



Volume 14, 2019

PROSUMERS' ENGAGEMENT IN BUSINESS PROCESS INNOVATION – THE CASE OF POLAND AND THE UK

Ewa Ziemba*	Faculty of Finance and Insurance, University of Economics in Katowice, Poland	ewa.ziemba@ue.katowice.pl
Monika Eisenhardt	Faculty of Finance and Insurance, University of Economics in Katowice, Poland	monika.eisenhardt@ue.katowice.pl
Roisin Mullins	Faculty of Business and Management, University of Wales Trinity Saint David, United Kingdom	r.mullins@uwtsd.ac.uk
Sandra Dettmer	Faculty of Business and Management, University of Wales Trinity Saint David, United Kingdom	sandra.dettmer@uwtsd.ac.uk

* Corresponding author

ABSTRACT

Aim/Purpose	The main purpose of this paper is to identify prosumers' engagement in business process innovation through knowledge sharing.
Background	In the increasingly competitive knowledge-based economy, companies must seek innovative methods of doing business, quickly react to consumer demand, and provide superior value to consumers. Simultaneously, contemporary consumers, named "prosumers", want to be active co-creators of value and satisfy their consumption needs through collaboration with companies for co-creation, co-design, co-production, co-promotion, co-pricing, co-distribution, co-consumption, and co-maintenance. Consequently, consumer involvement in development and improvement of products and business process must be widely analyzed in various contexts.
Methodology	The research is a questionnaire survey study of 388 prosumers in Poland and 76 in the UK.
Contribution	The contribution of this research is twofold. First, it identifies how prosumers can be engaged in business processes through knowledge sharing. Second, it investigates the differences between Poland- and UK-based prosumers in engagement in business process.

Accepting Editor Geoffrey Z. Liu | Received: December 12, 2018 | Revised: February 5, April 3, April 9, 2019
| Accepted: April 19, 2019.

Cite as: 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>

(CC BY-NC 4.0) This article is licensed to you under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). When you copy and redistribute this paper in full or in part, you need to provide proper attribution to it to ensure that others can later locate this work (and to ensure that others do not accuse you of plagiarism). You may (and we encourage you to) adapt, remix, transform, and build upon the material for any non-commercial purposes. This license does not permit you to use this material for commercial purposes.

Findings	The study found that prosumers are engaged in knowledge sharing at each stage of the business process innovation framework. However, there are differences in the types of processes that draw on prosumers' engagement. Prosumers in Poland are found to engage mostly in the business process of developing and managing products, whereas prosumers in the UK engage mostly in the business process of managing customer services.
Recommendations for Practitioners	This study provides practitioners with guidelines for engaging prosumers and their knowledge sharing to improve process innovation. Companies gain new insight from these findings about prosumers' knowledge sharing for process innovation, which may help them make better decisions about which projects and activities they can engage with prosumers for future knowledge sharing and creating prospective innovations.
Recommendations for Researchers	Researchers may use this methodology and do similar analysis with different samples in Poland, the UK, and other countries, for many additional comparisons between different groups and countries. Moreover, a different methodology may be used for identifying prosumers' engagement and knowledge sharing for processes improvement.
Future Research	This study examined prosumers' engagement from the prosumers' standpoint. Therefore prosumers' engagement from the company perspective should be explored in future research.
Keywords	consumer engagement, consumer knowledge, prosumer, knowledge sharing, business processes, consumer innovations

INTRODUCTION

In the increasingly competitive knowledge-based economy, companies from all over the world face profound changes in technology as well as demographical, social, economic, and cultural transformations. Their business success depends on innovative activities that target new products, new processes, new business practices, and new markets (Seran & Izvercian, 2014). Companies must seek innovative methods of doing business, quickly react to consumer demands, and provide superior value to consumers. In this context, innovations and related knowledge management are seen as major strategic concepts, which can significantly enhance companies' abilities to effectively respond to fickle customer requirements and maintain the competitive performance (Al-Sa'di, Abdallah, & Dahiyat, 2017; Dahiyat, 2015). For years, innovation practices were something companies did in-house. However, this guarded approach to innovations and knowledge management, when confined to the internal companies' research and development activities, is often very costly and too lengthy, not always reflecting consumers' actual needs, and thus becomes less effective (Deloitte, 2018). To address this underperformance, companies should be more open to external knowledge sources that help to boost innovation performance (Caputo, Lamberti, Cammarano, & Michelino, 2016) and reallocate traditionally separated tasks into new forms of horizontal stakeholder collaborations (Kortmann & Piller, 2016). Furthermore, they have realized that obtaining, managing, and sharing consumer knowledge can be a valuable resource to create innovations and maintain their market competitiveness (Pandey, Shukla, & Maurya, 2014). More and more companies are putting customers at the heart of their innovation efforts and encourage them to share knowledge, engage in business processes, and create innovations (Deloitte, 2018).

Simultaneously, contemporary consumers are more demanding and expect service based on the 7R principle, i.e., right product, right quantity, right condition, right place, right time, right consumer, right price (Gleissner & Femerling, 2013). Consumers are often better educated, more sophisticated,

inquisitive, critical, and creative. They are characterized by social concreteness, speed, freedom, openness, innovativeness, mobility, partnership, and cooperation (Tapscot, 2009; Tapscot & Williams, 2006). Moreover, they perceive the world as a place of creation and do not wish to be only passive consumers. They want to be active co-creators of value, and satisfy their consumption needs through collaboration with companies for co-creation, co-design, co-production, co-promotion, co-pricing, co-distribution, co-consumption, and co-maintenance (Prahalad & Ramaswamy, 2004). This is made possible through consumer knowledge sharing (Gibbert, Leibold, & Probst, 2002) and prosumers' engagement in companies' processes (Zminkowska, Zminkowski, & Blaszczyk, 2017). Thus, consumers become the company's "external employees" and innovators, who share their knowledge and actively participate in designing, producing, promoting, and distributing products (Ziemba, 2013).

As stated above, the most important actors or stakeholders of companies are consumers. Consumers are thought to be uniquely qualified minds that can unlock new value in their markets. Therefore, companies have a chance to utilize the power of technologies and create mindful environments to put consumers to work and create innovations (Tapscott & Williams, 2006). The move of incorporating consumers into a range of knowledge sharing processes, through the improvement of business processes and creation of business value, accompanied by satisfying the consumers' needs and increasing value for them, allows companies to be successfully competitive in the markets (Ziemba, 2013). These new consumers who share their knowledge, actively participate in companies' business processes, and create innovations have been called "prosumers" (Ritzer & Jurgenson, 2010). The evolving role of consumers from passive recipients to active co-creators of value entails redefining the companies-consumers relationships and associated business models. In the traditional relationship, companies decide how products are designed, produced, and distributed, and by implication what is of value to consumers. In the new relationship, consumers actively participate in designing, producing and distributing products, and through resolute intention they decide what is of value to them (Prahalad & Ramaswamy, 2004).

Prosumption and prosumers have become a valid subject of research over recent years (Prahalad & Ramaswamy, 2004; Ritzer & Jurgenson, 2010; Tapscott & Williams, 2006; C. Xie, Bagozzi, & Troye, 2008). Authors including Frow, Payne, and Storbacka (2011) developed a typology of prosumption 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-creation of meaning. That typology entails the components of the formal product lifecycle, and providing an apparatus for prosumers to engage and share their knowledge ultimately creates an informal two-step process of business innovation, i.e., idea generation and idea implementation, following the Schumpeterian notion of innovation (Walsh, Lee, & Nagaoka, 2016). Companies making use of prosumers' knowledge and converting this into their innovative potential promote a paradigm of open innovation (Chesbrough, 2006). Open innovation models enable companies to be more effective in creating and capturing value (Hossain, Islam, Sayeed, & Kauranen, 2016). Companies create value while influencing discussions with prosumers on many more ideas because of their access to a comprehensive variety of external concepts, their combined efforts refocusing the alternatives, and wider consumer product preferences (Chesbrough, 2007). Among other things, Gassman, Enkel, and Chesbrough (2010) suggested the user perspective for developing the open innovation approach, following Thomke and von Hippel (2002) who defined users as a common source of innovations. The main contribution of prosumers is perceived as an enlargement and enrichment of knowledge that can be utilized for the innovation process that aims for improving processes and products matched with the needs of prosumers. Thus, the prosumers' involvement in product development and business process improvement is widely analyzed by a large stream of scholars in various contexts (Gault, 2012; Seran & Izvercian, 2014; Stock, von Hippel, & Gillert, 2016; Vaisnore & Petraitė, 2011). However, customer involvement and related activity in the innovation process -- through sharing their knowledge for improving business processes -- remains complicated, because of the absence of a conceptual framework. In addition, while there is still much research being undertaken to analyze the possible impacts of national cultures on knowledge sharing (Anantatmula, 2010;

Hauke, 2006), these authors have examined the differences between national cultures and their influence on the level of innovation (Hofstede, 2001; Smale, 2016; Strychalska-Rudzewicz, 2016; Tian, Deng, Zhang, & Salmador, 2018), and diagnosed an affect of national cultures on consumers behavior (Kacprzak & Dziwanowska, 2015; Wojciechowska, 2017). Through analyzing the influences and effects, it becomes clear that cultural perspectives must be considered across country boundaries when investigating the prosumer's role in innovations and engagement in business processes.

This paper aims to answer the main research question: *how do prosumers engage in business processes innovations through their knowledge sharing?* Accordingly, the research objectives are twofold: first to identify business processes in which prosumers can be engaged through sharing their knowledge, and second to investigate the differences between the engagement of Poland- and UK-based prosumers in business processes innovations.

The paper consists of four parts. The literature review part discusses the value of prosumers' knowledge for business process innovation. Then the methodology part describes instruments used for data gathering and stages of the research. The third part is devoted to analysis of prosumers' engagement in business processes through their knowledge sharing. The paper concludes with a discussion of the findings, implications, limitations, and avenues for further research.

LITERATURE REVIEW

PROSUMERS' ROLE IN INNOVATION

Prosumers manage to extend their role in the relationships with companies by engaging creatively in companies' activities. They share their knowledge and experience with companies and actively participate in creating products from conception as well as designing, executing, testing and distributing products (Seran & Izvercian, 2014). Therefore, prosumers as a non-professional and non-organizational subset of product users have the ability to enable "user innovation". In this context, the user denotes any user who directly benefits from innovation, in a professional or consumer context, whereas prosumers are a non-professional and non-organizational subset of users (Hyusalo, Johnson, & Juntunen, 2017). User innovation through prosumers engagement has been described and reviewed by Vaisnore and Petraite (2011) as well as by Seran and Izvercian (2014).

Based on the Oslo Manual, an innovation is the introduction of a new or significantly improved product (good or service) on the market, or new or improved processes, marketing methods, or organizational methods brought into actual use in the companies' operations (Gault, 2012). Therefore, a prosumer innovation can be defined as a functionally novel product, process, or application developed by prosumers at private cost in their unpaid discretionary time (von Hippel, 2017). Prosumers occasionally innovate for commercial reasons (e.g., pay, royalties, and favors) (de Jong, Gillert, & Stock, 2018; Ziemba & Eisenhardt, 2016). Much more often, however, prosumers are driven by personal need or benefits derived from the innovation process itself (e.g., enjoyment, learning, satisfaction) (Raasch & von Hippel, 2013; Ziemba & Eisenhardt, 2016).

A series of studies in various countries have confirmed that user innovation is a quite widespread activity (Franke, Schirg, & Reinsberger, 2016). National surveys of citizens in the UK, USA, and Japan showed that millions of individuals in each of these nations developed or modified products to better serve their personal needs (von Hippel, Ogawa, & de Jong, 2011). In another study, de Jong (2016) indicated that the frequency of prosumer innovations in general populations is 4–6% in various examined countries.

By engagement of prosumers, companies can open up the innovation process and insource prosumers' knowledge and thus benefit from external knowledge while developing internally (Vanhaverbeke & de Vrande, 2008). The prosumer's role and activities in the innovation process vary by the degree of involvement and stage of innovation (Vaisnore & Petraite, 2011). Accordingly, the innovation process incorporates three generic stages (Vaisnore & Petraite, 2011):

- **Idea generation:** a stage where prosumers' ideas and concepts are collected or generated. It is focused on the identification and generation of opportunities, fresh ideas, and novel concepts. Following this iterative process, promising prosumers' ideas and concepts can be selected out of a range of alternatives and then be further processed;
- **Development:** a stage where those selected ideas are developed and specified. It is focused on collaborating, tinkering, co-designing, and submitting new or improved products; and
- **Commercialization:** a stage where value creation takes place by transforming ideas into new or improved products. Prosumers can take on the roles of testers, end users, or buyers of products.

Prosumer communities can be an incredible source of innovation if companies give prosumers the tools and instruments they need to share their knowledge for creating innovations (Tapscott & Williams, 2008). Felin and Zenger (2014) discussed a set of such instruments: communication channels for knowledge sharing, incentives, and property rights for appropriating value from innovation. Ziemba and Eisenhardt (2017) provided a comprehensive framework of employing prosumers' knowledge for companies' innovations which incorporates (1) types of prosumers' knowledge, (2) ways of sharing prosumers' knowledge, (3) attitudes of prosumers toward knowledge sharing, (4) incentives encouraging prosumers to share knowledge, (5) business processes in which prosumers' knowledge can be used for creating innovations, and (6) information-communication technologies supporting prosumers' knowledge sharing.

PROSUMERS' ENGAGEMENT IN BUSINESS PROCESSES INNOVATIONS

As described above, prosumers can be engaged in business process innovations, and prosumers' knowledge can be embedded into these innovations. There are many models and classifications of business processes in the literature, for example, Porter's classification (Porter, 1985), Kaplan's and Cooper's classification (Kaplan & Cooper, 1998), and congeneric APQC (American Productivity and Quality Center) Process Classification Framework (PCF) (APQC, 2018).

In using the APQC PCF in their research, Ziemba and Eisenhardt (2015) proposed a conceptual framework of prosumer engagement for creating innovations. The choice of the PCF was justified by the fact that this framework is a taxonomy of cross-functional business processes intended to allow for the objective comparison of organizational performance within and among organizations. The PCF sets an open standard to encourage improvement through process management and benchmarking, irrespective of industry, its size, or location (APQC, 2018).

The proposed framework embraces four operational processes in which prosumers' engagement can be notably used for creating innovations. They are the following: (1) developing and managing products; (2) marketing and selling products; (3) delivering products; and (4) managing customer service. For each of these processes, various types of prosumer engagement have been indicated. Based on further research (Ziemba, Eisenhardt, Mullins, & Grabara, 2018), it is possible to modify the framework. In doing so, some types of prosumer engagement have been combined while others have been removed from this framework. The modified framework used in this research is presented in Table 1.

It is necessary to emphasize that the prosumer's engagement related to the business process innovations, as specified in Table 1, can be attempted at the three stages mentioned above, i.e., idea generation, development, and commercialization. For example, prosumers may engage in the process of Developing and Managing Products by sharing knowledge to design new products and new functionalities of products for commercialization. The engagement of prosumers at each stage of the innovation process becomes quite significant for the business. For instance, prosumers can co-create a concept of new products (idea generation), prosumers can co-design new products (development), and prosumers can co-price and co-distribute the new products (commercialization).

Table 1. The conceptual framework of prosumers' engagement in business processes

Operational business processes	Types of prosumers engagement	Code
BP2* Develop and manage products	<ul style="list-style-type: none"> • designing new products • designing new functionalities of products • improving materials from which products were made • designing package or graphic elements of the product • improving reliability and durability of products • improving ease and intuitiveness of product usage • improving effectiveness and efficiency of usage 	<ul style="list-style-type: none"> • e1 • e2 • e3 • e4 • e5 • e6 • e7
BP3 Market and sell products	<ul style="list-style-type: none"> • designing advertising campaigns • creating product pricing strategy • creating product loans strategy 	<ul style="list-style-type: none"> • e8 • e9 • e10
BP4 Deliver products	<ul style="list-style-type: none"> • establishing new channels of sale • improving ordering process 	<ul style="list-style-type: none"> • e11 • e12
BP5 Manage customer service	<ul style="list-style-type: none"> • improving handling complaints and warranty services • improving consumer service 	<ul style="list-style-type: none"> • e13 • e14

*Numbering identification of processes is associated with APQC PCF

Source: Ziemba & Eisenhardt, 2015; Ziemba et al., 2018

INFLUENCE OF NATIONAL CULTURE ON KNOWLEDGE SHARING, INNOVATION, AND CONSUMER BEHAVIOR

Culture is defined as behavioral patterns and traits, which are passed through social interaction and developed over time (Laitinen, Pawlowski, & Senoo, 2015). The study reported here concentrates solely on national culture, which can be defined as the profile of a society with respect to behaviors, beliefs, norms, values, customs, and institutions shared by the population of a sovereign nation (Hofstede, 2001). In essence, national culture is a system of beliefs that are deeply embedded within the society and is reflected in the behaviors of its organizations and people (Chen, Sun, & McQueen, 2010). This system is composed of diverse variables including language, religion, rules and regulations, political system, social organization, history, economy, technology, education, values, attitudes, customs, traditions, concept of time, music, art, and architecture (Khan & Law, 2018). The best known (and probably most comprehensive) study on national culture was done by Hofstede and Minkov (2010). In their study, the authors identified six dimensions of culture: power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, long- vs. short-time orientation, and indulgence/restraint. G. Xie and Paik (2018) indicated that some countries may be quite close from the geographical point of view but their national cultures are surprisingly different. For example, there are major distinctions between the national culture of the UK and that of Poland in the Hofstede's dimensions: power distance, individualism/collectivism, uncertainty avoidance, and indulgence (Hofstede, 2019). The UK is characterized by low scores on power distance and uncertainty avoidance as well as high scores on indulgence, and it was found to be the most individualistic society. In contrast, Poland, found to be the most collectivistic society, has high scores on power distance and uncertainty avoidance, but low scores on indulgence.

The extant literature identified the importance of national culture from a perspective of knowledge sharing (Hauke, 2006; Ryan, Windsor, Ibragimova, & Prybutok, 2010). It has been revealed that different national cultures understand knowledge and its value differently (Anantatmula, 2010) and play a critical role in the knowledge transfer process (Chen et al., 2010). While Ryan et al.'s (2010) results support a model of core organizational practices that foster knowledge sharing and are transferable across national cultures, their findings also support the need for careful consideration of the type of knowledge sharing practices applied across different cultures. According to Hofstede (2001) and Gesteland (2002), there are national culture differences between the UK and Poland influencing

knowledge sharing among enterprises and their stakeholders. Poland belongs to countries which are relationship-focused, formal in the way they interact, fluid when it comes to time, and expressive, whereas the UK is deal-focused, formal in the way they interact, rigid when it comes to time, and reserved. Furthermore, Hauke (2006) indicated that, despite the cultural differences between the UK and Poland, all enterprises make much effort to ensure good conditions for knowledge sharing between their employees and co-operators. In Eisenhardt, Ziemba, and Mullin's study (2018) of main barriers to knowledge sharing for Poland- and UK-based consumers, the principal difference between countries pertains to actual reluctance to share knowledge. Consequently, UK-based consumers are by far more reluctant to share knowledge than Poland's consumers are. From these findings, it can be inferred that there are some difference between Poland- and UK-based prosumers in knowledge sharing for business process innovations.

Besides the impact on knowledge sharing, national culture affects innovation (Hofstede, 2001; Smale, 2016; Strychalska-Rudzewicz, 2016; Tian et al., 2018). Based on a systematic literature review of peer-reviewed papers published between January 1980 and January 2017, Tian et al. (2018) revealed that there exist significant influences of national culture on innovation. In addition, they stressed that studies on the effect of national culture on innovation has not changed much over time, for the reason that national culture has little change in a short period of time. According to Smale's (2016) empirical research, there are statistically significant correlations (and implied causality) between national culture and innovation, including differentially both initiation and implementation. Andrijauskiene & Dumciuvienė's (2018) analysis of the relationship between national culture and innovation suggests that societies having a potential to innovate have the following features: highly individualistic culture (high individualism), willingness to demand justification for inequalities of power (low power distance), feeling comfortable with uncertainty and risks (low uncertainty avoidance), and freely satisfying basic needs and desires by placing a higher degree of importance on leisure time (high indulgence). The UK, as the most individualistic society characterized by lower scores on power distance and uncertainty avoidance as well as high scores on indulgence, is seen to be more innovative than Poland, which is characterized by higher scores on power distance and uncertainty avoidance, lower scores on indulgence, and being the most collectivistic society (Andrijauskiene & Dumciuvienė, 2018). Based on this, it can be assumed that there are some differences between Poland- and UK-based prosumers regarding their engagement in business processes innovations.

Similar to the influence of national culture on knowledge sharing and innovation, national culture plays a vital role in consumer behavior (Kacprzak & Dziewanowska, 2015; Wojciechowska, 2017) and consumer innovativeness (Jain & Dalal, 2015). de Mooij (2017) compared consumer behavior using various multidimensional models of national culture, including a model by Hofstede (2001). Her findings confirmed that of all the models only a few dimensions do not show meaningful relationships with consumer behavior. Wojciechowska (2017) examined Poland- and UK-based consumers, and her findings showed significant relationship between national culture and consumer shopping styles and how consumers perceive branded products. Fandrejewska's (2017) study also indicated the significant impact of national culture on consumer behaviors in Poland and the UK. In addition, Yenyurt and Townsend (2003) indicated that power distance and uncertainty avoidance hinder the acceptance of new products, whereas individualism has a positive effect on the diffusion of new products. Furthermore, power distance and uncertainty avoidance turned out to be important determinants of consumer innovativeness (Jain & Dalal, 2015).

From the systematic review of literature covering a wide range of features and dimensions of culture, it becomes clear that the difference between national cultures across country boundaries must be taken into consideration when investigating prosumers' role in innovations and their engagement in business processes. Therefore, our study validates and compares prosumer engagement in business process innovations in the UK and Poland.

RESEARCH PROBLEM, QUESTIONS & HYPOTHESES

The research problem of this study is to investigate and explain consumer involvement with enterprises in negotiating improvements to business processes. The main research question is: How do prosumers engage in business process innovations through their knowledge sharing? To answer the above main research question, the study focuses on addressing the following two specific questions:

RQ1: Are there statistically significant differences between Poland- and UK-based prosumers' engagement in business process innovations?

To answer the first question (**RQ1**), the following hypothesis was developed:

H1: There are statistically significant differences between Poland- and UK-based prosumers' engagement in business process innovations.

RQ2: Are there statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to individual business process innovations?

To answer the second question (**RQ2**), the following hypotheses were developed:

H2a: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP2 innovations.

H2b: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP3 innovations.

H2c: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP4 innovations.

H2d: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP5 innovations.

METHODOLOGY

To address the main research problem, answer the specific research questions, and test the formulated hypotheses, a quantitative research approach was adopted and a questionnaire survey was conducted. The process is documented in detail below.

RESEARCH INSTRUMENT

We developed a prosumer survey questionnaire to collect empirical data from PL-based and UK-based prosumers (see Appendix). The original survey was designed in Polish, and then it was translated into English. We used the survey in Polish in Poland and then its English language version in the UK. The questionnaire contained a question concerning specified types of prosumers engagement, as presented in Table 1. The question was: *Please indicate, what is your engagement with products' or companies' comments or development concerns?* For each listed type of engagement, the respondents could choose one of five responses, according to a 5-point Likert scale: (1) definitely not (never), (2) probably not, (3) I don't know (no answer), (4) probably yes, (5) definitely yes (many times).

In November 2014 the more in-depth pilot survey was conducted in Poland. The purpose was to test and methodologically scrutinize the questionnaire. For reliability analysis, Cronbach's coefficient alpha was used. Cronbach's alpha for the 16 analyzed items was 0.881. Hinton, Brownlow, McMurvay, and Cozens (2004) suggested four different ranges of reliability, i.e., the excellent range (0.90 and above), the high (0.70-0.90), the high moderate (0.50-0.70) and the low (0.50 and below). Thus, it can be concluded that the scale had high reliability and it could be used in the research process. Moreover, substantive scrutiny of the questionnaire enabled the researchers to perform minor changes in order to improve the quality of the questionnaire.

DATA COLLECTION

The data were collected in two stages:

1. The survey of PL-based prosumers ran online from December 2014 through March 2015. Using the CAWI (Computer-Assisted Web Interview) method, the survey questionnaire was implemented as a website hosted on the Polish platform Ankieta.pl.
2. In the United Kingdom, the BOS (Bristol Online Survey) was employed. It is an online tool that permits contacting an accessible audience as the survey appears on the list of search engine results by adding metatags and appropriate keywords. The online survey ran from February through April in 2016.

SAMPLES

The targeted sample size in Poland was 2,500 people of different age, gender, and ICT skills, and the URL of the online survey in the UK was posted to 1,000 individuals of different age, gender, and ICT skills. After screening to exclude outliers, the survey produced a total of 388 valid responses from Poland and 76 from the United Kingdom, with a response rate of 15.5% and 7.6% correspondingly. The demographics of survey respondents are presented in Table 2.

Table 2. Demographic statistics of survey respondents

Demographic factors	Poland		United Kingdom	
	Number of respondents	Percentage	Number of respondents	Percentage
Gender				
Females	267	68.8%	40	52.6%
Males	121	31.2%	36	47.4%
Age				
Builders & Baby-Boomers (B-B) generations: +50	25	6.4%	7	9.2%
X generation: 36–50 years old	64	16.5%	34	44.7%
Y generation: 21–35 years old	179	46.1%	31	40.8%
Z generation: less than 21 years old	120	30.9%	4	5.3%
Level of education				
higher education	256	66.0%	29	38.2%
less than higher education	132	34.0%	47	61.8%

DATA ANALYSIS

The survey responses were compiled into data in Microsoft Excel format and analyzed with PS IMAGO and Statistical packages. The data analysis consisted of three parts: Cronbach's alpha for instrument reliability, Pearson correlation between types of prosumer engagement, per-item descriptive statistics for summary, and the Mann-Whitney U test for hypothesis testing.

Cronbach's coefficient alpha was used for assessing the reliability of instrument. For all the analyzed items (types of prosumers engagement), Cronbach's alpha was 0.86. The results showed that the removal of some items would not lead to improvement of internal consistency among items on the scale (it varies from 0.845 to 0.857). Overall, the original Cronbach's coefficient alpha scores with all 14 items and four business processes show a strong internal consistency and reliability.

Analysis in the form of descriptive analysis was employed to compare the engagement of Poland- and UK-based prosumers in business processes. The following statistics were calculated: mean (MN),

median (MDN), mode (MD), standard deviation (SD), coefficient of variation (CV), and skewness (SK).

Since the online survey was of convenient samples, the Mann-Whitney U test was used to test the hypotheses, specifically to identify differences between Poland- and UK-based prosumers. This test was selected because it does not require satisfying the assumptions of random sampling and homogeneity of variances.

RESULTS

PROSUMERS' ENGAGEMENT IN BUSINESS PROCESS INNOVATIONS – GENERAL ANALYSIS

The results summary specifies that the means for Poland- compared to UK-based prosumers are higher for each of the fourteen types of business process innovations. This instantly indicates that PL-based prosumers are more willing to engage in knowledge sharing than UK-based prosumers (Table 3). Further, UK-based prosumers appear to be less enthusiastic to share knowledge relating to the various types of business process innovations, where the majority of the median and mode values are 2, except for e12, e13 and e14. The coefficient of variation is used to describe the level of dispersion around the mean calculated as the ratio of the standard deviation to the mean. A low value of the coefficient of variation for each of the business process types for Poland- and UK-based prosumers is reported, which in this case is a good measure of preciseness of the estimate. The skewness for Poland was generally negative for all types of processes except for e1, e8 and e10, whereas the skewness reported for UK-based prosumers was generally positive except for e12, e13 and e14. Following on from these initial descriptive results, further statistical analysis was undertaken.

Table 3. Summary analysis of Poland- and UK-based prosumers' engagement in business process innovations

Process	Type	Poland							United Kingdom						
		CS	MN	MDN	MD	SD	CV	SK	CS	MN	MDN	MD	SD	CV	SK
BP2	e1	3.29	3	3	4	1.30	0.48	0.08	2.83	3	2	2	1.07	0.40	0.67
	e2		3	3	4	1.25	0.42	-0.15		3	2	2	1.09	0.40	0.55
	e3		3	3	4	1.28	0.44	-0.09		2	2	2	0.92	0.39	1.50
	e4		4	4	4	1.12	0.30	-0.95		3	2	2	1.17	0.40	0.39
	e5		4	4	4	1.23	0.34	-0.77		3	3	2	1.14	0.38	0.05
	e6		4	4	4	1.18	0.32	-0.85		3	2	2	1.17	0.40	0.33
	e7		3	4	4	1.26	0.36	-0.57		3	4	2	1.14	0.37	0.09
BP3	e8	2.45	3	2	2	1.34	0.52	0.34	2.29	2	2	2	0.81	0.39	1.92
	e9		3	3	4	1.38	0.46	-0.18		3	2	2	1.16	0.46	0.59
	e10		2	1	1	0.99	0.56	1.31		2	2	2	1.11	0.49	0.83
BP4	e11	3.23	3	3	4	1.30	0.43	-0.17	2.82	2	2	2	1.11	0.46	0.58
	e12		3	4	4	1.31	0.38	-0.57		3	4	4	1.29	0.40	-0.36
BP5	e13	3.41	3	4	4	1.36	0.42	-0.31	3.41	3	4	4	1.27	0.39	-0.26
	e14		4	4	4	1.27	0.35	-0.75		4	4	4	1.22	0.34	-0.93

Abbreviations used: CS - composite score, MN – mean, MDN – median, MD – mode, SD – standard deviation, CV – coefficient of variation, and SK – skewness.

The results of Mann-Whitney U test for testing hypothesis **H1** (to answer RQ1) are presented in Table 4.

Table 4. The Mann-Whitney U test for exploring the differences between Poland- and UK-based prosumers' engagement in business process innovations

	BP2	BP3	BP4	BP5
Z	-12.81	-6.49	-6.23	-2.44
p-value	0.000	0.000	0.000	0.015

The results show that for each business process the p-value is lower than 0.05 (the significance level for the study is 0.05), which means that there are statistically significant differences between Poland- and UK-based prosumers in their engagement in business processes innovations. Thus, hypothesis **H1** is supported in our study.

It is advisable to emphasize that the results presented above are general – they embrace all types of prosumers' engagement within individual business processes. Thus, we decided to perform detailed analysis on these differences as our intention was to draw a whole picture of Poland- and UK-based prosumers' knowledge sharing through engagement in business process innovation.

PROSUMERS' ENGAGEMENT IN BP2 INNOVATIONS

The results of Mann-Whitney U test for testing hypothesis **H2a** are presented in Table 5. As shown, the p value is lower than 0.05 in each case. The results indicate that there were significant differences between Poland- and UK-based prosumers in each type of engagement. Thus, hypothesis **H2a** is fully supported in our study.

Table 5. The Mann-Whitney U test results for exploring the differences between Poland- and UK-based prosumers' engagement in BP2 innovation

	e1	e2	e3	e4	e5	e6	e7
Z	-5.41	-6.55	-10.53	-12.50	-9.88	-13.17	-9.04
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The results of detailed frequency analysis present the differences between Poland- and UK-based prosumers in each of the seven types of engagement (Figure 1). The percentage values indicate the number of prosumers who want to be engaged in innovations of BP2. The biggest differences pertain to *improving ease and intuitiveness of product usage* (the difference is 37.4%), *designing package or graphic elements of the product* (the difference is 35.5%), and *improving materials from which products were made* (the difference is 33%). In general, the results show that most of PL-based prosumers want to engage in knowledge sharing and the innovations of BP2 (i.e., more than 70% of them want to be engaged in *designing packaging or graphical elements of the product*, *improving reliability and durability of products* as well as *improving ease and intuitiveness of product usage*) while there is only 40-50% of UK-based prosumers who want to be engaged in BP2 innovations.

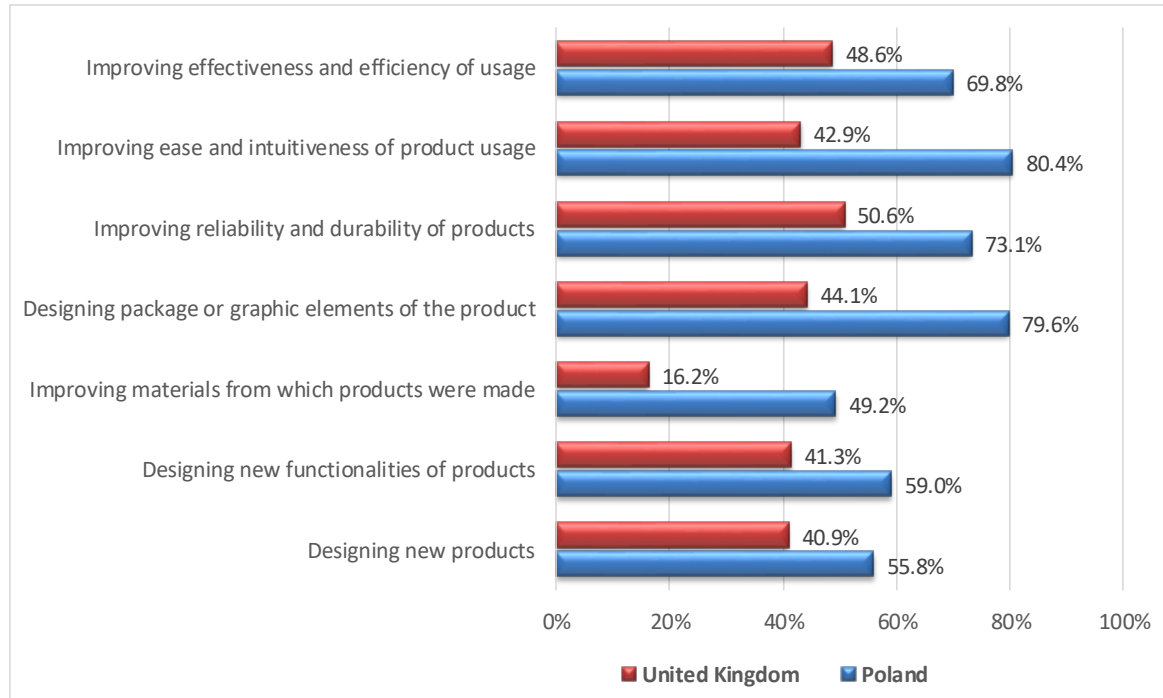


Figure 1. The differences between Poland- and UK-based prosumers' engagement in BP2 innovations

PROSUMERS' ENGAGEMENT IN BP3 INNOVATIONS

The results of Mann-Whitney U test for testing hypothesis **H2b** are presented in Table 6. As shown, in the case of *designing advertising campaigns* (e8) and *creating product pricing strategy* (e9), the p values are lower than 0.05. It indicates that there were significant differences between Poland- and UK-based prosumers in the case of *designing advertising campaigns* as well as *creating product pricing strategies*. The test did not show any significant difference between prosumers in Poland and in UK for *creating product loans strategy* (e10). Thus, hypothesis **H2b** is partially supported in our study.

Table 6. The Mann-Whitney U test results for exploring the differences between Poland- and UK-based prosumers' engagement in BP3 innovations

	e8	e9	e10
Z	-7.18	-8.30	-1.85
p-value	0.000	0.000	0.064

The detailed frequency analysis presented in Figure 2 shows that the biggest differences between Poland- and UK-based prosumers' engagement pertain to *designing advertising campaigns* and *creating product pricing strategy* (in both cases it is about 21%). In general, the results show that a greater number of PL-based prosumers want to be engaged in knowledge sharing and the innovations of BP3, nonetheless in the case of *creating product loans strategies* the UK-based prosumers appear to want to be engaged, in fact as much as twice as much as the PL-based prosumers.

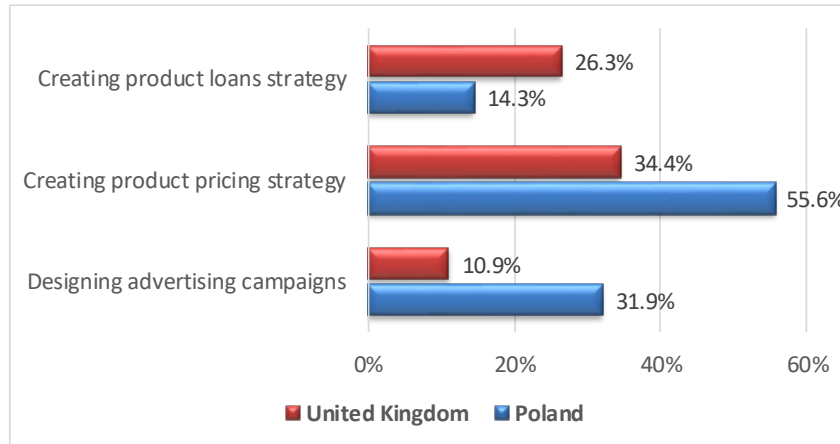


Figure 2. The differences between Poland- and UK-based prosumers’ engagement in BP3 innovations

PROSUMERS’ ENGAGEMENT IN BP4 INNOVATIONS

The results of Mann-Whitney U test for testing hypothesis **H2c** are presented in Table 7. As shown, in the case of *establishing new channels of sale* (e11) the p value is lower than 0.05. It indicates that there were significant differences between Poland- and UK-based prosumers for this type of engagement. The test did not show any significant differences between prosumers for *improving ordering process* (e12). Thus, hypothesis **H2c** is partially supported in our study.

Table 7. The Mann-Whitney U test results for exploring the differences between Poland- and UK-based prosumers’ engagement in BP4 innovations

	e11	e12
Z	-9.28	-1.41
p-value	0.000	0.158

The results of detailed frequency analysis present that the differences between Poland- and UK-based prosumers’ engagement in *establishing new channels of sale* is equal to 23.7%, while there is no difference in the case of *improving ordering process* (Figure 3).

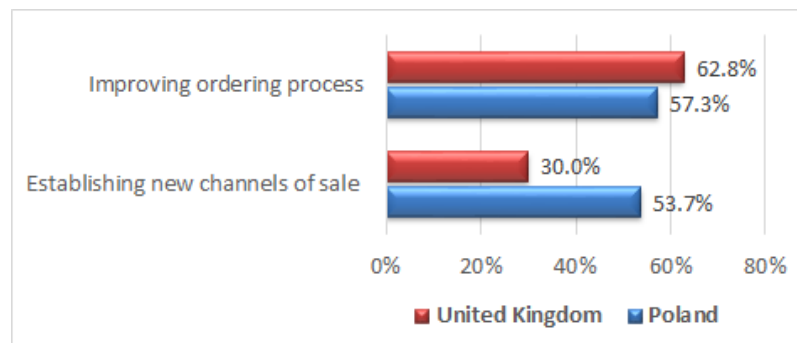


Figure 3. The differences between Poland- and UK-based prosumers’ engagement in BP4 innovations

PROSUMERS' ENGAGEMENT IN BP5 INNOVATIONS

The results of the Mann-Whitney U test for testing hypothesis **H2d** are presented in Table 8. As shown, in the case of *improving consumer service* (e14) the p value is lower than 0.05. This indicates that there were differences between Poland- and UK-based prosumers in this specific type of engagement. The test did not show any significant differences between prosumers in the case of *improving handling complaints and warranty services* (e13). Thus, hypothesis **H2d** is partially supported in our study.

Table 8. The Mann-Whitney U test results for exploring the differences between Poland- and UK-based prosumers' engagement in BP5 innovations

	e13	e14
Z	-1.62	-3.27
p-value	0.106	0.001

The detailed frequency analysis presented in Figure 4 shows that the differences between Poland- and UK-based prosumers' engagement in *improving handling complaints and warranty services* is equal to 3.6% while the differences between Poland- and UK-based prosumers in engaging in *improving consumer service* is only 1.4%. In general, these results show that most of the Poland- and UK-based prosumers want to be engaged in knowledge sharing and the innovations of BP5 – the percentage values vary from 54.7% to 64.6%. This result indicates the lowest variance of all the process innovations between Poland- and UK-based prosumers.

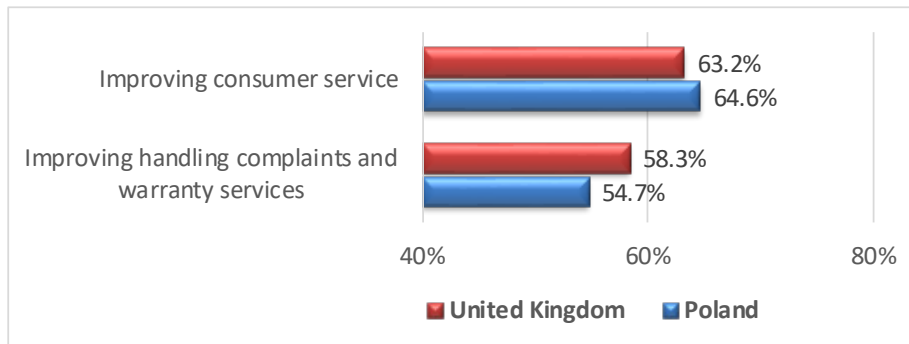


Figure 4. The differences between Poland- and UK-based prosumers' engagement in BP5 innovations

FINDINGS & DISCUSSION

The results revealed partial support for three of the formulated hypotheses (**H2b, H2c, and H2d**), and two hypotheses (**H1 and H2a**) was fully supported in our study (Table 9).

The results clearly show that there are statistically significant differences between Poland- and UK-based prosumers' engagement in business process innovation, and the hypothesis **H1** is supported. These differences might arise from the fact that the UK belongs to innovation leaders of the European Union (EU) with innovation performance well above that of the EU average, whereas the innovation performance of Poland is below that of the EU average and is classified as moderate innovators (EU, 2018). It has been seen that Poland has been improving their innovation position faster than the EU's average, but this is mainly due to the fact that the most developed countries generally progress slower. The fact that PL-based prosumers are more willing to engage in knowledge sharing than UK-based prosumers may be because Poland is still in the early stages of adopting social media and ICT tools for engaging with customers, at least when the study was undertaken. Perhaps they are more willing because it is still seen to be a new and exciting form of dialog with business, whereas in

the UK this type of communication has been in place for many years but the business responses, seen as digital marketing actions have not kept pace with consumer expectations, and more effort on the part of UK businesses to manage the communications may yield greater and informed engagement for each of the types of business process innovations (Ziemba & Mullins, 2016). Further, this suggests that organizational practices (Ryan et al., 2010) across cultural boundaries need tactical plans that foster knowledge sharing. Ding, Vuchkovski, Žabkar, Hirose, and Rašković (2018) have tested consumer innovativeness and, although we did not measure national culture dimensions or personal culture orientations, nonetheless, our results do show that prosumers' engagement in business process innovation through their knowledge sharing is likely determined by regional backgrounds. The cultural affect seen through regional backgrounds and their influence on the level of innovation is considered by numerous authors (Hofstede, 2001; Smale, 2016; Strychalska-Rudzewicz, 2016; Tian et al., 2018), and through analyzing these types of cultural influences it is clear that cultural perspectives may determine prosumers role in innovations and their engagement in business processes.

Table 9. Summary of hypotheses tests

Hypothesis	Findings
H1: There are statistically significant differences between Poland- and UK-based prosumers' engagement in business process innovations	Supported
H2a: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP2 innovations	Supported
H2b: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP3 innovations	Partially supported
H2c: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP4 innovations	Partially supported
H2d: There are statistically significant differences between Poland- and UK-based prosumers' engagement which contribute to BP5 innovations	Partially supported

Further, UK-based prosumers appear to be reluctant to share knowledge relating to the various types of business process innovations, except for e12, e13 and e14, interestingly these are the final stages of the processes suggesting they feel they have a more powerful voice during these types of activities. It is clear to see areas where business relationships need to be fostered to harvest improvements in the engagement with prosumers (Avery, Fournier, & Wittenbraker, 2014). On the other hand, it could be noted that this may also be some kind of inclination to express themselves and show group belongingness through consumption (Ding et al., 2018), especially when it comes to BP5 Manage Customer Service innovativeness.

When comparing each of the seven process types between Poland- and UK-based prosumers, hypothesis **H2a** is supported indicating statistically significant differences between Poland- and UK-based prosumers in their engagement in business process innovations. In the case of PL-based prosumers it may be that a higher priority is placed upon these fundamental important factors, improving ease and intuitiveness of product usage and designing package or graphic elements of the product, and these may be the features that determine why a product is bought which is why more than 70% are willing to engage in knowledge sharing in these processes. Whereas UK-based prosumers are more economically adept and may feel these particular features and processes have been settled as a result of businesses responding to their demand centric consumer society. As Poland becomes more economically rich, these fundamental process types will not be the main concern and the business strategic response will have to alter to match demand. Interestingly, these are potentially economic influential factors that explain current and future cultural difference on knowledge sharing (Anantatmula, 2010; Hauke, 2006).

The PL-based prosumers have a strong interest in engaging with business in the design of advertising campaigns and creating product pricing strategy, but are much less engaged in creating product loans strategy. While UK-based prosumers display the opposite tactical engagement with an emphasis on engaging in creating product loans strategies which may suggest they are more consumer conscious about types of loans that can be attractive to purchasing agreements and use this knowledge to leverage their purchasing power over businesses. Much of Poland's purchases are based on debit and the consumers use credit less than seen by UK consumers. The Polish consumers are more likely risk averse and use less credit cards whereas UK consumers are more used to using different credit card systems and credit processes. These are further examples of why cultural differences matter and why enterprises should frame their knowledge sharing around those features that can impact on the business consumer relationship, shaping knowledge sharing engagements and tactics into new forms of horizontal stakeholder collaborations (Kortmann & Piller, 2016).

It is clear that the PL-based prosumers are eager to engage with businesses in establishing new channels of sale, suggesting they want markets to open up greater choices to consumers. Interestingly both Poland- and UK-based prosumers are concerned with the delivery and fulfillment practices, particularly in improving ordering processes. This process type is the second most important of the innovations from the UK-prosumers perspective, and as Internet-based business make gains this part of the business process is of high strategic importance.

There were marginal differences between Poland- and UK-based prosumers in managing customer services, in particular in improving consumer service, and this was reported as the third priority process from the UK perspective. Also, the UK-based prosumers indicated that improving handling complaints and warranty services was their highest priority of all the fourteen types of process innovations. In fact both countries indicated the lowest variance of all the process innovations in managing customer services. This is an interesting cross-country preference from the prosumers. Cultural differences challenge the way knowledge is communicated and delivered across countries indicating the need to pay attention to cross-country preferences such as communication style, perception of power and risk and in particular trust bring recognized as one of the main factors in expecting individuals or the enterprise to share knowledge (Kaps, 2011), and it is clear that enterprises need to do more to create a culture of trust with consumers if they want to create ways to generate active knowledge sharing.

However the top three types of process innovations that PL-based prosumers are most keen to engage in are, in order of priority, ease and intuitiveness of product usage, followed by designing package or graphic elements of the product, and, third, reliability and durability of products. Interestingly all of these priority area are associated with BP2, whereas UK-based prosumers concerns are firmly placed in BP4 and BP5 indicating a degree of polarization of the process innovations between the two countries. The economic landscape in Poland has changed since the early 1990's, which affects the ways consumers communicate more openly with enterprises. Previously enterprises were state owned where consumers would not be able to contribute at any stage in the product life-cycle; whereas, in recent times the consumers may feel more liberated to collaborate with the rise of the capitalist system (Mróz, 2010).

The results lend themselves to being converted into guidelines to inform business strategic design, especially in using the proposed framework to address the four operational processes in which prosumers' engagement can be notably used for creating prosumers' process innovations. Our results are convergent with Johannsen's (2018) results which focused on using enterprise social media technologies for external communication purposes. The author's results show that the value propositions for business processes were largely reported for the "operating processes" of the APQC framework.

Finally, as prosumers engage with businesses it is speculated that the businesses are the parties who profit most from the current arrangements and the importance of rewarding the prosumers for their

contributions needs to be part of the process business model to appreciate the innovative value created from these mutual gains (Tapscott & Williams, 2006).

CONCLUSION

CONTRIBUTIONS

The paper represents one of the few studies on consumers' engagement in business process innovation through knowledge sharing. Findings of the study contribute to the theoretical and practical fields of knowledge management, consumer behavior, and innovation by incorporating the roles of consumers and their knowledge in innovation creation. The contribution of this study to these fields is fourfold. First, the study identified how prosumers can be engaged in business processes through knowledge sharing, and, second, it investigated the differences between the engagement of Poland- and UK-based prosumers in developing business process innovations. The third contribution is that the study uses the business process framework at a practical level to identify where prosumers apply their knowledge sharing efforts, which can be used to inform business strategy design. The fourth contribution reports the cultural difference in knowledge sharing and denotes these as cross-country preferences.

The study found that prosumers are engaged in knowledge sharing at each stage of the business process innovation framework. Prosumers have an interest in engaging with business in (1) developing and managing products, (2) marketing and selling products, (3) delivering products, and (4) managing customer service. However, there are differences in the types of processes that draw on prosumers' engagement. Prosumers in Poland are found to engage mostly in the business process of developing and managing products, whereas prosumers in the UK engage mostly in the business process of managing customer services.

Prosumers engagement in the business processes enables an enterprise to recognize the innovation connections necessary between each of the stages of the process innovation framework. Interestingly, as the framework was designed from the business perspective it may not be viewed as a linear process from the customer perspective, and this requires cognizance of designing frameworks for agile and flexible product design and delivery to meet the innovation processes directed to the prosumers. As prosumers engage in the process at any one stage it should trigger a response at that stage in the process, with the systems and actors in place to capture and match the conversation to the required process change realizing that innovation change. It may also necessitate a response either upstream or downstream in the process creating connections between the business and its suppliers, drawing prosumers even closer into the extended value network. It is this innovation process effect that will require the tiers of supply chain activities to evolve new methods for value collaboration and customization, no doubt an area where automation and artificial intelligence (AI) methods and techniques will be introduced into the processes at an operational level for improving and refining the stages of the process framework from developing and managing products, to fulfillment of the customer service level process stage. This contribution reemphasizes the role of knowledge management in innovation processes and practices that will need to be adapted and applied to the responsive demands of discerning prosumers across countries.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The novel empirically validated findings provide an opportunity for researchers to use this methodology and do similar analyses with different samples in Poland, the UK, other countries, and, indeed, enterprises and to make comparisons between different groups and countries to further knowledge of current prosumers types and patterns of engagement. Moreover, the methodology constitutes a very comprehensive basis for identifying the kinds of knowledge sharing at each stage in the business process innovations framework; nevertheless, researchers may develop, verify, and improve this methodology and its implementation. Furthermore, for practitioners, the findings of this study can

be used to adapt their business process to refine their engagement with prosumers and optimize their decision making gained through knowledge sharing.

A practical approach for researchers would be to create a prosumer project web site to house the research survey instruments so that they could be shared with researchers in other countries. This would make it easier for future researchers to share the surveys as well as share their data to enable easier cross-country comparisons. Further, a practical approach to encourage prosumers in sharing their ideas is to use snowball sampling methods where each participant is asked to invite or recommend another to participate. It is important to record how those who were involved were different from those who refused to participate if capturing the characteristics of these is possible. Also it may be worthwhile to consider an alternative setting such as including face-to-face interviews using the survey instruments as this is a practical approach to get a sample of respondents to participate and get a better balance in the demographics profile.

LIMITATIONS AND FURTHER RESEARCH

The study also has three apparent limitations. The sampling method can be more rigorous to widen the age participation in the research study as the current selection of survey respondents needs to be considered in light of the results, as the majority of the respondents were young individuals below 35 years in Poland. In this case it is advisable to extend the research study, and it would be useful to broaden the study to research elderly individuals, such as prosumers above age 50 years.

A second limitation relates to the methodological approach as the current study considered prosumer's only rather than broadening the study to include business enterprises from across the industry sectors. A future intention will be to include enterprises in a supplementary study.

A third limitation relates to bias, as the original survey was designed in Polish and translated into English, and this introduces some issues in addressing language styles and scope of questions, especially where the survey comprises technical language which may be viewed as complex or consisting of uncommon words, which can ultimately affect how the respondents interpret the questions. A pilot questionnaire was completed in the UK and questions were amended. However, translation often results in a language bias that may affect the results. Further research will address the effect of common language where technical jargon can be reworded and sentences rephrased so as to limit the appearance of ambiguous questions.

This is an area of the paper that could be strengthened in future as this is a question that could be included on a revised questionnaire, asking the participants to suggest (as a consumer) what percentage of their purchases are made with enterprises based in their own country vs. purchases from enterprises based outside their borders. Additional macro-cultural questions could be included to cross tabulate against the country and consumer groups.

REFERENCES

- Al-Sa'di, A. F., Abdallah, A. B., & Dahiyat, S. E. (2017). The mediating role of product and process innovations on the relationship between knowledge management and operational performance in manufacturing companies in Jordan. *Business Process Management Journal*, 23(2), 349-376. <https://doi.org/10.1108/bpmj-03-2016-0047>
- Anantatmula, V. S. (2010). Impact of cultural differences on knowledge management in global projects. *VINE Journal of Information and Knowledge Management Systems*, 40(3-4), 239-253. <https://doi.org/10.1108/03055721011071377>
- Andrijauskiene, M., & Dumciuviene, D. (2018). National culture as a determinant of firms' innovative performance. *Forum Scientiae Oeconomia*, 6(1), 47-67. Retrieved from <http://www.wsb.edu.pl/container/WYDANICTWO/forum-no-1-2018-4.pdf>

- APQC. (2018). *Process Classification Framework 7.2.1*. Houston: American Productivity and Quality Center. Retrieved November 05, 2014 from https://www.apqc.org/knowledge-base/download/426790/Cross%20Industry%20v7.2.1_Final.pdf
- Avery, J., Fournier, S., & Wittenbraker, J. (2014). Unlock the mysteries of your customer relationships. *Harvard Business Review* 92(7/8), 72-81.
- Caputo, M., Lamberti, E., Cammarano, A., & Michelino, F. (2016). Exploring the impact of open innovation on firm performances. *Management Decision*, 54(7), 1788-1812. <https://doi.org/10.1108/md-02-2015-0052>
- Chen, J., Sun, P. Y. T., & McQueen, R. J. (2010). The impact of national cultures on structured knowledge transfer. *Journal of Knowledge Management*, 14(2), 228-242. <https://doi.org/10.1108/13673271011032373>
- Chesbrough, H. W. (2006). *Open innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business Press. <https://doi.org/10.1108/14601060410565074>
- Chesbrough, H. W. (2007). Why companies should have open business models. *MIT Sloan Management Review*, 48(2), 22-28.
- Dahiyat, S. E. (2015). An integrated model of knowledge acquisition and innovation: examining the mediation effects of knowledge integration and knowledge application. *International Journal of Learning and Change*, 8(2), 101-135. <https://doi.org/10.1504/ijlc.2015.074064>
- de Jong, J. P. J. (2016). Surveying innovation in samples of individual end consumers. *European Journal of Innovation Management*, 19(3), 406-423. <https://doi.org/10.1108/EJIM-09-2015-0093>
- 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 Mooij, M. (2017). Comparing dimensions of national culture for secondary analysis of consumer behavior data of different countries. *International Marketing Review*, 34(3), 444-456. <https://doi.org/10.1108/imr-02-2016-0047>
- Deloitte. (2018). *Customer-focused growth: Rising expectations and emerging opportunities*. Quebec: Deloitte LLP. Retrieved November 02, 2018 from <https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/consumer-business/ca-en-consumer-business-customer-focused-growth.pdf>
- Ding, Z., Vuchkovski, D., Žabkar, V., Hirose, M., & Rašković, M. (2018). Ljubljana to Tokyo: Understanding drivers of young-adult consumer innovativeness and the role of regionalism in Eastern Europe and East Asia. *Journal for East European Management Studies*, 23(3), 502-522. <https://doi.org/10.5771/0949-6181-2018-3-502>
- Eisenhardt, M., Ziemba, E., & Mullins, R. (2018). Comparative analysis of barriers to knowledge sharing for Polish and UK consumers. *Polish Journal of Management Studies*, 18(2), 73-83. <https://doi.org/10.17512/pjms.2018.18.2.06>
- EU. (2018). *European Innovation Scoreboard 2018*. Luxembourg: Publications Office of the European Union. Retrieved January 31, 2019 from <https://ec.europa.eu/docsroom/documents/33147>
- Fandrejewska, A. (2017). Culture and its dimensions: Consumer behaviour in Poland and its main export countries. *Handel Wewnętrzny*, 4(369), 85-97. Retrieved March 20, 2019 from http://handelue.home.pl/ibrkk/pliki/hw/archiwum/handel_wew_4-2017-t-1.pdf
- Felin, T., & Zenger, T. R. (2014). Closed or open innovation? Problem solving and the governance choice. *Research Policy*, 43, 914-925. <https://doi.org/10.1016/j.respol.2013.09.006>
- 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 *Proceedings of ANZMAC 2011*, Perth (pp. 1-6).
- Gassmann, O., Enkel, E., & Chesbrough, H. (2010). The future of open innovation. *R&D Management*, 40(3), 213-221. <https://doi.org/10.1111/j.1467-9310.2010.00605.x>

- Gault, F. (2012). User innovation and the market. *Science and Public Policy*, 39, 118-128.
<https://doi.org/10.1093/scipol/scs005>
- Gesteland, R. (2002). *Cross-cultural business behavior: Marketing, negotiating, and managing across cultures*. Copenhagen Business School Press.
- Gibbert, M., Leibold, M., & Probst, G. (2002). Five styles of customer knowledge management, and how smart companies use them to create value. *European Management Journal*, 20(5), 459-469.
[https://doi.org/10.1016/s0263-2373\(02\)00101-9](https://doi.org/10.1016/s0263-2373(02)00101-9)
- Gleissner H., & Femerling, J. C. (2013). The principles of logistics. In H. Gleissner & J. C. Femerling (Eds.), *Logistics*. Springer Texts in Business and Economics (pp. 3-18). Cham: Springer.
https://doi.org/10.1007/978-3-319-01769-3_2
- Hauke, A. (2006). *Impact of cultural differences on knowledge transfer in British, Hungarian and Polish enterprises*. FEEM Research Paper. <https://doi.org/10.2139/ssrn.896665>
- Hinton, P. R., Brownlow, C., McMurray, I., & Cozens, B. (2004). *SPSS Explained*. East Sussex: Routledge.
- Hofstede, G., & Minkov, M. (2010). Long- versus short-term orientation: New perspectives. *Asia Pacific Business Review*, 16(4), 493-504. <https://doi.org/10.1080/13602381003637609>
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Thousand Oaks CA: Sage Publications. <https://doi.org/10.5465/amr.2002.7389951>
- Hofstede, G. (2019). *Country comparison*. Retrieved March 2, 2019 from <https://www.hofstede-insights.com/country-comparison/poland,the-uk/>
- Hossain, M., Islam, Z. K. M., Sayeed, M. A., & Kauranen, I. (2016). A comprehensive review of open innovation literature. *Journal of Science & Technology Policy Management*, 7(1), 2-25. <https://doi.org/10.1108/jstpm-02-2015-0009>
- Hyusalo, S., Johnson, M., & Juntunen, J. K. (2017). The diffusion of consumer innovation in sustainable energy technologies. *Journal of Cleaner Production*, 162, S70-S82. <https://doi.org/10.1016/j.jclepro.2016.09.045>
- Jain, S. K., & Dalal, A. (2015). Impact of culture on consumer innovativeness: A comparative study of consumers in Singapore and Australia. *International Journal of Management and Applied Science*, 1(3), 46-50.
- Johannsen, F.A. (2018). Process-related value propositions of enterprise social media use for the external communication with end consumers. *Business Process Management Journal*, 24(1), 183-215.
<https://doi.org/10.1108/bpmj-03-2016-0049>
- Kacprzyk, A., & Dziewanowska, K. (2015). Does a global young consumer exist? A comparative study of South Korea and Poland. *Journal of Marketing and Consumer Behaviour in Emerging Markets*, 1(1), 47-61.
<https://doi.org/10.7172/2449-6634.jmcbem.2015.1.4>
- Kaplan, R. S., & Cooper, R. (1998). *Cost & effect: Using integrated cost systems to drive profitability and performance*. Boston: Harvard Business School Press. <https://doi.org/10.1080/13675569808962056>
- Kaps, I. (2011). Barriers in intercultural knowledge sharing. Learning's from an international plant engineering project. *Open Journal of Knowledge Management*, III. Retrieved January 20, 2019 from <http://www.community-of-knowledge.de/beitrag/barriers-in-intercultural-knowledge-sharing>
- Khan, M. S., & Law, L. S. (2018). The role of national cultures in shaping the corporate management cultures: A three-country theoretical analysis. In J. Vveinhard (Ed.), *Organizational culture*. IntechOpen.
<https://doi.org/10.5772/intechopen.78051>
- Kortmann, S., & Piller, F. (2016). Open business models and closed-loop value chains: Redefining the firm-consumer relationship. *California Management Review*, 58(3), 88-108.
<https://doi.org/10.1525/cm.2016.58.3.88>
- Laitinen, J. A., Pawlowski, J. M., & Senoo, D. (2015). A study on the influence of national culture on knowledge sharing. In L. Uden, M. Heričko, & I. H. Ting (Eds.), *Knowledge management in organizations. KMO 2015*. Lecture Notes in Business Information Processing, 224 (pp. 160-175). Cham: Springer.
https://doi.org/10.1007/978-3-319-21009-4_13

- Mróz, B. (2010). Consumerism vs sustainability: The emergence of new consumer trends in Poland. *International Journal Economic Policy in Emerging Economies*, 3(1), 1-15. <https://doi.org/10.1504/ijepee.2010.032791>
- Pandey, S. C., Shukla, M. K., & Maurya, U. K. (2014). Managing customer knowledge in service economy: Proposing a conceptual model of CKM for services. In N. Ray & K. Chakraborty (Eds.), *Handbook of research on strategic business infrastructure development and contemporary issues in finance* (pp. 417-428). Hershey: IGI Global. <https://doi.org/10.4018/978-1-4666-5154-8.ch029>
- Porter, M. E. (1985). *Competitive advantage*. New York: The Free Press.
- Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5-14. <https://doi.org/10.1002/dir.20015>
- Raasch, C., & von Hippel, E. (2013). Innovation process benefits: The journey as reward. *Sloan Management Review*, 55(1), 33-39.
- Ritzer, G., & Jurgenson, N. (2010). Producer, consumer, prosumer. The nature of capitalism in the age of the digital 'prosumer'. *Journal of Computer Culture*, 10, 13-36. <https://doi.org/10.1177/1469540509354673>
- Ryan, S. D., Windsor, J. C., Ibragimova, B., & Prybutok, V. R. (2010). Organizational practices that foster knowledge sharing: Validation across distinct national cultures. *Informing Science: The International Journal of an Emerging Transdiscipline*, 13, 140-164. <https://doi.org/10.28945/1296>
- 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>
- Smale, T. (2016). Why national culture should beat the heart of innovation management. *Technology Innovation Management Review*, 6(4), 18-25. <https://doi.org/10.22215/timreview/978>
- 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>
- Strychalska-Rudzewicz, A. (2016). The impact of national culture on the level of innovation. *Journal of Intercultural Management*, 8(1), 121-145. <https://doi.org/10.1515/joim-2016-0006>
- Tapscott, D. (2009). *Grown up digital: How the net generation is changing your world*. New York: McGraw Hill. Available at [http://socium.ge/downloads/komunikacisteoria/eng/Grown_Up_Digital_-_How_the_Net_Generation_Is_Changing_Your_World_\(Don_Tapscott\).pdf](http://socium.ge/downloads/komunikacisteoria/eng/Grown_Up_Digital_-_How_the_Net_Generation_Is_Changing_Your_World_(Don_Tapscott).pdf)
- Tapscott, D., & Williams, A. D. (2006). *Wikinomics: How mass collaboration changes everything*. New York: Penguin Group.
- Thomke, S., & von Hippel, E. (2002). Customers as innovators – A new way to create value. *Harvard Business Review*, 80(4). Retrieved May 20, 2012 from <https://hbr.org/2002/04/customers-as-innovators-a-new-way-to-create-value>
- Tian, M., Deng, P., Zhang, Y., & Salmador, M. P. (2018). How does culture influence innovation? A systematic literature review. *Management Decision*, 56(5), 1088-1107. <https://doi.org/10.1108/md-05-2017-0462>
- Vaisnore, A., & Petraite, M. (2011). Customer involvement into open innovation processes: A conceptual model. *Socialiniai Mokslai*, 3(73), 62-73.
- Vanhaverbeke, W. W., & de Vrande, V. V. (2008). Understanding the advantages of open innovation practices in corporate venturing in terms of real options. In *Proceedings of International Conference on Industrial Engineering and Engineering Management*, 1-3, 954-958. <https://doi.org/10.1109/icem.2008.4738011>
- von Hippel, E. (2017). *Free innovation*. Cambridge MA: MIT Press. Retrieved December 10, 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.
- Walsh, J. P. Lee, Y.-N., & Nagaoka, S. (2016). Openness and innovation in the US: Collaboration form, idea generation and implementation. *Research Policy*, 45(8), 1660-1671. <https://doi.org/10.1016/j.respol.2016.04.013>

- Wojciechowska, P. (2017). Influence of personality on buying behaviour: A cross-cultural study comparing Poland and the UK. *Journal of Marketing and Consumer Behaviour in Emerging Markets*, 2(6), 54-76. <https://doi.org/10.7172/2449-6634.jmcbem.2017.2.4>
- Xie, C., Bagozzi, R. P., & Troye, S. V. (2008). Trying to prosume: Toward a theory of consumers as co-creators of value. *Journal of the Academy of Marketing Science*, 36, 109-122. <https://doi.org/10.1007/s11747-007-0060-2>
- Xie, G., & Paik, Y. (2018). Cultural differences in creativity and innovation: Are Asian employees truly less creative than western employees? *Asia Pacific Business Review*, 25, 123-147. <https://doi.org/10.1080/13602381.2018.1535380>
- Yeniyurt, S., & Townsend, J.D. (2003). Does culture explain acceptance of new products in a country? An empirical investigation. *International Marketing Review*, 20(4), 377-396. <https://doi.org/10.1108/02651330310485153>
- Ziembra, E. (2013). *Conceptual model of information technology support for prosumption*. In V. Ribiere & L. Worasinchai (Eds.), *Proceedings of the International Conference on Management, Leadership and Governance* (pp. 355-363). Bangkok: Bangkok University.
- Ziembra, E., & Eisenhardt, M. (2015). Prosumers' participation in business processes. *Online Journal of Applied Knowledge Management*, 3(1), 114-127.
- Ziembra, 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.
- Ziembra, E., & Eisenhardt, M. (2017). Utilization of consumers' knowledge in organizations. In F. Marimon, M. Mas-Machuca, J. Berbegal-Mirabent, & R. Bastida (Eds.), *Proceedings of the 18th European Conference on Knowledge Management* (pp. 1084-1093). Barcelona: International University of Catalonia.
- Ziembra, E., Eisenhardt, M., Mullins, R. & Grabara, D. (2018). Prosumers knowledge sharing to develop and manage products. *Online Journal of Applied Knowledge Management*, 6(2), 72-91.
- Ziembra, E., & Mullins, R. (2016). Identifying more about customers: the phenomenon of the switch to the knowledge exchange. *Online Journal of Applied Knowledge Management*, 4(1), 165-179.
- Zminkowska, K., Zminkowski, T. & Blaszczyk, R. (2017). Effects of customer engagement behavior. *Journal of Economics and Management*, 28(2), 133-154. <https://doi.org/10.22367/jem.2017.28.08>

APPENDIX

Survey questionnaire

Introduction

In the increasingly competitive knowledge-based economy, companies must seek innovative methods of doing business, quickly react to consumer demand, and provide superior value to consumers. Simultaneously, contemporary consumers want to be active co-creators of value and satisfy their consumption needs through collaboration with companies for co-creation, co-design, co-production, co-promotion, co-pricing, co-distribution, co-consumption, and co-maintenance. This survey aim is to identify your engagement in specified business activities through knowledge sharing.

Demographics

1. Gender:

- female
 male

2. Year of birth: _ _ _ _ _

3. You live in:

- city with a population of more than 100.000
- city with a population of less than 100.000
- rural area

4. Your education level:

- less than secondary education
- secondary education
- further education
- professional qualifications
- higher education

Please indicate, what is your engagement with products' or companies' comments or development concerns?

Your engagement	Definitely yes (many times)	Probably yes	I don't know (no answer)	Probably not	Definitely not (never)
designing new products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
designing new functionalities of products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving materials from which products were made	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
designing package or graphic elements of the product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving reliability and durability of products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving ease and intuitiveness of product usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving effectiveness and efficiency of usage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
designing advertising campaigns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
creating product pricing strategy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
creating product loans strategy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
establishing new channels of sale	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving ordering process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving handling complaints and warranty services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
improving consumer service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Specify, what was your engagement concerned with?

BIOGRAPHIES



Ewa Ziemia completed her Ph.D. and Post Ph.D. in Management, with a major focus on management information systems. She is a Full Professor at the University of Economics, Katowice, Poland. Her current research focuses on information systems and technologies for business and public administration transformation. She has published over 190 peer-reviewed papers and 19 books, and has played an instrumental role in prestigious Polish and international research projects. Ewa Ziemia serves on the editorial boards of several international journals, is the Editor-in-Chief of *Journal of Economics and Management*, the Founding Editor-in-Chief of *The Online Journal of Applied Knowledge Management*, the Senior

Editor of *Interdisciplinary Journal of Information, Knowledge, and Management*, and the Editor of *Interdisciplinary Journal of e-Skills and Lifelong Learning*. She is also the Vice President for Research Collaborations of the International Institute for Applied Knowledge Management. Ewa Ziemia has received numerous awards for research and teaching, including *The Excellent Award of the President of the University of Economics in Katowice*, *The Silver Cross of Merit from the President of Poland*, *The Medal of the National Education Commission from the Ministry of National Education in Poland*, *The Award of Fellow & Distinguished Scholar* and *The Excellence in Research & Scholarship Award* from the International Institute for Applied Knowledge Management, and several *The Best Papers awards*.



Monika Eisenhardt completed her Ph.D. with a major focus on management information systems as well as changes and challenges involving modern consumers. She is an Assistant Professor at the University of Economics in Katowice, Poland. She has published over 30 peer-reviewed pieces including conference papers, book chapters and international journal papers. She has received several *Best Paper awards* at the international conferences. Her current research focuses on consumers' knowledge as well as knowledge-based organizations, especially information systems and technologies for prosumption. Monika serves Editorial Assistant function in *Journal of Economics and Management* – the official journal of University of Economics in Katowice.



Roisin Mullins completed her Ph.D. in the development and evaluation of e-learning systems, learning communities and business training systems. She has published over 50 peer-reviewed pieces including conference papers, book chapters and international journal papers. Roisin Mullins serves on the editorial boards of several international conferences. Her research has emphasized practical solutions to technology problems or novel applications of technology, so that in addition to answering a question, the research outcomes have informed policy and practice guidelines at the European level and decision making processes in the SMEs of EU member countries. She has *The Award of Fellow & Distinguished Scholar Award* from the International Institute for Applied Knowledge Management, and several *The Best Papers awards* received at international conferences.



Sandra Dettmer completed her Ph.D. in Labour Economics where she looked at regional disparities between earnings, unemployment and public-private sector pay across the UK. She is currently employed as a lecturer for Business and Economics at University of Wales Trinity Saint David's. Her other research interests focus on returns to education and pedagogy. Prior to her academic career, she worked in the private sector and also gained insights into business operations during her consultancy work.