (2011) on account of their engagement in innovation activities, i.e., critics and creators. Critics are those consumers who engage in creating innovation by posting reviews and ratings as well as by sharing their opinions, insights and experiences about firms' products and processes. In turn, creators actively engage in the processes of designing or improving products and processes. Ziemba and Eisenhardt (2013) examined two types of consumers depending on their engagement in innovation activities, i.e., feedback providers and value creators. Feedback providers evaluate products and processes thorough rankings and polls as well as give opinions and comments, whereas value creators engage in designing new products and processes or their functionalities and features. Other researchers identified that reviews and discussion are important tools which can help firms gain innovative ideas from consumers to improve products and processes (Qiao, Wang, Zhou, & Fan, 2018).

Overall, taking into account the level of consumers' engagement in innovation activities, three main ways of such engagement have been indicated, i.e., (1) *scoring*, which means consumer quick opinion on product or enterprise operation, more than often ranging from 1 – not content at all to 5 – very content; (2) *reviewing*, which means consumers' comments and opinions on a product; and (3) *product designing*, which means that consumers are engaged in a wide range of activities aimed at product design.

2.2. Business Processes in Which Consumers' Innovation Can Be Utilized

Consumers can take different roles in creating innovation. While some of them can provide important information about products and processes as well as future trends and possible solution technologies, others may be more suited to create innovative concepts and participate in the refinement of a product or process. Piller, Ihl, and Vossen (2010) structured these roles around three different modes of using and generating customers' ideas in product development: "listen into" the customer domain, "ask" customers, and "build" with customers. As stated by Ritzer and Jurgenson (2010), consumers can create innovations throughout the whole product life cycle,

and they become co-creators and co-producers. Furthermore, Frow, Payne, and Storbacka (2011) developed a typology of consumers' co-creation forms consisting of 12 types: co-conception of ideas, co-design, co-production, co-promotion, co-pricing, co-distribution, co-consumption, co-maintenance, co-outsourcing, co-disposal, co-experience and co-meaning creation.

Overall, in our research we applied the conceptual framework of prosumers' engagement in business process innovation developed by Ziemba, Eisenhardt, Mullins, and Dettmer (2019). This framework embraces operational processes identified by APQC Process Classification Framework (APQC, 2018) and types of consumers' participation in these processes. Thus, in this study we were focused on four operational business processes (BP) in which consumers' engagement in innovations can be notably used, i.e., *BP 2.0 Develop and Manage Products and Services*; *BP 3.0 Market and Sell Products and Services*; *BP 4.0 Deliver Products and Services*; and *BP 5.0 Manage Customer Service*. What is more, each business process was divided into sub-processes connected with specific business activities, which consumers can undertake.

Thus, BP 2.0 was divided into a couple of sub-processes which support companies in accessing and attracting consumers to utilize them in the company's innovation development, such as:

- New product design (i.e., shape or color of the product);
- Materials from which the product was made (materials of a type from which the product should be produced);
- Package or graphic elements of the product (i.e., logo or label);
- Product functionality;
- Reliability and durability of the product;
- Ease and intuitiveness of product use; and
- Product performance (effectiveness and efficiency of use).

BP 3.0 was divided into three sub-processes connected with consumers' innovations, such as:

- Advertising / marketing campaigns;
- Pricing strategy; and
- Promotions, discounts, loans.

BP 4.0 concerns:

- Service availability and distribution channels; and
- Ordering process innovations.

BP 5.0 was divided into:

- Complaint handling and warranty service; and
- Customer service innovations.

2.3. Incentives Encouraging Consumers to Engage in Innovation Activities

Consumer sharing of knowledge is a basis for consumers' innovations (Koniorczyk, 2015). Consumers can share their knowledge voluntarily and

do not expect any tangible benefits, whereas other times they share knowledge under the condition of obtaining certain benefits in return, such as rewards or fulfilling personal goals (Yuan, Lin, & Zhuo, 2016; Ziemba & Eisenhardt, 2016). The literature indicates that incentives can drive consumers to share knowledge for creating innovations (Koniorczyk, 2015; Liu, Zhao, & Sun, 2018).

Therefore, various incentives should be introduced by firms to engage consumers in knowledge sharing and motivate them to create innovations (Gafni, Geri, & Bengov, 2014; Liu, Zhao, & Sun, 2018). Some researchers indicated tangible and intangible incentives that drive consumer knowledge sharing (Koniorczyk, 2015; Vuori & Okkonen, 2012).

Generally, based on the literature, the following incentives motivating consumers to engage in business process innovation have been indicated in our research: (1) tangible incentives embracing monetary compensations, material rewards, free testing of product prototypes, free samples of products, and bonus points with financial value; (2) intangible incentives embracing social media services, such as Facebook, YouTube, Twitter, LinkedIn, and Instagram; and (3) intangible incentives embracing other sources of information such as a popular news portal, the enterprise's own webpage, an Internet game, a blog, TV or radio information.

3. Research Methodology

The methodology adopted for this exploratory research is a case study approach with the target research area in Poland. The case study approach focuses on understanding the dynamic present with single settings and involves either single or multiply cases, and numerous levels of analysis (Eisenhardt, 1989). It is particularly useful to employ when there is a need to obtain an in-depth appreciation of an issue or phenomenon of interest, in its natural real-life context and develop a "how" question (Yin, 2014).

Our aim in this research was to provide insights into how ICT firms engage consumers in business process innovation. Therefore, descriptive and illustrative case studies (Scapens, 1990) have been employed. We described current practice of consumers' engagement in business process innovation and illustrated new and possible innovative practice adopted by particular firms.

Our research methodology was based on Eisenhardt's process of building theories from case study research (Eisenhardt, 1989) and consisted of the following steps:

1. Getting started – the literature was reviewed and research questions were defined. The main question was: How do ICT firms engage consumers in business process innovation? The specific research questions were: What are the ways of consumers' engagement in innovation activities?; What are the business processes in which consumers' innovation can

- be utilized?; What are the incentives encouraging consumers to engage in innovation activities?
2. Selecting cases – the population was selected as ICT firms which are active in Poland.
 3. Crafting instruments and protocols – a spreadsheet in Microsoft Excel was elaborated to evidence empirical data. It contained six sheets. In the first sheet, definitions and explanations of the main terms used in the spreadsheet were provided, such as innovation, a consumer innovation, and types of business processes. In addition, the links to the examples of consumer business innovations were given. The second sheet was designed to clarify the research objective and questions. The aim of the four consecutive sheets was to evidence and describe observed firms, ways of consumers' engagement in business process innovation, incentives encouraging consumers to engage in innovation activities, ICT supporting consumers' innovations as well as business processes in which consumers' innovations can be utilized.
 4. Entering the field – between January 2018 and February 2019 case studies were collected. Finally, 1575 case studies regarding different firms as to their operation profile and industry were evidenced in the Microsoft Excel spreadsheet.
 5. Analyzing data – the gathered 1575 case studies were verified and analyzed. After screening the case studies and excluding outliers, there was a final sample of 34 usable, correct, and complete case studies assigned to 20 ICT firms. Then, the case studies were screened in view of their importance in achieving the research objective and answering the research questions. Finally, we chose ten case studies of three ICT firms, i.e. Apple, Google, and Microsoft.
 6. Searching for cross-case patterns – the ten case studies were analyzed based on logical deduction. The analysis included dimensions suggested by the research problem and research questions. The patterns of consumers' engagement in business process innovations were illustrated.
 7. Enfolded literature – conclusions and recommendations regarding consumers' engagement in business process innovations were formulated and a comparison with similar literature was made.

4. Research Findings

4.1. Projects for Consumers' Engagement in Innovation

The selected case studies are presented in Table 1. They concern three ICT firms as specified in the Research Methodology section.

ICT firm	Case specification	Symbol of the case
Apple	The project is aimed at consumers' innovations on iPhones and software improvement. Dedicated webpage was created where the users can learn, create, and do more with the products they love	A1
	A forum for consumers was provided where they can assess Apple's products and consumers' services. It is also possible to share ideas about products concerning their design and functionality	A2
	Consumers can customize Control Center on their iPhones and iPads so they can quickly change the settings for the things they do most	A3
	The survey for prospective consumers asking which of the newest iPhone they would like to buy. The survey was open just after a conference during which Apple had presented two new iPhone models	A4
Google	Learn. Share. Become an expert. Save the day, one answer at a time. Product Experts earn special badges and perks by helping others make the most out of Google's Products. Enrich Google Help Communities with your passion for Google products and interest in helping others. You will become eligible for badges and special perks as you progress.	G1
	Ad suggestions for Smart campaigns. To help improve performance, a combination of human review and machine learning is used to create high-quality ad suggestions. Relevant content from a user account is used to create ad suggestions, include his/her existing ads, extensions, and landing page. Google also uses additional signals such as keywords and targeting in order to optimize the ad copy	G2
Microsoft	Xbox Design Lab where consumers can design their unique Xbox pad. The Microsoft's slogan for that project is: See where inspiration takes you with more than 1 billion possible color combinations.	M1
	Customer Experience Improvement Program (CEIP) for System Center Configuration Manager. When participating, Windows Phone will automatically send basic, anonymous information to Microsoft about how programs and devices are used, the types and number of errors encountered, and the speed of services. This information is combined with other CEIP data to help Microsoft solve problems and improve the products and features that customers use most often.	M2
	MVP application which helps IT experts share innovations on Microsoft's products	M3
	Start developing for Windows. Consumers can develop the innovations for a specific device, i.e., they can build desktop applications that target PCs running Windows by using platforms, including the Universal Windows Platform; other times they can develop games and applications that reach millions of players worldwide on Xbox One	M4

Tab. 1. Case studies specification. Source: Authors' own study.

The cases presented in Table 1 show that ICT firms offer a wide range of projects for consumers' engagement in innovations. As a result, they can utilize consumers' ideas and knowledge in their innovation development. It is notable that the majority of these projects are aimed at ordinary consumers, not experts.

The findings from this research presented below provide a critical insight into understanding consumers' engagement in innovation. As specified in the literature section, we decided to split them into three paths: the ways of consumers' engagement in innovations, the business processes in which consumers' innovation can be utilized, and the incentives encouraging consumers to engage in innovation activities.

4.2. Ways of Consumers' Engagement in Innovation Activities

To answer the first research question *RQ1: What are the ways of consumers' engagement in innovation activities?*, the ways of consumers engagement identified in the literature section were confirmed by the case study analysis. When discussing the ways of consumers' engagement, it became apparent that they are interrelated with ICT firms. Table 2 includes three ways of consumers' engagement specified in our study.

Symbol of the project	Consumers' engagement by:		
	Scoring	Reviewing	Product designing
A1	X	X	X
A2	X	X	
A3			X
A4	X	X	X
G1	X	X	X
G2		X	X
M1			X
M2		X	
M3		X	
M4			X
SUM	4	7	7

Tab. 2. The ways of consumers' engagement in innovation – overall analysis. Source: Authors' own study (X indicates that consumers were engaged in a specific project in a specific way).

The results presented in Table 2 show that consumers are mainly engaged in innovations in the way of reviewing and designing products. Both were found in seven out of ten analyzed cases. What is more, Apple is the only firm which engages consumers in the way of scoring. Other two firms do not engage consumers in that way.

During the content analysis it was discovered that the cases concern different activities and are directed toward different users. A few chosen examples are described below. The first one concerns Apple and more specifically is about A1 (Apple's first project). The newest campaign of the company is directed to children aged 8–12 who are going to be involved in their creativity exploration through fun, hands-on projects across four tracks ranging from coding to art & design. Obviously, Apple informs that all campers must be accompanied by a parent or legal guardian for the duration of the Apple Camp. From that perspective, the participants can choose to explore music, coding, moviemaking, or art & design Apple tools or applications. The next example concerns Google, which is running a webpage on which users can share innovative ideas and tips to get help from Google Ads Community. As to Microsoft, the consumers can customize a very popular product, i.e., take part in the project called Xbox Design Lab where they can design innovative color of their x-box pad.

4.3. Consumers' Innovation Employed in Business Processes

To answer the second research question *RQ2: What are the business processes in which consumers' innovation can be utilized?*, the business processes identified in the literature section were confirmed by the case study analysis. When discussing the business processes in which consumers can be engaged, it became apparent that they are interrelated with the selected ICT firms. Table 3 presents the number of cases which were assigned to the specific business process for which consumers' innovations were observed.

Symbol of the project	BP 2.0 Develop and Manage Products and Services	BP 3.0 Market and Sell Products and Services	BP 4.0 Deliver Products and Services	BP 5.0 Manage Customer Service
A1	7	0	0	0
A2	5	2	2	2
A3	4	0	0	0
A4	6	1	2	0
G1	7	2	2	2
G2	3	1	0	0
M1	3	0	0	0
M2	4	0	0	0
M3	2	0	0	0
M4	0	1	0	1
SUM	41	7	6	5

Tab. 3. Business processes in which consumers' innovation was observed. Source: Authors' own study.

The results presented in Table 3 show the number of cases for which consumers' innovations were observed for each prospective business processes. Business processes were split into sub-processes as specified in the literature section. Thus, the number 7 for BP 2.0 and A1 project means that consumers' innovations were observed for seven (all) sub-processes of BP 2.0. It also means that consumers' innovations were remarkable in that case. Number 0 in the table means that there were no observed consumers' innovations in the study. Thus, the data presented in Table 3 show that consumers' innovation concerns mainly BP 2.0, whilst for BP 3.0, BP 4.0, and BP 5.0 there were just a few observations of consumers' innovations. What is more, Apple is the most active firm in the field of consumers' engagement in innovations.

The content analysis shows that Apple pays particular attention to a wide range of consumers' innovations connected with business processes. Consumers' innovation can be utilized for products design, suggestions of package or graphic elements of the products (i.e., logo or label), innovative ideas of product functionality, performance, reliability, durability, and ease of use. Only in one case, i.e., materials from which the product should be produced, there were no suggestions of consumers' innovations observed. From that perspective it is possible to conclude that the majority of Apple's operations seem to be directed toward obtaining consumers' innovations.

Google also pays attention to business process innovations based on consumers' ideas and their knowledge. Both Google's projects – Learn. Share. Become an expert as well as Ad suggestions for Smart campaigns are aimed at product development; therefore, they both are directed at BP 2.0 innovations. What is more, the former project supports Google with BP 3.0, BP 4.0, and BP 5.0 innovations, whilst the latter project is aimed at BP 3.0 innovations.

Microsoft's main attention is directed toward product development. Consumers' innovations which the firm is trying to obtain and utilize is related to BP 2.0. More specifically, consumers' innovations concern unique Xbox pad designing, data sharing which can help Microsoft solve problems and improve the products and features that customers use most often. Finally, they are aimed at sharing knowledge and ideas which can develop the innovations for Microsoft's popular devices.

Concluding, all cases described above are related to business process development based on consumers' innovation. Nonetheless, the majority of innovations were observed for BP 2.0, whilst for the four other operational business processes they were observed significantly rarely. It may mean that ICT firms pay a lot of attention to consumers' innovations concerning product development, whilst they much less often involve consumers in innovations related to BP 3.0, BP 4.0, and BP 5.0. On the other hand, it may mean that these three ICT firms are looking for alternative solutions for marketing, selling, delivery, and customer service innovations.

4.4. Incentives Encouraging Consumers to Engage in Innovation

To answer the third research question *RQ3: What are the incentives encouraging consumers to engage in innovation activities?*, the three kinds of incentives identified in the literature section were confirmed by the case study analysis. Table 4 presents an analysis of incentives which were observed as encouragement for consumers to engage in innovation activities.

Symbol of the project	Tangible incentives	Intangible incentives embracing social media services	Intangible incentives embracing other sources of information
A1	2	3	0
A2	1	5	4
A3	0	3	0
A4	1	1	1
G1	1	2	1
G2	0	1	1
M1	0	1	1
M2	0	0	1
M3	0	0	0
M4	2	0	0
SUM	7	16	9

Tab. 4. Incentives encouraging consumers to engage in innovation activities. Source: Authors' own study.

The results presented in Table 4 show that consumers were encouraged to engage in innovation activities mainly through intangible incentives embracing social media services and applications, such as Facebook, YouTube, Twitter, LinkedIn, and Instagram. Less encouragement was found for intangible incentives embracing other sources of information and tangible incentives, both specified in detail in the literature section. The number 3 for *Intangible incentives embracing social media services* and A1 project mean that three incentives were observed for consumers' engagement in innovations. Specifically, in that case there were the invitations from Facebook, Twitter, and Instagram. Number 0 in the table means that there were no observed incentives for consumers.

During the content analysis it was observed that the information about the project displayed at the enterprise's own webpage was the most popular incentive for consumers among *Intangible incentives embracing other sources of information*. This incentive was observed in five cases. Facebook and YouTube were the most popular as incentives for consumers among *Intangible incentives embracing social media services*. Facebook was used as

an incentive in six cases, whilst YouTube in four. Furthermore, free testing of product prototypes was the most popular incentive among *Tangible incentives* and was observed in fifth cases.

5. Conclusions

The study analyses consumer engagement in business process innovation in the ICT sector.

The empirical case studies included three ICT main players, i.e., Apple, Google, and Microsoft. The selected case studies were related to the projects aimed at consumers and their innovations. The bottom line is that ICT firms in our study pay a lot of attention to engaging their consumers in innovations and make a lot of effort to this end. They employ different ways of consumers' engagement in innovation activities. Thus, scoring, reviewing and designing products are those ways of innovations which firms use most often. What is interesting, our results show that both reviewing and designing products are the ways of innovations which firms offer to consumers. It may mean that firms want to obtain innovative ideas or comments, not just a sole click on the scale (just like it works in the scoring case).

What is more, it was observed in our study that the three analysed firms utilize consumers' innovation for their business process development. Especially, it was apparent in BP 2.0. An overall analysis shows that consumers' innovations can be utilized for product design, suggestions about packaging or graphic elements of the products, innovative ideas for product functionality, performance, reliability, durability, and ease of use as well as for materials from which the product should be produced. Following that a firm can take advantage of consumers' innovations and develop a product in accordance with consumers' expectations and suggestions. In turn, it can influence sales results and profits as consumers will see their innovation in products available on the market, which they can buy and use.

Firms offer customers incentives to make them engaged in innovations. Our study attempts to answer the question: what are the incentives encouraging consumers to engage in innovation activities? Our results show that intangible incentives are widely used as an encouragement in all ten analysed projects. Especially, they embrace social media services and applications. Firstly, it means that firms use social media to inform consumers about the project. Secondly, they use social media as a tool for the launch and development of the project. Thirdly, other sources of innovations are used as an incentive to get consumers engaged in a specific project. These are often popular news portals, enterprise's own webpages, Internet games, blogs, TV or radio information.

This work contributes to extant research on consumers innovations by:

- indicating the projects of ICT firms which are directed toward consumers' innovations;

- addressing the ways of consumers' engagement in innovation activities;
- addressing the business processes in which consumers' innovation can be utilized; and
- addressing the incentives encouraging consumers to engage in innovation activities.

This study can be useful for researchers. They may use this methodology and perform similar analyses with different firms and other countries, additionally many comparisons between different groups and countries can be made. Moreover, the methodology constitutes a very comprehensive basis for identifying how companies may access and attract consumers to utilize them in their innovation development, but researchers may develop, verify and improve this methodology and its implementation. Furthermore, for practitioners, the results of this study can be used to target consumers' innovations that optimize the decision outputs gained through those innovations.

The study also has some limitations. The most important are two: the selection of ICT firms and the selection of projects for the analyses. In these cases, it is advisable to extend the research study to other firms operating in different sectors as well as to analyse a wider range of projects related to consumers and their engagement in innovation.

References

- APQC. (2018). *Process classification framework 7.2.1*. Houston: American Productivity and Quality Center. Retrieved from https://www.apqc.org/knowledge-base/download/426790/Cross%20Industry%20v7.2.1_Final.pdf.
- Bryant, C.A. (2011). *The social media bubble: an examination of social media user motivations and their implications for future users and communication technologies*. Carbondale: Southern Illinois University.
- Chen, J., Yin, X., & Mei, L. (2018). Holistic innovation: An emerging innovation paradigm. *International Journal of Innovation Studies*, 2(1), 1–13. <https://doi.org/10.1016/j.ijis.2018.02.001>.
- De Jong, J.P.J., Gillert, N.L., & Stock, R.M. (2018). First adoption of consumer innovations: Exploring market failure and alleviating factors. *Research Policy*, 47, 487–497. <https://doi.org/10.1016/j.respol.2018.01.004>.
- de Jong, J.P.J., von Hippel, E., Gault, F., Kuusisto, J., & Raasch, C. (2015). Market failure in the diffusion of consumer-developed innovations: Patterns in Finland. *Research Policy*, 44(10), 1856–1865. <https://doi.org/10.1016/j.respol.2015.06.015>.
- Di Gangi, P.M., & Wasko, M. (2009). Open innovation through online communities. In W. King (Ed.), *Annals of information systems: Vol. 4. Knowledge management and organizational learning* (pp. 199–213). https://doi.org/10.1007/978-1-4419-0011-1_13.
- Edwards-Schachter, M. (2018). The nature and variety of innovation. *International Journal of Innovation Studies*, 2(2), 65–79. <https://doi.org/10.1016/j.ijis.2018.08.004>.
- Eisenhardt, K.M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550. <https://doi.org/10.2307/258557>.
- Franke, N., Schirg, F., & Reinsberger, K. (2016). The frequency of end-user innovation: A re-estimation of extant findings. *Research Policy*, 45, 1684–1689. <https://doi.org/10.1016/j.respol.2016.04.012>.

- Frow, P., Payne, A., & Storbacka, K. (2011) Co-creation: A typology and conceptual framework. In M. Ogilvie & M. Ryan (Eds.), *Proceedings of the 2011 Australia and New Zealand Marketing Conference* (pp. 1–6). Perth: Australian and New Zealand Marketing Academy.
- Gafni, R., Geri, N., & Bengov, P. (2014). Investigating the effect of tangible and virtual rewards on knowledge contribution in online communities. *Online Journal of Applied Knowledge Management*, 2(2), 1–11.
- Gault, F. (2016). User innovation and official statistics. In D. Harhoff & K.R. Lakhani (Eds.), *Revolutionizing innovation: Users, communities, and open innovation* (pp. 89–105). Cambridge: MIT Press.
- Hacklin, F., Björkdahl, J., & Wallin, M.W. (2018). Strategies for business model innovation: How firms reel in migrating value. *Long Range Planning*, 51(1), 82–110. <https://doi.org/10.1016/j.lrp.2017.06.009>.
- Kiezel, M. (2015). Role of individual customers in development of banking products in the context of open innovation concept and demand approach to innovations. *Journal of Economics and Management*, 22(4), 96–106.
- Koniorczyk, G. (2015). Customer knowledge in (co)creation of product. A case study of IKEA. *Journal of Economics and Management*, 22(4), 108–120.
- Li, M., Kankanhalli, A., & Kim, S.H. (2016). Which ideas are more likely to be implemented in online user innovation communities? An empirical analysis. *Decision Support Systems*, 84, 28–40. <https://doi.org/10.1016/j.dss.2016.01.004>.
- Liu, Q., Zhao, X., & Sun, B. (2018). Value co-creation mechanisms of enterprises and users under crowdsourcing-based open innovation. *International Journal of Crowd Science*, 2(1), 2–17. <https://doi.org/10.1108/IJCS-01-2018-0001>.
- Ma, J., Lu, Y., & Gupta, S. (2019). User innovation evaluation: Empirical evidence from an online game community. *Decision Support Systems*, 117, 113–123. <https://doi.org/10.1016/j.dss.2018.11.003>.
- O'Hern, M.S., & Rindfleisch, A. (2010). Customer co-creation. A typology and research agenda. In *Review of Marketing Research* (pp. 84–106). Emerald Group Publishing Ltd. [https://doi.org/10.1108/S1548-6435\(2009\)0000006008](https://doi.org/10.1108/S1548-6435(2009)0000006008).
- Piller, F., Ihl, C., & Vossen, A. (2010). A typology of customer co-creation in the innovation process. SSRN. <http://doi.org/10.2139/ssrn.1732127>.
- Piller, F., Ihl, C., & Vossen, A. (2012). From social media to social product development: The impact of social media on co-creation of innovation. *Die Unternehmung*, 65(1), 1–22.
- Qiao Z., Wang G.A., Zhou M., & Fan W. (2018). The impact of customer reviews on product innovation: Empirical evidence in mobile apps. In A. Deokar, A. Gupta, L. Iyer, & M. Jones (Eds.), *Annals of Information Systems: Vol. 21: Analytics and data science* (pp. 95–110). Cham: Springer. https://doi.org/10.1007/978-3-319-58097-5_8.
- Ritzer, G., & Jurgenson, N. (2010). Production, consumption, prosumption: The nature of capitalism in the age of the digital 'prosumer'. *Journal of Consumer Culture*, 10(1), 13–36. <http://doi.org/10.1177/1469540509354673>.
- Robert, J.M., Maldar, M., Taraghi, M., & Seffah, A. (2019). User innovation, lead users and crowdsourcing for the design of new products and services: Why, what and how?. In S. Bagnara, R. Tartaglia, S. Albolino, T. Alexander, & Y. Fujita (Eds.), *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018)*, IEA 2018. *Advances in Intelligent Systems and Computing*, 824 (pp. 730–743). Cham: Springer. https://doi.org/10.1007/978-3-319-96071-5_77.
- Rose, J. & Furneaux, B. (2016). Innovation drivers and outputs for software firms: Literature review and concept development. *Advances in Software Engineering*, Article ID 5126069. <http://dx.doi.org/10.1155/2016/5126069>.

- Scapens, R.W. (1990). Researching management accounting practice: The role of case study methods. *The British Accounting Review*, 22(3), 259–281. [http://dx.doi.org/10.1016/0890-8389\(90\)90008-6](http://dx.doi.org/10.1016/0890-8389(90)90008-6).
- Seran (Potra), S., & Izvercian, M. (2014). Prosumer engagement in innovation strategies: The prosumer creativity and focus model. *Management Decision*, 52(10), 1968–1980. <https://doi.org/10.1108/md-06-2013-0347>.
- Stock, R.M., von Hippel, E., & Gillert, N.L. (2016). Impacts of personality traits on consumer innovation success. *Research Policy*, 45, 757–769. <https://doi.org/10.1016/j.respol.2015.12.002>.
- Svensson, P.O., & Hartmann, R.K. (2018). Policies to promote user innovation: Maker-spaces and clinician innovation in Swedish hospitals. *Research Policy*, 47, 277–288. <https://doi.org/10.1016/j.respol.2017.11.006>.
- Tapscott, D., & Williams, A.D. (2006) *Wikinomics: How mass collaboration changes everything*. New York: Penguin Group.
- von Hippel, E. (2017). *FreeInnovation*. Cambridge MA: MIT Press. Retrieved on 10 December 2018 from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2866571.
- von Hippel, E., Ogawa, S., & de Jong, J.P.J. (2011). The age of the consumer-innovator. *MIT Sloan Management Review*, 53(1), 27–35.
- Vuori, V., & Okkonen, J. (2012). Knowledge sharing motivational factors of using an intra-organizational social media platform. *Journal of Knowledge Management*, 16(4), 592–603. <https://doi.org/10.1108/13673271211246167>.
- West, J., & Bogers, M. (2013). Leveraging external sources of innovation: A review of research on open innovation. *Journal of Product Innovation Management*, 31(4), 814–831. <https://doi.org/10.1111/jpim.12125>.
- Yin, R.K. (2014). *Case study research: Design and methods* (5th ed.). Los Angeles, CA: Sage.
- Yordanova, Z. (2018). User innovation as a basis of innovation network between universities and business. *International Journal of Innovation*, 6(2), 85–96. <http://dx.doi.org/10.5585/iji.v6i2.308>.
- Yuan, D., Lin, Z., & Zhuo, R. (2016). What drives consumer knowledge sharing in online travel communities? *Computer in Human Behavior*, 63(C), 68–74. <https://doi.org/10.1016/j.chb.2016.05.019>.
- Ziemba, E., & Eisenhardt, M. (2013). Prosumption awareness among young consumers. *Studia Ekonomiczne*, 153, 163–177.
- Ziemba, E., & Eisenhardt, M. (2016). Incentives encouraging prosumers to knowledge sharing – framework based on Polish study. *Online Journal of Applied Knowledge Management*, 4(2), 40–58.
- Ziemba, E., Eisenhardt, M., Mullins, R., & Dettmer, S. (2019). Prosumers' engagement in business process innovation – The case of Poland and the UK. *Interdisciplinary Journal of Information, Knowledge, and Management*, 14, 119–143. <https://doi.org/10.28945/4320>.