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Motivating crowd members to participate in open innovation processes on crowdsourcing platforms

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Abstract

As online and voluntary workers, crowd members use and develop own knowledge and creative abilities during execution of open innovation processes on crowdsourcing platforms (CPs). Managers of CPs motivate crowdsourcing workers to effectively develop open innovations as well as new products or services for clients (such as companies, non-profit organizations or people) in accordance with their orders. The purpose of this paper is to present a model of motivating crowd members to participate in open innovation processes on CPs and verify its possible applications on the existing platforms. The model expands the Self-Determination Theory (SDT) framework and adapts the extrinsic, internalized, and intrinsic types of motivation to applications on CPs. Each type of motivation is divided either into an individual or a group subtype of motivation and there are relevant components of crowdsourcing workers' motivation determined for them in the defined two stages of crowdsourcing open innovation processes. The paper analyses the results of Internet's research that was conducted on 66 websites of CPs in 2023 and the social media they make use of. All the motivations determined in the model are used by the CPs under analysis; most of the CPs apply all the components of internalized motivation. The research results confirm that there are possible practical applications for the CPs of the motivations presented in the model.

Keywords: virtual crowdsourcing, crowd members, motivation components, voluntary work, open innovation

Introduction

Recent research suggests that crowdsourcing is an effective approach to generating open innovations. One way to involve external resources of knowledge and labor is to open up innovation processes to crowd members and motivate them to solve innovative challenges on crowdsourcing platforms (CPs) (Bakici, 2020; Moghaddam et al., 2023; Sun et al., 2023). Crowdsourcing is a production platform through which people and firms send requests and other people (i.e., the crowd) give responses. A CP connects crowd members and employs their skills and/or knowledge for the purpose of elaborating on open innovation or solving problems. Crowd members decide to contribute a potential solution in a voluntary fashion. Crowdsourcing also becomes the key new thing enabling firms to tap talent and experience from outside their boundaries (Blohm et al., 2018; Saxton et al., 2013).

The strength of CPs is that they make it possible to deliver clients value in a more efficient and effective way because crowd members can solve innovative problems faster, better, and cheaper than traditional companies could on their own. That way, online work of crowd members becomes competitive. By encouraging external innovators (i.e., relevant crowd members) to contribute to improved knowledge and new value or solutions, CPs become capable of significantly growing in size and revenue without increasing the costs of their activity at the same time. The goal for any CP is to engage a crowd that has both the willingness and ability to create new value and innovations (Blohm et al., 2018; Kohler, 2018; Lee et al., 2019).

The following research problem has been put forward in order to be solved: How to motive crowd members to participate in the development of open innovation processes

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on CPs? This is a research gap that has been identified in this paper. The proposed new idea for a two-stage open innovation process in conjunction with the framework of the Self-Determination Theory (SDT) as well as the concept of development of this model in order to adapt it to the CPs' activities all form basis for elaboration of own model of motivating crowd members on CPs, which is the purpose of this paper.

The objective of this paper is to present the model of motivating crowd members to participate in the development of open innovation processes on CPs and verify its possible applications on the existing platforms.

According to the concept of the SDT, the extrinsic, internalized, and intrinsic types of motivation are adapted and expanded in line with the needs of crowdsourcing workers. In the model proposed in this paper, each motivation type is divided into either an individual or a group subtype of motivation and there are relevant components of crowd workers' motivation determined for them in the defined two stages of a crowdsourcing open innovation process. The names of these stages are derived from the relevant actions and tasks performed during their accomplishment on CPs.

This paper contains a review of the relevant literature about the possibilities of open innovation development and research on motivating crowd members on CPs. It describes the assumptions and rules of operation of CPs, the conditions of voluntary and online work of crowd members as well as their cooperation with the contributors on the CPs (i.e., the platform managers, crowd members, clients, and external collaborators) during execution of tasks as part of open innovation processes. The paper also describes the SDT framework and possibilities of its application by CPs as well as the types of crowdsourcing workers' motivation. In line with the aforementioned objective, a model of motivating crowd members during accomplishment of the open innovation processes is developed in this paper and its practical applications by the existing CPs are verified. To perform this verification, relevant research was conducted on 66 CPs that were selected for this purpose through non-random purposive sampling via the Internet in 2023. The process was based on secondary research and observations of the platforms' websites under examination as well as the social media they make use of. Analysis of research results was carried out using descriptive statistics; it was confirmed that it is possible for the CPs under analysis to use the motivations of crowd members determined in the model for the purpose of developing open innovations in the economic practice.

Participation of crowd members in crowdsourcing open innovation

One way to involve external resources in executing open innovation processes is to open those up to the Internet's communities on CPs, which can provide companies and people with access to the results of crowdsourcing innovators' work (Bakici, 2020; Lee et al., 2019). Borders of contemporary enterprises are dissolving and innovation processes are changing from being centralized to being decentralized and from closed to open ones. Open models of innovation widely suggest using external knowledge and work resources and currently open innovations can be developed on CPs. Companies facing external competition and internal resource shortages are seeking crowdsourcing possibilities also in the form of contests to channel crowd members' knowledge, experience, and engagement into elaboration of open innovations (Chesbrough, 2012; Yin et al., 2022).

Crowdsourcing open innovation is defined as outsourcing innovative problem-solving and R&D tasks to crowd members on the Internet. In this situation, competent crowd workers ought to be motivated to be willing to generate and offer appropriate and valuable innovative solutions as well as to agree on the choice of winners from among the best solutions according to client's final expectations and decision.

Crowdsourcing contests have emerged as innovative ways to source new ideas and innovative solutions from online communities. In these contests, external incentives like monetary prizes are only awarded to winners. There is no formal contract to regulate conditions of the solvers' voluntary work or participation in CP contests. In such a competitive and voluntary context of crowdsourcing work, it is critical for a CP to motivate solvers efficiently in order to attract more effort and engagement from them (Jian et al., 2019; Liang et al., 2018; Wu et al., 2022).

Crowdsourcing workers may be professionals, that is, experts, researchers, specialists, representatives of commercial entities or universities with the relevant competences, skills, and experience in elaborating innovative projects as well as students or amateurs who decide to submit their own solutions within the framework of innovative challenges on CPs (Dolińska, 2020; 2022).

Crowd members create innovative solutions individually or co-create them in teams, networks or through mutual collaboration, communication with CP clients, other crowd members, and external partners, who are suppliers of knowledge (e.g., consultants, facilitators, patent owners, designers, specialized firms). They are engaged in anticipating evolution of markets and preferences of customers in innovation markets, presenting new values, developing new concepts, solving technological problems and R&D challenges, creating innovative solutions as well as new products or services, and even taking part in their application and commercialization. Motivating crowd members to participate and cooperate during execution of open innovation processes influences the effects of their work on CPs.

In CP contests, clients determine own orders as well as expectations and define task requirements, contest duration, and the reward. Crowd members submit proposals of new ideas and design concepts,

new products, services, and technology as own solutions to challenges put forward by the CP's clients. Voting and commenting on CPs are popular tools that are used to express crowd members' opinions or to evaluate the quality of the proposed new ideas and products or services. Clients conduct financial and marketing analyses of the proposed best solutions and decide which of them are the best candidates for implementation and/or profitable sale. Sometimes clients of CPs actively engage solvers in commercialization of the winning innovative solutions (e.g., products or services), that is, in promotion and/or selling them on the markets via online and/or physical channels (Dolińska, 2020; Pinto & dos Santos, 2018).

Crowdsourcing workers can be involved in the execution of a single task, a few tasks or all of the tasks or activities within the framework of open innovation processes: from learning about new market trends and consumers' expectations, through sharing knowledge and abilities while developing innovative ideas, to participation as solvers in elaborating new products and/or services and sometimes also in promoting and/or selling them on market. The above structure of open innovation processes serves as basis for solving the research problem determined in this paper: How to motivate crowd members to perform tasks within the framework of the stages of open innovation processes taking place on CPs?

Application of the relevant motivations by CPs should take into consideration open competition on the Internet's market as well as the conditions and constraints related to encouraging crowdsourcing workers to effective individual or group, voluntary, and online work, including their cooperation and communication with collaborators during the execution of open innovation processes, and additionally offering them expected benefits.

Motivating crowdsourcing workers and the relevant literature review

Developing and application of effective motivations to foster both participation and quality performance in crowdsourced tasks as well as expected effects of their accomplishment becomes a critical challenge for CPs (Chan et al., 2021; Chen et al., 2021; Flostrand et al., 2019; Ta et al., 2021). „In the context of crowdsourcing, studies that address the diversity of motivations which can be used in crowdsourcing innovative challenges have been relatively scarce" (Acar, 2019, p. 3).

Proper motivation of crowd members as voluntary workers has impact on the efficiency of their work and on its results, which are expected by CP clients and are also connected with achieving the aims of workers' engagement and their job satisfaction.

SDT has often been used as a main theoretical framework in studies exploring motivations of crowdsourcing workers. The assumptions of this theory of human motivation are concerned with the interrelations among different types of motivation, the impact

of social environments on motivation, and how it affects human behaviors (Flostrand et al., 2019; Ryan & Deci, 2000).

The central idea of SDT is that a motivation system exists on a self-determination continuum of extrinsic vs. intrinsic motivations. Intrinsic motivation is fully self-determined and involves individuals undertaking activity because of internal forces, such as interest or enjoyment, own needs or benefits. Intrinsically motivated people feel that their effort is completely voluntary (Acar, 2019; Ryan & Deci, 2000). At the opposite end of the self-determination continuum, there are behaviors that are regulated externally and so originating from extrinsic motivation. These are activities that are undertaken to obtain something positive (such as a reward) or avoid something negative (such as punishment) (Battistella & Nonino, 2012; Ryan & Deci, 2000).

Researchers have established the importance of extrinsic and intrinsic motivations while taking into account various forms of internalized ones that exist amidst the intrinsic and extrinsic motivations and can be used on CPs (Acar, 2019; Ta et al., 2021).

Internalized motivation involves more autonomy than the extrinsic one and less autonomy than the intrinsic motivation because in this case the effort is driven not by inherent interest in certain activity but by the belief that it will somehow help achieve another personal goal which is particularly valuable for the individual and connected with the effort that may be less voluntary in nature (Acar, 2019; Ryan & Deci, 2000).

External motivations may be either winning a prize or boosting one's reputation or professional career in the context of crowdsourcing challenges and becoming a winner in a contest. Building reputation includes publicly announcing contest winners and updating their digital profiles with this information on CP websites. Non-monetary extrinsic motivations may involve enhancement of professional advantages or some future material benefits (such as a future job and higher salary opportunities) (Acar, 2019; Bakici, 2020; Moghaddam et al., 2023). SDT and literature on crowdsourcing suggest that individuals are self-determining and intrinsically motivated to engage in crowdsourcing tasks. Solvers who are highly motivated by their inner needs tend to have more desire to achieve self-fulfillment by engaging in solving innovative challenges (Feng et al., 2018; Liang et al., 2018).

Intrinsic motivations include opportunities to express individual creativity as well as pursue self-development and self-achievement, acquire new skills, organize one's own work, improve its efficacy, gain satisfaction from performing individual tasks, solve innovative challenges, belong to a group, cooperate with CP's collaborators, enjoy active participation in something or take part in fun and entertaining activities. Important intrinsic motivations are the need to show one's competences, achievements in online self-presentation, and improve self-efficacy during communication and interactions with CP's

collaborators (Acar, 2019; Battistella & Nonino, 2012; Dolińska, 2020).

The following internalized motivations could be used by CPs: clear and interesting presentation of a CP offer (e.g., products or services) and its market and/or technological achievements as well as self-marketing, participation of crowd members in sensible and creative work, exchanging valuable knowledge with collaborators, individual and collective learning, development of social capital, doing something beneficial for the people or the economy, and altruism.

Researchers highlighted the importance of financial rewards as extrinsic motivations of CP solvers (Liang et al., 2018; Zhao & Zhu, 2014). Some authors also identified and explored several intrinsic motivations involved in crowdsourcing activity and their impact on the participants' effort and appropriateness of the solutions (Feng et al., 2018; Moghaddam et al., 2023). Yan and Hollingshead (2022) as well as Moghaddam et al. (2023) examined how extrinsic motivations affect solutions to innovation problems on CPs. Other studies also presented how extrinsic and intrinsic motivations affect effort that CP solvers put in their tasks (Chan et al., 2021; Liang et al., 2018; Wu & Gong, 2021) as well as the development of crowdsourcing innovations (Battistella & Nonino, 2012).

The role of presentation of relevant information in motivating participants in crowdsourcing contests was analyzed by Yin et al. (2022) as well as Wu et al. (2022). Bakici (2020), in turn, explored social factors and motives that either increase or decrease people's intention to participate in work on CPs. Whereas research by O. A. Acar (2019) was focused on intrinsic and extrinsic motivations and analysis of the three components of internalized motivations relevant for crowdsourcing innovative challenges.

The model of motivating crowd members to participate in the development of open innovation processes in crowdsourcing

The proposed model of motivating crowd members to participate in the development of open innovation processes on CPs determines:

I. Collaborators of crowd members in open innovation processes:
- other crowd members as individual members of the crowd and team or network partners;
- clients of innovative solutions;
- managers of CPs.
II. Types of crowd members' motivations according to the SDT framework: (A) extrinsic, (B) internalized, and (C) intrinsic motivations. Each motivation type is divided into (i) an individual and a (g) group subtype of motivation. Next, each type and its relevant subtypes are determined by motivation components, which can be used by CPs in the relevant stages of open innovation processes.

III. Two stages of the open innovation process on CPs, whose names are derived from the actions and tasks performed in the relevant stage.

Open innovation processes of CPs are determined in the model by the following two stages:

1. Generation and presentation of new market concepts, designing ideas, and evaluation and selection of the best (winning) innovative solution(s);
2. Elaboration of the final project of the winning innovative solution or new product or service by the solvers; contest winner(s) taking part in promotion and/or sale of those.

The following types of motivations are presented in the proposed model:
- non-financial motivation: (A) extrinsic, (B) internalized, and (C) intrinsic motivations which can be applied in the first and second stage of the open innovation process;
- financial (F) extrinsic motivations which can be used in the second (2) stage of the process under analysis.

Financial (F) motivations are determined for (i) individual crowd members or (g) groups of crowd members. The non-financial types of motivation, which can be (a) extrinsic, (B) internalized or (C) intrinsic, are divided into the following subtypes:
- (i) individual motivations of single crowd members;
- and (g) group motivations for teams/networks of crowd members.

As regards motivations of crowd members, the proposed model presents their types, subtypes, and their relevant components which can be applied in two (consecutive) stages of open innovation processes on CPs; they are provided in columns I, II, and III of Table 1.

Results of research on the possibilities of practical application of the presented model

Research on opportunities for practical application of the model proposed in this paper was conducted by the author for 66 existing CPs. This paper attempts to answer the following research question:
- Can the presented model of motivating crowd members to participate in the development of open innovation processes on CPs be used by the platforms operating on the Internet?

Most (77.27%) of the CPs under examination cooperate with individual crowd members and most of them (65.15%) also cooperate with teams and/or networks of solvers.

The results of research conducted on motivation components used by the CPs under analysis are presented (in %) in column IV of Table 1.

Table 2 presents synthesis of the final results of the research conducted on the CPs under analysis organized according to type and subtype of motivation as

Table 1

Crowd members' motivations defined for open innovation processes on crowdsourcing platforms (CPs) and results of the conducted research (in %)

I Stages of an open innovation process	II Types and subtypes of crowd members' motivations		III Motivation components which can be used on CPs	IV % of the CPs under analysis, which use the relevant motivation
(1) Generation and presentation of new market concepts, designing and evaluation of ideas, selection of the best innovative solution(s)	A. Extrinsic	i) individual	a) possibilities of improvement in professional skills; free trainings, workshops, e-handbooks b) offering free subscription to CP magazine(s), newsletter(s)	33.39% 69.70%
		g) group	a) determining clear conditions and rules of competing with other crowd members in contests b) organizing participation in execution of tasks in collective innovative projects	66.67% 46.97%
	B. Internalized	i) individual	a) promotion of innovative achievements, events, success stories on a CP's websites and its social media b) personal learning opportunities	80.30% 89.39%
		g) group	a) mutual communication and exchange of information and knowledge with other collaborators of CPs b) taking part in building social bonds with collaborators and development of the social capital on CPs	63.63% 57.58%
	C. Intrinsic	i) individual	a) possibilities of presenting information on work efficiency of contest winners b) treating execution of crowdsourcing tasks by crowd members as enjoyment, fun, and entertainment	53.03% 39.39%
		g) group	a) opportunities for cooperation with CP managers and clients, other crowd members, and external partners b) participation in the evaluation and voting to choose the best solutions along with the other crowd members	89.39% 71.21%
(2) Elaboration of the final project of the best innovative solution (or the new product or service) as well as participation in promotion and/or sale of those	F. Financial extrinsic	i) individual or g) group	a) monetary rewards for the best solutions b) free final products and/or services or reduction in their price and cash bonuses	84.85% 8.18%
	A. Extrinsic	i) individual	a) career benefits, enhancing professional reputation: presentation of the best solvers' achievements and the elaborated innovative solutions on CP's websites and/or social media b) access to specialized software in connection with solving the relevant innovative challenges	62.12% 28.79%
		g) group	a) sharing professional knowledge, experience, and abilities during co-creating of the final projects b) offering solvers the possibility to attend conferences, professional meetings or innovation events	75.76% 21.22%
	B. Internalized	i) individual	a) self-marketing: possibilities for crowd members to write a blog b) presenting own work results in CPs' case studies and publications on implemented innovations	55.09% 86.36%
		g) group	a) sharing knowledge with others during mutual and interorganizational learning b) sensible and creative work during collaboration in elaborating the final innovative projects	75.76% 84.85%
	C. Intrinsic	i) individual	a) being listed as one of the creators or winners to influence one's job satisfaction and improve professional status b) creating personal profiles by solvers on CPs	66.67% 30.30%
		g) group	a) engagement of the winning creators in selling the implemented best innovative solutions b) elaborating beneficial new solutions for the people, the society, and the economy as well as altruism	19.70% 54.55%

Source: author's own work.

Table 2

Research results (in %) per type and subtype of crowd members' motivation

Stages of an open innovation process	Type of crowd members' motivation	Arithmetic means of the results (in %) for the relevant types of motivation	Subtype of motivation	Arithmetic means of the results (in %) for relevant subtypes of motivation
(1) Generation and presentation of new market concepts, designing and evaluation of ideas, selection of the best innovative solution(s)	A. Extrinsic	54.18	i) individual	51.55
			g) group	56.82
	B. Internalized	72.73	i) individual	84.85
			g) group	60.61
	C. Intrinsic	63.26	i) individual	46.21
			g) group	80.31
(2) Generation and presentation of new market concepts, designing and evaluation of ideas, selection of the best innovative solution(s)	F. Financial extrinsic	46.52	i) individual or g) group	46.52
	A. Extrinsic	45.62	i) individual	45.46
			g) group	48.49
	B. Internalized	75.52	i) individual	70.73
			g) group	80.31
	C. Intrinsic	42.81	i) individual	48.49
			g) group	37.13

Source: author's own work.

defined in the model; they are provided in columns I, II, and III; research results for the components of motivation are shown in column IV of Table 1.

The research results presented in column IV of Table 1 prove that all the components of motivations provided in column III (Table 1) are applied by the CPs under analysis and the majority (69.23%) of them are offered by more than 50% of the platforms. Additionally, more than 50% of the CPs under examination make use of the following motivations:

1. In the first stage of open innovation processes:
   - most (69.70%) of the CPs offer crowd members extrinsic and individual motivations in the form of free subscription to magazines and newsletters;
   - most (66.67%) of the CPs under analysis use extrinsic and group motivations of determining clear conditions and rules of competing with the other crowd members in contests;
   - the vast majority of CPs make use of internalized and individual motivations, that is: (a) 80.30% of them offer promotion of crowd members' innovative also technological achievements in the form of presentation at important events or as success stories on a CP's website or its social media; (b) 89.39% of the CPs offer opportunities for personal learning;
   - internalized and group motivations are offered by most of the CPs, that is: (a) 63.63% of the CPs organize crowd members' mutual communication and exchange of information

and knowledge with the other collaborators; (b) 57.58% of the CPs offer possibilities of building social bonds with the collaborators and taking part in the development of the social capital;
   - intrinsic and individual motivations (a) are used by most (53.03%) of the CPs; they put crowd members' work efficiency on display through, for example, making information on contest winners public;
   - intrinsic and group motivations are applied by the vast majority of the CPs, including (a) opportunities for acquiring new skills and raising crowd members' professional possibilities during mutual cooperation with CP users (i.e., managers, clients, other crowd members, their external partners: employees of universities, laboratories, and other firms or patent owners), which are made available by 89.39% of the CPs, and (b) participation in evaluating and voting during choosing the best innovative solutions along with the other crowd members, which is offered by 71.21% of the CPs;

2. In the second stage of open innovation processes:
   - financial (extrinsic) motivations, that is, (a) financial rewards for the best solutions, are used by the vast majority (84.85%) of the CPs;
   - extrinsic and individual motivations are offered by most (62.12%) of the CPs under examination, that is, (a) the best solvers'

careers benefit by way of enhancing their professional reputation due to presentation of their achievements and elaborated solutions on the CPs' websites and/or their social media;

- extrinsic and group motivations are used by most (75.76%) of the CPs under analysis through enabling crowd members to share knowledge, experience, and abilities during participation in co-creating of the final innovative solutions;
- internalized and individual motivations are offered by (a) most (55.09%) of the CPs in the form of arranging crowd members' self-marketing through conducting their own blogs and by (b) the vast majority (86.36%) of the CPs in the form of presentation of crowd members' work results in CP case studies and publications about the implemented innovative solutions;
- internalized and group motivations are applied by (a) most (75.76%) of the CPs under analysis through having solvers share knowledge with others as well as mutual, inter-organizational learning and by (b) the vast majority (84.85%) of the CPs in the form of sensible, creative work during collaboration to carry out the final innovative projects;
- intrinsic and individual motivations are offered by most (66.67%) of the CPs through (a) putting solvers on a list of innovation creators and that way influencing their job satisfaction and growth of professional status;
- intrinsic and group motivations are used by 54.55% of the CPs by way of (b) having solvers elaborate beneficial innovative solutions for the people, the society, and the economy as well as through presentation of their altruism.

The research results in Table 2 show that all the components of internalized individual and group motivations, which were determined in the model, are used by most of the CPs under examination; they are used in the first stages by 72.73% of the CPs and in the second stages by 75.52% of the CPs. Most of the CPs under analysis apply extrinsic (over 50%), internalized (over 70%), and intrinsic (over 60%) motivations in the first stages; whereas in the second stages of open innovation processes, most of the CPs (over 70%) use internalized motivations while fewer of the CPs (over 40%) apply extrinsic and intrinsic motivations.

The components of internalized motivations are recognized by the managers of the majority of the CPs under examination as the most important ones in terms of engagement of crowd members in the execution of tasks in open innovation processes and as ones producing impact on the effects of their work, which are expected based on CP clients' orders. Practical application of internalized motivations is beneficial for the CPs as well as their employees.

The analysis that has been conducted also determines which motivation components of the proposed model are offered by the vast majority (more than 80% and less than 90% as per column IV of Table 1) of the CPs under examination and are crucial for their innovative development in the economic practice and on the competitive Internet market. These motivations (marked in the Table 1 with the symbols specified in brackets) are used in both stages of the innovation process subject to analysis: Two internalized individual motivations (Bia, Bib) and one intrinsic group motivation (Cga) are employed in the first stage; while financial (Fi/ga), internalized individual (Bib), and group (Bgb) motivations are used in the second stage of the process. These motivations are connected with individual and professional benefits enjoyed by the crowdsourcing workers, such as opportunities for personal learning, increasing innovative competences, promotion of own innovative achievements, obtaining monetary rewards offered to contest winners as well as taking part in interesting and creative work during elaboration of innovative projects.

The tasks that are executed in open innovation processes by crowd members require that they make use of their innovative skills as well as their own time, energy, and creativity but at the same time motivate them to active learning and achieving professional benefits through individual and/or team online work. Managers of the CPs offer crowd members the forms of motivations which affect their engagement in crowdsourcing work and its effects, produce possibilities of professional reputation enhancement, and take into account their job satisfaction and even entertainment connected with learning. The results of the research that has been carried out show that managers of the CPs under examination understand the impact of motivating crowd members to engage in mutual cooperation through benefits and possible achievements on global market of innovations on the Internet.

The conducted study confirms that the proposed model of motivating crowdsourcing workers is useful for CPs and the motivation components that it proposes can be applied by the CPs during the development of open innovations and in their e-businesses on competitive innovative markets.

Most other researchers focused on studying the application of extrinsic motivations, especially financial rewards (Bakici, 2020; Liang et al., 2018; Yan & Hollingshead, 2022), fewer authors investigated the application of extrinsic as well as intrinsic motivations on CPs (Acar, 2019; Battistella & Nonino, 2012; Chan et al., 2021; Feng et al., 2018; Liang et al., 2018; Moghaddam et al. 2023; Wu & Gong, 2021; Zhao & Zhu, 2014). Additionally, O. A. Acar (2019) analyzed the use of a few internalized motivations. Not many researchers focused on motivating crowd members during the process of solving innovative problems on CPs (Acar, 2019; Battistella & Nonino, 2012; Moghaddam et al., 2023; Yan & Hollingshead, 2022) and some authors analyzed motivating crowd members to participate

in contests, which are important in open innovation development on CPs (Wu et al., 2022; Yin et al., 2022; Zhao & Zhu, 2014).

There have yet been no studies that would analyze the many motivations of crowdsourcing workers in accordance with an adapted and expanded SDT framework encompassing the extrinsic, intrinsic, and, in particular, the internalized motivation types as well as, additionally, individual and group motivation subtypes and their components appearing in the two stages of the open innovation process on CPs. Furthermore, the proposed model and the research that has been carried out take into account the CPs that hold or do not hold contests in their innovative activity.

Conclusions

The model presented in this paper represents a new comprehensive approach that connects motivating crowdsourcing workers with the execution of open innovation processes on crowdsourcing platforms (CPs). Motivating crowd members enable CPs to link the expectations of the clients of open innovations with the relevant knowledge, creativity, experience, and R&D skills of online workers from all over the world.

The proposed model presents the diversity of crowd members' motivations, including their types, subtypes, and (26) components, which can be used in the defined two stages of open innovation processes on CPs.

The study that has been conducted confirms that all motivation components defined in the model are used by the CPs under examination and the majority of them are offered by more than 50% of the CPs. The vast majority of the CPs offer crowd members components of internalized motivations in the first and second stages of open innovation processes, because they can affect the effects of crowd members' work and CP activities during the development of crowdsourcing open innovations. The results of the research that has been carried out show that the presented model is suited to the current conditions of crowdsourcing work.

The final conclusion is the following: The presented model of motivating crowd members to participate in the development of open innovation processes on CPs can be applied in the economic practice. Future studies may be concerned with improving motivation system of CPs on the basis of surveys conducted on crowdsourcing solvers.

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