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USER INNOVATION AS A BASIS OF INNOVATION NETWORK BETWEEN UNIVERSITIES AND BUSINESS

[1]Zornitsa Yordanova

ABSTRACT

The paper aims at building a conceptual framework on how user innovation concept may be employed for the idea of creating innovation network between universities and business. Such innovation network would serve different purposes that are currently qualified as barriers for innovation management in business organizations as lack of easy access to lead-user innovators; difficulties in building minimal viable products; problems in validating innovation in its pre-market phase, etc. On the other hand, such innovation network would also satisfy some identified problems in innovation management education like reducing the gap between theory and business; teaching students through real live projects, etc. The approach for designing the conceptual framework steps on the user innovation theory. A literature analysis on user innovation identifies the utility of utilizing users in innovation development. Based on these, a focus group with 15 innovation managers qualitatively validates whether the identified 26 user activities in innovation development from prior researches would be beneficial if students take the role of user innovators (educated user innovators). The conceptual framework is built as a result from the respondents' answers by designing where students may participate in innovation development as user innovators and how beneficial it is expected to be that cooperation. The assessment aims also at define the best place where the proposed activities may take place within the innovation development process. The finding of the study may play the role of a roadmap for user utilization in innovation development.

Keywords: User Innovation; Innovation Management; Innovation Development; Co-Creation; Educated User Innovators

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[1] Industrial Business Department, University of National and World Economy, Sofia (Bulgaria).
Email: < zornitsayordanova@abv.bg>

LA INNOVACIÓN DE USUARIO COMO BASE DE LA RED DE INNOVACIONES ENTRE LAS UNIVERSIADES Y EL NEGOCIO

RESUMO

El objetivo del papel es elaborar un marco conceptual sobre el modo en que el concepto de innovación del usuario podría contribuir a la idea de crear una red de innovaciones entre las universidades y el negocio. Una tal red de innovaciones cumpliría varios propósitos que actualmente representan obstáculos para la gestión de la innovación en organizaciones empresariales, tales como acceso fácil a usuarios de innovaciones – líder; dificultades al crear productos viables mínimos; problemas a la hora de validar la innovación en su estado antes de llegar al mercado, etc. Por otro lado, una tal red de innovaciones resolvería también algunos problemas en la enseñanza de la gestión de la innovación: reducir la brecha entre la teoría y el negocio; enseñar a los estudiantes basándose en proyectos de la vida real, etc. El enfoque de diseñar el marco conceptual está basado en la teoría de la innovación del usuario. Un análisis de la literatura sobre la innovación del usuario demuestra el provecho de involucrar los usuarios en el desarrollo de la innovación. A base de esto, un grupo de enfoque compuesto de 15 managers de innovación comprueba mediante un análisis cualitativo si las 26 actividades de usuario en el fomento de la innovación de investigaciones anteriores podrían ser útiles si los estudiantes desempeñan el papel de innovadores usuarios (innovadores usuario instruidos). El marco conceptual ha sido desarrollado a base de las respuestas de los encuestados diseñando donde los estudiantes pueden tomar parte en el desarrollo de la innovación como innovadores usuario y que beneficiosa podría llegar a ser esta colaboración. Otro objetivo de esta evaluación es el de definir el mejor sitio dentro del proceso de desarrollo de la innovación donde las actividades propuestas pueden tomar lugar. La constatación del estudio podría servir de hoja de ruta en cuanto a la utilización de usuarios en el desarrollo de la innovación.

Palavras-chave: Innovación Del Usuario; Gestión De La Innovación; Desarrollo De La Innovación; Co-Creación; Innovadores Del Usuario Educados.

INTRODUCTION

Users are valuable ingredient in innovation development process (von Hipple, 1986).

Business involves them within innovation development so to serve different goals as validation of ideas, testing, achieving more customer-centric solutions, recognizing market gaps, etc. That is why the user innovation theory has been gaining much attention and academic interest lately.

Thus, users have become the missing part of the increasingly complicated innovation development in business organizations (von Hipple, 1986). Yet, user involvement supposes interactions with external entities (Altman and Tushman, 2017) which makes their management challenging and complex (Flowers & Voss, 2015) and brings a reason for deeper research.

The theory examines in details how a company can identify potential users as lead-users (Urban and von Hippel, 1988) but it does not answer to two basic and simple questions: (1) how exactly users may be utilized in innovation development in systematic way and (2) how companies may access and attract users for utilizing them in their innovation development.

Schuurman (2015) has already defined these two questions as "a search for needles in a haystack".The presented research explores the possibility of developing innovation network based on user innovation concept between economic universities and business organizations so to give an option for answering the stated two questions above.

The conceptual framework, which is the purpose of the research, puts students as 'educated user innovators' (a variation of lead-user innovators, firstly introduced here).

The educated user innovators are not individual innovators but rather supportive actors within business innovation development in different phases of the process.

The finding of the study illustrates specific actions within innovation development where students may be useful for business as user innovators (educated user innovators). These activities are assessed and put in order so to be optionally used as a roadmap in such user utilization in innovation development and helping the process of access, attract and utilize potential user innovation.

The practical implication of the study proposes a framework ready for business exploitation on how business organizations may utilize students in innovation development in the role of educated user innovators since the current research in user innovation have already identified the misunderstanding of how this to happen exactly (Schuurman, 2015). The main contribution of the paper is systematization and clear presentation of activities within innovation development process where students may benefit some innovation-related activities as educated user innovators and supporting companies to better utilize users into the process.

As a secondary contribution of the research, a new term "educated user innovators" is introduced for the first time. The educated user innovators are users with basic or advanced innovation management knowledge that may be involved within innovation development for achieving better validation and more customer-centric outcomes.The educated user innovators are a variation of user-lead innovators.

Future research addresses the application of the proposed framework and what outcomes it will deliver. Further research will be also conducted for identifying the negative effects on such educated user innovators, incorporated within innovation development, such as: limited vision; lack of experience; non-compliance with ordinary users; big difference in expectations of organizations; lack of conformity, etc.

THEORITICAL BACKGROUND: USERS IN INNOVATION DEVELOPMENT

Involving users and external partners in innovation development benefits the outcome of innovation development in many ways (Von Hippel,

1986; Chesbrough, 2003; Buur and Matthews, 2008; Brem and Voigt, 2009). According to Franke and von Hippel (2003) innovations developed by lead users are more likely to be commercially successful than those created by producers.

Von Hippel (1986) has analysed the importance of involving users within innovation development process in the users' role as sources of pure innovativeness, possibility to test and simulate market research for a good that has no market alternative and as bearers of the future needs of mass users.

The main purpose of their involvement in innovation process is better satisfaction of their own needs and the needs of other users.

Chesbrough (2003) defines users and out-of-company sources of innovativeness as a tool for breaking the limitation of the single path to market that the traditional innovation development approach proposes. Buur and Matthews (2008) analyse why users can be involved in the corporate innovation process when it comes to goals, methods and basic philosophy.

Yordanova (2018a) concluded that customer-centred and user-lead innovations have the best chances for successfulness in commercializing phase because of their larger life cycle.

A specific in Buur and Matthews (2008) is their statement that users' involvement as co-innovation instead of user-lead innovation participation within innovation development. The currently existing academic studies from the user innovation theory do focus mainly on involvement of users in the innovation process researching these users' identification and profiling.

The following researchers have emphasized the problematics of user innovation involvement from different perspectives but regardless of the extended research work on the topic recently, the user involvement in innovation development networks is not clear yet as well as what exactly this utilization looks like.

Bosch-Sijtsema and Bosch (2014) analysed user feedback throughout the whole innovation process. Rothwell et al. (1986) emphasized the importance of users as active participants in the innovation process. Gardiner and Rothwell (1985) surveyed users' role in product or process improvements, as re-innovation. Hani and de Marcellis-Warin (2016) made a breakdown of involvement of End-Users. Flowers at.al. (2010) researched specific types of users in products or industrial categories. Roy (2018) observed the role of lead user for disruptive innovation.

Brem and Voigt (2008) studied in their research how through involving users in innovation process, companies try to alleviate the risk of lacking user-acceptance afterward the innovation release.

The research provides insight on how the user involvement in innovation process concept has been developed and even revolutionized with development of the web and internet technology. Additionally, some methods suppose utilization of users in different stages of innovation process.

These are Lean start up and agile. The literature also distinguishes between the benefit and result from users' involvement in innovation development to creation, modification, creation and modification and new ideas (Flowers et.al. 2010; Mujika-Alberdi, Arrizabalaga and Martins, 2013). Prahalad and Ramaswamy (2004) concluded that users have become active players in innovation process and they are no more a "passive audience".

As such, users are an increasingly important actor especially in innovation networks where users can reveal the most of their potential to innovation development and innovation progress. Yordanova (2018a) reports an analysis of the benefits of utilizing users in innovation development, presented in table 1.

Table 1 Benefits of utilizing users in innovation development by business organizations.

User utilization type	*User utilization clarification*	*Benefit for company*
Needs identification	To forecast better customer needs since these are their own unsatisfied needs	Bringing more customer-centre approach in identification of customer needs
Needs identification	To forecast customer needs before manufacturers do	Faster time-to-market and shorter research and development
Needs identification *Selecting of ideas for solution* *Prototyping* *Diffusion*	Consumers do not have the primary job to innovate products, they do this on their own initiative, and motivation, unprofessionally, in their spare time and only after a specific need has been identified.	Reducing costs for developing innovations in their initial process - identifying needs, generating ideas and solutions for their satisfaction
Needs identification *Selecting of ideas for solution* *Prototyping* *Diffusion*	No costs are paid for unsuccessful decisions and innovations, but only for already valued and value-based solutions	Reducing costs for developing innovations in their initial process - identifying needs, generating ideas and solutions for their satisfaction
Needs identification *Selecting of ideas for solution* *Prototyping* *Diffusion*	User innovation is the guiding principle of satisfying the need and in many cases satisfying is sufficient for the user – innovator.	Reducing costs for developing innovations in their initial process - identifying needs, generating ideas and solutions for their satisfaction
Needs identification *Selecting of idea* *Solution for satisfying a need*	In user innovation, the need first emerges.	The level of correct and accurate identification of consumer needs in user innovation is much higher due to the causal link in the model
Team work	Synergy of collective work	Efficiency in innovation process and development
Needs identification *Selecting of idea* *Solution for satisfying a need*	Innovation development in a business organization is often aligned more to existing resource, existing product range, strategy, market positioning in the same sector than to proper market and user needs. This restriction limits innovation.	Removing limitation and barriers in innovation development, existing within the organization
Needs identification *Selecting of idea* *Solution for satisfying a need* *Prototyping* *Diffusion*	A tool for internationalization of business	It may be used by companies to enter new markets at lower prices and using the strengths of online communication and virtual teams
Needs identification *Selecting of idea* *Solution for satisfying a need* *Prototyping* *Diffusion*	User innovators are not limited in their innovation development as employees usually are.	Expand business and extend product range
Needs identification *Selecting of idea* *Solution for satisfying a need*	User innovators do not harm the existing innovation process of business organizations.	Alternative channel for gathering ideas, regardless of the R & D department's work.
Needs identification *Selecting of idea* *Solution for satisfying a need*	User innovators often contribute to NPO causes.	Bringing more social/public/citizen element because of the direct interaction between the users and business.

Generally, literature review shows the following users' involvement types in innovation process: user innovation (von Hippel, 1986; von Hippel, 1977), user-lead innovation (Von Hippel, 1986), co-creation of innovation (Jespersen, 2008), participatory innovation (Lievens, et al., 2014).

Students have not been identified until the moment as a consistent and potential group when it comes to user innovations and innovation development. Too many studies focus on simply indicating that users were involved in innovation development, but fail in showing the added value of their contribution and how exactly they were involved (Schuurman, 2015). Bogers and West (2012) confirmed that studies find it difficult to identify users' input in innovation development.

All these is a reason for a deeper investigation into appropriate activities to implement a conceptual model for users' utilization in innovation development by introducing the concept of educated user innovators and developing suggestions for utilizing these users in innovation development.

The reason for choosing this proper group of users, not another, is some good results of the work of students on innovation management in informal university-to-business projects where students brought added value to innovation process of business.

At the same time, the literature analysis shows a wide gap for new concepts and proposals for defining better who may be user innovator and how companies to access and utilize these users.

METHODOLOGY

The conceptual framework for innovation network between universities and business is based on the assumption that students on business innovation are appropriate target for building user-lead innovator skills and even more – grouping them into a new category – educated user innovators. The building of the conceptual framework steps on both user innovation and innovation process theories. For testing the concept, the following activities take place:

Creating a Focus group

The research started with creating a focus group of innovation managers. A couple of criteria selected them: innovation management as their primary role and responsibility; had already used users in some of their innovation projects; work in the IT sectors (for achieving consistency of the test), representatives of different companies with diverse user innovators experience.

Fifteen members composed the focus group. The research does not aim at testing the concept in quantitative way, only in qualitative means so to validate the assumptions put together into the conceptual work.

The focus group has been acquainted with the theory of the simple innovation process before the actual discussion to begin.

The first session took place in October 2017 and it was for introducing the innovation process according to the theory (for alignment between the 15 participants in the research) and a discussion on the users' utilization in current projects of the Focus group members.

Developing a questionnaire and assessment by the Focus group

The second stage of the research was developing a questionnaire for testing the expectation of innovation managers of utilizing students as user innovators and where exactly this utilization can be put within innovation development process. In the questionnaire are listed 26 possible activities that users may be involved in (Yordanova, 2018a).

The respondents have been asked to assign a process phase to each of these activities (where exactly they may be useful) and to assess how useful would be utilizing of educated users (students covering a course of business innovation) for these activities.

The process phases of a simple innovation process are introduced during the first session of the Focus group.

The simple innovation process contains the following phases: Idea generation; Idea selection; Business analysis; Development and POC; Prototyping; Production; Commercialization. The assessment method allows respondents to evaluate the appropriateness of utilizing educated users based of a three-point scale: 0 – not applicable; 1 – possible; 2 – seems to be useful. The term "educated user innovators" was introduced to the innovation managers as well as all the topics coved by the course of business innovation.

These are: Foundations of business innovation; Innovation-related concepts; Innovation classification and typology; The process of making innovation; Innovation management; Innovation models; Innovation strategy; Business environment for innovation; Innovation project management; Innovation funding and investing; Teams and company's innovativeness; Innovation and technology transfer. Innovation diffusion; Innovative companies and Start-ups; Personal innovativeness for business purposes; National innovation systems. The questionnaire plays the role of an assessment tool for the listed activities for user utilization. It is presented in Appendix 1.

The second session of the Focus group took place in December 2017. The results of the assessment were taken via paper questionnaires in the form, presented above on table 1. It aims at tracking the assessment of the proposed conceptual framework.

Summarizing and analysing the results

The principle for achieving final assessment of the proposed users' activities is based on statistic average result from the assessment by the members of the Focus group. After each respondent gave his score, all the points are summed and an average is formulated.

The activities with lower than the average assessment are presented in white in the section with the research results; activities with average score are coloured in yellow and the activities with higher than average result are coloured in green.

For each of the listed activities has been also assigned a proper phase of innovation development process which each members of the Focus group considered it would be relevant.

The appropriate phase for each user activity were discussed and agreed on by the Focus group after the assessment for achieving single process place.

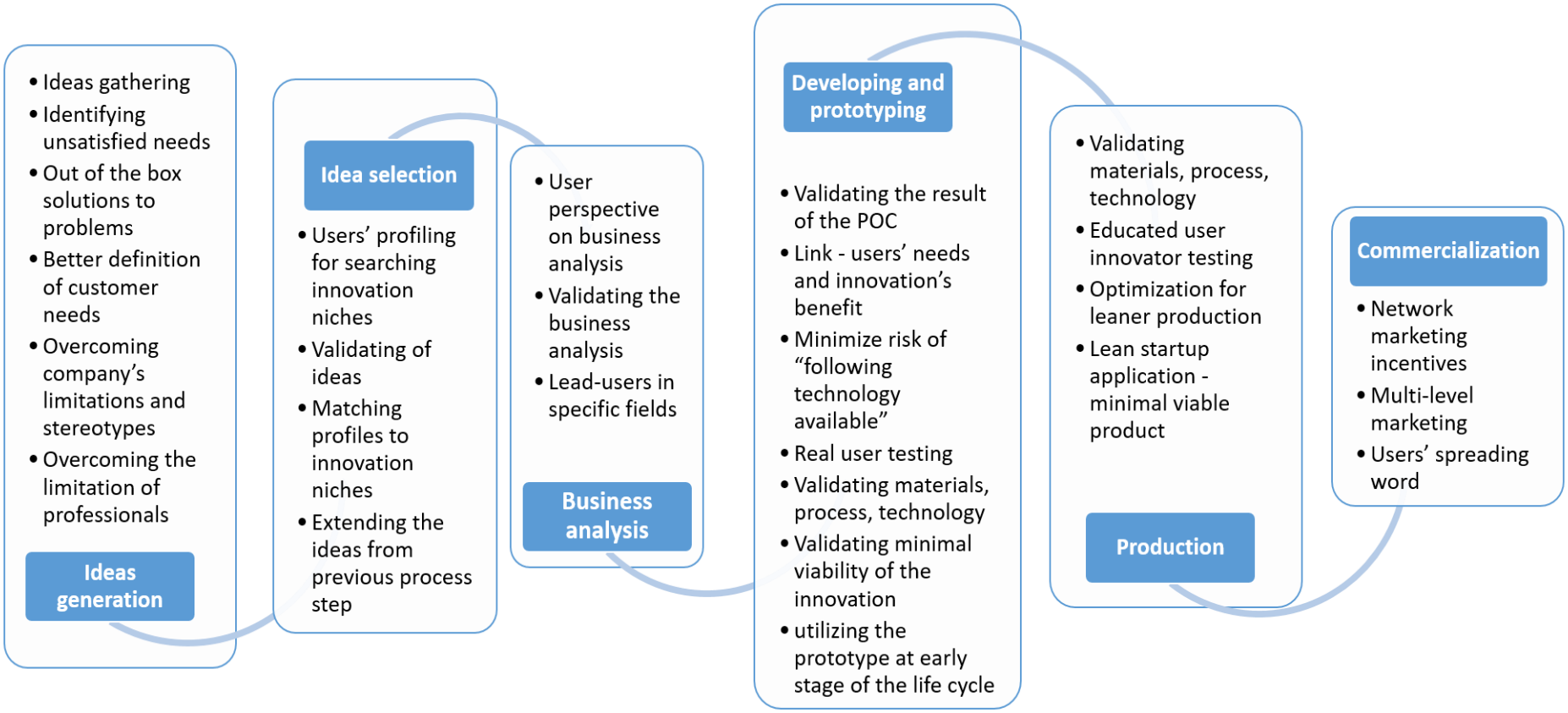
An assumption in the methodology used is the difference between users' utilization from industry to industry or innovation to innovation. That is why, the methodology steps on simple and basic rules so eventually this evaluation process to be performed by companies itself for better and individually defining of the best utilization of educated users in their own case.

That would mean the results of the study are only an indication or may refer to IT industry only (since the focus group is formed by innovation managers from IT industry only).

RESULTS

The results from the research show the following distribution of the proposed activities with user involvement as part of innovation development process presented on Fig. 1.

Fig. 1: Educated user innovators activities within innovation development process.



The result of the first part of the research shows no differentiation in the opinion of the innovation managers where exactly in the innovation process these users' activities may take place.

Only for some activities were received additional comments out of the structured questionnaire with clarification that the place and time of the activities may vary depend on the project management approach, respectively depending on using waterfall, agile, scrum, Kanban or Lean start up (if it is possible Lean start up to be summarized all together with project management technics and methods). For some education users' activities additional clarification was required so the focus group to have one understanding of the real activities which are expected to be performed by the user.

This brought to additional clarification of the proposed conceptual activities. Here are presented the additional clarification of the scope of some of the misunderstood user activities which the focus group agreed on.

Table 2 Additional clarification of some of the proposed user activities resulted from a group discussion.

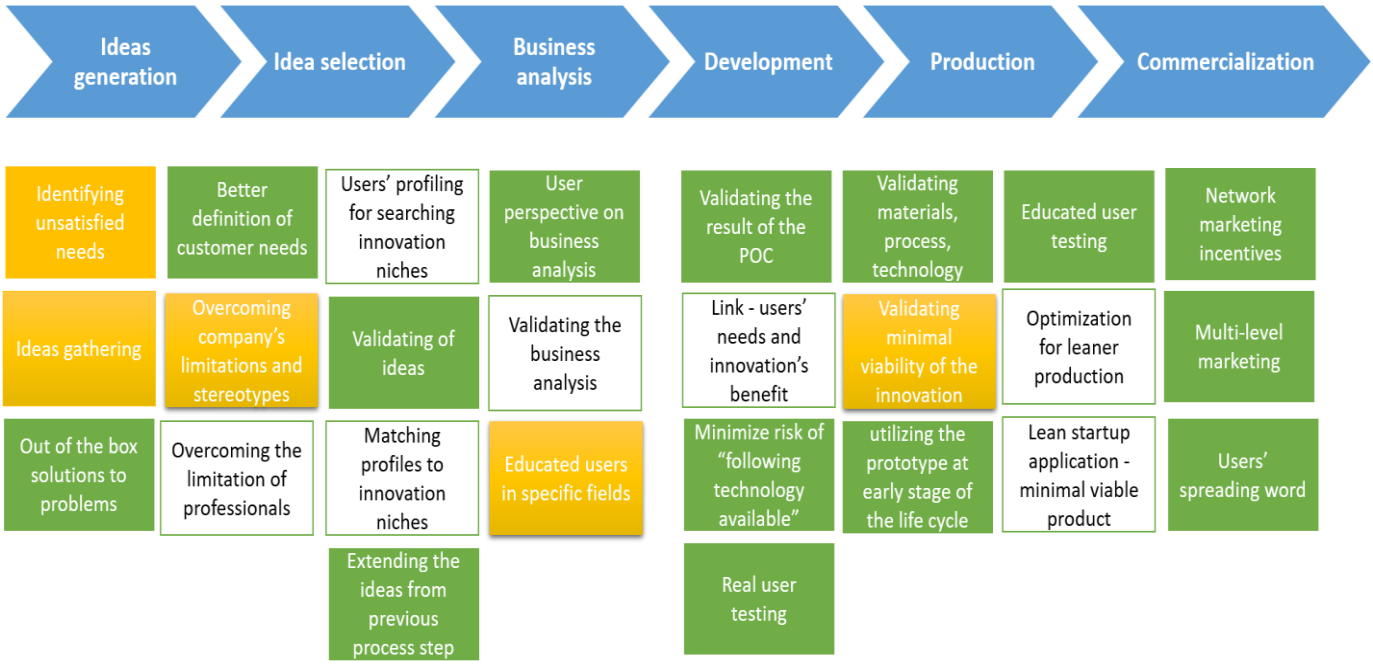
User activity	Explanation	Scope
Users for out of the box solutions to problems	Out of the box solutions to problems are solutions that do not refer to company's current product range, existing technology, market research.	Generating solution to already identified problems without the limitations of working in the area and without knowledge restriction what is possible and what is not.
Users' profiling for searching innovation niches	Educated user innovators may provide new and more relevant profiles using customer-centricity approach or adding value since they are part of the new generation (generation X).	Defining different target groups and exploring their individual/group needs or searching for innovation niches within the newly formulated target groups.
Lead-users in specific fields	Educated user innovators in specific fields	Bring synergy between their role as users, educated users and experts in specific field.
Validating the result of the POC by comparing it with the initial intention of the innovative idea	The innovation process often changes the initial point and contort the idea (because of taken decisions or lack of validation of the concept within the whole process).	Involving educated users only in some of the innovation process phases so to validate the initial innovation intention and the end-product.
Lean start up implementation when it comes to minimal viable product	Lean start up approach implies techniques for testing the innovation concept at its very first stage of development.	First user testing

Additionally, some comments were received referring some potential problems of utilizing users instead of professionals in the innovation process. These were: Users for overcoming company's limitations and stereotypes; Users for overcoming the limitation of professionals (materials, technology, etc.) and Contribute with user perspective on business analysis. Further discussion with the focus group summarized the reasons for the criticism of these user activities and these was all related to the lack of expertise and deep experience of educated users which may lead to unsatisfactory results, waste of time and even wrong direction and decisions for innovation development.

The second part of the empirical research shows results about the assessment of the proposed user activities and this assessment is presented on Fig. 2 by using three-point scale (white, yellow, green). No matter of the simple scale used, the best evaluated users' activities

are reported here: real user testing (30 points, pointed out from all respondents as very useful); better definition of customer needs (21 points); out of the box solutions to problems (18points). The weakest assessed activities were Production process optimization with users' utilization for leaner production (4 points) and Keep the link between users' needs and the innovation's benefit and the developing innovation (with all limitation referring to technology, process, assumptions, materials, workarounds, etc.) – 7 points.

Fig. 2: Assessment of appropriateness of activities with educated user innovators involvement.



The focus group agreed on a conclusion that the assessment of the appropriateness of applying the different activities by educated users depends on the innovation, industry and individual case. It may also depends on the utilized educated users.

As a recommendation, the focus group proposed additional criteria for selecting educated users to be applied before utilizing them. That selecting may be based on interviews, testing the knowledge of the educated users in specific knowledge or else.

In conclusion, the research results show an indication for possible utilization of educated users within innovation development and this utilization appropriateness in the case of IT industry (based on the focus group opinion). Since the research has not been a quantitative study, the results do not show absolute arguments for educated user innovators utilization on the way the research proposes.

However, the assessment of the focus group of innovation managers with experience in utilizing users in innovation development provide potential for further research of the proposed conceptual framework. Added value of the conceptual framework from its ideation to the existing stage of a conceptually researched framework is the suggestions for extending the process.

The involving of educated user innovators should be extended with a pre-criteria phase for selecting the appropriate educated user innovators and optionally performing the last stage of the methodology in each case so the expectations and results to be more adequate and relevant for each individual industry, company, innovation case. That would mean

assessing the relevance of utilizing educated user innovators when it comes to innovation process case by case with the proposed methodology.

The results answer partially the identified knowledge gap in the theory of user innovation with a methodological suggestion how educated users may be utilized in innovation process. The research indirectly responds also to the second research question how potential user innovators may be accesses since the proposed approach refers to students on innovation management.

CONCLUSION AND DISCUSSION

As a result from the conducted research are clarified 26 activities in which educated user innovators may take part as part of innovation development in business organizations. The research also clustered them into three groups: not applicable, possible and potential according to 15 innovation managers who had already utilized users in their innovation projects.

The paper also answers which of the proposed users' activities can take place during the different phases of innovation development. The research propose a framework that may be tested repetitively in different industries and for different innovative purposes so to be properly and individually applied.

Limitation of the study is the lack of real empirical application and testing of the proposed framework. The concept is tested across innovation managers from IT industry only so to explore the vision and possibilities of utilization of such educated user innovators. The results validates qualitatively the assumptions only for that sector.

Further research of the author will explore some specifics in such cooperation/innovation networks in innovation development between universities and business in other sectors and will search for those fields where the approach is suitable.

The listed 26 activities continue to supplement. The author will start a research with a real approbation of the conceptual framework with business organizations and students in the role of educated user innovators. Further research will also direct the precision of the newly introduced term - educated user innovator.

The author will also validate the concept by conducting a research focusing on the negative effects possible from using such model for business organizations as some research on related topics indicates that it may exists. A concrete example of such a research is on using Lean start-ups and how that may hamper breakthrough innovations and company's innovativeness (Yordanova, 2018b).

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