

Why do people participate in Innovation Tournaments?

An application to student ideation competitions

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Abstract

This thesis investigates the relation between incentives and participation in innovation tournaments in a student environment. It investigates whether tangible, intangible and multiple-winner vs. winner-takes-it-all influence the intention to participate, the intensity of participation and the confidence that the tournament will create new ideas. I found that intangible and tangible incentives do influence these output variables separately, but there is no evidence for an interaction effect. This implies that tangible and intangible incentives seem to be substitutes. Results of multiple-winner incentives are mixed. Multiple-winner tournaments attract more people, have no effect in their planned intensity of participation in general but, importantly, the effect is highly significant on the planned effort to help mature others' ideas. A winner-takes-it-all tournament leads people to be less willing to collaborate with others, which is rational given that they are more "competitors" than in the multiple-winner tournament.

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Introduction and Problem Statement

Innovation is very important, however, in order for innovation to be an integral part of an organization, be it a company or a university, it must be promoted in all levels of an organization. In order to help my university and especially my school, I will look at the types, and different levels of intensity of different incentives in order to promote such innovation so as to do my fair share for the university that has given me so much.

My interest for the subject of innovation – in particular innovation from the ranks, or grassroots innovation as it is sometimes called - was sparked after I was exposed to an initiative by the Erasmus Centre of Innovation (ECMI: <http://www.eur.nl/ecmi>): their *ESE Innovation Tournament* while working for the Economic Faculty association Rotterdam (EFR: <http://www.efr.nl/>).

I maintain that innovation tournaments are *“a process in which many raw opportunities are considered at the outset and only the best survive selection”* (Terwiesch and Ulrich, 2009, p.3). To give some further insights into what an Innovation Tournament is, I will briefly explain how the ESE Innovation Tournament worked. From May 1st to June 7th 2013, students and staff of the Erasmus School of Economics (ESE) were asked to propose ideas that can improve the ESE in the future. The ideas that could be proposed had to be in one of four domains, namely in the domains of (i) Education, (ii) Knowledge Creation, (iii) Knowledge Dissemination and (iv) Internationalisation. Besides posting the idea, participants had the opportunity to mature their idea with the feedback of the peers and a so-called Innovation Team, consisting of specially-trained coaches and moderators into a final proposal. Lastly, after a final selection of five proposals that held the ideas in light of the organizational goals of the ESE and their feasibility, the selected participants were asked to pitch their idea in front of a grand jury, consisting of top-level management of the ESE as well as people from the EFR, in order to bring the tournament to a conclusion and to start developing the chosen proposals.

During the ESE Innovation Tournament, 137 ideas were proposed. Of these 137 ideas, 37 matured to the phase of final selection for the grand jury, making the first edition a success. For more information about the tournament and its workings, please see Appendix 1.

One of the difficulties encountered by the tournament organizers was attracting a large number of students to participate and ensure the success of the innovation tournament. Due to the vast

amount of activities organized by the EFR and other Study Associations of the ESE, students face dozens of possible events all competing for their scarce time, strongly reducing the propensity of students to participate in any particular event. In order to trigger students to participate, event organizers thus need to engage in significant efforts to make students aware of the event, interested in participating and sufficiently proactive to register and actively participate in the event itself¹. This is particularly difficult for events that last for a relatively long time, like the ESE Innovation Tournament, which required relatively intense student participation for almost 7 weeks.

Thus the organization of the tournament engaged in significant efforts to promote the tournament. In order to get the initial attention of students, a lot of exposure was needed in the form of posters, billboards, banners, t-shirts and strong social media campaign efforts. Examples of these actions included Like & Share stunts in which donuts with the tournament logo or sushi boxes were given to participants who liked and shared the tournament page; and gift certificates given to participants who actively commented in their colleagues' ideas and helped maintaining the platform alive (see Appendix 1). With all of this, students got to know the benefits and advantages of both participating, as well as the benefits to them as a person and were convinced to participate in the tournament. Also, an after movie about the entire tournament and a movie about the pitches were made. These can be found on the ESE Facebook page or on Youtube².

During the tournament I came into contact with Nuno Camacho, Assistant Professor of Marketing at the Erasmus School of Economics, who introduced me to the theoretical principles behind the tournament, which stem from the topic of *grassroots innovation*, or "*a set of mechanisms, processes and resources which a company [or institution] puts in place to (i) promote the emergence of self-coordinated and self-assembled teams (ii) composed by selected employees in the ranks with (iii) sufficient managerial autonomy to propose new business [or research] ideas and, (iv) who are given, conditional on pre-determined strategic fit and market opportunities criteria, sufficient resources to take those ideas to market*" (Betz, Camacho, Gerards and Stremersch, 2013, p. 8). In particular, he shared with me a book chapter³ describing a conceptual framework for grassroots innovation and an in-depth case study describing how grassroots innovation principles had been implemented at Merck KGaA. This case study and the framework proposed therein had me thinking to investigate whether

¹In a company the situation may be similar as participants in, say, a bottom-up innovation tournament also need to find time for innovation while keep responding to the multiple requests of their normal jobs

² <http://www.youtube.com/watch?v=oLPiCcpAkmg> and <http://www.youtube.com/watch?v=4CvBXKlbQZo>

² <http://www.youtube.com/watch?v=oLPiCcpAkmg> and <http://www.youtube.com/watch?v=4CvBXKlbQZo>

³ Betz, U., Camacho, N., Gerards, M. and Stremersch, S. (2014), "Grassroots Innovation: A Promising Innovation Paradigm for Pharmaceutical Companies." In *Innovation and Marketing in the Pharmaceutical Industry*, Ding, M., Eliashberg, J., Stremersch, S., Eds. New York, Springer International Series in Quantitative Marketing.

such a framework - and in particular the incentives (both tangible and intangible) of an innovation tournament - can be extended and successfully applied to the context of an educational institution, in particular in the context of a contest which aims at generating (new) innovative ideas/concepts for a university. Antikainen and Väättäjä (2010) found that “monetary rewarding is important, as well as recognition based on the quality of ideas” (p. 453), supporting the effect of tangible and intangible incentives in an innovation tournament.

In particular, I decide to look at the effects of incentive type (tangible vs. intangible) and incentive scope (winner-takes-it-all vs. multiple-winner) in key intentions and attitudes by the prospective participants towards the tournament. *Tangible incentives* are incentives that are *perceptible by touch*, or *clear and definite*, i.e. *real* (Tangible, 2013). Examples of tangible incentives include monetary prizes or gift cards, such as those investigated by Gneezy, Meier and Rey-Biel (2011). *Intangible incentives* are just the opposite, incentives that are not perceptible by touch. This can include constructs such as recognition and praise. The distinction of multiple-winner and winner-takes-it-all incentives is that in the former, there is more than one winner (for the purposes of this work there are five), whereas in the latter, there is only one.

These incentives influence the motivation people have for participating. Motivation, in turn, can be distinguished into *intrinsic motivation*, which refers to doing something because it is inherently interesting or enjoyable (Ryan, and Deci, 2000, p. 55), and *extrinsic motivation*, which refers to doing something because it leads to a separable outcome (Ryan, and Deci, 2000, p. 55). More about the taxonomy of incentives and motivation can be found in the theoretical framework section.

I will thus use the ESE Innovation Tournament as a case study that will allow me to answer my research question. To summarize, the problem I am most concerned with is that of the adequacy of different *types* of incentives - tangible and intangible – and different *scope* of these incentives (offered to one or multiple winners), as a tool to motivate students to participate in future editions of innovation tournaments. In order to investigate these incentives, the following research question is proposed:

What are the most important incentives for participants in innovation tournaments in an education context?

In order to answer this question, several sub questions are available which will help me answer my main research question. These are:

To what extent do prospective participants perceive tangible (financial) incentives as important?

To what extent do prospective participants perceive intangible incentives as important?

To what extent are multiple-winner or winner-takes-it-all incentives important?

Theoretical framework

Because of its importance, innovation has been extensively discussed in both firms and in scientific literature. A quick search on the Internet returns tens of thousands of papers on the importance of innovation and what the best way of approaching innovation is (Hauser, Tellis, and Griffin, 2006; Peres, Muller, and Mahajan, 2010). However, in current times there seems to be a shift from traditional types of innovation structures to new innovation structures (Quy and Mintzberg, 2003).

Wisdom of the Crowds: Crowdsourcing and Grassroots Innovation

Besides itself often being called one of the biggest innovations of the 20th century, the Internet has brought about a dramatic change in how innovation is being viewed. This has mostly to do with the ease people experience to connect with each other and the ease of information dispersal.

One of the most important developments is that of *crowdsourcing*, a term coined by Jeff Howe in Wired Magazine, to describe the “*act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call*” (Howe, 2006). Though the act of crowdsourcing has been around a long time, it came to prominence when the Internet made communication easy and widespread.

Being a relatively new field of research, crowdsourcing as a concept underwent several different interpretations. Estellés-Arolas and González-Ladrón-de-Guevara (2012) tried to form a global definition from all these separate interpretations in order to “*describe any given crowdsourcing activity*” (p. 190). After extensive research they came to the final definition, which I will maintain throughout my thesis:

“Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The

undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken.” (Estellés-Arolas and González-Ladrón-de-Guevara, 2012, p. 197).

Within crowdsourcing, two major fields are identifiable. First there is that of Crowdfunding, a distinct form of crowdsourcing that involves (micro)crediting. An example of this application is the site Symbid.nl⁴, which makes it possible for normal individuals to invest, partly becoming owner (this depends on the amount invested and on the structure of the investment), in a start-up or other business and as such providing capital.

Another major field is that of Grassroots Innovation, which is based on the concept of Wisdom of the Crowd, “which refers to the finding that the aggregate of a set of proposed solutions from a group of individuals performs better than the majority of individual solutions” (Yi, Steyvers, Lee, and Dry. 2012, p. 452). This can either be in the form of individuals within the firm, or individuals from without. In the case of employees within a firm being asked to collectively propose and improve new (business) ideas, scholars typically refer to grassroots innovation or bottom-up innovation. More formally, grassroots innovation is “*a set of mechanisms, processes and resources which a company [or institution] puts in place to (i) promote the emergence of self-coordinated and self-assembled teams (ii) composed by selected employees in the ranks with (iii) sufficient managerial autonomy to propose new business [or research] ideas and, (iv) who are given, conditional on pre-determined strategic fit and market opportunities criteria, sufficient resources to take those ideas to market*” (Betz, Camacho, Gerards and Stremersch, 2013, p. 8).

“In virtually all cases, exceptional opportunities are discovered through innovation tournaments, a process in which many raw opportunities are considered at the outset and only the best survive selection. An innovation tournament, just like its counterpart in sports, (...) begins with a large set of opportunities (“contestants”) that are compared with each other. A filtering process selects a subset to move to the next stage (into the “playoffs”) and, from those, picks one or more winners.” (Terwiesch and Ulrich, 2009, p. 3). In other words, a large number of opportunities, or “ideas that

⁴ <http://www.symbid.nl>

may have value after further investment” (Kornish, and Ulrich, 2011, p. 107), are identified from which a subset is selected to further develop (Kornish, and Ulrich, 2011).

One of the major problems raised by Kornish and Ulrich (2011) is that of repetition. Because a lot of ideas are created in parallel, similar ideas may be proposed, competing for an organization’s limited resources (e.g. time and attention of the tournament organizers, etc). In their experiments, they investigate if this parallel development of ideas leads to redundancy in ideas, and whether similar ideas are more valuable than those that stand out (i.e. more unique ones). Based on their results, “redundancy is quite small in absolute terms” (Kornish, and Ulrich, 2011, p. 122). Furthermore, and even more interesting, they say that ideas that are dissimilar to others are generally not considered more valuable. One might argue that the similarity of ideas is not because of low innovativeness, but that it “*addresses a widely held need, suggestive of market acceptance of the innovation*” (Kornish, and Ulrich, 2011, p. 121).

When designing an innovation tournament, several tournament structures are available to the organizers. There are two most commonly suggested structures. First, we have the team structure, in which “*individuals work together (...) in the same time and space*” (Girotra, Terwiesch, and Ulrich, 2010, p. 591). Second, we have the hybrid structure. Here, “*individuals work independently for some fraction of the allotted time (sometimes called a nominal group) and then work together*” (Girotra, Terwiesch, and Ulrich, 2010, p. 591).

Girotra, Terwiesch and Ulrich (2010) criticize existing literature on idea generation in innovation management. Their main concern is that existing literature focuses on the number of ideas generated, thus assuming that more leads to better. Second, they argue that most of the literature focuses on the average quality of ideas, and not the quality of the best ideas, which are exactly those a firm would be interested in further developing.

Stephen, Zubcsek, and Goldenberg (2013) focus, like Girotra et al. (2010), on the structure of idea competitions. They focus their attention at the way an individual’s network, in an online ideation tournament, affects that person’s innovativeness. They find that “*more densely interconnected people are more likely to produce similar ideas, thus reducing the uniqueness of their ideas as sources of inspiration to others connected to them*” (Stephen et al., 2013, p. 31). Even purposefully priming individuals within the network with good ideas did not lead to overall increase in quality and number

of innovative ideas. Overall, the results obtained indicate that *“having densely connected ideation agents (...) can lower performance”* (Stephen et al., 2013, p. 32).

Luo and Toubia (2012) explore *“how firms may enhance consumer performance in idea generation by customizing the task to suit the specific consumer’s knowledge level with regard to their products/services”* (Luo and Toubia, 2012, p. 3). In their paper they maintain that idea generation involves recalling information stored in the long-term memory. They argue that idea generation is composed of two stages. In the first stage, search cues for specific problems are put into the short-term memory to search long-term memory. Afterwards, these cues generate specific knowledge that is being combined to produce new ideas or associations. These are then again added to the search cues from the first process, invoking more information stored in long-term memory that leads to improved ideas or associations. They further hold that some *“basic ingredients”* (Luo and Toubia, 2012, p. 5) are necessary to make the search cues.

Besides the concept of search cues, Luo and Toubia (2012) argue that there is a difference in high- and low-knowledge consumers. High knowledge consumers have a lot of knowledge in a certain domain whereas low-knowledge consumers do not. This makes idea generation for low-knowledge consumers more difficult since they are less able to search problem-relevant knowledge in their long-term memory. Because high-knowledge consumers have a lot of knowledge in certain domains, they need fewer triggers to come up with a new idea. This is not the case for low-knowledge consumers though. Providing more basic ingredients for them may be beneficial since it provides them more search cues to unlock information that may have otherwise not been accessed. A problem that involves mainly high-knowledge consumers is that *“high-knowledge consumers often do not perform in accordance with their full potential”* (Luo and Toubia, 2012, p. 3). When posed a question, high-knowledge consumers often use only a part of their knowledge to come up with an answer. However, when the question is broken down to its components, this leads high-knowledge workers to consider each component as a new search, thus recovering more information that gives a more complete picture of the original question.

But how does this all relate to the ESE Innovation Tournament? The ESE Innovation Tournament was a tournament of ideas. In this tournament of ideas, students were free to post ideas and suggestions. However, unlike previous studies, there was a group of trained moderators available that helped the participants improve their idea in any given direction that was required. This was especially important to counter the issues high-knowledge workers encountered because it forced them to think differently about certain aspects of a problem. Furthermore, the moderators mitigated other

problems such as (1) repetition, because it forced individuals to explore different trains of thought, thus resulting in different ideas, (2) quality of ideas, it forced participants to back up their ideas with proof, and (3) the interconnectedness of individuals, due to the directions given to individuals to moderate their train of thought.

Another important aspect of this tournament was that it fostered performance, using incentives. In literature, the use of incentives for innovation tournaments is not very much researched. I now discuss different types of incentives. Subsequently I discuss how these different incentives affect prospective participants' motivation to participate in an innovation tournament.

Type of Incentives: Tangible vs. Intangible Incentives

I maintain the following definitions: tangible incentives are incentives that are *perceptible by touch*, or *clear and definite*, i.e. *real* (Tangible, 2013). Examples of tangible incentives include monetary prizes or gift cards. They are “performance-based rewards (monetary or non-monetary) aimed at spurring employees' motivation and entrepreneurial activity” (Betz et al., 2013, p. 14).

Intangible incentives are just the opposite, incentives that are not perceptible by touch. This can include constructs such as recognition and praise. Incentives are analogous to rewards. These incentives influence the motivation people have for participating. Motivation can be distinguished into intrinsic motivation, which occurs when “an activity has a motivation of its own, independent of any reward” (Gneezy, and Rustichini, 2000, p. 792), and extrinsic motivation, that which is triggered from without. There is extensive literature on how incentives affect motivation and behaviour. There is research that suggests that some types of incentives (e.g. monetary rewards) may undermine intrinsic motivation (See Deci et al., 1999; Lepper et al., 1973; Ryan and Deci, 2000). On the other hand, there is also research suggesting that tangible incentives may in fact *improve* motivation, as long as they are used to strengthen other (intangible) incentives that are known to improve intrinsic motivation. More about that can be found below.

The typical taxonomy for incentives used in the academic world is that of tangible and intangible incentives. Tangible incentives are performance-based rewards (Betz et al., 2013, p. 14), which can be divided into monetary and non-monetary rewards. This means that there are environmental causes that may cause a person to act. Toubia (2006) proposes that rewarding participants leads to more exploration. He defines exploration as the “*long-term contribution by investigating an approach on which little experience has been accumulated so far*” (Toubia, 2006, p. 412). This goes for both tangible and intangible incentives. Building upon this idea, it can be argued that tangible

incentives have an impact on extrinsic motivation, and as such may impact innovation output (Betz, Camacho, Gerards, and Stremersch, 2013; Jeffrey, and Shaffer, 2007). This means that incentives are able to direct attention from a topic on which a lot is currently being ideated, to less popular topics. Toubia (2006) argues that this is necessary because the additional work done on popular topics adds less value than work done on less popular topics, since there is more to gain from working on those topics. In short, he argues that incentives are able to make participants switch to ideation of projects with a higher marginal contribution. Furthermore, he finds that rewards were present, “participants tried harder to generate ideas and did not give up easily” (Toubia, 2006, p. 419).

Scope of Incentives: Multiple-winner vs. Winner-takes-it-all Incentives

Besides the tangibility or intangibility of incentives the use of multiple-winner and winner-takes-it-all incentives treatments is interesting. I maintain that multiple-winner incentive treatments include incentive schemes in which more than one person receives an incentive and winner-takes-it-all incentive schemes in which only one person receives an incentive or reward (see the Methods section for an expanded set-up). One of the main characteristics of both multiple-winner and winner-takes-it-all incentives is that it is based on rank-order. Kalra and Shi (2001) investigated what effect multiple-winner incentive schemes versus winner-take-it-all incentive schemes had to motivate salespeople in firms. They found that in a “Multiple-Winner format, the salesperson whose performance is just sufficient to win is better off than any of the other winners as he exerts the least effort to win, but obtains as high a reward as the rest of the winners. Therefore, salespeople exert less effort in such a contest” (Kalra and Shi, 2001, p. 189). Analogously, a similar effect can be expected when opting for multiple-winner incentives rather than winner-takes-it-all incentives in innovation tournaments, resulting in lessened effort of participants in multiple-winner incentive treatments compared to winner-takes-it-all incentive treatments.

The Effects of Incentives on Prospective Participants’ Participation and Attitudes Towards the Grassroots Innovation Tournament

In order to relate the different types of incentives just described to key output variables of a grassroots innovation tournament (i.e. prospective participants’ participation intentions and confidence on their and on the tournament’s capacity to generate valuable ideas), I build upon the conceptual framework proposed by Betz et. al (2013) with the goal of examining the best ways incentives can be used to increase the quantity and quality of participation. In short, these authors argue that, in order to bring forth innovation or innovative ideas, an individual within an organization needs both intrinsic motivation, or “the inherent tendency to seek out novelty and challenges, to

extend and exercise one's capacities, to explore, and to learn" (Ryan and Deci, 2000, p.70.) and extrinsic motivation (career opportunities, recognition, etc.).

The basis for the framework proposed by Betz et al. (2013) is Self-Determination Theory (SDT), which "addresses such basic issues as personality development, self-regulation, universal psychological needs, life goals and aspirations, energy and vitality, nonconscious processes, the relations of culture to motivation, and the impact of social environments on motivation, affect, behavior, and well-being. Further, the theory has been applied to issues within a wide range of life domains" (Deci and Ryan, 2008, p. 182).

SDT is a theory that poses a broad framework, within which research is possible into motivations. Because it is able to research motivations, as a result is also must be able to research incentives.

I will use the self-determination continuum of motivation (Deci, and Ryan, 2000) to determine the spectrum of extrinsic or intrinsic motivation. *Extrinsic motivation* exists when there are enough causes in an environment (i.e. external reasons) for a person to perform and persist in a certain task (Lepper, Greene, and Lisbett, 1973). This implies that an "activity is done in order to attain a separable outcome" (Bhaduri, and Kamur, 2010, p. 32), or a goal other than the self-enjoyment experienced by intrinsic motivation (Bhaduri, and Kamur, 2010, p. 32). However, when a person is performing a task out of his or her sheer enjoyment of the task, and as such does it for the sake of doing it, then *intrinsic motivation* is present (Fisher, 1978; Amabile, Hill, Hennesey, and Tighe, 1994). In SDT, internalisation is the process that represents the integration of rewards with one's self. The more a reward is integrated within one's self, the more likely a reward is capable of influencing motivation (Ryan, and Deci, 2000).

In order to further specify the factors that give variation in intrinsic motivation, Deci and Ryan (1985) introduced Cognitive Evaluation Theory (CET), a sub theory of SDT. This theory holds that intrinsic motivation can be improved by looking at three factors, namely Competence, Autonomy, and Relatedness/Networking, collectively known as the innate psychological needs. In the context of this thesis, I define Competence as "*participants' perceived capability, or self-efficacy, to transform their original ideas into a viable and implementable idea for a new business*" (Betz, Camacho, Gerards, and Stremersch, 2013, p. 11). Besides being able to feel competent, participants also need to feel Autonomous, "*the organismic desire to self-organize experience and behavior and to have activity be concordant with ones' integrated sense of self*" (Ryan, and Deci, 2000, p. 231). In other words, activities must be initiated from the individual itself and not be put upon them from higher-up. Lastly,

SDT argues that intrinsic motivation is more likely to become evident if a person can relate to peers and is in a safe environment (Ryan, and Deci, 2000). The interplay of all of the above factors can be seen in figure 1. Note, however, that the dotted arrows show the secondary effects on extrinsic motivation.

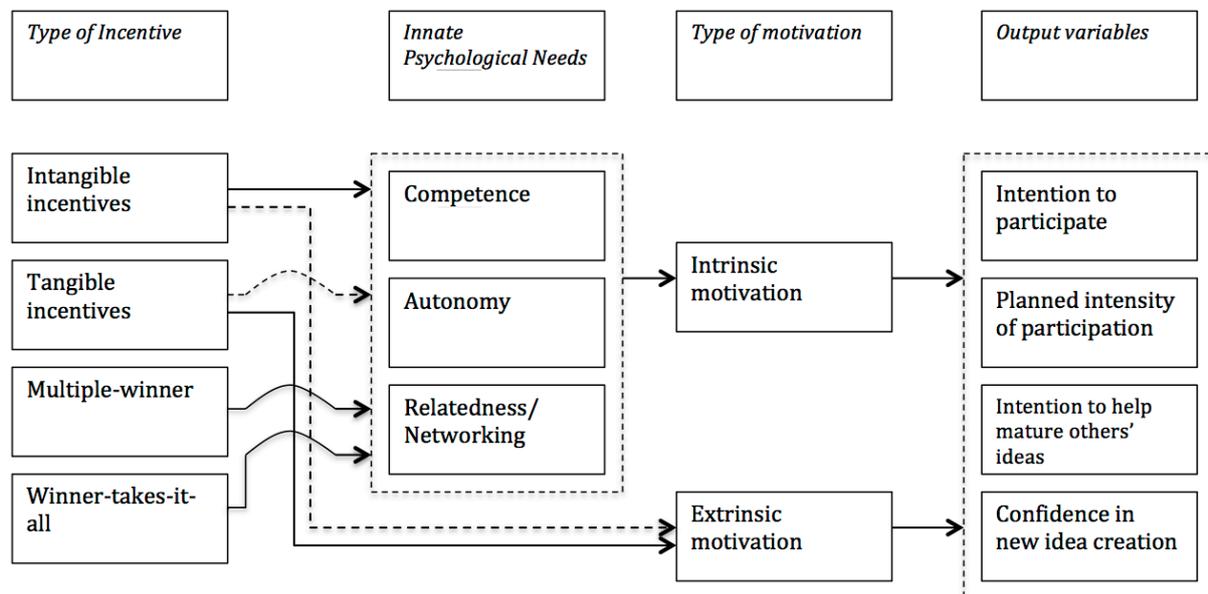


Figure 1 – The effect of incentives on motivation and participation

In order to answer my research and sub questions, I translated them into several hypotheses:

- H1a: Tangible (financial) incentives have a positive effect on prospective participants' intention to participate in an innovation tournament.
- H1b: Tangible (financial) incentives have a positive effect on prospective participants' planned intensity of participation in an innovation tournament.
- H1c: Tangible (financial) incentives have a positive effect on prospective participants' confidence in new idea creation.
- H2a: Intangible incentives have a positive effect on prospective participants' intention to participate in an innovation tournament.
- H2b: Intangible incentives have a positive effect on prospective participants' planned intensity of participation in an innovation tournament.
- H2c: Intangible incentives have a positive effect on prospective participants' confidence in new idea creation.
- H3a: Multiple-winner incentives have a positive effect on prospective participants' intention to participate in an innovation tournament.
- H3b: Multiple-winner incentives have a positive effect on prospective participants' planned intensity of participation in an innovation tournament.

H3c: Multiple-winner incentives have a positive effect on prospective participants' confidence in new idea creation.

Methods

The subjects of my thesis are students from the Erasmus School of Economics. I have conducted a survey-based experiment in which students were randomly divided to different treatment groups, where I manipulated the incentives provided and measured their intentions to participate, planned intensity of participation and confidence in (own and tournament's) capacity to generate valuable new ideas. I will then compare the different groups along these dimensions to quantify the effect of incentives on prospective participants in innovation tournaments. In other words, my survey generates experimental data that will allow me to do a between-subjects as well as a within subjects analysis. Experimental survey data, just like laboratory experimental data, relies on random assignment of participants to a control group and to different treatment conditions and, therefore, is helpful in empirically identifying causal mechanisms (De Jong, 2013).

Experimental Design

The design of my survey experiment is as follows. I use a 4 (*type* of incentives used: none, only tangible, only intangible, both tangible and intangible) x 2 (*scope* of incentives: winner-takes-it-all vs. multiple-winners) experimental design. I manipulate incentive *type* within-subjects, i.e. participants had to answer questions regarding four hypothetical tournaments each of which with the following incentives (ordering of the tournaments was randomly determined for each respondent to avoid order effects using the survey software): (1) only intangible incentive provided (recommendation letter by the Dean), (2) only tangible incentive provided (a 500 EUR gift card), (3) both tangible and intangible incentives combined (recommendation letter by the Dean + 500 EUR gift card) and (4) no incentive provided (control group). In addition, I manipulate the *scope* of incentives between-subjects: one half of the subjects were randomly allocated to (1) an *winner-takes-it-all incentive* treatment, whereby they were told that in the next tournament there would exist one single winner and the other half to (2) a *multiple-winner incentive* treatment, whereby, instead of a single winner, participants were told there would exist five winners. In other words, respondents in the *multiple-winner incentive* group saw a tournament with five letters of recommendation and five gift cards (of €500), another tournament which promised five letters of recommendation, another tournament offering five gift cards, and the control tournament which again had no incentives. The no incentives tournament in the winner-takes-it-all and multiple-winner setting differ in that they are answered by a different group of participants.

Tournament	Winner-takes-it-all (top idea)	Tournament	Multiple-winner (top 5 ideas)
1	Only intangible incentive	5	Only intangible incentives
2	Only tangible incentive	6	Only tangible incentives
3	Intangible and tangible incentive	7	Intangible and tangible incentives
4	No incentive	8	No incentives

Table 1 - Layout of incentives and tournaments

The incentives are coded as follows. The letter of recommendation is meant as a conceptualization of prestige and respect. It indicates that the ESE and the Dean acknowledge the best idea(s) from the tournament. It therefore represents the intangible incentive. Second, the gift certificate is meant as a monetary reward for performance. Therefore, it is a tangible incentive. The incentives are then related to several questions in the survey (these are all the same for the different tournament designs).

Model specifications

In order to answer these hypotheses I designed the following regression model:

$$DV_{ij} = b_0 + b_1 * DUMMY_{INT,j} + b_2 * DUMMY_{TAN,j} + b_3 * (DUMMY_{INT,j} * DUMMY_{TAN,j}) + b_4 * DUMMY_{SOC,j} + b_8 * GENDER_i + b_9 * YEAR_i + b_{10} * ATTACHM_i + \varepsilon_{ij}$$

Here I follow the standard assumption in multiple regression and assume that the residuals, ε_{ij} , are normally and independently distributed with a mean of zero and a constant error variance. The dependent variables (DV) in the model are the (i) Intention to Participate of participant i , (ii) the Confidence in the Effectiveness of the tournament of participant i , (iii) the Confidence in own likelihood of Winning of participant i , (iv) the Predicted Engagement in hours per week of participant i , and (v) the Predicted Engagement in hours per week spent on Maturing others' ideas of participant i . I also transformed the intangible and tangible variables, as well as the multiple-winner and winner-takes-it-all variables into dummy variables in order to differentiate between the different sets of tournaments (i.e., tournaments with multiple-winner vs. winner-takes-it-all variables, intangible vs. tangible variables or a combination thereof).

To summarize:

Variable in model	Variable – explained
INTPART _{<i>i</i>}	Intention to Participate of participant <i>i</i>
CONFTOURN _{<i>i</i>}	Confidence of participant <i>i</i> in the Effectiveness of the tournament in creating new and/or innovative ideas
CONFOWN _{<i>i</i>}	Confidence in own likelihood of Winning of participant <i>i</i>
PREDENGHRS _{<i>i</i>}	Predicted intensity of participation in hours per week of participant <i>i</i>
PREDENGMAT _{<i>i</i>}	Predicted intensity of Maturing others' ideas in hours per week of participant <i>i</i>
DUMMY _{INT,<i>j</i>}	Dummy variable of intangible incentives for tournament <i>j</i> (1=intangible incentives present)
DUMMY _{TAN,<i>j</i>}	Dummy variable of tangible incentives for tournament <i>j</i> (1=tangible incentives present)
DUMMY _{SOC,<i>j</i>}	Dummy variable of multiple-winner incentives for tournament <i>j</i> (1=multiple-winner incentives present, 0=winner-takes-it-all incentives present)
GENDER _{<i>i</i>}	The gender of participant <i>i</i> (1=male, 0=female)
YEAR _{<i>i</i>}	The year of the programme participant <i>i</i> is currently enrolled in
ATTACHM _{<i>i</i>}	The level of attachment to the ESE that participant <i>i</i> has

Table 2 - Variables in model and explained

Analysis and Results

The survey was distributed using several groups within the university, using social media. The participants of the survey are all ESE students in different stages of their program, with some graduates (less than one year graduated). The survey ran for approximately two weeks and totalled of 102 completed responses. The control questions were analysed with a one-way ANOVA between groups (winner-takes-it-all vs. multiple-winner) to find out whether the samples were significantly different from each other. All control questions were not significant, implying that the samples were not significantly different. (For the significance levels please see APPENDIX 3). The results are shown per output variable. Note that all analyses were done at a 95% confidence interval, unless stated otherwise.

Intention to participate

When performing the regression for the Intention to participate, we receive the following unstandardized model:

$$\begin{aligned}INTPART_{ij} = & 1,793 + 0,571 * DUMMY_{INT,j} + 0,505 * DUMMY_{TAN,j} - 0,184 \\ & * (DUMMY_{INT,j} * DUMMY_{TAN,j}) + 0,188 * DUMMY_{SOC,j} - 0,073 * GENDER_i \\ & - 0,045 * YEAR_i + 0,128 * ATTACHM_i\end{aligned}$$

Hypotheses 1a and 2a considered the effect of tangible (financial) as well as intangible incentives, respectively, on the intention to participate. When looking at the significance levels, there is a significantly positive effect of the intangible incentive on the intention to participate ($p=,000$). Also, when looking at the effect tangible incentives have on the intention to participate this effect is positive and significant, with a p -value of 0,000. Therefore, I cannot reject hypothesis 1a and 2a. Other significant and both positive effects on the intention to participate is that of multiple-winner incentives ($p=,043$), meaning that intention to participate in multiple-winner tournaments is higher than in winner-takes-it-all tournaments, as well as the attachment person feels towards the ESE ($p=,008$). The positive and significant multiple-winner incentive effect implies that the multiple-winner incentive is stronger driver for participation than an winner-takes-it-all incentive, thus giving support to H3a. For all other variables there is no significance (see appendix 3B).

Planned intensity of participation

When performing the regression for the planned intensity of participation, we receive the following two unstandardized models

$$\begin{aligned}PREDENGHRS_{ij} \\ = & 2,353 + 0,814 * DUMMY_{INT,j} + 0,624 * DUMMY_{TAN,j} - 0,272 \\ & * (DUMMY_{INT,j} * DUMMY_{TAN,j}) - 0,153 * DUMMY_{SOC,j} + 0,097 * GENDER_i \\ & - 0,020 * YEAR_i - 0,036 * ATTACHM_i\end{aligned}$$

and

PREDENGMAT_{ij}

$$= 1,724 + 0,466 * DUMMY_{INT,j} + 0,416 * DUMMY_{TAN,j} - 0,274 \\ * (DUMMY_{INT,j} * DUMMY_{TAN,j}) + 0,148 * DUMMY_{SOC,i} - 0,316 * GENDER_i \\ - 0,081 * YEAR_i + 0,021 * ATTACHM_i$$

where PREDENGMAT_{ij} stands for the planned intensity of participation in hours per week and PREDENHRS_i stands for the planned intensity of maturing others' ideas in hours per week. Hypotheses 1b and 2b considered the effect tangible (financial) incentives as well as intangible incentives have on the intensity of participation. The multiple-winner incentive treatment had a p-value of 0,429, implying that there is not enough significance to support a positive effect of multiple-winner incentives on intensity to participate in hours per week.

The expected number of hours per week spent on the tournament is positively affected by tangible incentives ($p=0,16$) as well as intangible incentives ($p=,002$), supporting H1b and H2b for hours per week spent on the tournament. All other factors are not significant (see appendix 3C).

On the effort people expect to make to mature others' ideas, tangible and intangible incentives have a significant and positive effect ($p=,001$ and $p=,000$, respectively), making it impossible to reject hypotheses 1b and 2b for the effort used to mature others' ideas. Furthermore, multiple-winner incentives have a positive effect ($p=,000$), as was proposed in H3b. Also, gender ($p=,007$) has a negative effect on the effort people expect to make to mature others' ideas.

Confidence in new idea creation

When performing the regression for the confidence participants have in the effectiveness of the tournament, we get the following regression:

$$CONFTOURN_{ij} = 1,509 + 0,650 * DUMMY_{INT,j} + 0,515 * DUMMY_{TAN,j} - 0,312 \\ * (DUMMY_{INT,j} * DUMMY_{TAN,j}) - 0,049 * DUMMY_{SOC,j} + 0,388 * GENDER_i \\ - 0,034 * YEAR_i + 0,118 * ATTACHM_i$$

Hypotheses 1c and 2c investigate whether there is a positive relation between tangible and intangible incentives on the confidence people have of the effectiveness of the tournament. Both intangible and tangible incentives have a significantly positive ($p=,000$ for both) on the confidence participants have in the effectiveness of the tournament. Also, the gender and the attachment to the ESE have a positive significant effect ($p=,000$ and $p=,022$, respectively). These results support that H1c and H2c.

	INTPART _i		PREDENGHRS _i		PREDENGMAT _i		CONFTOURN _i	
	Parameter estimate	Sign.	Parameter estimate	Sign.	Parameter estimate	Sign.	Parameter estimate	Sign.
Intangible	,571	,000	,814	,002	,466	,000	,650	,000
Tangible	,505	,000	,624	,016	,416	,001	,515	,000
Intangible *Tangible	-,184	,293	-,272	,456	-,274	,108	-,312	,094
Social	,188	,043	-,153	,429	,148	,101	-,049	,616

Table 3 - Summary of findings

Related to the confidence in new idea creation is that of the perceived likelihood participants have that they are able to win the competition. However, when regressing the dependent variable CONFTOURN_i I find that none of the coefficients in the standard model are significant (with the exception of the intercept ($p=,000$) and gender ($p=,000$)). Also, the ANOVA of the regression is not significant ($p=,233$). I will therefore exclude this model here forth. The output of analysis is attached in appendix 3F. For a summary of all outputs see table 3.

Conclusion

Managerial implications

Before answering the research question, let me summarize. In this thesis the main research question is what the most effective incentives are when trying to boost participation in an innovation tournament, in this case in an educational context. ECMI initiated the ESE Innovation Tournament, which ran from May 1st to June 7th 2013, for the Erasmus School of Economics with the intention of creating new ideas to innovate the Erasmus School of Economics. The goal of this thesis is to investigate what incentives work best for future tournaments. The tournament is based on the principles of Grassroots Innovation, a form of Wisdom of the Crowd, in which an individual, firm or other organization uses the “aggregate of a set of proposed solutions from a group of individuals performs better than the majority of individual solutions” (Yi et al., 2012, p. 452).

Often, Grassroots Innovation comes in the form of a tournament, using a survival-of-the-fittest approach. These tournaments have two commonly used structures; that of a team and a hybrid structure in which a certain proportion of the time is used to work alone before coming together in a team setting. There are several issues that arise when using innovation tournaments.

First, especially when wanting to solve a multi-dimensional problem, there is a dichotomy between high-knowledge and low-knowledge participants. The performance in idea generation is dependent on this dichotomy, with high-knowledge participants performing better than low-knowledge participants. However, prior research shows that high-knowledge participants do not use their full potential, and as such do not maximize potential innovation output. A solution to this is to separate a problem in several aspects, forcing participants to think about each facet individually. Second, when using online ideation tournaments, having densely interconnected individuals may lead to more similar ideas being produced, which reduces performance as well. Third, a problem that exists mostly in literature is that the focus is on the average amount of ideas produced, and not on the best ideas.

The ESE Innovation tournament addresses this problem by giving incentives for only the best (or best five) ideas. Incentives can be divided into tangible and intangible. Tangible incentives are incentives such as monetary rewards. Intangible incentives are those such as praise or respect. In literature, there is a debate whether tangible incentives improve motivation or worsen it. Different studies found different results, however, there is some evidence that when tangible incentives are used to stimulate other (intangible) incentives, it improves motivation. When taking into account the effect multiple-winner and winner-takes-it-all incentive treatments have, it is important to remember that multiple-winner treatments are expected to lessen effort. In order to connect incentives to the output variables, I use the framework proposed by Betz et al. (2013), which links the continuum of motivation to intrinsic and extrinsic motivation. Intrinsic motivation is controlled by the innate psychological needs of competence, relatedness/networking and autonomy. These needs can in turn be affected by intangible incentives such as praise, respect and recognition. The self-determination continuum of motivation also holds that extrinsic motivation can be internalized. Extrinsic motivation in the form of tangible incentives can thus also be internalized, and as such impact the output variables.

I used a 4 (type of incentive) x 2 (scope of incentive) experimental design to manipulate incentives with type of incentive manipulated *within-subjects*, and the scope of incentives *between-subjects*. Participants were asked to fill in a survey, half of which were randomly put in a group that showed only the winner-takes-it-all incentive treatment, and half of which were randomly put in a group that showed only the multiple-winner incentive treatment. This survey-experiment approach has been recently proposed as good methodology for empirical identification of causal effects that may be difficult to estimate using non-experimental cross-sectional or longitudinal surveys (De Jong, 2013). All of the hypothetical tournaments which participants had to evaluate were characterised on

whether intangible incentives were used, whether tangible incentives were used, and whether multiple-winner/winner-takes-it-all incentives were. This format allowed me to make hypotheses testing what effect these three characteristics had on the intention to participate, the planned intensity of participation, both for the tournament itself as well as for maturing others' ideas, and last the confidence participants had in new idea creation. An overview of the hypotheses and whether they are significant can be found below in table 4.

I found that intangible incentives have a positive and significant effect on intention to participate in a tournament. This implies that participants perceive intangible incentives have a positive effect on intentions to participate. However, not only intangible incentives had an effect. Tangible incentives had a strong and statistically significant positive effect on the intention to participate. Lastly, regarding the question of whether multiple-winner incentives had an effect of increasing participation, the results supported that there exists a significantly positive relation between multiple-winner incentives and the intention to participate. More importantly, in winner-takes-it-all contests people are less likely to help others improve their ideas, which defeats one of the key benefits of online platforms. This is also one of the concerns online ideation platforms have (See Hutter et al., 2011).

When looking at the planned intensity of participation, there are two results. First, the expected number of hours per week spent on the tournament is positively affected by tangible incentives as well as intangible incentives. On the effort people expect to make to mature others' ideas, tangible and intangible incentives have a significant and positive effect. This implies that tangible and intangible incentives positively influence the planned intensity of participation. In the intensity of participation in hours per week, the multiple-winner incentive treatment was not significant, implying that there was not a positive effect of multiple-winner incentives. However, when looking at the effort to mature others' ideas, there is a significantly positive effect, implying multiple-winner incentives do influence the effort people perform to mature others' ideas.

The last output variable, confidence in new idea creation, is both positively influenced by intangible and tangible incentives. However, when regressing multiple-winner incentives, I find that the multiple-winner incentive is not significant, thus there is no statistically valid effect of multiple-winner incentives on the confidence in new idea creation.

Hypothesis		1	2	3
		Output variable		
Intention to participate		Not rejected	Not rejected	Not rejected
Planned intensity of participation	In the tournament	Not rejected	Not rejected	Rejected
	Maturing others' ideas	Not rejected	Not rejected	Not rejected
Confidence in new idea creation		Not rejected	Not rejected	Rejected

Table 4 - summary of the hypotheses and their effect on output variables

The research question was: *What are the most important incentives for participants in innovation tournaments in an education context?*

In order to investigate this three sub questions were made which were linked to hypotheses. These subquestions are:

To what extent do prospective participants perceive tangible (financial) incentives as important?

To what extent do prospective participants perceive intangible incentives as important?

To what extent are multiple-winner or winner-takes-it-all incentives important?

I found that when separated, both tangible and intangible incentives are significant in affecting participation in innovation tournaments. This is supported by the fact that all output variables were positively affected by tangible and intangible incentives. However, when investigating an interaction effect between tangible and intangible incentives and their effect on the output variables, all I found was a negative, insignificant relationship⁵ (see table 3 or Appendices 3B-F). This result points to the fact that intangible and tangible incentives can both contribute independently to tournament success, which is consistent with the fact that the pathways in prior literature are indeed different, with intangible incentives leading to more intrinsic motivation and tangible ones to more extrinsic motivation.

Support that multiple-winner incentives have an effect on participants in innovation tournament is mixed, but very interesting. Multiple-winner tournaments attract more people, have no effect in their planned intensity of participation in general but, importantly, the effect is highly significant on the planned effort to help mature others' ideas. A winner-takes-it-all tournament leads people to be

⁵ Because intangible incentives affect intrinsic motivation, which in turn affects the output variables, this outcome supports the vast amount of literature that tangible incentives in combination with an intangible incentive have a negative effect on intrinsic motivation.

less willing to collaborate with others, which is rational given that they are more “competitors” than in the multiple-winner tournament.

The implications for future editions of the ESE Innovation Tournament is that the incentives used to trigger students to participate must be either in the form of a gift card or in the form of a letter of recommendation. Experimentation with the number of incentives used may provide an optimal number of the incentives. However, depending on the goals such a tournament might pose on the participation or the intensity of participation, different forms of winner-takes-it-all or multiple-winner tournaments might be devised.

Limitations and Future Research

One of the limitations of my thesis is that it did not measure process measures such as the innate psychological needs. Also, the size of the sample was a little small with only 102 completed responses.

Future research can be directed into these process measures. Secondly, there has been no experimentation with the number of incentives used in this thesis. The number of incentives has been arbitrarily determined; keeping in mind the total budget available for such a tournament as well as the number of letters of recommendation the Dean would be willing to write. Future research could focus on the effects gender, phase of study as well as the attachment to the ESE have on the participants in the innovation tournament. Furthermore, interaction effects between tangible, intangible, multiple-winner and winner-takes-it-all incentives can be researched more thoroughly. Also, since the results for multiple-winner vs. winner-takes-it-all incentives are mixed, they are very interesting for future research. These results may offer an explanation of why scholars and some practitioners seem disillusioned with some aspects of grassroots innovation efforts, especially those using online social platforms to foster collaboration. There is an important paradox present here: setting higher winner-takes-it-all rewards (both tangible and intangible) motivates people to participate and increases the confidence of people, yet making these results restricted to a single winner undermines a key aspect of grassroots innovation, that of the collaboration amongst participants in an online tournament. Henry Chesbrough (2011) accentuates this idea of collaboration. He uses a great analogy about the rise of Microsoft over Apple in the early stages of

operating systems. In that time, even though may argue that Apple had superior technology, it lost the war to Microsoft because Microsoft did it smartly. At that time, Microsoft's OS was supported by a great number of third-party developers, coordinated by Microsoft, making it impossible for Apple to compete. The similarity of Microsoft to innovation tournaments is as follows: collaboration is key to have success.

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Appendices

Appendix 1 – Images of the ESE Innovation Tournament

THE FUTURE OF ERASMUS SCHOOL OF ECONOMICS STARTS TODAY

Do you have a great idea that would increase the value Erasmus School of Economics creates for some or all of its stakeholders (students, faculty, staff and society as a whole)?

Through our online platform, you can easily share your ideas. You are welcome to propose out-of-the-box ideas across any of four domains:

- Education
- Knowledge Creation
- Knowledge Dissemination
- Internationalisation

Submit Your Idea Today!
To take full advantage of the tournament and maturation process, we encourage you to submit your ideas as early as possible (**FIRST ROUND SUBMISSION: FROM MAY 1 - MAY 15**). We will distribute 5 gift cards of €25 each, among the first 50 submissions.

Don't miss this chance to participate in this unique experiment. Submit your idea today!



SUBMIT YOUR IDEA

Idea Domains:

 Education	 Knowledge Creation	 Knowledge Dissemination	 Internationalization
--	---	--	--

Above: Initial call for ideas

THE FUTURE OF ERASMUS SCHOOL OF ECONOMICS STARTS TODAY

Idea Maturation:

After submitting your idea, you will have the opportunity to develop and mature your idea while the tournament is live.

Starting on May 1, 2013 the tournament lasts until June 7, 2013. During this period, you will receive feedback from your colleagues and from specially-trained coaches and moderators.

This idea maturation process will give you the opportunity to develop and mature your idea into a solid proposal. The best ideas will then be transformed into a "pitch" that will be evaluated by senior university officials and sent to our Dean. The best ideas will also be presented in Centennial celebration of Erasmus School of Economics.



The Full Process:

- 1 Get Creative.**
Innovation begins with a creative idea. Do you have any ideas for ESE's future? Try to think out-of-the-box!

- 2 Submit Your Idea.**
Once you have your idea, go to the SUBMIT page and describe your idea. Tell us why your idea is good one for ESE's future.

- 3 Develop Your Idea.**
Based on social feedback on our platform, your idea will be developed. You'll clarify several questions. Which problem does your idea solve and for whom? How does your solution look like? A selection will then be made. Winning idea owners can pitch to the Dean.


Above: Explanation of idea maturation



Above: Like & Share stunt - Donuts



Above: promotion materials for the tournament

Appendix 2 – Survey questions

Question number	Questions	Questions (continued)	Relation to incentive	Type of motivation
1	I would participate in this tournament because	... I am sure I would enjoy this tournament very much.	Intangible	Intrinsic
2		... I am sure I would have fun while participating in this tournament.	Intangible	Intrinsic
3		... I like to participate in a tournament like this one.	Intangible	intrinsic
4		... I feel I could get a nice financial compensation due to my participation in this tournament	Tangible	Extrinsic
5		... I feel I could get career benefits due to my participation in this tournament.	Tangible	Extrinsic
6		... I feel attracted by the bonus and financial rewards promised by this tournament.	Tangible	Extrinsic
7	If the tournament just described was run at our school next year, would you participate?			
8	How confident are you that the tournament just described would generate a new and extremely valuable idea for our school?			
9	How likely do you think you would be a winner of this tournament?			
10	How many hours per week do you think you would spend on this tournament?			
11	How much effort would you be willing to put to help other participants mature their ideas (e.g. by commenting on their ideas or indicating whether or not you like them)?			

Appendix 3 – Significance levels and other statistics

3A: Control questions

ANOVA – control questions

		Sum of Squares	df	Mean Square	F	Sig.
Attached_ESE	Between Groups	,697	1	,697	,867	,354
	Within Groups	90,084	112	,804		
	Total	90,781	113			
Control_reward	Between Groups	1,191	1	1,191	,859	,356
	Within Groups	155,300	112	1,387		
	Total	156,491	113			
Control_interest	Between Groups	1,988	1	1,988	1,580	,211
	Within Groups	140,933	112	1,258		
	Total	142,921	113			
Control_helping	Between Groups	,581	1	,581	1,004	,318
	Within Groups	64,857	112	,579		
	Total	65,439	113			
Control_goal	Between Groups	,985	1	,985	,856	,357
	Within Groups	128,874	112	1,151		
	Total	129,860	113			
Control_money	Between Groups	3,376	1	3,376	2,120	,148
	Within Groups	178,379	112	1,593		
	Total	181,754	113			
Control_finish	Between Groups	1,552	1	1,552	2,000	,160
	Within Groups	86,913	112	,776		
	Total	88,465	113			

3B: Intention to participate

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,383 ^a	,146	,132	,885

a. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	54,150	7	7,736	9,879	,000 ^b
Residual	315,563	403	,783		
Total	369,713	410			

a. Dependent Variable: INTPARTi

b. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	1,793	,271		6,611	,000	1,260	2,326
Dummy_INT	,571	,124	,301	4,622	,000	,328	,814
Dummy_TAN	,505	,123	,266	4,092	,000	,262	,747
Dummy_INTxTAN	-,184	,175	-,084	-1,053	,293	-,527	,159
Dummy_SOC	,188	,093	,099	2,032	,043	,006	,370
GENDER	-,073	,090	-,038	-,816	,415	-,250	,104
YEAR	-,045	,031	-,072	-1,488	,138	-,106	,015
ATTACHM_ESE	,128	,048	,124	2,677	,008	,034	,222

a. Dependent Variable: INTPARTi

3C: Planned intensity of participation – hours per week

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,231 ^a	,053	,037	1,846

a. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	77,122	7	11,017	3,233	,002 ^b
Residual	1373,408	403	3,408		
Total	1450,530	410			

a. Dependent Variable: PREDENGHRSi

b. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	2,353	,566		4,159	,000	1,241	3,465
Dummy_INT	,814	,258	,217	3,158	,002	,307	1,321
Dummy_TAN	,624	,257	,166	2,427	,016	,119	1,130
Dummy_INTxTAN	-,272	,364	-,063	-,747	,456	-,988	,444
Dummy_SOC	-,153	,193	-,040	-,791	,429	-,532	,227
GENDER	,097	,188	,026	,517	,605	-,272	,467
YEAR	-,020	,064	-,016	-,313	,754	-,145	,105
ATTACHM_ESE	-,036	,100	-,018	-,361	,718	-,232	,160

a. Dependent Variable: PREDENGHRSi

3D: Planned intensity of participation – Maturing others' ideas

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,336 ^a	,113	,098	,861

a. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	38,042	7	5,435	7,332	,000 ^b
Residual	298,717	403	,741		
Total	336,759	410			

a. Dependent Variable: PREDENGMATI

b. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	1,724	,264		6,534	,000	1,205	2,242
Dummy_INT	,466	,120	,257	3,874	,000	,230	,702
Dummy_TAN	,416	,120	,230	3,465	,001	,180	,652
Dummy_INTxTAN	-,274	,170	-,131	-1,612	,108	-,608	,060
Dummy_SOC	,148	,090	,081	1,643	,101	-,029	,325
GENDER	,316	,088	,172	3,609	,000	,144	,488
YEAR	-,081	,030	-,133	-2,715	,007	-,139	-,022
ATTACHM_ESE	,021	,047	,021	,448	,654	-,071	,112

a. Dependent Variable: PREDENGMATI

3E: Confidence in new idea creation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,383 ^a	,146	,132	,944

a. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	61,739	7	8,820	9,901	,000 ^b
Residual	359,899	404	,891		
Total	421,638	411			

a. Dependent Variable: CONFTOURNi

b. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	1,509	,289		5,220	,000	,941	2,078
Dummy_INT	,650	,132	,321	4,926	,000	,390	,909
Dummy_TAN	,515	,132	,255	3,917	,000	,257	,774
Dummy_INTxTAN	-,312	,186	-,133	-1,677	,094	-,678	,054
Dummy_SOC	-,049	,098	-,024	-,502	,616	-,243	,144
GENDER	,388	,096	,189	4,046	,000	,200	,577
YEAR	-,034	,033	-,050	-1,052	,293	-,098	,030
ATTACHM_ESE	,118	,051	,106	2,301	,022	,017	,218

a. Dependent Variable: CONFTOURNi

3F: Confidence in effectiveness of tournament – own likelihood of winning

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,242 ^a	,058	,042	24,699

a. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15252,118	7	2178,874	3,572	,001 ^b
	Residual	245841,809	403	610,029		
	Total	261093,927	410			

a. Dependent Variable: CONFOWNi

b. Predictors: (Constant), ATTACHM_ESE, Dummy_INTxTAN, GENDER, YEAR, Dummy_SOC, Dummy_TAN, Dummy_INT

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	35,775	7,568		4,727	,000	20,897	50,653
	Dummy_INT	5,380	3,450	,107	1,559	,120	-1,403	12,162
	Dummy_TAN	2,560	3,442	,051	,744	,457	-4,207	9,327
	Dummy_INTxTAN	-1,254	4,874	-,021	-,257	,797	-10,835	8,327
	Dummy_SOC	1,508	2,582	,030	,584	,560	-3,568	6,584
	GENDER	-10,142	2,514	-,199	-4,035	,000	-15,084	-5,201
	YEAR	,196	,853	,012	,230	,818	-1,481	1,874
	ATTACHM_ESE	2,388	1,336	,087	1,787	,075	-,239	5,014

a. Dependent Variable: CONFOWNi