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CROWDSOURCING LOGISTICS ON THE INTERNET

ABSTRACT

Background: Crowdsourcing is a form of IT-enabled creating of innovative solutions (as knowledge products) by crowd (the Internet's community) members on crowdsourcing platforms (CPs) for their clients (organizations also companies and/or people). This paper addresses the current gap in the literature, which is placed in the area of study on CP e-logistics.

Methods: The paper aim is to propose the model of CP e-logistics and verify its application in the economic practice, This model consists of processes of internal also external knowledge and information flow via e-logistics activities on CP. An analysis of own research results on crowdsourcing e-logistics which was conducted into 52 CPs on the Internet in 2019 should verify using the presented model in practice.

Results: The conducted in this paper investigation integrates solving theoretical, research and practical problems on how to organize and execute processes of knowledge and information e-logistics on CPs. This paper determines principles of CP e-logistics development and characterizes e-logistics activities of the chosen platforms. It presents elaborated model of CP e-logistics, also ways and possibilities of its practical application on the Internet.

Conclusions: The strength of CPs is possibility of competitive creating knowledge also innovative solutions by the crowd on the Internet. Learning of using crowdsourcing e-logistics by contributors of CPs influences on their more efficient and effective activity in virtual markets.

Keywords: e-logistics, crowdsourcing platforms, a model, processes, knowledge and information flow, research on the Internet

INTRODUCTION

CPs are virtual, innovative companies. Different kinds of organizations (also companies and non-profit institutions), and private individuals try to use CPs for their benefits. Virtual

crowdsourcing is a form of IT-enabled development of innovative solutions (new values, - trends of the market, - knowledge, - design ideas, - open innovations also new products, and solutions which are created during solving problems, challenges) by crowd (the Internet's community) members - also workers on CPs.

Managers of CPs enable organizations also companies and/or people (clients of CPs) to order elaborating innovative solutions (knowledge products) by creative members of the crowd (their solvers). Managers encourage crowd members to generating innovative solutions (in the form of virtual projects) outside the platforms and supplying them online, and next deliver the best solutions to clients. Clients of CPs apply satisfied them solutions in the economic practice and/or to society also own advantage. Development of knowledge and information economy influence on evolutionary changes in logistics area concerning also crowdsourcing logistics on the Internet.

E-logistics is presented as logistics concepts applied through the Internet use and it means necessary processes for transferring goods which are sold online to their buyers (Erceg and Sekuloska [2019]). E-logistics of CPs include accomplishment of processes of internal and external knowledge and information flow via e-logistics activities, which are executed during collaboration of platforms' managers with crowd members and clients, and/or between them. These processes are connected with work flow and value creation on CPs.

E-logistics processes (subprocesses, activities) on CPs integrate: (1) knowledge also innovative solutions, information flow from the crowd members to CPs, and (2) innovative solutions (which are results of creative using knowledge) and information flow from CPs to their clients, and also (3) knowledge also innovative solutions and information flow during mutual collaboration of CPs contributors, that is managers, clients, the crowd members, and other external specialist partners (firms or their employees). These processes may be connected with flow of financial means from clients to creators (when clients offer the best solvers financial rewards). Clients pay for innovative solutions on commercial CPs, but non-profit platforms offer clients (also as non-profit companies) free products (services).

The study in this paper is placed in the area of gap research, which concerns using e-logistics in activity of CPs. The purpose of this paper is to propose the model of CP e-logistics and verify application of this model in the economic practice. This model consists of processes of internal also external knowledge and information flow via e-logistics activities on CPs.

This paper characterizes rules of CP activity and mutual collaboration of its contributors on the Internet. It describes assumptions and an essence of CP e-logistics development and characterizes e-logistics activities of the chosen existing CPs. Next section of this paper proposes the model of CP e-logistics. It present using e-logistics in processes of internal also external knowledge and information flow on CPs. Analysis of research results on CP e-logistics, which was conducted by the author into 52 websites of the platforms on the Internet in 2019, includes discussion on possibilities of using the proposed model in the practice. Finally, the conclusion determines the potential of CP logistics development on the Internet and directions of future research on this subject.

ACTIVITY OF CROWDSOURCING PLATFORMS AND THEIR CONTRIBUTORS

CPs have emerged over the past decade as some of the most powerful and valuable business models which activity is fundamentally different from traditional producer-consumer transactions (Kohler 2015). Leveraging digital technology and capitalizing on users' innovative potential, an increasing number of organizations are shifting their business models from a closed model to open and crowdsourcing business model (Blohm et al. 2018).

The purpose of CP activity is to engage members of the crowd that have both the willingness and innovative competencies to virtual work during solving problems, creating knowledge, supplying innovative solutions also new products (services), which are delivered to clients in accordance with determined by them orders and requirements.

The strength of CPs is to deliver clients the value unit in a more efficient, effective, reliable and personal way, because crowd members on the Internet can solve certain problems faster, better, and cheaper than companies they are able to do it in house (Blohm et al. 2018, Kohler 2018).

Now CPs are routinely used by business for various tasks, including product innovation (InnoCentive), graphic design (99design), software development (TopCoder), and small jobs (Amazon Mechanical Turk). Typically, they conduct innovation challenges that engage the crowd in collaborative or competitive processes (Jian et al. 2019, Malhotra and Majchrzak 2014) of internal and external knowledge and information flow via e-logistics activities of the platforms.

The crowd members participate in creation of new values, design ideas, innovative solutions, new products, services, and sometimes in evaluating them, testing them, and/or in

online promotion, sale of the best solutions, or even applying them with clients in practice (Dolińska 2017). CPs clients post orders and describe their requirements, the duration of the contests, and sometimes the financial reward values. Solvers submit own solutions to problems or tasks which are initiated by clients. Finally, clients evaluate and select the best solutions, sometimes do it with help of the crowd, and next they on some platforms transfer winners financial rewards.

Financial compensation is an important impetus for participation in IT-based development of innovative solutions and using in them knowledge on CPs, but the crowd members on many CPs even create innovative solutions free of charge or for a small fee (Jian et al. 2019, Kohler 2015).

The active role of the crowd on CPs is accompanied by the rapidly evolving global trend of social communities (networks) development on the Internet. From the perspective of CPs the value of using these external networks depends on collaboration with their members in e-logistics activities which enable managers to acquire their knowledge, abilities and communicate with them during creating innovative solutions, and next delivering them to CPs clients.

The crowd members create individually and/or co-create innovative solutions in teams, within networks and sometimes also with other kinds of CP participants that is seekers of open innovations, proposed by the managers external partners (consultants, facilitators, patent owners, designers, specialized firms). Creative members of the crowd in CP may be professionals that is experts, researchers, specialists, representatives of commercial entities, but also students or dedicated amateurs submitting innovative solutions to determined challenges on the platforms.

PRINCIPLES OF CROWDSOURCING E-LOGISTICS DEVELOPMENT

We are moving towards knowledge economy where intangible assets as knowledge, innovations are seen as essential components of value creation processes in organizations. Knowledge resources also acquiring them from outside become critical ingredients for gaining competitive advantages by organizations in this new economic landscape (Dolińska 2015). CPs assimilate and integrate knowledge by facilitating its communication, sharing, and transfer among individuals and by encouraging interactions, relationships in groups and within networks during knowledge flow, that is its acquiring, exchange, storage, development,

practical application (also in innovative solutions) and commercialization. Information support processes of internal also external knowledge (also innovative solutions) flow on CPs.

Now information logistics is one of the main types of logistics in an information economy. In particular, due to the fact that with the development of information and communication tools, technologies, and increasing importance of information influence on development of information logistics changes in other traditional forms of logistics (e.g. purchase, supply, storage, delivery, sale, etc.), and also the emergence of new types of logistics. E-logistics occurred within information logistics as a result of the Internet development and spread of the use of electronic presentation of information. … The basis of "traditional" logistics is the material flow (Skitsko 2016) but virtual organizations as CPs are developed in knowledge and information economy, and their logistics activity is connected with knowledge and information e-logistics.

Currently, organizations also enterprises want to use modern IT solutions which include also logistic applications in various and diversified business profiles and relate to the minimization of operating costs (Shvartsburg and Zaborowski 2019). CPs apply modern IT-solutions in own activity also in an area of e-logistics which integrate internal also external knowledge (also innovative solutions) and information flow.

CPs are network structures and their contributors that is managers, the crowd members, clients, other specialist partners conduct mutual collaboration and communication during value creation in networked processes of internal also external knowledge and information flow, which is integrated via e-logistics activities. These processes cross CPs virtual borders which are shaped dynamically by current contributors of the platforms. E-logistics activities of CPs link internal transfer and external flow in, flow out of knowledge and information on the platforms. CPs as providers of e-logistics services always try to develop their activity efficiently also improve satisfactions of their clients and workers (the crowd members).

CPs provide the crowd members and clients with virtual services of information and knowledge (also innovative solutions) logistics. These services are concentrated on acquiring, procurement, generation and distribution of knowledge also innovative solutions and information in accordance with expectations of clients. Information and knowledge logistics activities make possible creation of innovative solutions' value on CPs.

Using crowdsourcing e-logistics is presented on the examples of three platforms:

- Threadless is an online company that offer the crowd members designing T-shirts. Its crowd members supply, discuss and promote own designs. Virtual community members score and comment on the designs and the Threadless staff selects the designs to print. The winner of the competition receives financial award from the company - client of the platform. Threadless also rewards active members of the crowd with T-shirt sale and submitting photos of wearing them (Kavaliova et al. 2016).

- IdeaConnections offers solving problems, designing new products and elaborating innovative technological solutions for companies by teams of the crowd creators. The platform managers organizes interactions, communication between seekers and creators of innovative solutions. The company as the platform client presents a problem for solving, dissects the problem into smaller challenges and describes connected with them expectations. Firm-clients of CP propose financial prizes for creators of the best innovative solutions which will be implemented in practice (Battistella and Nonino 2012).

- LEGO cooperates with crowdsourcing partner - Cuusoo company. The LEGO Cuusoo CP allows the crowd members to submit LEGO-related virtual projects of new products. The crowd members interact and communicate online with managers of CP, comment, discuss, and vote on design ideas. Managers of the platform deliver the winning ideas to LEGO experts and they choose the best candidates for practical implementation and entering the market. LEGO activates creators in application, promotion and distribution of new product via its online and physical channels, and offer them financial rewards (Schlagwein and Bjørn-Andersen 2014).

THE MODEL OF CROWDSOURCING PLATFORM E-LOGISTICS

Creators do work outside CPs and supply own solutions in virtual forms to the platforms, next managers organize their evaluating and the best solutions are delivered to suitable clients of CPs. The crowd work is organized and curried out in accordance with individual orders of CPs clients. Virtual collaboration, interaction also communication with clients and the crowd members via e-logistics activities enable managers to accomplish the value generation and work flow processes on CPs.

The proposed in this paper model of CP e-logistics presents knowledge (also innovative solutions) and information flow in the networked processes of CPs. These processes integrate execution of the following activities:

- acquiring, sharing, storage, exploiting, transfer, aggregation, development, delivery of knowledge

and its practical application in innovative solutions,

- also collection, analysis, storage, transformation of information and organization of its transfer in electronic form, also selection of the necessary data for decision making on CPs.

Processes of internal also external knowledge and information flow via e-logistics activities enable CPs to connect orders, expectations of clients with effective and efficient using knowledge, abilities, experience by the crowd members in elaborated innovative solutions. The model of CP e-logistics consists of the following main processes of:

A) knowledge also innovative solutions (as products of knowledge) flow; these solutions are results of knowledge creation and/or its creative using by the crowd members: (1) individually and/or (2) during their collaboration in teams or within networks, and/or (3) the crowd members' collaboration with (3a) clients or (3b) external specialist partners of CPs; these processes make possible knowledge flow inside CPs and its transfer from and to CPs;

B) information flow during collaboration of CPs managers with (a) clients, (b) the crowd members, and/or (c) other partners, and /or among them; these processes are integrated with processes of internal and external knowledge flow and support their execution on CPs; on some CPs these processes include information about financial flow from clients to creators of innovative solutions, which is linked with offering solvers financial rewards by clients.

Processes of knowledge flow (A) lead to elaborating ordered by clients innovative solutions by solvers, and include the following component processes:

A1) presenting knowledge on new values, needs, expectations of market customers who are served or will be served by clients of CPs,

A2) generating knowledge (outside CPs) in the form of new design ideas and submitting them online by creators (individually and/or their teams, networks),

A3) active creating and/or co-creating innovative solutions by the crowd members, and/or during their collaboration and mutual exchange, development, using knowledge with clients and/or other specialist partners of CPs.

Processes of information flow (B) on CPs concern communication with clients, the crowd members and may include the following activities:

B1) preparing by clients and managers, and presenting primarily material on CP websites, which is used by the crowd for elaboration,

B2) answering questions of actual and potential clients and the crowd members,

B3) cooperation and communication of managers with chosen by them teams of solvers,

B4) including the crowd in evaluating, commenting submitted design ideas and/or voting on them,

B5) cooperation and communication between clients and creators during promotion and/or sale of winning innovative solutions, also new products,

B6) information flow about financial rewards from clients to creators.

Sometimes CPs offer the crowd members access to internal knowledge resources which are stored on the platforms, also presented on CP websites e-handbooks and valuable information of external experts.

Managers organize flow of information, knowledge along processes of generating innovative solutions on CPs and delivery of the best solutions to clients.

Value generation can be reached by improving current operational efficiency and/or offering innovative products and services. At this stage the company needs to build e-logistics capability for integration, building and reconfiguring internal and external competences for quick response to the changing environment. This capability needs integration of all the company's resources – processes, technology, and people (Erceg and Sekuloska 2019). The proposed in this paper model is placed in the area of building capability of CP e-logistics, which integrate competencies of internal and external collaborators of the platforms, also influence on effectiveness, efficiency and competitiveness of CPs activity in the Internet's market.

RESEARCH RESULTS ON E-LOGISTICS OF CROWDSOURCING PLATFORMS

The research on crowdsourcing e-logistics was conducted by the author into 52 websites of CPs on the Internet in 2019.

This paper tries to answer the following research question:

- Can processes of CP e-logistics be executed in practice in accordance with the proposed in this paper model.

The analyzed CPs execute the following main processes of internal also external knowledge (also innovative solutions) and information e-logistics:

- In 88.85% of the analyzed CPs the crowd members provide own knowledge and information on customers' new values, needs, expectations of markets which are or will be served by clients;

- The crowd members of most (92,31%) CPs generate (outside) new design ideas and supply them online to the platforms, the chosen best ideas are delivered to clients;

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- On 78.85% of the platforms creators generate innovative solutions also new products (services) for clients individually and on 63.45% of them providers co-create solutions in teams or within networks.

Execution of presented above – main processes of CP e-logistics is connected with mutual collaboration of solvers with:

- external experts and acquiring from them useful knowledge, important information in most (85%) CPs,

- clients during collective creation of innovative solutions also new products (services) on 40.38% of the platforms; this kind of collaboration is initiated by clients and make possible delivering specialist knowledge resources to creators, and cooperating and communicating with them during using collective knowledge on the platforms.

The following processes (component processes, activities) of information flow, which concern communication with clients and the crowd members, are executed on the analyzed CPs:

- clients and managers discuss, determine condition of their collaboration with the crowd members, and 66.38% of CPs present results of their collective arrangement as primarily material on their websites, which is used by the crowd for elaboration,

- managers on 63.23% websites of CPs place answers typical questions of actual and potential clients and the crowd members,

- 40.38% of CPs store specialist knowledge resources on their websites and/or collect specialist e-handbooks, also offer creators access to them,

- 30.77% of the analyzed CPs specialize in organizing work of creators in teams, acquiring and connecting prepared by them ideas, solutions together, and next delivering them as final solutions to clients,

- managers of fewer (17.31%) CPs offer the crowd specialist software which enable them to participate in evaluating, commenting submitted design ideas and/or voting on them,

- clients of most (75%) CPs propose the best creators payments for effects of their work and then CPs inform solvers about this, and also organize virtual flow of financial means from clients to solvers.

Most analyzed CPs conduct effective communication with own clients and the crowd members, which enable the platforms to integrate internal and external knowledge flow via e-logistics activities also deliver innovative solutions to clients. Fever of CPs curry out activities

of information flow which is connected with providing their collaborators (clients, the crowd members) with specialist services.

Clients of 42.31% CPs engage winners of contests and also authors of delivered them the best solutions in their promotion and/or distribution. In this way creators of fever CPs participate in execution of additional activities of e-logistics which are connected with delivery of implemented by clients innovative solutions to their final consumers in the markets.

All the analyzed CPs conduct collaboration with the crowd members and clients, which is based on knowledge and information e-logistics. The research results confirm that most explored CPs accomplish the proposed model (but the platforms execute different kinds of these processes: some of CPs execute one kind of these processes, other CPs execute two or three kinds of them). Additionally most CPs collaborate with external experts and acquire from them knowledge and valuable information, and clients of fewer CPs open their specialist knowledge resources to creators and collaborate with them during development of innovative solutions and/or during commercialization of implemented the best solutions. Most analyzed CPs accomplish main processes of CP e-logistics model and fever of them take part in execution of additional and/or specialist activities of these processes. The above analysis proves that the proposed in this paper model of CP e-logistics can be applied in practice.

CONCLUSION

New knowledge and information technologies, and also connected with them e-logistics services enable CPs to obtain information about needs of clients from all over the world, receive their orders, organize generating and supplying innovative solutions by the crowd members, next delivering them to clients quickly. In this way CPs can offer own clients competitive advantages and respond to changes in world markets. Satisfaction of clients and effects of CPs activity depend on accomplishment of CP e-logistics processes.

The proposed in this paper model was verified in the economic practice during conducting research of CP e-logistics activity on the Internet. Results of this research confirm that the proposed model (its components) may be used in activity of CPs also by their contributors. Potential of using e-logistics in virtual and innovative CPs is now unlimited because is consistent with current assumptions and possibilities of their fast development in knowledge and information economy. Future research could be concentrated on determining ways of improving crowdsourcing e-logistics to meet expectations of CPs contributors, which concern

efficiency of the platforms' activity, greater satisfaction of clients and the crowd members as workers of CPs.

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