

# User Involvement and Social Networking for Information System Development

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**Abstract— Since the beginning of business information system (BIS) development, the problem of end-user involvement in the system design and implementation has been discussed. For years, BISs for users have been changed into the systems constructed by end-users. The Web 2.0 technologies should strongly support this tendency. The paper aims to answer the question if end-users are involved and actively participate in BIS development processes. The paper covers results of the survey done in 270 companies in Poland.**

*Keywords - innovation, user involvement, user participation, social networking, new media, end-user support*

## I. INTRODUCTION

User participation in the BIS development seems to be considered as essential for the business success and economic benefits of business organization. However, the placement of end-users in the information system development process is constantly problematic and changeable. Barki and Hartwick [5] proposed a distinction between user involvement and user participation. They define user participation as the assignments, activities and behaviours that users and their representatives perform during the system development process. User involvement refers to the subjective psychological state reflecting the importance and personal relevance that a user attaches to a given system [5]. User participation is defined as the degree to which the user is involved in producing and delivering the service.

This research on end-user participation has focused on how to engage users to increase productivity in the BIS delivering context without failures. The purpose of this research is to collect IT staff opinions on end-user behaviour to fulfil the gap in the literature on user role in BIS development. Furthermore, the theoretical framework linking BIS development to social networking and new media application is also analysed and some empirical findings are given.

Generally, BIS user involvement can take different forms, e.g.,:

- Customer participation in the new service development process directly [11].
- Co-operation of technology providers and users on exploration of the technology in a specific industry [3].
- Partnership i.e., a formal relationship between the customers and the company [6].

- Prosumption, i.e., the dual role played by the customer as a BIS provider as well as a customer [12].

Users involved in BIS development are grouped into the three classes: lead users, normal users and community users [15]. Lead users are defined as members having two characteristics. First, they anticipate obtaining relatively high benefits from the developed information technology (IT) solution according to their needs. Second, they are at the leading edge of important trends in a market place under study. Although normal users' involvement might help provide innovative ideas, their limited understanding of new technologies could threaten the executability of the ideas, therefore there is a need to carefully select normal users for further co-development of IT products. Community users seem to have expertise in a specific field. They are willing to spend more time online on innovations. Business organizations are now exploring ways to provide a platform (i.e., Websites) through which users can generate and contribute content, resulting in a cooperative experience between users and organizations.

For the purpose of this research two groups of users are considered i.e., normal users and community users. The research question guiding the paper concerns the factors influencing user involvement in the BIS development. The paper consists of three parts. At first, theoretical frameworks of user involvement are discussed. The next part covers presentation of research methodology and results. The last part includes findings and conclusion.

## II. THEORETICAL FRAMEWORKS OF USER INVOLVEMENT IN INFORMATION SYSTEM DEVELOPMENT

The critical role of end-user in the manufacturing or research and development process encourages the companies to invite users to the value adding processes as partners. Companies should focus on employees' creativity as the essence of innovation and growth. Workers ought to be adaptable and interested in new knowledge and skills acquiring. Lately, new modes of innovation have been introduced and they require openness, i.e., an ability for firms to access and integrate others' ideas in their own practice. "Others" can mean other firms, non-profit units, universities and also other actors - users, consumers, amateurs, volunteers, who are influencing the demand for innovation [9].

Firms are conscious that they are able to turn their intangible assets into value. Beyond research and

development (R&D), patents, software, the intangible assets covering human resources and new organizational structures are the drivers of firm's growth. In Europe, the current downturn will be to depress investments in innovation and increase investments in the innovation infrastructure that extends beyond R&D to cover human capital, IT and entrepreneurship for sustainable development. The crisis can be an opportunity for business to consider new policy instruments, which have not yet been implemented at a substantial scale. Since innovation is closely linked to the demand from users, business organizations can promote innovations by being a recipient of end-user creativity results and by signalling an acceptance of new inventions provided by end-users. While more work is needed to ensure that such mechanisms do not distort competition or deliver suboptimal performance, such "pull from the customers" mechanisms can provide incentives for the development and commercialisation of technologies closer to the market - an important complement to traditional innovation policies that have primarily "push" strategy including pushing the technologies to the business.

The IT innovations can start in different parts of a business organization. They can be initiated:

- From technology: new technology or better use of existing technologies make it possible to change work practices.
- From information: intention to use different information or to provide information in a different form or level of detail leads to innovative use of existing or new technology.
- From participants: providing training on technology in a work system leads to new possibilities for doing work differently.
- From work practices: change the business processes to enable use technology more effectively for better results.
- From products and services: improvement of a work system's products and services by incorporating digitized information or even new hardware enables providing additional value for customers [2].

Innovations are always realized in a certain business organization context, where the real value of invention can be estimated. Organizational context is determined by the organizational culture, which includes the shared values, the beliefs, the history, the intellectual and operational traditions, the rules of conduct, and the business organization's general philosophy of operation. Business organization should be strongly engaged in the preparation of workers to develop and implement innovations.

Creating an atmosphere of innovations permits users to behave as innovators. Sometimes user-led innovation involves a community, which creates and exploits innovative solutions on a continuing basis. Good examples of this include the Linux community around computer operating systems or the Apache server community around Web server development applications, where communities have grown up and the resulting range of applications is constantly growing. A growing range of Internet-based applications

make use of communities - for example Mozilla Firefox. Social networking and crowd-sourcing approach support co-creating the innovations and new ways of creating and working with such communities need to be developed. In innovation communities, an increasingly significant strategy of prosumption has been implemented, which demands seeing users as active players in that process. Their ideas and insights can provide the starting point for every new direction and create new markets, products and services. The problem is how to find ways of identifying and working with such community users. For example, Microsoft maintains a group of so called Microsoft buddies who work as Web masters, programmers, and software vendors [15]. High technology firms have recognized the importance of linkages and connections - getting close to users to understand their needs, working with suppliers to deliver innovative solutions, linking up with collaborators, research centres, even competitors to build and operate innovative systems. There are many advantages of pushing the social networking into innovation development process, i.e., collective efficiency, collective learning, bringing new insights and supporting shared experimentation, collective risk taking, development of different relationships to build across firms' frontiers [14].

Baldwin et al. reports that users do not anticipate selling goods or services based on their innovations, although they may later go into business as users-manufacturers [4]. Users-innovators are motivated to design new IT products and services, because they believe that new designs can enhance the things they do and in the way, which is the most appropriate for them. Prior to the advances in IT (e.g. online communities, wikis, user-generated content websites) users were bound by physical limitations for their social environments. Content in a digital form allows users to modify, share, use and reuse information, regardless of the creators' original purpose [7]. Websites such as Twitter, Facebook, MetaCafe, Wikipedia, Flickr have all been introduced within the last decade and rapidly grow in user membership. Organizations are beginning to invest in development of social media, to capitalize on a growing user population that is interested in creating, retrieving and exploring the Websites. Lindermann et al. have noticed that using Web 2.0 applications within SMEs implies consequently breaking down innovation process to employees level [10]. In daily business practice, Web 2.0 (e.g., wikis and blogs) has been observed as primarily being restricted to communication with the user and internal information and knowledge management.

Social network services enable people to connect online based on shared interests, hobbies or causes. Social networking inside an enterprise is valuable when the organization rewards individual effort but needs to encourage knowledge sharing and connection with others-across geographical or functional boundaries [8]. Social networking permits a social presence online that is the degree to which a medium allows the user to feel socially present in a situation that is mediated via technology [13]. Aggarwal argues that social networks provide rich content-based knowledge, which can be exploited for data mining

purposes [1]. Schuster et al. add that social networking offers users autonomy in a unique way. Users can be independent from computer scientists, engineers and web designers to have a presence on the Internet. Sometimes, people overvalue the Internet information and hence integrate the pieces of information into their decision making process [17]. On the other side, people carefully select information provided on social network platforms. Currently social network sites are adopted in organizations for recruiting, advertising and internal collaboration [16].

III. SURVEY METHODOLOGY AND RESULTS

The literature studies create very optimistic view on user involvement in BIS development. Particularly, proponents of Web 2.0 strongly support the thesis that users are involved and participate or create the BIS by themselves and for themselves. This very optimistic view should be verified, therefore that empirical research was done in 2011 in Polish micro, SMEs and big companies. The research covered interviews with information technology (IT) personnel (i.e., CIOs) responsible for contact with end-users. The respondents were gathered from 270 firms. Characteristics of surveyed firms are presented in Table I.

Involvement of the end users in IT projects covering IS development is presented in Table II. The following activities of users have been specified: goal specification and project concepts (GSPC), business logic analysis and business process modelling (BLA BPM), requirements engineering (RE), information system design (ISD), information system implementation (ISI), information system testing (IST), information system installation and migration to a new IT environment (ISE), information system maintenance (ISM), security of information system (SIS), information system usage (ISU).

TABLE I. SURVEYED COMPANIES FEATURES

Feature	N=270
<i>Number of employees</i>	
Micro Enterprises (1-9 employees)	44,4%
Small Enterprises (10-49 employees)	29,3%
Medium Enterprises (50-250 employees)	15,2 %
Big Companies (more than 250 employees)	11,1 %
<i>Dominating Activities</i>	
Production	9,3%
Commerce	22,6%
Services	50,4%
Mixture of above activities	17,8%
<i>Main Clients</i>	
Individual	61,1%
Institutional	38,9%
<i>Scope of Activities</i>	
Local market	27,8%
Regional market	23,7%
National market	35,6%
International market	7,4%
Global market	5,6%

In the Table II six different profiles of users has been included. Passive users and users-evaluators are oriented towards the observation and acceptance of other people efforts. Co-creator supports IT staff in business information

system development works. User as the partner plays equally important role as IT professional in the system development process. User as the producer is self-dependent and has got sufficient competencies to utilize IT independently of the IT staff help. The last, i.e., prosumers are able to utilize IT by themselves and for their work purposes. In this paper the definition of prosumption was adapted from the work of Xie et al. [18].

TABLE II. PARTICIPATION OF USERS IN IT PROJECTS

	User					
	Passive	Evaluator	Co-creator	Partner	Producer	Prosumer
<b>GS PC</b>	15%	17%	<b>33%</b>	24%	10%	1%
<b>BLA BPM</b>	<b>32%</b>	22%	19%	20%	5%	1%
<b>RE</b>	<b>37%</b>	19%	17%	16%	10%	1%
<b>ISD</b>	<b>34%</b>	20%	19%	15%	10%	1%
<b>ISI</b>	<b>39%</b>	16%	19%	15%	9%	1%
<b>IST</b>	18%	20%	<b>24%</b>	21%	15%	2%
<b>ISE</b>	22%	<b>27%</b>	24%	14%	10%	2%
<b>ISM</b>	20%	23%	<b>24%</b>	19%	12%	3%
<b>SIS</b>	<b>33%</b>	18%	20%	14%	13%	1%
<b>ISU</b>	7%	23%	20%	<b>30%</b>	15%	4%

Taking into account the results included in Table II you can notice that users are rather inactive. CIOs evaluate users as inactive at business analysis and business process modelling stages as well as at requirements engineering, system design and implementation. IT people do not demand the technical expertise from users, they should be helpful at the initial stages of business information system development process. Users were evaluated as co-creator in project concepts specification, information system testing and maintenance. Security of IS is the domain of IT professionals, and of course the strong activity of users is revealed at the business information system exploitation stage.

IV. USER INVOLVEMENT EVALUATION

Further analyses were realized for each of 4 groups of companies separately. In micro and small companies end-users are assumed to have direct, face-to-face (F2F) contact with IT staff, therefore they know more about requirements of each individual. In medium and big companies, the contact between the end-user and IT personnel is indirect and online, occasional, therefore the procedures of registration of user needs are implemented, and the end-user has no chance to be personally involved in the BIS development process.

The first question concerns the expected benefits and potential impediments. At big companies, over 70% of respondents admit that the most important benefits of end-user involvement in BIS development process cover better understanding of end-user requirements (83.3%), reduction costs of research and development works (73.3%), opportunities for market offer differentiation (73.3%), and improvement of company image (over 70%). Similarly at medium companies, over 70% of respondents argue that the

most important benefits of end-user involvement in BIS development process comprise better understanding of end-user requirements (80.5%), development of strong relationships with user (80.5%), reduction of the cost of knowledge acquisition (75.6%) and improvement of company image (75.6%).

At small companies, the most important benefits of end-user involvement in BIS development include: supporting user education (72.2), better understanding of user requirements (72.2), taking better market position (67.1%). At micro companies, the most important benefits of end-user involvement in BIS development cover: better understanding of the user requirements (over 83%), moving to the better market position (over 71%), and improvement of company image (70%).

The most important impediments of end-user involvement in BIS development process comprise:

- At micro companies, end-user lack of knowledge and skills (73% of all respondents mention that), inevitability to learn new technologies (66%), lack of incentives and encouragement from the BIS producer (65%),.
- At small companies, necessity to learn new technologies (72% of all respondents state it), end-user lack of knowledge and skills (71% ), and end-user lack of incentives provided by BIS producers (62%).
- At medium companies, end-user lack of knowledge and skills (according to 80% of respondents), the end-user necessity to learn new technologies (68%), and threat of theft of end-user ideas (61%).
- At big companies, necessity to know new technologies (80%), end-user lack of knowledge and skills (73%), and lack of incentives provided by BIS producers (57%).

The next question in this survey concerns methods of activation of end-user to encourage them to the cooperation for BIS development. So, in the survey the following methods have been identified:

- At big companies, participation of end-user in training courses and workshops (90% of respondents emphasize that), constant discussions of IT personnel with end-users (86.7%) and participation of end-user in reviewing processes covering interfaces reviews and use case analyses (77%).
- At medium companies, participation of end-users in BIS testing (indicated by 90% of respondents), constant discussions of IT staff with end-users (85%), and participation of end-users in quality management team work (76%).
- At small companies, participation of end-users in training courses and workshops (75% of respondents answered that), constant discussions of

IT personnel with end-users (72%), and occasional interviews and meetings with end-users (72%).

- At micro companies, interviews and meetings of IT staff with end-users (75%), participation of end-users in courses and workshops (73%), participation of end-users in quality management team works (71% of respondents), and distribution of free and open source software (70%).

None of the respondent groups emphasizes agile methods application for software development or for project management. IT personnel and end-users are observed as conservatively minded persons. Similarly, the corporate architecture model discussions as well as IT product customisation opportunities have not be perceived as valuable for end-user encouragement. Beyond that, end-users are not interested in control and evaluation of BIS administrator works.

The fourth question concerns the knowledge from end-users demanded by IT staff. For micro and small companies knowledge on personal computer construction and usabilityes and end-user tasks are the most important characteristics, although for medium and big companies, knowing business processes is enhanced (Table III).

TABLE III. END-USER KNOWLEDGE DEMANDED BY IT STAFF

User Knowledge	Acceptance [%] at Companies:			
	Micro	Small	Medium	Big
Computer usabilityes	<b>50.8</b>	<b>57.0</b>	<b>58.5</b>	60.0
User tasks	<b>50.8</b>	<b>57.0</b>	51.2	<b>76.7</b>
Business processes	30.8	45.6	<b>61.0</b>	<b>66.7</b>
BIS technology	30.8	30.4	41.5	13.3
BIS interface technology	19.2	20.3	29.3	3.3
Software engineering	14.2	12.7	19.5	13.3

The next question focuses on end-user involvement in the works on BIS development. The IT staff considered separately end-users' involvement and engagement of online communities. In this research, the following activities have been analysed: basic research works, industry research works, development works, pilot implementations and product exploitations. Generally, the presence of end-users in BIS development process was accepted. However, the level of acceptance was different for different size companies:

- For big companies, end-users and online community were considered as required but not necessary for BIS development, and only in some cases the activities of community of users were treated as useless for high quality of BIS.
- At medium and small companies, involvement of end-users was perceived as demanded and necessary to ensure the high quality of BIS, however activities of online community were less

important, and even in some cases, the involvement of end-users and community of users was considered as impediments for high quality of BISs.

- At micro companies, end-user involvement in BIS development works was accepted as necessary for high quality of IT products, but online communities were treated as neutral for BIS development.

The sixth question concerns the usability of virtual communities as well as social media for BIS development. The controversial opinion results are presented in the Tables IV-VII. The IT staff representatives were asked if the virtual communities and new media are important for high quality of business information systems. Their opinions were distinguished as:

- Compulsory (C): the Internet solution is necessary to ensure a high quality of BIS.
- Required (R): the proposed solution seems to be required, but not so strong demanded as above.
- Neutral (N): the solution is indifferent to the BIS development and without impact on it.
- Useless (U): the Internet solution is superfluous for BIS development.
- Impediment (I): the solution is harmful and detrimental for the BIS development (i.e., design, implementation and exploitation).

TABLE IV. VIRTUAL COMMUNITY AND SOCIAL MEDIA AT MICRO COMPANIES - IT PERSONNEL ATTITUDE

Media	For high quality of BIS				
	C	R	N	U	I
Newsletters	14	29	42	13	2
Company staff blogs	13	34	42	10	1
Users' blogs	9	29	51	10	1
Facebook	11	26	52	8	3
Twitter	8	24	57	9	2
ITproduct sale portals	9	32	44	13	2
IT product exploitation portals	9	35	46	9	1
Social networking	9	23	52	14	2
Chat room	6	18	62	13	1

Tables IV-VII include the percentage of positive responses in each of the 4 companies groups. The presented in Tables IV-VII information reverse a theory concerning very positive acceptance and necessity to develop virtual communities and social media implementing for BIS development. Mostly, the new media solutions are treated as required and neutral, but they are not necessary.

The IT staff is able to tolerate the mentioned in Tables IV-VII solutions i.e., newsletters, company staff blogs, users' blogs, Facebook and Twitter presence, IT product sale and exploitation portals, social networking and chat room,

but they do not admit that the mechanisms are valuable for BIS implementation and exploitation.

TABLE V. VIRTUAL COMMUNITY AND SOCIAL MEDIA AT SMALL COMPANIES - IT PERSONNEL ATTITUDE

Media	For high quality of BIS				
	C	R	N	U	I
Newsletters	18.9	31.6	37.9	10.1	1.5
Company staff blogs	11.3	37.9	43.0	6.3	1.5
Users' blogs	13.9	32.9	40.5	8.9	3.8
Facebook	18.9	22.8	35.4	18.9	4.0
Twitter	16.5	16.5	43.0	21.5	2.5
ITproduct sale portals	13.9	36.7	29.1	16.5	3.8
IT product exploitation portals	17.7	36.7	30.4	15.2	0.0
Social networking	18.9	27.8	31.6	15.2	6.5
Chat room	12.7	29.1	43.0	10.1	5.1

TABLE VI. VIRTUAL COMMUNITY AND SOCIAL MEDIA AT MEDIUM COMPANIES - IT PERSONNEL ATTITUDE

Media	For high quality of BIS				
	C	R	N	U	I
Newsletters	14.6	31.7	41.5	12.2	0.0
Company staff blogs	12.2	43.9	36.6	7.3	0.0
Users' blogs	12.2	41.5	29.3	14.6	2.4
Facebook	12.2	21.9	53.7	12.2	0.0
Twitter	9.8	19.5	60.9	9.8	0.0
ITproduct sale portals	7.3	24.4	51.2	14.6	2.5
IT product exploitation portals	9.8	36.6	39.0	12.2	2.4
Social networking	9.8	29.3	46.3	12.2	2.4
Chat room	7.3	21.9	53.7	14.6	2.5

TABLE VII. VIRTUAL COMMUNITY AND SOCIAL MEDIA AT BIG COMPANIES - IT PERSONNEL ATTITUDE

Media	For high quality of BIS				
	C	R	N	U	I
Newsletters	13.3	40.1	40.0	3.2	3.4
Company staff blogs	13.3	20.0	56.7	6.7	3.3
Users' blogs	13.3	33.3	43.4	10.0	0.0
Facebook	16.7	16.7	46.6	16.7	3.3
Twitter	13.3	16.7	50.0	16.7	3.3
ITproduct sale portals	13.3	23.3	46.7	13.3	3.4
IT product exploitation portals	20.0	30.0	33.3	13.3	3.4
Social networking	20.0	26.7	40.0	13.3	0.0
Chat room	13.3	16.7	56.7	6.7	6.6

The last question asked for the survey concerned attitudes of end-users towards traditional solutions implemented for their support, i.e., Customer Relationship Management (CRM) systems, insourced and outsourced Help Desk, IT service anticipation systems and providing consultancy by CIOs. The end-user support mechanisms are accepted as required. For big and medium companies, the respondents have argued that only insourced Help Desk is necessary, the other solutions are required and neutral. At small companies, the IT service anticipation systems were mostly preferred. For micro companies, respondents have no special preferences.

In this survey, social networking and IT service support mechanisms were presented from the IT staff point of view. They seem to be pragmatic and prefer traditional and verified solutions instead of strong acceptance of new media. They perceive new media as attractive but not necessary to support users and to involve them in BIS development.

## V. CONCLUSION

Literature studies lead to the conclusion that business organizations are beginning to realize the potential benefits that can be captured when users and IT firms co-create values. Companies benefit from a large membership of users. They get benefits such as marketing insights, cost savings, brand awareness and idea generation. Users benefit from a positive experience that fulfils personal needs and interests. Experience is defined as an intensive individually involved event.

In the survey done in 270 firms these these were verifies. So, IT professionals have been observed as very sceptical about utilisation of new media and social networking, although in Internet several positive examples are registered. The research revealed important problems of lack of knowledge and skills of end-users as well as a lack of incentives necessary for their deeper involvement in BIS development. Therefore a huge social capital is unused.

In the research, the quantitative methods are applied to reveal the influence of new media and social networking on information system development. The research does not provide an optimistic view to encourage for further development of new media and social networking. But the social networking tools' providers should not be disappointed, in particular cases recognized through a qualitative approach their tools can be recognized as well accepted. The future research works will cover cloud computing tools for end user support.

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