Preface

Thanks to recent advances in information technology, customers today are contributing to organizational processes and collaborating with companies to produce things of value. Companies are forced not to offer mass products nor more product options and price points, not even customized products, but they should create opportunities for product development by consumers.

This publication is aimed at providing a greater understanding of issues, challenges, trends of IT prosumption effecting the overall utilization of digitalized goods and services in modern communities around the world. The chapters in this book address the emerging issues in theories on IT acceptance and prosumer entrepreneurship, e-learning in end-user perspective, Web 2.0 for collaboration, user involvement in IT projects, technologies and IT solutions for prosumers on IT market, healthcare prosumption, and geographic information prosumption.

Originally, in economics, the producers were consumers, and the surplus of their production was sold by them on the market. However, because of work dividing, task sharing, and specialization in Modern Age, the producers have provided goods and services to the market, and they were forced to buy the basic goods. These processes are growing up, and eventually the consumers are not able to create any goods at home (e.g., meals, clothing, shoes), and they must buy everything. However, for some people there is still a dilemma: make or buy. Therefore, we can talk about prosumer as a special case of outsourcer.

The ability to efficiently produce large quantities of products has improved over time and with studies. For many years, the production for own usage by producer was a marginal activity, covering mostly agriculture activities. As such, the problem was mostly ignored as less valuable. In 1980, Alfred Toffler called them prosumers (contraction of producer + consumer). There was, as Toffler said, a small quantity of production for exchange (i.e., for the market), but the production for sale was predominant. However, now, there is another interpretation of prosumer when he or she is identified with active or innovative consumer.

In the academic literature, consumer demand is often assumed to be exogenous so that demand is usually taken to be a well-defined and pre-specified function of price and other product attributes such as quality. Now, companies are forced to use more sophisticated techniques. They must offer not mass products nor more product options and price points, not even customized products, but they should create opportunities for product development by end users. Some examples are given in other branches (e.g., IKEA provides furniture that must be composed by customers).

To address the recent developments, the book presents the research results of IT user-driven demand. This is an emerging research area that focuses on the evaluation of different innovative products, services, and sales initiatives, and in all of these chapters, it is critical to obtain a deeper understanding of IT user behavior first and then to develop efficient response to the behavior.

User innovation refers to innovation elaborated by consumers or end users. User innovation means innovation of use and implementation, innovation in service, innovation in configuration of technologies, and finally, the innovation of novel technologies themselves. While most user innovation is concentrated
in use and configuration to existing products and technologies, and is a normal part of long-term in-
novation, new technologies that are easier for end users to change and innovate with and new channels
of communication are making it much easier for user innovation to occur and have an impact. Virtual
customer environment as a forum helps companies partner with their customers in various phases of
product development as well as in other value creation activities.

Innovativeness of Internet user:

- **User as an information provider:** Information retrieval and filtering through browsers.
- **User as medical practitioner:** Self-diagnosing and self-therapy.
- **User as marketer:** Looking for information on product and diffusing the product information in
  viral marketing.
- **User as researcher:** Involved in observations, delivering information for further research, fulfill-
ing questionnaires.
- **User as teacher in self-learning:** Distance learning system provides educational content and
  freedom of course selection opportunities.
- **User as application designer uniPaaS.**
- **User as publisher and author of newsletters, journals, music, films.**

In Information Technology (IT) sector, the problem of active users and their activities was known
since the beginning of business information systems development. The question concerning the role of
end-user in information systems development returns from time to time.

Innovations are less dependent on in-house specialized research and development activities. The en-
vironment is more involved. Customers play a central role. If they are business customers, there is more
focus on innovations’ importance to their production and their customers – the innovation process must
be seen from the customer’s side. IT innovation can be viewed as a process or as an object.

Although IT innovation always involves IT in some way, they can actually start in different parts of
a work system. For example:

- **Starting from technology:** New technology or better use of existing technology makes it possible
to change work practices.
- **Starting from information:** Intention to use different information or provide information in a
different form or level of detail leads to innovative use of existing or new technology.
- **Starting from participants:** Providing training on technology in a work system leads to new pos-
sibilities for doing work differently.
- **Starting from work practices:** Change the business process that makes it possible to use technol-
ogy more effectively for better results.
- **Starting from the products and services:** Improve a work system’s products and services by
  incorporating digitized information or even new IT hardware that provides additional value for
  customers.

Innovation is an interactive process: in many cases, new ideas emerge from the combination of exist-
ing ideas. Globalization and the rise of the Internet have enhanced this effect, making openness central
to innovation processes:
• New modes of innovation require “openness,” that is to say the ability for firms to access and integrate others’ ideas in their own research.
• “Others” can mean other firms, non-profits, or universities from the same country or from abroad.

It also includes new innovators—users, consumers, amateurs, philanthropists—who are emerging and influencing the demand for innovation.

The emergence of knowledge markets as mechanisms for enabling, supporting, and facilitating the mobilization, sharing, or exchange of information and knowledge ensures the appropriate conditions for open innovator activation. This includes various mechanisms: some are purely commercial, like inter-firm co-operation or IPR exchanges like licensing or patent pooling; others are partially commercial, like university/industry partnerships or open source; others are non-commercial, like Wikipedia or the diffusion of public research inventions.

Most policies currently are not suited to this new world: IPR and competition policy notably need to be reviewed and updated in light of these new challenges. The role of non-traditional actors, including users and consumers, has become more important in driving scientific discovery and innovation. That raises new challenges for policies, including education policy and IPR.

In 1980, Alvin Toffler in his book, *The Third Wave*, included the term prosumer as a connection of producer and consumer. Lately, the Customer Relationship Management (CRM) strategy was successfully developed, encouraging many people to the construction of appropriate software applications. Business organizations noticed that the customer is the most important link in a production process; therefore, they began gathering information about them in CRM systems and data warehouses for data mining. CRM systems support monitoring and forecasting the customer behavior. However, Don Tapscott and Anthony D. Williams in the book *Wikinomics* noticed that to achieve a high level of individualization of products, customers should take part in the production process, particularly at the requirement specification stages. So in business, in another way than in economics, prosumer is understood as active consumer.

In economy and particularly in e-economy, the enterprises focusing on customer involvement have arrived. For example, Amazon.com as e-commerce leader supports the development of Internet dialogues environment for customers. However, now the problem is not to allow the clients for choice of products, offers, product lines, product mark, but encourage production as a hobby. The prosumption must be just for pleasure, according to the special hobbies or interests, free time preferences. This is the creation of the new market of product components for people who are not satisfied by products delivered by professionals. The new market development encourages customers to self-learning and exercising, so they are not amateurs, but professional hobbyists satisfied with their work. For example, companies (i.e., Practiker, Home Depot, Leroy Merling, IKEA) involve active customers.

In Information Communication Technology (ICT) sector, end users have an opportunity to improve, modify, and determine the final form of product in such a way to satisfy the needs and expectations. Open sourcing is introduced as business strategy allowing for innovativeness dispersion. Receiving the information customers need is very difficult to catch; therefore, maybe it is more suitable to support them with appropriate work tools for their own activities.

So far, well-known information system development methods were provided in producer aspect and passively involved the user. The Joint Application Development Method (JAD) was an exception. Generally, JAD is a method of defining user requirements and information systems design method assuming intensive work of users. JAD sessions allow for generating the synergy effects for IS development. Simi-
larly, agile software management methods strongly involved end-users as the basic evaluator of created software, but even here, the end users are identified with other stakeholders, and they are still perceived as recipients of created software, not as the main actors. Similarly, other lately developed user-driven or consumer-centric methods (i.e., User Experience [UX] approach, User-Centered Development [UCD] process) still respect the secondary role of end-users. Generally, there are two important elements (i.e., user-orientation and user-participation). User participation was defined as user membership in design team, but user-orientation is considered positive and cognitive thinking about user involvement in the design work. Although user orientation is a feature of information system development methodology, user participation covers activities of end user in system development process. In e-business environment consumers behave as prosumers and the movement covers social networks for collaborative innovation (i.e., Enterprise 2.0, Health 2.0, Learning 2.0, etc.).

**STRUCTURE OF THE BOOK**

The book’s 20 chapters are organized into four sections that address four issues in IT prosumption. These are:

**Section 1:** Theoretical considerations on IT prosumption and prosumers, Chapters 1 to 6.

**Section 2:** Qualitative and quantitative research on IT prosumption development and evaluation, Chapters 7 to 11.

**Section 3:** ICT development for prosumers and produsers, Chapters 12 to 15.

**Section 4:** ICT prosumption applications’ review, Chapters 16 to 20.

Section 1 includes the fundamental considerations that emerged as important premises and pervasive themes of the book. We urge readers to start here as these ideas underlie all the other chapters that follow. The first section’s chapters address the theoretical considerations. Through the first six chapters, Section 1 contains a discussion on the actual theories on IT prosumption.

The first chapter on “The Challenges of the Prosumer as Entrepreneur in IT” aims to emphasize the importance of the prosumer as an entrepreneur in the IT domain, taking into account that an active and creative user plays an important role in increasing the added value of the business. For the author, user value, its recognition, and cooperation are strategic factors of a business organization. The chapter covers discussion on the strategic process of entrepreneur prosumer in relationship with some elements of innovation and creativity. The author considers the strategic advantage of the entrepreneur prosumer, and she examines how elements of strategy of the entrepreneur prosumer are used to increase added value of organizations.

The second chapter on “Improving IT Market Development through IT Solutions for Prosumers” looks at what key factors are associated with prosumers and how organizations can harness this power through personalization. The author has noticed that personalisation through prosumers can improve the software development cycles and innovations through incorporating individual expert skills. Specifically through study of the chapter, the reader should be able to recognize the service concept, evaluate New Service Development (NSD) models, differentiate user needs, identify how human psychological characteristics
may influence the prosumer, produce prosumer specification to improve IT market development. The chapter covers the review of approaches that have been developed by prosumption specialists to improve the integration between the production for use and production for sale. The author argues that prosumers constitute an important market power in the future and can influence the future technologies.

The third chapter on “Concept of User Experience and Issues to Be Discussed” aims to emphasize the value of User Experience (UX) approach within the context of usability studies. At first, the author presents the brief history of the UX concept, the publication of the UX white paper. Beyond that, the author surveyed the relation of the UX concept with the hedonic aspects. According to the author, US is a hot topic for usability professionals, marketing specialists, and software designers. However, the concept of UX is not clearly defined. Therefore, the chapter covers discussion on the concept and its connotation and extension. The author proposes several tentative models in terms of the UX.

The fourth chapter on “Evolution of End User Participation in IT Projects” is a review of evolutionary design paradigms that determine the end user’s role in Information Technology projects. The research study includes different perspectives starting from technology-oriented sequential software development lifecycles, through user-centred approaches, ending finally in contemporary service design approaches supported by e-business and social media. The author argues that development of software technology and growing expectations of users and customers result in gradual refinements in IT project management practices. They lead to various highly differentiated forms of user participation in designing computerized information systems.

In the fifth chapter on “Enabling IT Innovation through Soft Systems Engineering,” the authors focus on Software Development processes. Particularly, they are interested in the innovation processes, where the software development team has to acquire knowledge for the innovativeness project realization. The team has the problem of conversion of the innovative idea into the expected value, particularly value-in-use. The authors argue that Soft Software Engineering is a certain response to address the innovation complexity and to cope with the user-driven methods in an open innovation environment. According to the authors, IT innovation is the result of a combination of competencies, which promote advancement of business, society, and wellbeing. The term “users” refers to individual end users, consumers, and social organizations that are software system stakeholders.

The main objective of the sixth chapter titled “Prosumer’s Responsibilities? On Stage to a Dedicated Framework for Services Sharing and Compliance in the Healthcare Domain” is to describe the influence of the constraints in the service elaboration mechanisms. The authors propose an approach for the specification of the constraints associated to services and for the management of access rights needed to use and exploit services. The authors argue that their work intends to enrich the forthcoming theory related to service sharing along the two important dimensions (i.e., the responsibility of the prosumers and the needs for compliance with legal framework and organizational constraints).

Section 2 addresses the qualitative and quantitative research methodologies and their usages in the area of information technology prosumption. The next four chapters include both statistical approaches as well as case studies. In the section 2, we would like to present that even within disciplines that traditionally use quantitative research, the application of mixed methods research is becoming increasingly common.

The seventh chapter on “Web 2.0 and Its Implications on Globally Competitive Business Models” explores how social media is used to enable innovation practices in company internal operations as well as external stakeholders. Beyond that, the author evaluates the need and scope of Web 2.0 behind the restructuring of the business model, with major emphasis on implementing user-centric business models. According to the author, the Web 2.0 technologies should be assessed to determine the real impact and
many assessment techniques, including interviews, observations, and surveys, can be used to measure
the impact over time across multiple business areas. The author argues that considering the impact of
using social media, the implications for the company operations are required to be explored.

The eighth chapter on “Exploring the Effects of Trust, Perceived Risk, and E-Services Systems on
Public Services in E-Government” aims at the presentation of the research on the adoption of technology-
based service channels, in particular, digitalized public administration processes. The author proposes
a model that combines the effect of behavioral beliefs and intentions together with other variables (i.e.,
perceived usefulness of e-services, subjective norms, self-efficacy, technology facilitating conditions, trust
and perceived risk), as well as individual characteristics. The author proposed a questionnaire method to
study the intentions of government civil service employees towards adopting digitalized services. In the
research, the Structural Equation Modelling is applied for further analysis of the data and for the design
of a theoretical model for prediction of the intentions to accept e-services in e-Government in Taiwan.
In this chapter, two crucial objectives are (1) to illustrate the relationship between key factors and civil
servant perceptions to administer e-services for public services delivery, and (2) to clarify the variables
concerning online service delivery, which may provide a framework for policies cultivating information
pertaining to trust and perceived risks for e-governments.

A fundamental challenge for the future is to develop Information Communication Technology (ICT)
environments that allow users who do not have a background in programming to develop or modify their
own applications. The purpose of the ninth chapter on “Information Technology Prosumption Accep-
tance by Business Information System Consultants” is to present the results of the research on customer
(i.e., user) participation in information system development and its effect on users’ future cooperation
behaviour. Beyond that, the theoretical framework linking information system development to customer
satisfaction and intention toward future collaboration is proposed. In the chapter, the benefits of end
user participation in value creation of IT processes in the extended enterprise context are well recog-
nized. The goal of the chapter is to bridge the gap in the management science by investigating customer
participation in information system development and its effect on cooperation among users and system
developers. The theoretical framework linking information system development to user satisfaction and
intention toward future collaboration is proposed.

In the tenth chapter on “Cognitive Authority Revisited in Web Social Interaction” revisits the concept
of Cognitive Authority as a means for supporting better social interactions on the Web. They propose
the Value Pie for analysis and further discussions on values and cultures in social software communities.
In order to situate their discussion in practice, the authors propose a case study related to the design of
a social network system intended to support the constitution of a network of authorities. The case study
allows the revelation of how values and cultural aspects influence the way a computational feature must
be designed to make sense to the users. The authors argue that they must consider the culture and values
of people to create applications useful for them. They revisit the concept of Cognitive Authority as a
means for supporting better social interaction in computerized information systems. They re-examine
the concept and present examples and discussion from a context of a social network where authority as
well as identity and confidence are important values.

In the eleventh chapter on “Social Acceptability of Open Source Software by Example of the Ubuntu
Operating System,” the author presents the results of the statistical research done in the community of
users of Ubuntu operating systems. He is interested in analyses and monitoring the Ubuntu users’ at-
titudes and preferences development. He has realized the questionnaire research online by Google Docs
within the community of Ubuntu users. The survey was designed to examine whether people, who have an opportunity to choose a commercial operating system or free alternatives are ready to give up paid solutions and try switching to free and complimentary systems.

Section 3 concerns development of information communication technology for prosumption enabling and support. It confronts and reveals problems of information technology implementation. Whereas most literature in science on management addresses the problem of consumption and prosumption, the authors treat this from a technological perspective. The next four chapters cast familiar scenery in a new light as authors discuss new technological approaches to successfully deal with IT prosumers in a business environment.

In the twelfth chapter on “Users as Prosumers of PETs: The Challenge of Involving Users in the Creation of Privacy Enhancing Technologies,” the author focuses on methods and tools for securing human activities online and protecting user privacy on the Internet. The author discusses Privacy Enhancing Technologies (PETs). The author explores the way in which user involvement has been considered during the development process of PETs. He emphasizes that more democratic approaches of user involvement and data handling practices are necessary. For him, users should play an active role as the producers of ideas and sources of inspiration for the development of useful PETs.

The thirteenth chapter on “Harvesting Deep Web Data through Produser Involvement” focuses on the particular information systems useful for end users and is perceived from the end user perspective. The authors carefully investigate their interfaces, languages that they expose to end users, and the platforms that accompany the systems to involve end users and allow them to share the results of their work. The authors analyze the following information systems: Chickenfoot and Greasemonkey as add-on modules for the Mozilla Firefox browser, Smart Bookmarks system, Co-Scripter system, and Yahoo!Pipes tool.

The fourteenth chapter on “User-Driven Documentation Building for the ERP System” encourages readers to learn about the problems of end user who are lacking the appropriate information system documentation. Lack of appropriate manuals, workshop materials, and training is a source of many problems of end users who have to do their daily work using the ERP systems. Therefore, the author has proposed the usage of the Enterprise Social Software (ESS) to help users and to support them by the actual and suitable information. Beyond that, applications such as wiki, RSS, blogs, tags, and discussion forums can be very useful for collaborative knowledge creation and dissemination. The author discusses the possibilities of usage of the new media in the ERP system documentation development process.

The authors of the fifteenth chapter on “The Prosumer Paradigm for Life Cycle Assessment Services” emphasize the prosumption approach developed in 1980 by Alvin Toffler, so they consider prosumer as active consumer. The chapter aims at the application of the prosumption paradigm to a real data integration system of the Life Cycle Assessment (LCA). The authors use a case study approach, and they are doing research at the ENEA, the Italian National Agency for New Technologies, Energy, and Sustainable Economic Development. The agency promotes the adoption of prosumption practice in small companies belonging to the industrial and agricultural sector supplying them with a simplified LCA system. In this chapter, the authors show how a domain expert user (i.e., prosumer) can use the proposed framework to easily map the classification of data flows and processes provided by the simplified LCA system into the ELCD (European reference Life Cycle Database), containing a standard classification provided by the EU. This makes their proposal completely shareable with the whole thematic classification and vision promoted by the European Commission. According to the authors, LCA is a technique to assess environmental impacts associated with all the stages of a product’s life from-cradle-to-grave (i.e., from...
raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling). They argue that the goal of LCA is to compare the full range of environmental effects assignable to products and services in order to improve processes, support policy, and provide a sound basis for informed decisions.

The last section, Section 4, covers considerations on practical implementation of information systems for prosumers as well as the applications’ review. Mostly, the authors provide analyses of prosumption problems in the e-learning domain. However, the consequences of openness strategy and accessibility of end users to digital media are also discussed in the last five chapters.

The sixteenth chapter on “TRIZ Guidelines for Innovating E-Learning Environments with Respect to Prosuming” provides a framework of reference for assessing, comparing, and innovating e-learning systems by regarding them as technical systems. The framework consists of a number of guidelines based on the 40 design principles of the Theory of Inventive Problem Solving (TRIZ). TRIZ is the product of an exhaustive analysis of the world’s most creative technological innovations as described in worldwide patent literature. It is a systematic approach to develop innovative products or services based on the fact that the evolution of technical systems follows objective laws.

The author of the seventeenth chapter named “Evaluating E-Learning from an End User Perspective” examines a variety of evaluation techniques adopted from e-learning, personalised learning, and User Modelling to suggest improvements within industry to challenge the end users’ perceptions of on-line education. Finally, the author formulates the proposals and suggestions for the e-learning system developers. He argues that personalisation, learner-centricity, User Modelling, and Open Source can help change people’s views on how to evaluate traditional e-learning environments.

The authors of the eighteenth chapter on “Social Networks and Internet Communities in the Field of Geographic Information and their Role in Open Data Government Initiatives” argue that users are playing an increasingly relevant role in geospatial data production. They have noticed that traditional procedures for creating cartography, mainly by experts in official mapping agencies, has evolved into a more participative process for generating data: neogeography. The authors assume that information technology and the Internet are now user-friendly for a wide range of people who have become active users of global networks, such as GEOSS, INSPIRE, Eye On Earth, and EarthCube, and official producers need to adapt to the new era of openness, collaboration, and hybrid maps by adopting open standards.

The author of the nineteenth chapter on “Reader-Centric Writing for a Prosumer Market: Effectively Using Professional Writers to Create and Maintain Content and Metadata in Digital Media” focuses on user-centric, persuasion-centric, and quality-centric writing on the Internet. He emphasizes that in writing for the prosumer, quality-centric and persuasion-centric are as common and perhaps more important than user-centric. Later on, he presents how writers are in a position to make valuable contributions to content quality, metadata quality, landing page optimization, search engine optimization, and return on investment, particularly when producing Websites for audiences as demanding as prosumers.

The twentieth chapter is on “Learning Styles in E-Learning: Theoretical Framework and Selected Empirical Research Findings,” and it covers considerations on e-learning experiences in the Czech Republic. Beyond the discussion on e-learning problems, the authors focus on analyses of research studies presented in three important e-learning conferences within the last decade in the Czech Republic: eLearning (Faculty of Informatics and Management, University of Hradec Kralove), ICTE (Faculty of Natural Sciences, University of Ostrava), and SCO (Sharable Content Objects, Masaryk University, Brno).
POTENTIAL USES

The research on prosumption of information systems must be realized in open network environment, in virtual organizations and in virtual communities, in collaborative networks, and in e-business organizations. There is still no good book on prosumption, so the chapters’ authors focus mostly on information systems development methods for end users as well as on the analysis of economic consequences of prosumption development.

Prosumption demands inclusion of end-users in the process of development and exploitation of information systems. The book is aimed to elaborate the fundamentals of modeling social activities and a systematic approach to construction of software applications. The processes should be considered completely different in big companies (more formalized procedures) and in SMEs (less formalized, informal approaches). The research work should enable and suggest developers of information technology tools focus on user environment, understanding the context of user activities and development of IT platforms for further increase of activities and creativity of end-users.

In recent years, the open source software phenomenon is one where emergent properties reveal innovations beyond those planned or intended. Despite some claims, access to the source code is not the key factor in itself, but rather how this facilitates the collaborative development model of truly independent pan-globally located developers, which allows for a rapid evolution of killer applications. Open access phenomena analyses presented in the book are believed to provide new business models and innovative modes of work organization, which have been extremely successful and further implemented.

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