St. Petersburg State University
Graduate School of Management
Master in Management

LEAD GENERATING INTERNET PLATFORM-BASED COOPETITION: COMPANY CHARACTERISTICS AFFECTING THE COOPERATION PERFORMANCE

Master's Thesis
by the 2nd year student
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ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

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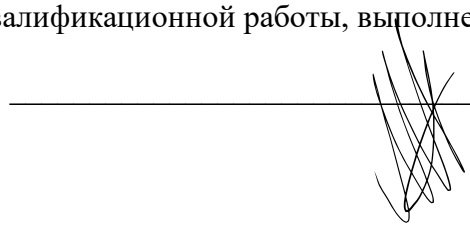

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I, Daniil Morachev, second year master student, program «Management», state that my master thesis on the topic «Lead Generating Internet Platform-Based Coopetition: Company Characteristics Affecting The Cooperation Performance», which is presented to the Master Office to be submitted to the Official Defense Committee for the public defense, does not contain any elements of plagiarism.

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АННОТАЦИЯ

Автор	Морачев Даниил Игоревич
Название ВКР	Лидо-генерирующая коопетиция на базе интернет-платформы: характеристики компании, влияющих на результат кооперации
Факультет	Высшая Школа Менеджмента
Направление подготовки	Менеджмент, профиль – Маркетинг
Год	2020
Научный руководитель	Зенкевич Николай Анатольевич
Описание цели, задач и основных результатов	Основной целью является выявление потенциального воздействия, которое может быть вызвано ведением сотрудничества на основе интернет-платформ среди компаний, работающих в одной отрасли, на эту отрасль. Основные задачи: проанализировать существующую модель, которая используется как основной механизм генерации лидов, выявить основные характеристики компании, которые могут использоваться для формирования групп при создании коалиции для дальнейшего сотрудничества, внести изменения в существующую модель, добавив процесс выбора коалиции на основании характеристик компании, проанализировать, какие стратегии успешны при данной модели, определить влияние характеристик групп на общий перформанс коалиции. Основные результаты работы: определенный набор характеристик и разделенные на кластеры группы, определяющие успех коалиции, модель, которая учитывает формирование групп на основании определенных параметров, выявление влияния формирования групп на перформанс коалиции.
Ключевые слова	Коопетиция, кооперация, конкуренция, теория игр, агентное моделирование, симуляция, коалиция, распределение выигрыша, характеристики успеха компании

ABSTRACT

Master Student's Name	Daniil Morachev
Master Thesis Title	Lead Generating Internet Platform-Based Coopetition: Company Characteristics Affecting The Cooperation Performance
Faculty	Graduate School of Management
Main field of study	Management, concentration — Marketing
Year	2020
Academic Advisor's Name	Nikolay A. Zenkevich
Description of the goal, tasks and main results	The main goal is to identify potential impact that can be caused by a lead generating internet platform-based coopetition among companies, which operate in one industry, on this industry. Main objectives: to analyze the existing model, which is used as the main mechanism for generating leads, to identify the main characteristics of the company that can be used to form groups when creating a coalition for further cooperation, to make changes to the existing model, adding a process for choosing a coalition based on the characteristics of the company, to analyze, what strategies are successful with this model, determine the influence of the characteristics of groups on the overall performance of the coalition. The main results of the work: a specific set of characteristics and divided clusters of groups that determine the success of the coalition, a model that takes into account the formation of groups based on certain parameters, identifying the impact of group formation on the performance of the coalition.
Keywords	Coopetition, cooperation, competition, game theory, agent based modeling, simulation, coalition, pay-off, characteristics of company success

INTRODUCTION

Nowadays there can be detected a growing interest to the topic of coopetition as a strategy of inter-firm relationships. Actually, many companies are trying to start applying cooperation in their business models. In many scientific works, this concept is studied by the authors from the point of view of game theory, and also finds application in the implementation of Internet platforms.

Coopetion is now primarily debated from a destructive angle as to how other companies should run it. However, it seems hard to find research material to try to create a practical cooperation concept that might be implemented. Coopetition remains poorly discussed in terms of impacts that it can possibly produce on the scale of an industry.

In this work, the author continues the study (Shlegel, Zenkevich, 2016), which combines the concepts of coopetition, theory of games and two-side platforms to develop the idea of using competitive cooperation as a mechanism of generating lead. The author proposes to consider concepts that were not touched on in the previous work and expand the study to improve the model.

In a previous work, it was determined as limitations that a coalition is formed only on the basis of two characteristics: price and product quality. However, when evaluating the success of competitive cooperation, more critical indicators should be taken into account for a clearer picture of what the author explores in this paper.

Thus, the study of this topic is determined by the following order. After researching the literature, special attention was devoted to the characteristics of companies that influence the performance of cooperation. It was further updated and describes the design of a concept of a lead generating internet platform-based coopetition taking into account the identified characteristics. Next, the model is simulated in the AnyLogic 8. It was decided to use data that at some extent describes the Russian Digital market of year 2018. And in the final chapter the results and possible outcomes were defined.

1. STATE-OF-THE-ART OF COOPETITION, COOPERATIONAL GAME THEORY AND PLATFORM BASED MARKETS

1.1 Background

From the late 1990s until today, the volume of scientific work on relationships based on simultaneous competition and cooperation, namely coopetition - has been growing non-stop in response to increased trends and the demand of companies to unite and compete within the alliance to increase benefits (Devece, C., Ribeiro-Soriano, DE, & Palacios-Marqués, D., 2017). In many scientific works, this concept is studied by the authors from the point of view of game theory, and also finds application in the implementation of Internet platforms.

In this work, the author continues the study (Shlegel, Zenkevich, 2016), which combines the concepts of coopetition, theory of games and two-side platforms to develop the idea of using competitive cooperation as a mechanism of generating lead. The author proposes to consider concepts that were not touched on in the previous work and expand the study to improve the model. To do this, it is proposed to consider the theoretical frameworks that will be needed to build and to describe the model.

1.2 Coopetition

Over the past few decades, the concept of cooperation has become one of the keys to the strategy and development of many progressive companies. This change is directly determined by the current dynamic complex business contexts, which have significantly changed the industrial logic aimed at internal resources (Prahalad & Hamel, 1990; Wernerfelt, 1984), to another logic that defines network interaction as a mechanism for integrating external resources (Chesbrough, Vanhaverbeke, & Wes, 2006; Eisenhardt, Furr, & Bingham, 2010). Moreover, the business model familiar to market players, in which the company's activity was limited to one company, is rapidly changing towards intercompany interaction to enable dynamic movement (Harrigan, 1981; Lieberman, 1987; Miller & Friesen, 1984). All these aspects and significant changes in the behavior of companies are investigated by researchers as part of the study of cooperation between rivals, identifying such relationships as cooperation.

Defined in the 1980s by businessman Raymond Noorda, coopetition is an integral part of philosophy and strategy that goes beyond the generally accepted rules of competition and cooperation to reach the benefits of both (Brandenburger & Nalebuff, 1996). The singularity of coopetition lies in the fact that global competitors, by cooperating together, increase productivity, sharing recourses, and achieve common goals in certain areas, while improving their efficiency,

continuously competing among themselves, actively developing distinct areas of the company (Luo, 2004). And although there are a certain violation of logic (Chen, 2008) and contradictory differences (Gnyawali, Madhavan, He, & Bengtsson, 2016), according to the literature, researchers attribute this phenomenon as an important tool in strategic management (Gnyawali, He, & Madhavan, 2006; Hoffmann et al., 2018; Le Roy et al., 2018), advanced technological development (Gnyawali & Park, 2011) and disruptive innovations (Ansari, Garud, & Kumaraswamy, 2016).

In recent works (Gnyawali & Ryan Charleton, 2018), as well as in a series of earlier articles (Bengtsson & Kock, 1999; Gnyawali & Madhavan, 2001; Luo, 2005; Padula & Dagnino, 2007), cooperation is defined as simultaneous competition and collaboration between companies with the ultimate goal of creating value intent. Having examined the concept in more detail, the keywords that define the essence of coopetition are simultaneous and creating value intent. Simultaneous determines the relationship between cooperation and competition, and creating value intent, in turn, refers to the motivation of companies to create new important benefits (Gnyawali & Ryan Charleton, 2018). And despite the fact that these two definitions are an integral part of the concept of coopetition, the researchers attached more importance to the study of the intention to create value, since such an action encourages participation in cooperation even at the risk of reducing or destroying value in case of failure (S. H. Park & Ungson, 2001).

The basic concept of coopetition, as already mentioned, determines the simultaneous state of competition and cooperation with the further goal of creating value intent. Figure 1 proposes a model that explains the manifestations of certain difficulties and problems in the formation of coopetition. The proposed model distinguishes two main indicators of competition, rivalrous spirit and resource relevance, as well as mutuality and resource commitments for cooperation (Gnyawali & Ryan Charleton, 2018).

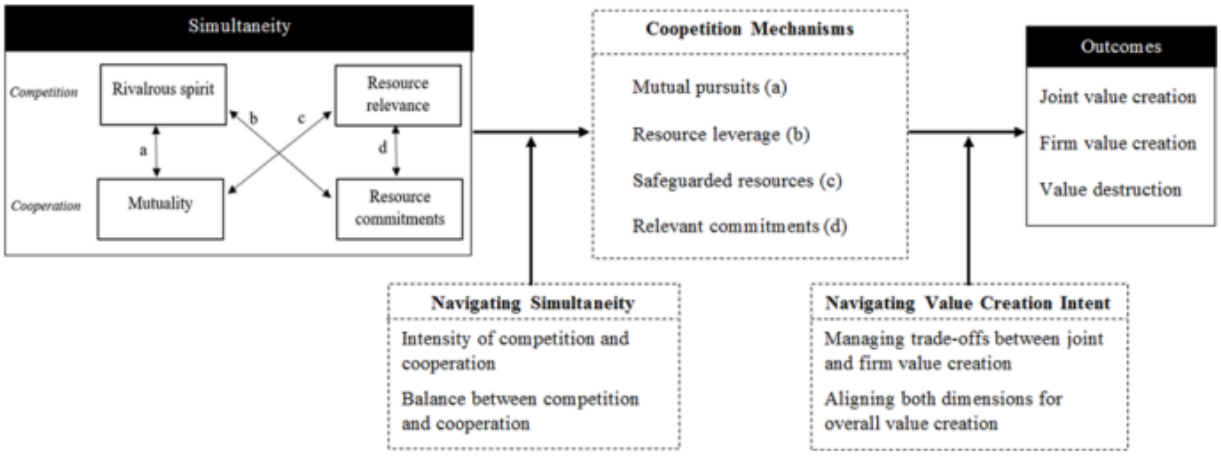


Figure 1 - A Conceptual Model of Coopetition

This model explains the interaction between the aspects of competition and cooperation through several mechanisms of cooperation. These include mutual prosecution, the use of resources, guaranteed resources and related obligations. The items under the signs a, b, c, d shown in the figure 1 refer to a certain interaction in the simultaneity field. This explains the principle of interaction of aspects that affect the basic properties of cooperation. These indicators, which depend on the degree of simultaneity, can have different effects when creating value intent. Ultimately, this model defines the following results: joint value creation, creation of a firm's value, and destruction of value. This scheme also explains the maximization of value creation and the limitation of its destruction with the main goal of creating value in the framework of cooperation (Gnyawali & Ryan Charleton, 2018). This concept accurately explains the uniqueness and complexity of the concept of collaboration (Fernandez et al., 2014; Gnyawali et al., 2016) through the constructed blocks between simultaneity (left rectangle) and results (right rectangle).

Returning to the theory and the very definition of co-petition, in the literature the condition of co-petition is determined by a strong need for external resources and a position in the sector (Bengtsson and Kock, 1999). This implies the fact that cooperation should simultaneously include an individual dimension (regarding the need for external resources) and a communal dimension of the company (relative to its position in the sector). “Firms fight for their freedom of action (share) and, therefore, for their independence, at the same time undergoing the saving of strengths and, therefore, the common fate of their competitive group” (Baumard, 2000). Thus, due to their presence in a strategic group, firms must take care of their collective fate. Indeed, if this were not so, companies that were tempted to go it alone would see each other, and then would be under pressure from the community. According to its market position, the firm must take care of others. Conversely, if her position is strong, the firm may adopt a “selfish” strategy based on difference. However, such a risk will depend on its position in the sector, as well as on its need (strong or weak) for shared resources.

The authors believe that there are four types of cooperation, which differ depending on the number of firms involved and the number of types of activities in the value chain: simple dyadic cooperation, complex dyadic cooperation, cooperation in a simple network, cooperation in a complex network. For Dagnino and Padula (2002), when several firms are involved in several activities in the value chain, this is collaboration in a complex network. The network vision of the sector requires that author consider not only its functioning, but also mainly the relations between the participants. It then becomes important to determine whether the complexity of the networks changes the behavior of the actors or not.

For several decades, interest in the model of cooperation has been increasing; more and more cooperation agreements are being signed between competitors (Harbison & Pekar, 1998). In the literature there are a number of factors that motivate competitors to collaborate.

Competitive cooperation significantly strengthens the economic, technological and transactional relationships between competitors. Competitive pressure and shared desire act simultaneously, provoking two competitors to act together, sharing shared costs (Lado et al., 1997).

Talking about innovation, in order to reduce the risks and costs associated with the development and introduction of innovative products while expanding in the global market, firms enter into competitive cooperation to minimize development time costs and also reduce costs when entering new markets (Luo, 2007). That is, competition is the engine of the technological process, motivating the creation of innovative products that society needs (Porter, 1985). Collaboration can also be regarded as internalization in different meanings (quasi or actual) to acquire and exchange competitor skills (Hamel, 1991). In addition, cooperation determines the degree to which leaders in the global market are strengthened and the positions of members within the cooperation group are strengthened (Luo, 2007).

It was also found that competitive cooperation takes place in industries that are just starting their development in the market for the successful launch of their product (Dorn et al. 2016). To some extent, this competition is associated with a certain risk, as young players may shy away from the terms of the cooperation agreement (Levy et al. 2003).

One of the important motives for creating cooperation is the number of competitors in the overall portfolio of alliance partners. Each increase in the number of partners will lead to a strategic alignment of relationships with different partners (Ritala, P. 2001).

Also, the motives of firms to adopt a collaboration strategy are explained by game theory. There is a theory that the concept of a cooperative implies collaboration for the purpose of joint winnings, which in the future will be divided among the participants through competition (Brandenburger and Nalebuff, 1996). So, the alliance can simultaneously increase the total value that each member individually can capture.

In collaboration, rivals work together, which depends on various factors. For instance, Wang et al. assume that the optimal resolution of social dilemmas can be justified by the intermediate interaction density of enough network partners.

Wang et al. also analyze the effect of population density on collaborative developments in structured populations. Cooperation reliability also increases because of social penalties and heterogeneity in aspirations is a significant factor in cooperation sustainability in structured population groups.

Moreover, cooperation on an intermediate level of aspiration is best promoted. Therefore, the relationship must be managed systematically in order to form a successful cooperation relationship to create the necessary conditions for success. An important and interesting question therefore is how to model collaborative relationships mathematically. Cooperative gaming theory is a common tool for the analysis of cooperative situations. But, as Shoham and Leighton-Brown point out, the term "cooperative" in 'cooperative gaming' theory can be misleading, since the hidden competence of the theory does not exactly reflect it, "cooperative" in theory of cooperative games "indicates that the fundamental modeling unit is a group of actors opposed to the non-cooperative games theory, where the main modeling unit is In cooperative-gaming theory, therefore, players are groups of players whose ability to define coalition models and distribution schemes is analyzed based on groups, which leads once again to a competition analysis similar to that of non-cooperative games with an emphasis on paidout values for each coalition. And ignoring the internal cooperation structure. The participants work together through coopetition, whose effectiveness relies on several variables. For example, several paperwork have shown that intermediate densities of relatively intensive network participants require an ideal approach to social dilemmas. The impact of population growth has also been evaluated on community collaboration in organized communities. The robustness of cooperation is also strengthened by mutual payment and the heterogeneity in expectations is recognized as an significant survival factor for coordinated population co-operation. In fact, a moderate stage of ambition promotes collaboration.

1.3 Cooperative game theory

The author is not attempting to establish or evaluate some principle in game theory in this particular paperwork. But many rules and definitions, however, help the author build the structures and ideas mentioned in the chapters below.

The theory describes that the actions of individuals very often depend equally on his own behavior and on other members of society. So, the evolutionary theory of games was created and presented to analyze the development of behavior or other aspects in which fitness depends on frequency (Van den Berg, P., & Weissing, F. J. 2015).

In 1944, «Theory of Games and Economic Behavior» by John von Neumann and Oskar Morgenstern was published, which introduced and described the concepts of a cooperative game, with transferable utility, its coalitional form and its von Neumann-Morgenstern stable sets. These and many other principles subsequently found wide application in the economy.

To understand game theory, author should know the core idea behind it. Most people think economics is about accounting, money and banking, public policy and the markets. In economic model the key tool in the analysis is competition as game theoretic models work similarly. The core of economics is actually very simple; it is the science behind why people make the decisions they make. In other words, economics is the field of science, social science in fact, behind human decisions. In neo-classical economic model competition is searched with respect to many assumption and condition, it is determined like using folk as if in game theoretical way it is determined like using chopstick to balance between simultaneous strategies (Camarer,1991). Game theory is a mathematical analysis of any social situation in which one player or actor, but possibly a firm or nation—tries to figure out what other players will do, and choose the best strategy given those guesses about others. Most game theory describes the fictional behavior of an ideal, hyper calculating, emotionless and, as a result, is not always a good guide to how normal people who don't plan too far ahead will actually behave. Behavioral Game Theory describes hundreds of different experimental studies which show where game theory predicts well and predicts poorly, and suggests some new kinds of theory. Game theory merely analyzes decisions that affect the decisions of other people. Game theory is the strategic theory of mathematically formalized interaction. Game Theory (Fudenbegand Trole, Gibbons, 1992) is a discipline designed to model situations in which policymakers need to make mutual, possibly conflicting and consequences-oriented specifications. It examines how strategic interactions between actors yield outcomes for the interests (or utilities) of those agents, when none of those agents have intended the outcomes. It was mainly used in economics to model competition between companies. Game theory was created as a subset of economics because while economics was good at describing why people made decisions that only affected the individual (microeconomics) or a mass of people (macroeconomics), it was lacking when it came to understanding decisions that involved multiple people where one person’s decision would affect the other person’s decision. Game theory was created to fill that gap. At its core, game theory is about analyzing decisions that will impact other people’s decisions. Game theorists call these types of decisions “strategies.” The simple premise behind game theory is that you can calculate the right decision to make even in multi-person (or multi-player) situations, before needing to make it. If you think about the most decisions you make, it’s likely that they have some affect, either large or small, on the decision of others

Game theory is a mathematical analysis of any social situation in which one player or player, but perhaps a company or nation, is trying to figure out what other players will do and choose the best strategy, given these assumptions about others. Most game theories describe the fictional behavior of the ideal, hypers counting, without emotion and, as a result, not always a good guide to how normal people who don't plan too far ahead will actually behave. Behavioral game theory describes hundreds of different experimental studies that show where game theory predicts good and bad predictions and offers some new types of theory. Game theory simply analyzes decisions that will influence other people's decisions.

Game theory (Fudenbegand Trole, Gibbons, 1992) is a discipline aimed at modeling situations in which decision-makers must make specifications that have mutual, possibly contradictory, consequences. This is a study of the ways in which strategic interactions between actors lead to results regarding the preferences (or utilities) of those agents where these results may not have been intended by any of the agents. It was used mainly in the economy to simulate competition between companies. Game theory was created as a subset of economic theory because, although the economy was good at describing why people made decisions that affected only individuals (microeconomics) or masses of people (macroeconomics), it was lacking when it came to understanding decisions in which many people participated. where the decision of one person will affect the decision of another person. Game theory was created to fill this gap. At its core, game theory is about analyzing decisions that will affect other people's decisions. Game theorists call these types of decisions "strategies." A simple premise of game theory is that you can calculate the right decision that you need to make even in situations with multiple people (or with multiple players) before making it. If you think about most of the decisions you make, it is likely that they have some kind of influence, big or small, on the decisions of others. Game theory is a set of mathematical tools, the correct application of which is used to study interactive solving problems between rational players, as well as to predict the possible outcome of an interactive solution problem. In game theory, there is a concept like "Nash equilibrium" that defines a state in which no player has any additional advantages for simply changing his strategy unilaterally (S. Mehta and K. S. Kwak, 2010).

Game theory has found wide application in various fields and industries: healthcare, telecommunication and IT technologies, as well as in logistics ("Prison breakthrough", 2020). To present the game, a consistent description of actions is required, which is typical for dynamic games. Dynamic games are mainly described using an extended form using game trees (Figure 2) (S. Tadelis, 2013). The nodes of such a tree have a choice in which each player chooses an action,

each of which corresponds to the outgoing edges of the selection node (Gavidia-Calderon, C., Sarro, F., Harman, M., & Barr, E. T., 2019).

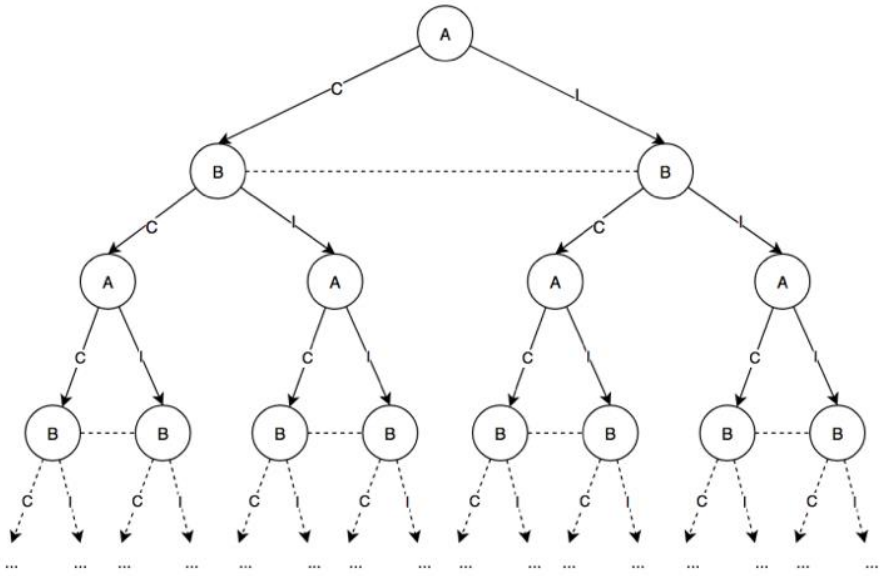


Figure 2 - Extensive form game for a multi-project dilemma

Games can be classified formally at many levels of detail, here; author in-general tried to classify the games for better understanding. As shown in the figure games are broadly classified as co-operative and non-cooperative games. In non-cooperative games the player cannot make commitments to coordinate their strategies. A non-cooperative game investigates answer for selecting an optimum strategy to player to face his/her opponent who also has a strategy of his/her own. Co-operative game can, and often does, arise in non-cooperative games, when players find it in their own best interests. Conversely, a co-operative game is a game where groups of players may enforce to work together to maximize their returns (payoffs). Hence, a co-operative game is a competition between coalitions of players, rather than between individual players. There are lots of fundamental things need to be discussed about co-operative games which are simply out of the scope of this chapter. Furthermore, according to the players' moves, simultaneously or one by one, games can be further divided into two categories: static and dynamic games. In static game, players move their strategy simultaneously without any knowledge of what other players are going to play. In the dynamic game, players move their strategy in predetermined order and they also know what other players have played before them. So according to the knowledge of players on all aspects of game, the non-cooperative/cooperative game further classified into two categories: complete and incomplete information games. In the complete information game, each player has all the

knowledge about others' characteristics, strategy spaces, payoff functions, etc., but all these information are not necessarily available in incomplete information game (M. Felegyhazi et al., 2006, M.J. Osborne & A Rubinstein , 1994, V. Srivastava et. al , 2005).

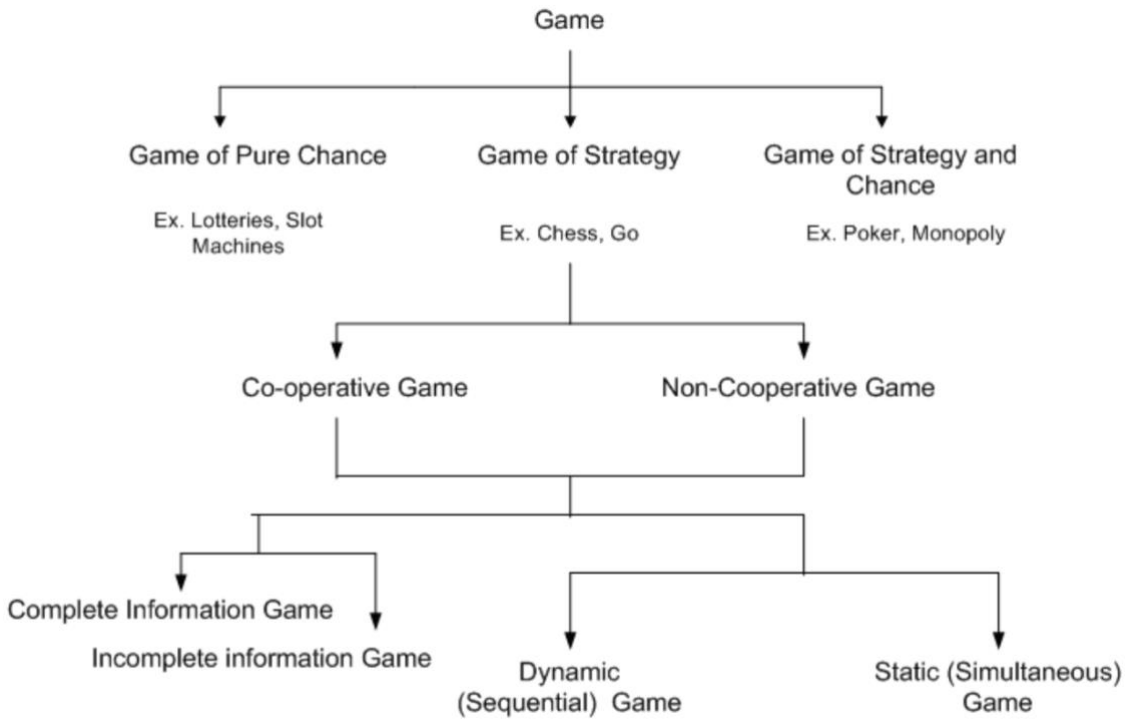


Figure 3 - Classification of Games

Two major situations of the Nash balance can be considered (the "egoistic," the "egoistic"), and (the "contract" and the "contract"), with the first dominating in Pareto. Furthermore, the "egoistic" strategy of the second boss doesn't matter if the first one chooses the "egotical" strategy or the "contract." But the strategy of 'contract' will benefit the second boss if he chooses a 'contract.' The fact is that the "egoistic" balance is a non-strict Nash balance, unlike the "negotiated" one. All of the above allows us to hope that the result of this game will be the "contractual" balance (Neumann, Morgenstern 1970).

The example above demonstrates how expanding a host of strategies through the ability to work together between players can lead to a Pareto-optimal Nash balance. Such ideas form the basis of a separate section of game theory-cooperative game theory. The foundations for this approach were laid at the same time as the non-cooperative game theory (Neumann, Morgenstern 1970), but the analysis of the joint actors' behavior required the creation of game models which differed significantly in normal and expanded forms from the formulation of game problems.

Player interactions are formalized using the concept of coalition in theory of cooperative games. Information coalitions will be a group of players who will exchange information. It is believed that agreements are signed in the process of forming a coalition which force players to provide the information necessary. At the same time, the possibility of bluffing is not considered to report inaccurate information. Coalitions whose members can exchange profit are referred to as utility coalitions or coalitions.

Transferable utility games (TU games) are called games in which players can form utilities coalitions. By comparison, players in which only knowledge coalitions can form are called non-transferable games (NTU games). The TU and NTU games have historically been studied in parallel, although the theory of NTP games is technically much more complex, so we are limited to only considering TP games

The theory of cooperative games mainly focuses on the cooperating actions of players during the game, i.e. on what coalitions are formed during the game and what conditions are needed to maintain a stable coalition. This is linked to a considerable difference in problem formulation compared with non-cooperative game theory, which is the main mathematical model for a game in its normal form. As a sufficiently detailed description of the conflict situation, the game in normal form has proved to be too complex a model for studying cooperative actors' interactions. To describe how a game is usually used even during the simplest negotiation process, it requires an incredible complication of many player strategies, both of which are the elements for transferring information to other players and the elements that describe the reaction to their message. The key idea of the theory of cooperative games is to evaluate the possible outcomes without taking into consideration the negotiation phase as such and to draw conclusions on the viability of a specific outcome. The elements of the game description in the form of a feature function are therefore not the strategies of the players but the gains that this or that coalition can guarantee itself (Neumann, Morgenstern 1970).

1.4 Platforms and platform-based markets

The business model on the platform is strengthening the position in the digital market, finding extensive application in the business environment (Nike, Amazon, Apple). Such platforms provide customers with the necessary solutions from external and independent firms, simplifying the interaction process and creating innovative proposals (Cennamo, 2019).

Two-sided platforms (or markets) are defined as markets in which one or more platforms try to ensure interaction between end-users and maintain the relationship between the two parties,

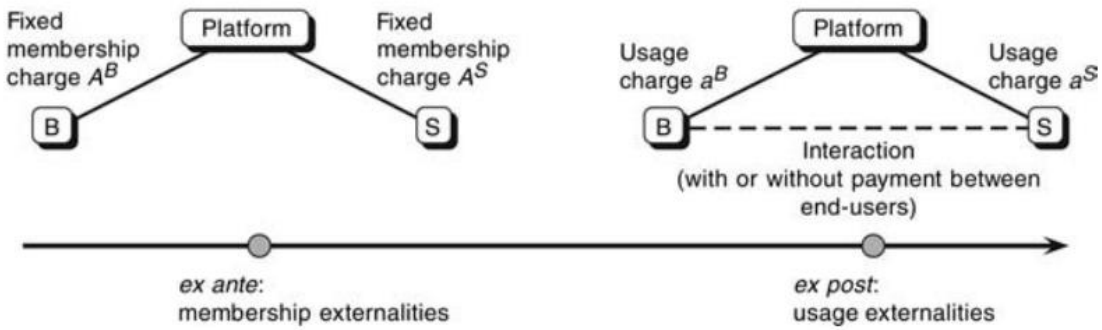
while simultaneously charging a corresponding fee from each side (Rochet, J.-C., & Tirole, J. 2006). Nowadays, it can be found examples of such platforms that have a two-side model. Among gamers, Nintendo, Sony Play Station and Microsoft X-Box are those platforms that attract, on the one hand, developers of software applications, and on the other hand, users directly to encourage the use of a specific game console (Rochet, J.-C., & Tirole, J. 2006).

Most businesses use two-sided platforms in their industry. Typically, these companies serve groups of customers by organizing a common place of communication (meeting) to facilitate interaction between two different groups. The literature determines that the two-sided platform play an important role in the economy, finding demand in both new and old industries, minimizing transaction costs between organizations that can pay off from the cooperation (Schmalensee, Richard and Evans, David S., 2007).

In his early work, Luchetta, G. describes the conditions under which the two-sided platforms function properly:

1) the implementation of one transaction between two different groups of users connected by the platform;
2) the multiplicity of each group of users creates mutual positive external effects;
3) as a result, both sides are logically and constructively necessary for the operation.

Two-sided market theory is conceptually related to network externality theories and (business or regulated) multi-product pricing. The latter refers to end-users from Katz and Shapiro



(1985, 1986) and Farrell and Saloner (1985, 1986), and to the idea that market power distorts price structures less than price levels. The price literature for multiple products does not allow for external features of the application of certain products, since the purchaser of a razor takes a famous example of the net surplus which he would receive from the purchase of raser blades. The starting point for two-sided market theory is, in contrast, that the end user doesn't internalize the social effects of his use of the network on other end users.

Figure 4 - Two-sided platform interaction

Assume that there are potential market advantages of a "interaction" between two end-users named for convenience by both the buyer (B) and the seller (S). A website enables or promotes the interaction between the two parties whether they are really interested in communicating.

Almost anything may be the interaction, but it needs to be clearly defined. When the buyer (gamer) buys a game developed by a seller (play publisher) and plays it on a platform console, an interaction takes place. Similarly, interaction takes place when the buyer (user) buys an operating system (OS) seller-built application on the platform. In the case of payment cards, a buyer interacts with a cardholder by a seller. When a viewer reads an ad, a "viewer" communicates with a newspaper or TV-channel advertiser. A telecommunications network contact between a caller and a recipient is a telephone conversation and information transmission from a website to an internet user. Authors distinguish between membership fees and usage fees, membership externalities and external uses. Trade between end users almost always generates profit: the cardholder and retailer gain comfort benefits if the former uses a card, not cash, the caller and the street, not by the telephone itself. How much the platform charges for use depends on how much. For example, the USE charges a dealer discount for aS>0, while the customer pays no amount to use the US Express card, aB = 0.7. A caller receives a fee per minute and a fee per minute is paid to the receiver. External uses are based on decision-making: if I simply use the card rather than the cash, the merchant exercises (positive) use it to accept the card. Likewise, if I like to call a friend on my cell phone, that friend's willingness to give me his number and answer my call allows my externality to be used well. Ex ante, AS and AB can be paid for interaction-independent fixed fees. For example, American Express charges annual cardholders' fees (AB > 0). For video games, platforms can charge fees for the developer kits (AS>0) as well as copy-selling royalties (aS>0) and recharge the video game console for the players (AB>0). Microsoft charges consumers unused fees (AB > 0) for Windows, but no variable fees (aS = aB = 0). In the sense that a side-user I is given a purely positive net surplus by using j = I membership decisions to engage with additional end-users generates member externalities.

The pricing strategy and investment strategy in the bilateral market are closely connected with the cross-network effect between the two sides of the platform. Therefore, in some cases, the approach to improve platform revenue is to set the prices of consumers considerably below expense on one side of the market.

The concept of two-sided markets is young enough. The term was first proposed by Rochet and Tirol (Rochet, Tirole, 2003), a number of authors have contributed to the development of the concept, including Parker and Alstyne (Parker, Alstyne, 2000), Caioud and Jullien (Caillaud,

Jullien, 2001), Evans (Evans, 2003), Armstrong (Armstrong, 2006). It should be noted that various authors use new terminology. Thus, the terms “two-sided markets”, “multilateral markets”, “two-sided platforms” or “multilateral platforms” are often used by the authors to describe the same phenomena with some variations in the definitions and criteria used.

Rochet and Tirole (Rochet, Tirole, 2006) proposed the following definition of the markets in question: “A market is two-sided if the platform can influence the volume of transactions by setting a higher price on one side of the market and lowering the price paid by the other side for the same amount; in other words, price structure matters and platforms must be designed to attract both sides of consumers on the platform. ”

There is no single agreed definition of two-sided markets among researchers, however, the whole variety of definitions is based on three main characteristics of markets with two-sided network effects arising from the definition of Roche and Tyrol.

1. The presence of cross-network effects between different groups of consumers. In such markets, the value of the platform for a member of each group positively depends on the number of users on the other side of the platform.
2. The platform assists in ensuring transactions between market participants. Both costs and platform profits arise on both sides of the market at the same time, and they can only be divided conditionally.
3. The key functionality of the platform is to provide communication between different groups of users. The platform provides infrastructure and game rules that facilitate interaction between different user groups. The platform can affect the volume of transactions, raising the price on one side of the market and lowering it on the other.

In fact, this means that a firm that maximizes profits (or other objective function), making decisions about the level and price structure of products provided to various consumer groups, internalizes positive externalities, expanding the scale of transactions in such a way that it helps to achieve the goal better than if in prices this dependence did not find reflection. This idea corresponds to the general logic of the problem of external effects and structural alternatives to their internalization.

Many features of two-sided markets are based on well-known concepts from the theory of industry markets. So, one of the key concepts for two-sided markets is the theory of network effects. The theory of two-sided markets looks like some derivative from the traditional concept. The main contribution of the theory of two-sided markets is to formalize the cross-network effects that arise between the sides of the platform.

However, in principle, the theory of two-sided markets has its roots in Coase's theorem and the theory of external effects investigated by Pigou. The question of external effects inevitably arises in situations where not all benefits and costs are reflected in the price system, but in a more general sense, in agreements that structure exchanges between economic agents (Shastit-ko, 2010). External effect - the value of utility or costs, which is not taken into account in the price system or other conditions of agreements and thereby does not find proper reflection in the actions of their participants. Thus, due to external effects, differences arise between public and private benefits (for positive external effects) or between private and public costs (for negative external effects).

Two-sided markets create value by solving the coordination problem and transaction costs between user groups (Evans, Schmalensee, 2005), which is a response to the existence of external effects, including from market participants. Two-sided markets exist because there are costs that prevent the parties from carrying out two-sided transactions directly without the help of the platform. In this regard, the functioning of two-sided platforms can be considered as a way of internalizing the external effect. So, consider the situation of the presence of a cross-network effect between the X and Y sides - with an increase in the number of users on the X side on A_X, the user usefulness on the Y side increases by A_{Uy} (A_X). However, in the case of traditional two-way interaction between the parties, this cross-network effect is not taken into account and is not internalized. If a platform appears that sets a different price for the parties to complete the transaction, the cross-network effect is internalized. So, the platform, setting a lower price for X users, attracts a larger number of consumers in this group. In turn, this leads to an increase in the usefulness of group Y, whose members are therefore ready to pay the higher price set by the platform.

Thus, the platform monetizes the gains from the internalization of cross-network effects by changing the price structure — the size of the board set for different sides of the platform. Moreover, a side effect may be an increase in the dependence of willingness to pay for members of one user group in response to a change in the size of another group, as well as the emergence of new types of cross network effects as a result of the development of a business model (see comments on the list of types of platforms).

Summing up the preliminary results, author note that a list of criteria that various researchers use to determine bilateral markets can be distinguished:

1. the presence of at least two different user groups of the platform;

2. the presence of cross network effect. According to the approach of various authors, a one-way cross network effect may be sufficient, and a two-way cross effect may be required;
3. the importance of not only the level of the aggregate price set by the platform for economic exchange, but also the price structure, i.e., the fee that is set for each of the independent groups of users of the platform;
4. direct interaction between representatives of various user groups during the transaction, that is, the situation when the platform only ensures the implementation of the transaction, but does not affect its essential conditions;
5. the implementation of a single transaction, i.e., the inability to decompose the transaction into several consecutive economic exchanges.

1.5 Concept of Lead Generating Mechanism Model

In 2016, a concept model was developed that took into account the basic principles of coopetition, game theory and a two-sided platform. This model allowed to evaluate how coopetition will affect competition, and also to answer the question impact can be caused by a lead generating internet platform-based coopetition among companies, which operate in one industry, on this industry. However, this model was limited by a number of barriers that do not allow revealing the potential of the model. The following issue can be distinguished that can significantly change the behavior of the model:

Since the existing model takes into account only one specific characteristic that was used in the formation of the groups, it is not known how the model will behave and what will be the output if the groups use the set of characteristics as the main ones?

1.6 Characteristics affecting success

Due to the fact that human needs are very diverse, no less diverse are the ways to satisfy them. This is the main reason for the variety of products on the market, and the companies that supply these products to the market. Each manufacturer seeks to produce goods with the best characteristics, because it is such a product that will certainly be bought on the market, which means that the manufacturer will make a profit. However, the principle of compensation applies here. It consists in the fact that the desire to achieve the best characteristics of the product in some respects forces to some extent to give up other virtues. The reasons for this are partly objective and partly subjective. Many product characteristics are in objective contradiction (for example, high-speed and fuel-efficient).

On the other hand, much depends on the consumer, on what he subjectively searches for in this product. The success of the company in the market, therefore, depends not only on its willingness to improve its products, but also on the validity of the choice of those properties that are subject to improvement, and also (which is equally important) on determining what can be donated.

The principle of compensation, however, is not limited to this. It extends deeper: not only to goods, but also to the companies themselves that produce them. As applied to firms, it consists in the fact that, developing one traits in itself, the company loses others, for the increase in efficiency in one area it pays for its decrease in another. In other words, adaptation of a company's marketing strategy to serving certain market segments, as a rule, occurs at the cost of losing other market segments or reducing the ability to succeed in them.

A direct consequence of the principle of compensation is the multiplicity of ways to achieve success in competition, i.e., the multiplicity of marketing competitive strategies of firms. Marketing competitive strategy, as already noted, is determined on the basis of:

- external factors (analysis of environmental conditions);
- internal factors (available company resources) (2, p. 34).

Despite the fact that the behavior of a company in the market is characterized by only one specific combination, the choice of marketing strategy is dictated by certain rules.

First of all, it depends on whether the market niche of the company (product differentiation) lies within the framework of a standard or specialized business. In standard business, the company produces standard products, and then the scale of the business: from global to local (market differentiation), becomes an important characteristic that determines the content of its strategy.

In the second case, the company focuses on the production of rarely encountered (or generally absent from the market) goods and / or services (product differentiation). At the same time, she can either adhere to the marketing strategy of adapting to the special needs of the market, or adhere to the opposite line - instead of adapting herself to the requirements of the market, try to change these requirements themselves (market differentiation).

Thus, there are at least four main types of marketing strategies for competition, each of which is focused on different conditions of the marketing environment and different resources at

the disposal of the enterprise: violent tapes, commutators, patents and expellers. The firms adhering to them are each in their own way, but equally well adapted to the requirements of the market, and all of them are necessary for the normal functioning of the economy.

Thus, coexistence and mutual complementarity of companies of different types occurs on the market, and competition, respectively, is conducted by different methods based on different competitive strategies. Moreover, the complete crowding out of one of the types of firms is impossible, since the complete unification of human needs is impossible (4, p. 122).

Competition is based on the differentiation of niches, which consists in the fact that firms, due to their unequal adaptability to activities in different market conditions, tend to work only in those market segments where they are stronger than competitors.

In Porter's terminology, niche-oriented firms are called strategic groups. Differentiation of niches weakens the competition between different strategic groups and strengthens it within such groups (8, p. 324).

The natural growth of the company during the life cycle is often associated with a successive change of strategies.

The fact is that a simple increase in size without changing the marketing strategy is doomed to failure, in order to continue the development of the company must change competitive strategies.

The need to analyze the features and nature of competitors' marketing strategies is due to the fact that this makes it possible to assess their likely actions when promoting their products and / or services on the market.

The forecast of competitors' behavior is based on the following factors:

- the size and rate of increase in profitability of a competitor;
- the motives and goals of the supply chain policy;
- current and previous sales strategies;
- structure of production costs;
- production and marketing organization systems;
- level of managerial culture.

The novelty of the organization. Stinchcombe was one of the first to suggest that new organizations are characterized by "vulnerability of newness" (Stinchcombe, 1965). This vulnerability leads to frequent failures among new firms compared to more mature companies. The author believes that new firms should define new roles and tasks that are associated with high time costs, temporary inefficiencies, anxiety and conflicts. New companies are also faced with the task of establishing relationships with customers and suppliers, and they must rely on interaction with strangers (Hannan, Freeman, 1984; Romanelli, 1989; Robertson, Gatignon, 1986).

Size of organization. New enterprises usually emerge as relatively small organizations with a handful of employees and very limited financial resources. Although some new companies are able to attract and receive venture capital and thus mitigate problems caused by lack of resources, most new firms have problems with raising capital (Gruber, 2004). Lack of resources makes new companies vulnerable, as their opportunities for sustainable economic growth are limited. This is also due to the fact that they face a critical lack of required skills due to the inability to compete in the labor market for more professional employees. Finally, small organizations have fewer opportunities for employee development and innovation (Gruber, 2004).

1.7 Research problem, objectives and delimitation

Nowadays, cooperation is one of the key concepts in the strategies of many organizations. And although a few years ago a number of solutions were proposed on the topic that concerns the research of coopetition as a lead generating mechanism (Shlegel, Zenkevich, 2016), certain factors that affect coopetition when used in lead generation have not been fully studied.

As in the previous study (Shlegel, Zenkevich, 2016), for this work, it was decided to concentrate on one group of marketing activities. Lead-generation is determined by the method of attracting potential orders, customers or company services through digital. That is, lead directly means the final action (application or call) (Chechelashvili, Berikashvili, 2018).

Also, the study will not be conducted on the entire market, but on one specific industry related to the personal experience of the author, as well as the ability to provide a larger pool of data for research and application in the work.

Based on the analysis of the previous study, there were questions that will be investigated in this paper:

The aim of this work is to continue to study the impact that may be caused by cooperation on the basis of an Internet platform among companies operating in the same industry, as well as to fill in the research gap, which was not fully implemented in the previous work.

Main goal: to identify potential impact that can be caused by a lead generating internet platform-based coopetition among companies, which operate in one industry, on this industry.

To achieve the main goal, sub-goals were decomposed, the implementation of which will be the result of research:

- Identify company characteristics for a specific industry that determine success;
- Create a model that will take into account the characteristics of success in the simulation of cooperation;
- Determine which strategies are best within the framework of leading generating internet platform-based coopetition among companies.

1.6 Summary of Chapter 1

The first chapter reviewed basic literature on a given topic. The basic concepts of coopetition, the principles of game theory, as well as the mechanisms and fundamentals of two-sided platforms were examined. The information obtained will be useful for use in the following chapters, as well as for constructing a basic model for revealing the main research questions.

2. RESEARCH METHODOLOGY

2.1 Starting point of the research and its research gap

The theory of competitive cooperation is a new look at the concepts of competition and cooperation of firms, which implies a transition from their opposition to each other to the perception of interrelated, not exclusive, but mutually complementary forms of interaction of firms in the market. Thus, the growing interest of science and practice itself in the coopetition activity is objectively conditioned.

The number of research papers that tend to go deeper in the understanding of coopetition strategies within various types of the organizations is constantly growing. These papers aim to execute deep analysis of all the activities that are made by the organizations in order to present then some statistical data for proving the possible benefit of underlying coopetition phenomenon. Some academic papers make attempts to structure and classify the existing types of strategies and activities basing the research on the actual experience of the companies and now the experts only start to come up with some coopetition tools and instruments in this field.

Due to the fact that this study is a continuation of the existing research on competitive cooperation conducted in 2016, the largest percentage of the approach in practical part will be based on the methods used in the above-mentioned work. As it was already highlighted in that paper and it is crucial to mention again that there are still a sufficient number of descriptive works were produced, rather than more practice-oriented researches that seek to answer the question of how to make a real application of competitive cooperation in practice.

Since the publication of the above-mentioned work, namely from 2016 to the present moment, no new works have appeared which would not use a purely descriptive approach and would attempt to answer the question of the actual implementation of the above-mentioned cooperation. That is why the existing research gap in this question remains unfilled and leaves the opportunity to create a practical research and answer the question about coopetition implementation and its effects on particular industry. Thus, completing such research could bring some valuable contribution to filling the described above research gap.

On the basis of the described research gap the following research question were formulated:

- What set of company characteristics can be used as a base for group formation for cooperation?

- How will the design of a lead generating coopetition process among companies, which operate in one industry, change if a set of characteristics is used in the formation of coalitions?
- What is the possible impact of lead generating coopetition on companies with different price and quality strategies, which uses the characteristics of the company as a basis for the formation of cooperation groups?

2.2 Design of a concept

To further test the existing LGIPBC model, the author describes the concept design using induction. For this, frameworks and the theory of basic concepts were used, on which the principles of cooperation, game theory, and two-sided platforms are based. Based on this theory, a model concept will be tested that allows simulating lead generating coopetition.

2.3 Agent-based model simulation

To address the above points, it is important to determine potential consequences of a complicated operation of the program. These findings appear to be barely measured and projected using basic statistical formulas. It is therefore necessary to pay attention to the fact that future consequences of the operation of such a program rely on various market actors (competitors, clients) making specific decisions. The above criteria appear to be rational grounds for using an agent-based model simulation as a means of evaluating the feasibility of a new definition of engagement with competition.

Agent modeling is a relatively new direction in simulation modeling used to study decentralized systems, the dynamics of which are determined not by global rules and laws (as in other simulation modeling paradigms), but rather, when these global rules and laws are the result of individual activity of group members. The agent model represents the real world in the form of many separately specified active subsystems called agents (autonomous objects that purposefully function in a specific environment according to a certain set of rules that interact with each other and adapt in the process of functioning). Typically, in such systems there is no global centralized management; agents operate according to their laws asynchronously. The behavior of agents is regulated by their own scheme, i.e., a cognitive structure that determines what action the agent takes at time t, taking into account its perception of the environment. There are many definitions of an agent.

Common to all definitions of this concept is that an agent is a certain entity that has activity, autonomous behavior, which can make decisions in accordance with a certain set of rules, interact

with the environment and other agents, and can also independently change (evolve). Based on simple rules of behavior and interaction of agents, natural systems clearly show group intelligence.

Agent modeling is a tool with which successful modeling of complex adaptive systems is possible. The model is based on a set of basic elements from the interaction of which a generalized behavior of the system is born. It is important to understand that in this case the task is not to find the optimal economic balance, but to try to understand nature at the basis of complex social phenomena.

The resulting behavior is the result of the interaction of system elements. Accordingly, within the framework of this approach to modeling, it becomes necessary to correctly display the mechanism of behavior and interaction of system elements, the so-called agents. Agents, for example, can be not only individuals (sellers, buyers, voters, etc.), but also social groups - families, companies, etc.

2.4 Data collection

In this paper, two types of data were used to build the model: quantitative and qualitative. For this master thesis, the industry of Russian Digital agencies was chosen, since the data of this industry are accessible and also perfectly suitable as parameters for the model.

At the first stage, key data was collected on the CMS magazine website describing the digital industry. 236 respondents representing leading Russian agencies were interviewed about the profile of the company, as well as about trends in the industry as a whole. Also, it was important to gather data of main characteristics of particular industry to determine the main parameters that are used for simulation is collected. For the simulation, data were taken from the Ruward service, which collects key ratings, analytics and special infrastructure projects of the Russian digital agency market.

After the main characteristics that determined the quality of the product or service were derived, an interview was conducted with four industry representatives to evaluate these indicators. Four experts from the digital industry identified these characteristics and approved each for further use in the questionnaire phase.

At the second stage, representatives of digital agencies were asked to take a survey (Appendix 1), in which it was proposed to answer, what characteristics of their company's services and product are suitable for them. To do this, it was proposed to fill out a survey with the data of your company. The goal was to determine which potential groups companies can be combined based on the selected characteristics. For the study, 76 representatives of digital agencies were

interviewed. The survey was attended by representatives of the top management of the company, who are aware of the structure of the company and average annual turnover.

To collect the main parameters about the advertising budget and the main indicators of advertising that were necessary for the simulation (Yandex Direct, 2020): cost-per-click rates and number of potential clients. The author investigated the possible indicators of PPC advertising.

The work also used data from The CMO Survey, which annually reviews marketing trends. For the study, 265 responded for a 10.1% response rate, 98% of which were VP-level or above, were surveyed. In general, the data was taken from 2631 top marketers at for-profit companies. Data collection was conducted via email contact with four follow-up reminders from January 2020.

All the data listed above were used to identify the limits of main parameters defining the behavior and characteristics of the environment and agents in terms of current study.

2.5 Data analysis

To segment the group by characteristics, in this paper author will use cluster analysis. Cluster analysis is a tool that allows:

- To group objects based on their characteristics so that there is a greater similarity among units within groups that there is among units across groups,
- It is recommended to segment by hand, focusing on only on factors that are known as distinctive, inserting them one by one to the analysis,
- A configurational approach using cluster analysis in SPSS allows for comparing the diverse factors simultaneously, not only focusing on individual factors but their complex combinations.

For this paperwork the following principles of clustering were used (e.g., Venkatesan, Farris and Wilcox, 2014):

- Select the variables to be used as a basis for your clustering,
- Compute the distance between observations along your selected variables,
- Apply the Clustering Procedure (hierarchical or non-hierarchical) to the distance measures,
- Decide on the number of clusters,
- Interpret Your Cluster Solution, draw conclusions.

2.5 Validation of the model

When modeling, the researcher must be sure of the correctness of the model, in accordance with the model of the real prototype. The accuracy of mathematical modeling depends on how well the mathematical model reflects the properties of the object. It is important for the researcher to know with what error he gets the result, because in the case of a large error, the calculation loses its meaning.

Validation of the model — checking the correspondence of the data obtained in the process of machine simulation to the real course of phenomena for the description of which the model was created. It is done when the experimenter was convinced at the previous stage (verification) of the correctness of the structure (logic) of the model and consists in the fact that the output data after calculation on a computer are compared with the available statistical information about the simulated system.

2.6 Simulation software

To conduct tests through the simulation, the java-based program AnyLogic 8 Personal Learning Edition will be used. The choice of such software is due to the fact that in this environment it is possible to create and work with models of the agent approach. In the AnyLogic editor, it is possible to develop animation and an interactive graphical interface for the model. The editor supports a wide range of shapes, controls (buttons, sliders, input fields, etc.), import of raster graphics and vector graphics in DXF format. Animation can be hierarchical and support several perspectives. AnyLogic includes data analysis tools and a large set of business graphics elements designed for efficient processing and presentation of simulation results: statistics, data sets, graphs, charts, histograms.

2.7 Summary of Chapter 2

- At the first stage, the author studies the existing literature to describe the basic concept of the model, which is based on coopetition trailers, game theory and two-way platforms;
- Further, the author determines what characteristics of a certain industry influence the success of coopetition.
- Author make changes to the design of the model
- The author uses data from the Russian Digital Agencies market of year 2018, which are used as parameters for the model.
- The author conducts a simulation using AnyLogic 8Personal Learning Edition
- The author analyzes the data obtained from the simulations and uses the study results as a basis for answers to the above questions;

- Finally , the findings, possible consequences and drawbacks of current work are discussed.

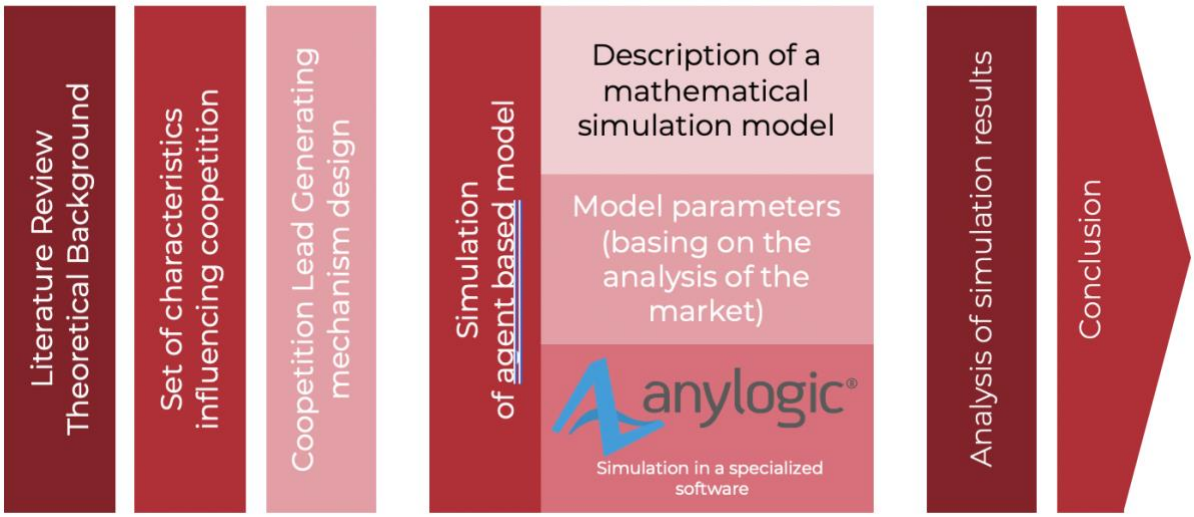


Figure 5 - The research structure

3. DESIGN OF A LEAD GENERATING INTERNET PLATFORM-BASED COOPETITION

This chapter will describe the model design of a lead generating internet platform-based coopetition, which takes into account the new approach to model creation. So, in order to improve the indicators of the successful functioning of the model, the characteristics will be determined on the basis of which the groups will be identified. These groups will be used in the model at the stage when companies are distributed according to a similar level of quality characteristics.

3.1 Identification of characteristics influencing group formation

At the first stage, the author determines what characteristics can be used to form groups on the basis of which coalitions can be created. Based on the analysis of the literature, critical characteristics of companies that can determine the quality of a product or service were identified.

Name of characteristic	Description	Parametrs
Agency lifetime and proven service experience	An indicator that determines the experience of an industry-based agency.	1 to 5 in increments of one year
Service turnover	The average annual turnover of the agency is an indicator that shows the profitability of the company, and therefore its success in the implementation of cases.	10 to 40 million in increments of 10 million
Number of professional employees	An indicator that describes the number of professionals providing a service within the agency.	Level 1: 4 designers, 3 front-end developers, 3 backend developers, 1 system architect, 1 system administrator, 1 QA manager, 1 content manager, 1 design specialist. Level 2: 3 designers, 3 front-end developers, 3 backend developers, 1 system administrator. Level 3: 2 designers, 2 backend developers, 2 front-end developers, 1 project manager (except CEO).
Service Contracts	The number of company contracts (orders received).	10 to 40 in increments of 10
Reviews for the service	Availability of reviews of the service from different clients, currently included in the latest lists of RBC-500	1 to 5 in increments of 1

	or Expert-600, Interbrand rating, among large state structures (and / or other representatives of large customers)	
The total staff of the company with full-time employment contracts at the office	The total staff of the company with full-time employment contracts at the office	10 to 45 people in increments of 15

Table 1 – Characteristics of Companies Performance

Interviews were conducted with four representatives of companies that identified these characteristics, and also confirmed which indicators can be considered real.

3.2 Group formation

To form groups, a survey was created, which was attended by 76 company representatives. Six parameters were identified, on the basis of which clusters were formed, which later will be integrated into the model. For data processing and group formation, it was decided to use cluster analysis. Cluster analysis is a quantitative tool for the study of socio-economic processes, for the description of which many characteristics are needed. It allows you to split the sample into several groups according to the feature being studied, analyze groups (how variables are grouped), group objects (how objects are grouped).

The first step is to prepare data for cluster analysis. In most cases, the data is described in the form of tables, where the column is one of the attributes, and the row is the data object. For this study, author selected metrics for each specific data type individually.

Name of characteristics	**Variables**	**Designation**
Agency lifetime and proven service experience	Years_general	2 years = 1 3 years = 2 4 years = 3 5 years = 4
Service turnover	Turnover	over 35 million rubles = 4 20 million rubles - 34 million rubles = 3 10 million rubles - 19 million = 2 up to 10 million rubles = 1
Number of professional employees	Employees	Level 1 = 3 Level 2 = 2 Level 3 = 1

Service Contracts	Contracts	50 and more = 4 35-49 = 3 20-34 = 2 10-19 = 1
Reviews for the service	Reviews	From 1 to 5
The total staff of the company with full-time employment contracts at the office	Stuff_fulltime	50 and more = 4 35-49 = 3 20-34 = 2 10-19 = 1

Table 2 – Variables Identification for Cluster Analysis

As a result of cluster analysis, using predefined variables, observation groups are formed. Members of one group (one cluster) should have similar manifestations of variables, and members of different groups should be different. The results of hierarchical algorithms are presented in the form of a dendrogram, a tree diagram, which shows in which sequence the objects are divided into clusters.

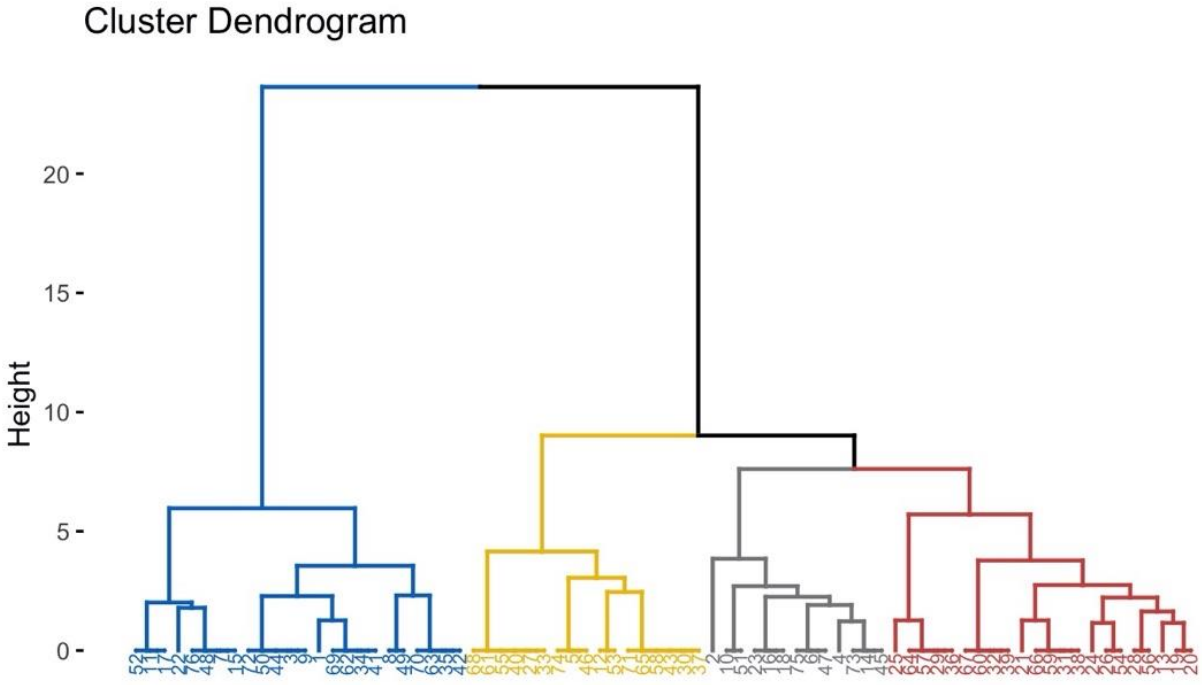


Figure 6 - Cluster Dendrogram

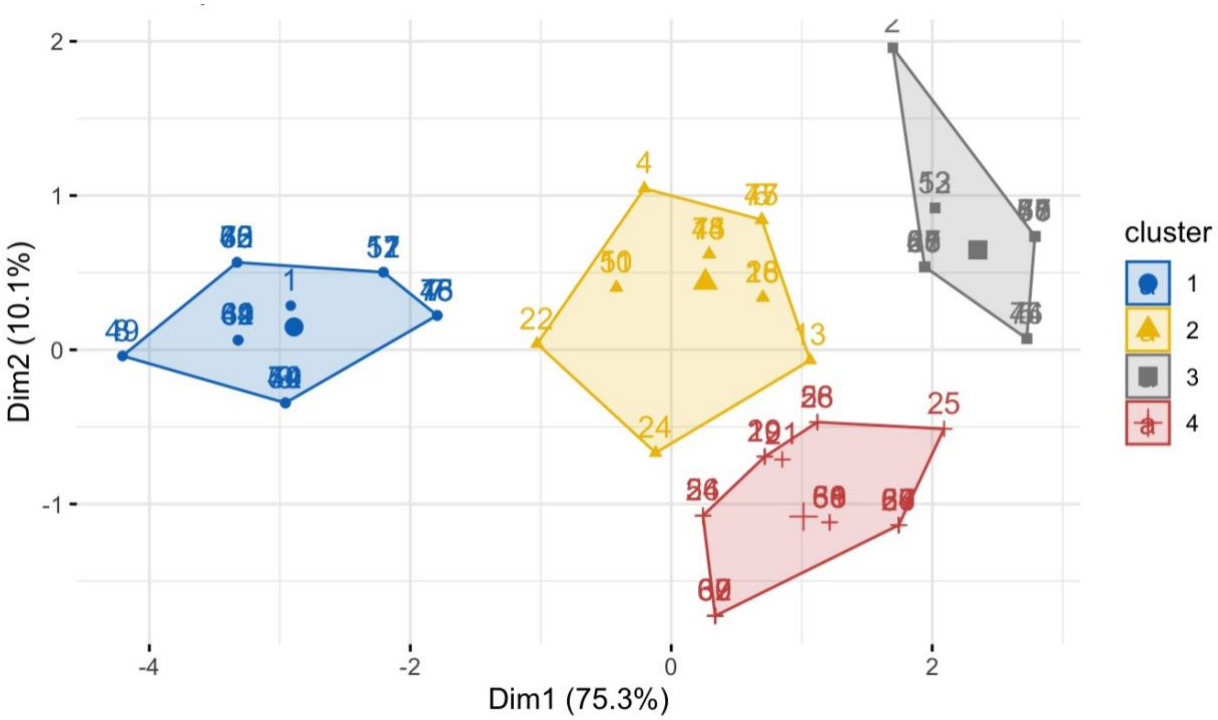


Figure 7 - Cluster Plot

Final Cluster Centers				
	Cluster			
	1	2	3	4
Years_general	5	2	4	4
Turnover	4	1	2	3
Employees	3	1	2	2
Contracts	3	1	1	3
Reviews	4	2	2	3
Stuff_fulltime	4	1	1	2

Table 3 - Final Cluster Centers

Number of Cases in each Cluster		
Cluster	1	19,000
	2	12,000
	3	21,000
	4	24,000
Valid		76,000
Missing		0,000

Table 4 - Number of Cases in each Cluster

Thus, four clusters can be distinguished:

- Group 1 (High Performance)

  This group is the strongest among the identified clusters. All indicators that were identified are at maximum. That is, the companies that are part of this group have existed on the market for more than 5 years, which means they have impressive experience. Also, the turnover of more than 35 million rubles, which is a high indicator in the industry.

- Group 2 (Low performance)

  This group is the weakest in quality among the rest. This is mainly due to the fact that such companies are relative newcomers to the market, that is, experience is less than two years, which affects the average turnover, which does not exceed 10 million rubles. The staff of such companies is limited to about 10 specialists, which means that the number of professionals in the team is much smaller than that of the group with higher characteristics.

- Group 3 (Medium Performance I)

  The third group shows results close to the second group, that is, of poor quality, but at the same time, the number of years on the market is much higher, as well as more professionals in the team, although the number of all employees is the same as the group with the lowest rates. The third group shows improved average annual turnover, which affects the overall view of the group.

- Group 4 (Medium performance II)

  The last fourth group in characteristics is similar to the group with the highest indicators, but inferior to it in some parameters. And although the number of contracts coincides with the first group, the average annual turnover is much less, which indicates the fact that such companies work with smaller budgets and smaller companies.

3.3 Description of lead generating internet platform-based coopetition

In order to answer the research questions posed in the work, it is necessary to describe the design of the platform model that generates leads through cooperation. Since in the previous work the general concept was described the main concept of the model (Schlegel, 2016), in this part the author describes the concept of the new model, which takes into account how the groups are formed before the start.

LGIPBC concept is based on co-invested ad campaigns. Companies which sell similar products form an alliance on the basis of the Internet (operator) network. This operator offers a partnership that embraces a web page and conducts a promotional campaign on the advertising budget of the coalition. Ad campaign generates possible consumer traffic on the home page of the alliance. The generated traffic then converts product demands from the leaders (coalition members). Every lead obtained from a co-invested marketing campaign in a coalition spreads among all coalition members and, after leadership from coalition members, they begin to compete with their selling strategies for him. This definition involves competition and collaboration at different stages of their interaction process. This means that it can be described as a strategic partnership between firms (Brandenburger and Nalebuff, 1996).

The operator charge its organization, coordination and ad campaign organization participants of a gathered coalition on the budget of the coalition formed. Operator offers companies to join a coalition producing the same product. Coalitions are based on market groups of companies of a specific product assigned by the Operator.

Group allocation is based on characteristics of the product distributed on the market by the companies. Operator often provides participants with a prediction of a potential one-lead average price, which participants will receive. Possible average price for one lead is inversely linked to the amount of companies forming an alliance.

Each company has to decide whether they are willing to join one of the announced coalitions, or reject the Operator 's offer. If company embraces the bid they need to agree on, coalition on the basis of the exact party they are entering (based on their own understanding of their commodity and strategy).

The biggest benefit that leaders of each individual alliance get is a decrease in the overall price for one lead. This is archived according to the following mechanism:

1) Any organization seeking to enter a coalition shall pay the membership charge for that coalition. The Operator sets the entrance fee.

2) The Operator shall use the total sum of the entry fees paid by the members of the coalition as an advertising budget.

3) The operator distributes the advertisement budget of a specific coalition on the advertising tools which draw potential consumer traffic on the

4) The traffic of potential clients is converting to leads.

5) Operator provides full access to all members of the coalition

Eventually, every coalition member gets leads produced on the advertising budget of the coalition. The website of the coalition generates more leads for one coalition participant at a cheaper cost, if the authors equate that with one lead, created by a single promotion campaign led by one company with its own brand.

The LGIPBC 's competitive dimension starts when alliance partners start to obtain leadership. At this level, everything depends on the particular characteristics of the participant 's individual marketing strategy, his sales processes, product quality etc. After providing all the leaderships, the Operator concludes the LGIPBC session and recommends that the next one be attended by participants. LGIPBC has three main phases:

- Coalition partition phase
- Cooperating activities (co-invested lead generation
- Competition for consumers

As previously mentioned, it is a web-platform. The first group of users on this Internet platform consists of companies distributing certain products. The second group of users (second side) are persons and organizations that could be potential customers of the first group of users of the internet platform. This means that the Internet can be defined as a two-sided platform (Amstrong 2006).

3.4 Coalitional partion stage

All companies that produce the same product (Companies) with different characteristics which describe it are subdivided into coalitions. N = {1,i, ... ,n}; N — company set, n > 0, company number, I — current company.

Each Company produces a product that can be descried in some way. Operator announces characteristics of this product (Characteristics). R = {R_1,..,R_k,...,R_r}; R - set of Characteristics, r – number of characteristics. $R_k \in R$ – particular characteristic.

After a set of Characteristics was announced, Operator defines maximum and minimum levels of each Characteristic on the market of a product produced by the Companies (Market).

Operator defines maximum and minimum levels of each Characteristic on the Market basing on the research of this Market: $M = \{LR_1{:}LR_1,...,LR_k{:}LR_k,...,LR_r{:}LR_r\}$; M –Market. LR_k – level of a particular characteristic, LR_k – minimum level of a particular Characteristic on the Market, LR_k – maximum level of a particular Characteristic on the Market

After the Market is described, Operator starts to distinguish particular groups of Companies on the Market. That process is made in the following way:

1. Operator divides the market with the help of cauterization. As a result he distinguishes a set of groups: G={G1,...,G$_j$,..,G$_g$}; G – set of Groups, g – number of Groups, G$_j$ – a particular Group.
2. Operator defines border Levels of each Characteristic for each particular group; LR$_k$ – minimum level of a particular Characteristic in a particular group, LR_k - maximum level of a particular Characteristic in a particular group.
3. As a result each particular group out of a set of Groups can be described in the following way: $G_j = \{LR_1{:}LR_1,LR_k{:}LR_k,...,LR_r{:}LR_r\}$.

Each market company can refer to one of the groups. It chooses based on its own perception of its own product's level of characteristics. LRk(i) – the perception level of the present company of a particular characteristic. Each company can therefore produce its own characteristic product profile (profile). {LR1(1), LRk(1), ... , LRr(1)}; CPi – the current company profile.

Operator announces that only one coalition Sj can be formed on the basis of each group. The company must pay an entrance fee to enter a particular coalition. The operator sets the entry fee for each group ASj>0 based on a market analysis.

Once groups have been defined, each participant is offered by the operator to decide which group he refers to. Participants choose based on their own perception of product characteristics. Finally, the operator announces the expected level of average lead price reductions for each coalition member formed on the basis of a particular group at different levels of the coalition advertising budget from a particular investment perspective.

$$PR\left(X_{S_j}\right) = \frac{X_j}{M(X_{S_j})} - \frac{AS_j}{M(X_{S_j})}$$

where $X_{S_j} > 0$ – advertising budget of a particular coalition

$$X_{S_j} = \mathrm{AS_j} * \mathrm{d_j},$$

where $d_j > 0$ – number of members of a particular coalition

Function $M(X_{Sj})$ describes the relationship between the amount of advertising investments and the number of advertising companies' leads. This function can be extracted in several ways, one of which is a regression analysis (but not the only one). It's up to:

• Coalition target market,

• Coalition advertising instruments,

Season, when advertising campaign is held,

$$M\left(X_{S_j}\right) > 0.$$

Each extra added coalition participant significantly reduces PR. In other words, if there was no increased competition linked to the growth of the coalition members it would be prudent for the Companies to create a maximum coalition, which could optimize the price reduction of one lead to its members.

The operator uses PRj to motivate companies to join one of the coalitions. There is reason to suggest that, based on research into trust building among companies, organizations choose whether to trust or not, mainly based on estimates made on the basis of calculations (Faulkner, 2000; Lewicki and Bunker, 1996). The amount of average lead price reduction from a single coalition member PRj's individual investments is an instrument designed to meet the trust-building measurement criteria.

When all relevant information has been released, businesses determine if they want to join one of the group-based coalitions. If no companies join a specific coalition, this coalition will not be formed.

3.5 Possible strategies of the companies

In order to avoid the situation when Company *i* enters into a coalition only on the basis of its own perception of the characteristics of its product or service, clusters were created with a certain set of characteristics, based on which the distribution into groups occurs.

To identify possible situations that may arise in the formation of groups, there is a range of possible strategies for companies. Each Company has a selection option in which it is necessary to decide:

- To enter into an alliance (Join);
- Not to form an alliance (Avoid).

In the event that Company i decides to join a coalition, then based on the information provided about its company that determines the level of quality of a product or service, the Company is determined in one of the following groups:

- Group 1 (High Performance);
- Group 2 (Low performance);
- Group 3 (Medium Performance I);
- Group 4 (Medium performance II).

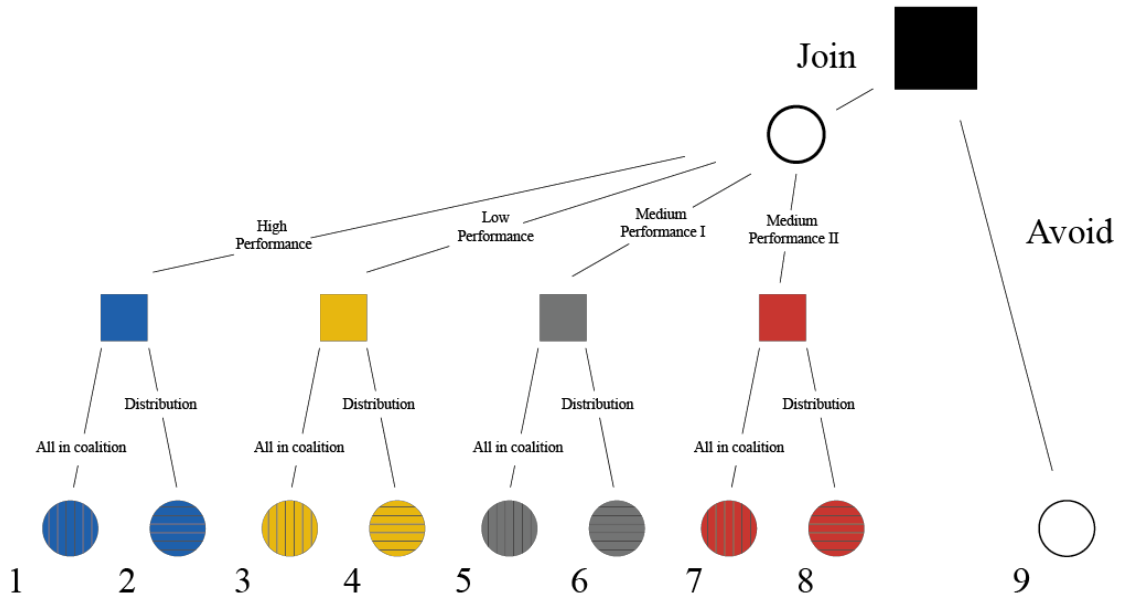


Figure 8 - Strategies of group formation

At the last stage of the formation of groups, when the companies are distributed according to the similar characteristics of their product or services, it is necessary to decide how the budget for advertising will be spent. The company has the opportunity to choose one of the following options:

- To invest only in promoting a coalition website;
- To distribute promotional budget between its own website and alliance webpage.

In this way, one can schematically reflect the strategies and selection process using the tree. All possible strategies and their outcomes will directly affect the behavior of the model. The simulation results for each LGIPBC will be described in the next chapter.

3.6 Profit and ROAS

After the formation of the coalition, the Operator's task is to launch an advertising campaign. The budget of this campaign consists of contributions (entrance fees) made by digital agencies, coalition members, at the time they join the coalition. In addition, each coalition is assigned its own web page with basic information and basic characteristics. The web page consists of a list of companies included in the coalition X_{S_j} this is the basic information by which the potential client decides whether to interact with this coalition by sending it a request for the services that this particular client needs.

When the client has chosen the coalition whose services he wants to receive, he sends his request (or a brief of basic information about his company, if he represents it, and the necessary services). Notification of a request for a service is received by all representatives of the coalition X_{S_j}. Immediately after receiving a request, coalition members, all digital agencies enter the struggle for leadership - the winner of this competition gets the opportunity to provide marketing services to the client by signing a contract with him. It is at this point that the LGIPBC concept comes into play.

After the end of the LGIPBC session (when the advertising budget X_{S_j} becomes equal to zero), an important step is to evaluate how effectively this session was held for each participant individually and for the entire coalition as a whole. Depending on this effectiveness, each agency and the entire coalition make decisions on further actions (for example, whether to change the composition of the coalition or declare a greater number of services provided).

There are two main values with which author can evaluate the effectiveness of the past LGIPBC session: Profit and Return on advertising spends. When evaluating the profit from the last session of a coalition $V(S_j)$, the following main parameters are taken into account: the total amount of funds contributed by each member of the coalition (investment in the advertising

campaign) and how much profit was generated by the sales of each digital agency, member of the coalition. The following is the equation by which author consider the profit of the coalition for a specific session:

$$V(S_j) = I_{S_j} - X_{S_j}$$

$V(S_j)$ – coalition profit from LGIPBC session;

$X_{S_j} > 0$ – total budget spent by the coalition on advertising;

$I_{S_j} \geq 0$ – coalition total income from LGIPBC session.

In addition, an important indicator for each digital agency of the coalition is its personal performance indicators of the completed session. Author consider the individual income of each member according to the following formula:

$$I_{S_j} = \sum I_i^j,$$

$I_i^j \geq 0$ – an indicator of the personal (individual) income of a particular digital agency, a coalition member, which he received after a specific LGIPBC session.

From the previous equations it follows that any member of the coalition can learn not only individual personal income, but also understand how much the past session was profitable for him, that is, find out personal profit. The personal profit $V_i(j)$ of each digital agency is calculated as follows:

$$V_i(j) = I_i^j - AS_j$$

$V_i(j)$ – profit of a current member of a particular coalition.

At this point, on the basis of the previous parameter, personal profit $V_i(j)$, author can calculate the second parameter, according to which the effectiveness of the last session will be determined in the future – the return on advertising spends (ROAS) of each coalition member. This parameter is calculated as follows:

$$ROAS_i(j) = I_i^j / AS_j$$

$ROAS_i(j)$– Return on advertising spends of a current member of a particular coalition

Finally, in order for each particular coalition to conclude how effective its last session with an active advertising campaign was, calculate the following parameter as shown below:

$$ROAS_{S_j}=I_{S_j}/X_{S_j}$$

It is important to note that it is impossible to know or determine the profit of coalition members before the LGIPBC session ends. In addition, very different factors can affect the calculated values, such as, for example, the economic situation of a particular country, the conditions of a particular market (in this case, the market conditions of marketing and digital services), as well as the quality of the coalition members perceived by customers.

Taking into account the variability of the factors described above, it becomes clear that it is sometimes difficult to predict the behavior of potential customers in such conditions and such a prediction is subject to many errors that may not be taken into account. Therefore, in this study, an attempt is made to simulate the behavior of the client. So, each member of the coalition has the opportunity to assess possible profits and apply potential successful strategies in their work that could maximize profit and work efficiency.

4. MODELING AND SIMULATION OF LGIPBC

4.1 Model mechanics description

A simulation of an agent-based model was used to estimate the possible efficacy of LGIPBC. Throughout the current paragraph there is a summary of the model used for simulation, its environment, actions and its agents' parameters;

1. This model is used to simulate the market of organizations which produce the one items (Companies) in this market with a possible coalition (S1 – Coalition).
2. The model simulates the market of companies that only offer a possible coalition in this market.
3. There is one firm (I = 1) with all parameter manually setting values (the Company observed).
4. Number of Companies, which operate on the market n ≥ 0 is a manually settable value, $N = \{1,...,i,...,n\}$ – set of Companies, $i \in N$ – current Company

   Number of clients on the market nl ≥ 0, is a manually settable value, nl ∈ NL, $NL = \{1,...,l,...,nl\}$; NL–setofclients, $l \in NL$–current client

5. Manually adjustable is the number of companies which collect in Coalition d > 0.
6. The value of the AS > 0 entry fee for the coalition is a manually set value.
7. The party collects the overall budget for ads $X = d * AS$.
8. Each company (coalition) selects for each period its own ABi advertising budget of 0%. In terms of simulation, this budget is allotted on a uniform basis and covers the range with fixed limits.
9. Each of the Coalition 's members has an AB_i advertising budget. If AB = AS, then it means that a particular member of the Coalition only invests in the co-invested ad campaign and does not invest in its own website. While AB_i > AS, it means a certain member of the coalition invests money in the Coalition 's website advertising campaign and invests in his own website advertising campaign.
10. Each company obtains its quality level qi > 0, which is a random value assigned on a uniform basis from Q = {q: q} where Q – set of quality levels, $q_i \in Q$ assigned.
11. When businesses have a clear quality standard, they do get their rates, which are distributed arbitrarily based on uniform delivery and fall into the range:

    $$p_i \in [MPQL(q) - \varepsilon * MPQL(q); MPQL(q) + \omega * MPQL(q)]$$

where ε and ω fall into a range from 0 to $\gamma \geq 0$, γ is a manually settable value.

$\varepsilon \in [0;\gamma]$, $\omega \in [0;\gamma]$, ε and ω are randomly assigned on the basis of uniform distribution.

12. According to formula there can be calculated maximum and minimum possible prices on the Market. Minimum possible price on the Market: $p = MPQL(q) - \gamma * MPQL(q)$, while maximum possible price on the Market can be calculated in the following way:

    $p = MPQL(q) + \gamma * MPQL(q)$

13. Each company has a webpage of its own.
14. The Coalition has a website for itself.
15. Every company (coalition) uses advertising pay-per - click (PPC) as a tool for advertising where advertisers pay a pay-per - click cost (PPCC Total 0), each time their ads are clicked.
16. On the market, PPC advertising is the only way to promote it.
17. If a potential consumer appears on the web page of a particular corporation (coalition), that means that this potential customer relied on the company's publicity (coalition), the Coalition's publicity budget lowers PPCC's (coalition's) advertisement budget.
18. There are four PPCC rates that are set manually.
19. PPCC is assigned to each company in simulation based on a uniform distribution among the possible options. This simulates the choice of the PPCC rate that each company uses.
20. Particular PPCC determines the expectation that the prospective buyer may click on a product commercial assigned to a given PPCC. This likelihood is called a click rate (CTR > 0).
21. Every organization launches its promotional campaign in terms of arbitrarily set limits at a random date.
22. From the beginning of the simulation Coalition and the Observed Company start their publicity campaigns.
23. Conversion rate (CVR penalty 0) determines the probability of a client accessing a certain company's web-page (Coalition) making a request for their services. Every company takes its CVR(i) off the triangular distribution range of CVR(s) where the maximum possible CVR (manually adjustable value), CVR (manually adjustable value) and CVR_m are the minimum possible.
24. CVR of the coalition website is a manually set value
25. When a single customer makes a complaint on a company's Web page, the client is the customer's "Potential contractor."

26. When an individual customer leaves a request on the web page of the Coalition, all members of the Coalition are given "potential contractor" status by that customer.
27. Each customer has his requested NR>0 number, which he leaves on web pages. NO is allocated to each client on the basis of a uniform distribution and covers the range with manually fixed limits
28. Where consumers have submitted their request on a company's webpage (coalition) but have not received their maximum amount of requests, they are now browsing other companies' websites (but never returned to the webpage on which he placed his request)
29. If the customer leaves an application on a company (coalition) website and gets his desired number of requests, he stops visiting other websites.
30. After the customer stops visiting webpages, he has to choose one of his potential contractor.
31. Description of potential customer behaviour:
32. Each potential customer receives its own subjective quality level Potential Contractor $ql(i)$ ≥ 0

$$q_l(i) \in \begin{cases} [q_i - q_i * \alpha; q_i + q_i * \beta], & (q_i - q_i * \alpha) > 0 \\ [0; q_i + q_i * \beta], & (q_i - q_i * \alpha) \leq 0 \end{cases}$$

33. Where α and β fall into a range from 0 to τ, where τ is a manually settable value.

    $\alpha \in [0; \tau]$, $\beta \in [0; \tau]$, where α and β are randomly assigned on the basis of uniform distribution

    b. Every client has his quality perception level θl, which falls into the quality perception level range of the Market: $\theta = [\theta; \bar{\theta}]$, where $\theta = p/q$, and $\theta = \bar{p}/\bar{s}$
    c. Every client tries to maximize his subjective utility that a potential client gets from a particular company for its price Ul.

$$U_l(p_i, \theta_l, q_l(i)) = \begin{cases} \theta_l * q_l(i) - p_n, & \theta_l * q_l(i) > p_i \\ 0, & \theta_l * q_l(i) \leq p_i \end{cases}$$

34. Therefore, if a potential customer decides between five organizations (potential contractors), he often gives the company his preference which offers the most subjective utility.
35. The current model includes a set of hand-definable scenarios to simulate different market environments and different strategies:

A coalition exists on the market. Each company which has entered a coalition can have an advertisement budget greater than the coalition fee (companies spend in coalition websites and in their own websites).

$AB_i \geq AS$

36. The company observed joins the coalition; however, its advertising budget is equal to the coalition entry fee $AB_1 = AS$
37. The standard of quality: the company observed that distinguishes its personal output is manually adjustable
    a. If the Observed Company gets manually set q_1 = 2, then the Observed Company has chosen “High Performance”
    b. If the Observed Company gets manually set q_1 = 3, then the Observed Company has chosen “Low Performance”
    c. If the Observed Company gets manually set q_1 = 4, then the Observed Company has chosen “Middle Performance I”
    d. If the Observed Company gets manually set q_1 = 5, then the Observed Company has chosen “Middle Performance II”
38. In order to evaluate the efficacy of the various approaches, the company's benefit and ROAS estimate is required (coalition)
    a. ROAS of Company I = 1 is calculated as follows: ROASi = I / ABi in which ROASi – return on advertising expenditure of Company Ii = 0 – income of Company Ii
    b. ROAS from Coalition S1 is calculated in the following manner: ROASs1 = Is1 / X_{s1} where $ROAS_{s1}$- returns on the Coalition's ad spending, I_{s1} – Coalition revenue
    c. Product benefit I = 1 is calculated in this way: Vi = Ii − ABi
    d. Coalition S1's profit is calculated according to: Vs = Is −Abs

4.2 Parameters for the simulation

To run the simulation of the LGIPBC model, it was decided to use data from some particular market. Through this, results of the simulation could be closer to reality. Also that could ease the process of interpretation and analysis of results.

Digital agency market was decided to set up the foundation for the LGIPBC model regarding the following factors:

1. The development of social media marketing strategies has an estimated 85 percent share in the average income structure of Russian digital agencies. This could form the basis for a statement that there is a product market (SMM strategy), and that digital agencies could be motivated enough to attract customers through advertising.
2. According to the data that was obtained through a survey on Ruward services, which annually collects statistics on the digital industry, most companies use search queries as a way to find contractors. A quarter of new customers also come through PPC advertising. At the same time, about 48% of all digital agencies use PPC advertising as the main tool to attract customers.

Based on these data, it can be assumed that PPC advertising is used as the main mechanism for promotion and take it as a basis in the model for simulation.

To identify the range of potential advertising budgets, one approach to advertising budget identification was determined through a business turnover. Adhere to one of these frameworks, for some time the company should use a certain percentage of its turnover as the next advertising budget. In order to define potential borderline advertising, it is necessary to know the average turnover of digital agencies, and the average proportion of this turnover could be used as an advertising budget.

Over 80% of digital agencies report a turnover growth of at least 10% in the current period. At the same time, the agency's average profit fluctuates between 5–20% (Ruward, 2018).

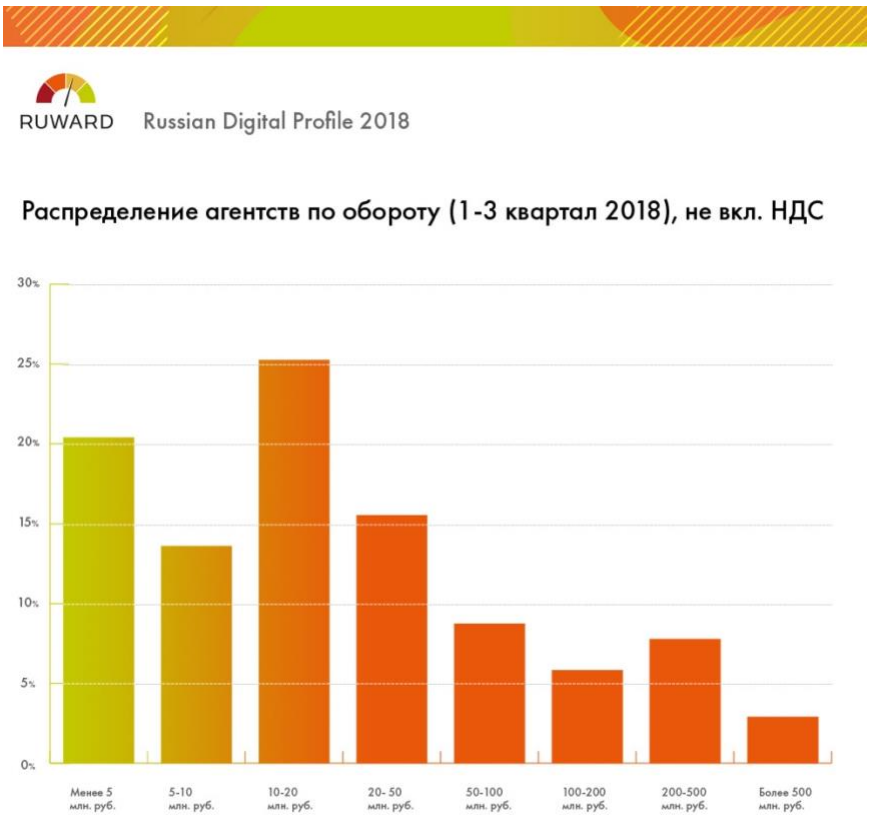


Figure 9 - Agencies Distribution in terms of average turnover

According to Ruward, there are approximately 10 thousand agencies operating in the Russian digital market, taking into account cross-cutting budgets for media purchases. A quarter of Russian digital agencies have a turnover of 10−20 million rubles.

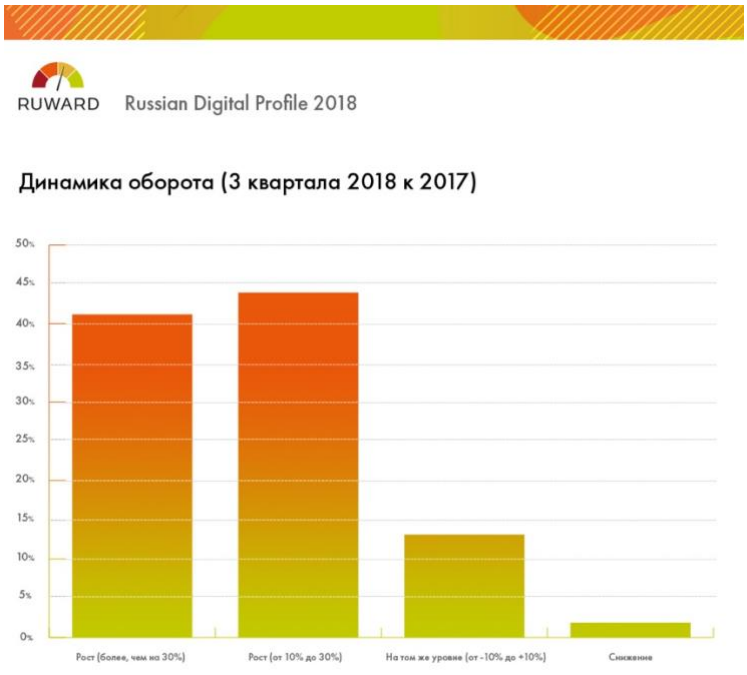


Figure 10 - Turnover Dynamics

To determine the Number of Companies *(n)* on the Market, the author divided the digital market into segments at the price of the service. In 2020, there are about 5,000 digital agencies on the Russian market, the prices for services of which vary significantly based on various parameters: experience, quality of service, size of agency staff. Depending on these parameters, as well as on the complexity of the work, the price can vary from 15,000 to 1,000,000 rubles for the service. In this work, the author identifies the following average price categories, which fully describe the selected market:

1. Less than 40,000 rubbles (34.8%)
2. From 40,000 to 90,000 rubbles (29.6%)
3. From 90,000 to 150,000 rubbles (16%)
4. From 150,000 to 300,000 rubbles (11.8%)
5. From 300,000 to 600,000 rubbles (4.1%)
6. More than 600,000 rubbles (3.7%)

To simplify the work with these price categories, the author identified three main groups, which are united by price. One of the key reasons for uniting all companies price over 300,000 in a category was to believe that consumers who can have a web site for 600,000 rubbles will not use PPC instruments as much as those who need cheap or medium-sized products to find a contractor. This means that leaving high prices as separate categories could make them unpopular among companies.

In a common category, the second and third categories of prices were grouped into the most numerous groups of companies which represented almost half of the market.

With reference to the existing simulation it was decided that the second set should be used as total market (n=2870), since it has valid price limits, which could be used as price limits of the model: $\bar{p}$ = 40,000, p = 300,000.

Price category	Price range	Percentage of participants	Estimated number of participants
1	Less than 40,000 rubbles	34.8%	1740
2	From 40,000 to 300,000 rubbles	57.4%	2870
3	More than 300,000 rubbles	7.8%	390

Table 6 – Price range of Digital Agencies

Since during the simulation PPC advertising is used as the main mechanism of the model, it is necessary to determine the main parameters that are indicators of the effectiveness of the campaign. The service provided by the agencies of the selected industry in this study is SMM promotion. Accordingly, it is important to determine how advertising campaigns function in PPC advertising. The Russian company Yandex, which is one of the platforms for creating advertising campaigns, provides data on requests that can determine advertising budgets and key indicators. Since one of the forms of such advertising is pop-up ads in search engine, the data for the engine "SMM" was analyzed. According to data in May 2020:

- Ad impression forecast: 87,068;
- CTR (Click-through rate): from 0.38% to 7.44% (depending on the average cost-per-click).

To determine the number of customers who will be in the Market as part of the simulation, the author takes the maximum number of potential visitors to the platform of one agency. This number can be calculated by taking the maximum variables: 7.44% click-through rate and 87068 ad impressions. Thus, the number of clients will be approximately 6477 (I = 6477).

As the PPC campaign rates for this simulation, author took the average cost-per-click indicators:

PPC advertising instrument					
Price per one click, rub	40.5	74.50	123.20	168.90	442.70
Click-through rate, %	0.38	0.42	6.35	6.71	7.44

Table 7 – PPC campaign rate

4.3 Analysis of the simulation results

The variables of all parameter values have been derived from the analysis of processes and trends in the digital marketing sector (see Appendix 1).

A set of tests with the analyzed company are performed to answer the third question from the current research author. The main objective of these tests is to identify the best strategy (in the light of effectiveness) for the various price and quality combinations of the services provided by the company observed. For the most successful scenario identification, there are two criteria:

- Profit of the observed company
- ROAS of the observed company

So if profit from the studied company is used as a performance metrics, simulation results show that most companies benefit from Scenario 6 and Scenario 2. The only type of companies that did not profit from a coalition presence on the market is low-quality, high- or upper-average prices. Based on this data, it could be assumed that the presence of an LGIPBC has an impact on a particular industry 's profits. Additionally, there is a reason for believing this effect could be counted as optimistic.

When ROAS is taken as the main criteria for effectiveness, simulation shows pretty close results (see Figure 11). The only significant difference is that Scenario No6 appears as a potential effective scenario for low-cost organizations with high or low-quality services. ROAS perspective also demonstrates that, when there is no LGIPBC on the market, companies with high or upper-average prices and low quality benefit from situations. All other participants get an increase in ROAS when LGIPBC works and participate in cooperation.

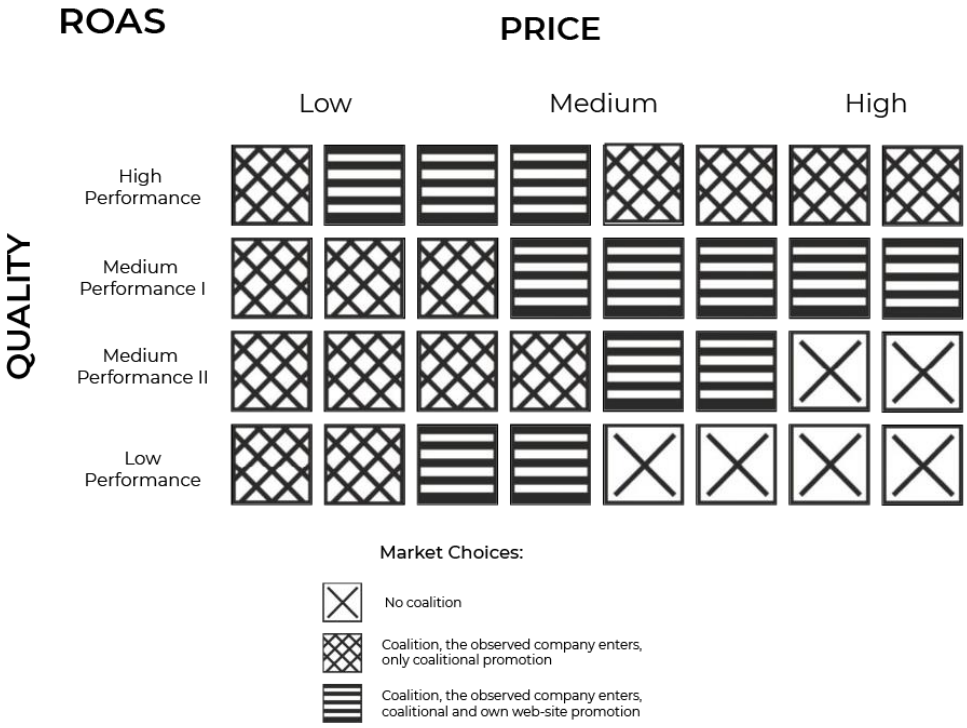


Figure 11 - Best market choices for the standpoint of ROAS

Although Scenario 2 does not seem to be realistic in both efficacy tests, because it seems impossible that all Coalition members refuse to invest their money in their own website. However, simulation results show that high-quality / high and upper-average price mix organizations and medium-quality / low-price companies get the best results from these scenario. This could also be used as a basis for assuming that LGIPBC increases market transparency, making its customers find contractors that best suit their needs.

The third main implication that can be made based on ROAS tests is the idea that LGIPBC could be effective for low-price companies. It means that low-price companies can afford not to invest in their own promotional campaigns, but use only the coalition as the only source of leads they receive. Based on this premise, an additional statement may be made that there is a possibility that LGIPBC has the ability to decrease average prices in a specific industry.

According to the above test results, there is sufficient basis to state that LGIPBC has a positive impact on industry and can increase profits and effectiveness of its participants' advertising campaigns (except those with high or upper average prices and low quality).

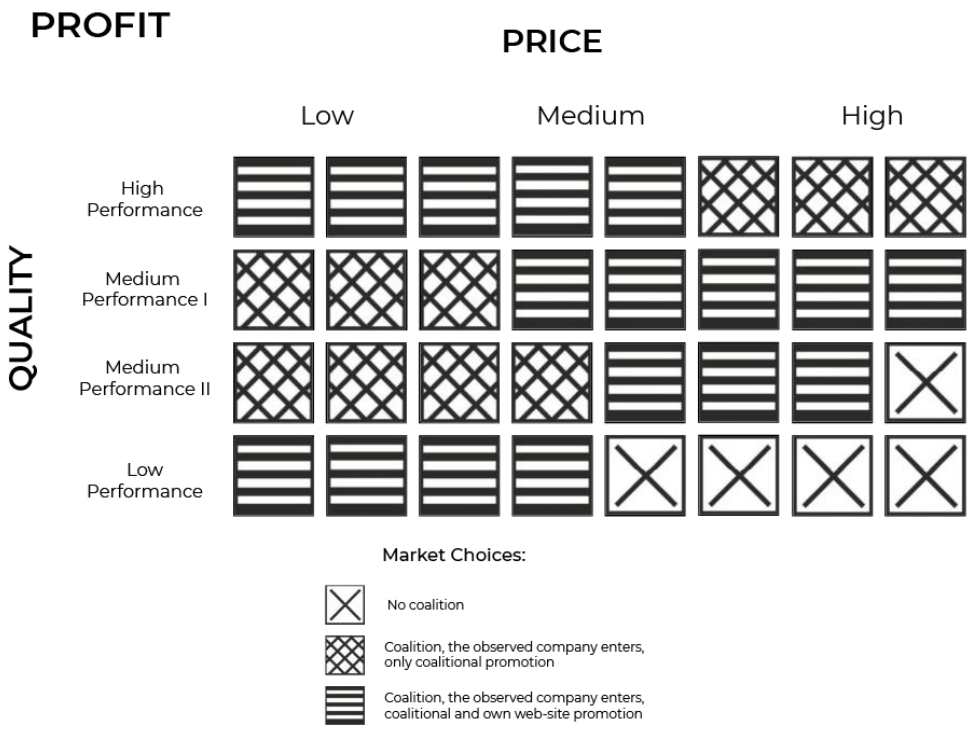


Figure 12 - Best market choices for the standpoint of Profit

5. CONCLUSIONS

5.1 Discussion of the findings

The core objective of current research: to identify potential impact that can be caused by a lead generating internet platform-based coopetition among companies, which operate in one industry, on this industry.

To achieve the main goal, sub-goals were decomposed, the implementation of which will be the result of research:

- Identify company characteristics for a specific industry that determine success;
- Create a model that will take into account the characteristics of success in the simulation of cooperation;
- Determine which strategies are best within the framework of leading generating internet platform-based coopetition among companies.

Sub-goal 1: Identify company characteristics for a specific industry that determine success.

As part of the work on improving the model, a decision was made to identify the characteristics of the company that affect the performance of the company. Through analysis of the literature, as well as interviews with industry representatives, the main characteristics of the company were identified. Using cluster analysis, groups were identified that combine companies with specific indicators in order to improve the quality of cooperation performance.

Sub-goal 2: Create a model that will take into account the characteristics of success in the simulation of cooperation

In this work, a model was defined that describes the situation when in a certain market that distributes a certain product, there is a form of relationship in which groups are formed for competitive cooperation. Such a framework is presented in chapter 4 of this master's thesis. As a basis for the formation of the group, a set of characteristics was determined that determines the success of the coalition's behavior. To test the model, a simulation was carried out, the data for which were taken from the real world (Russian Digital Agencies).

Sub-goal 3: Determine which strategies are best within the framework of leading generating internet platform-based coopetition among companies with different price and quality strategies, which uses the characteristics of the company as a basis for the formation of cooperation groups.

The agent-based simulation of one-product industry with inputs from Russian digital agencies proves that with the help of LGIPBC, nearly all industry participants can receive greater profits and improve their ROAS. The only group of firms not winning from LGIPBC presence on the market are firms with high prices and poor quality.

5.2 Managerial Implications

There is clearly a chance and an interest in managing and practical use of current research to imply the LGIPBC on the basis of a real, multi-sided platform to test the potential of the concept in real terms. However, it is important to note that this tool can be defined as a static instrument in terms of master theses (everyone chooses at once). It is also important to understand that current research does not deal with LGIPBC from a single repetition (potential effects of reputation or strategy change through time will not be examined).

LGIPBC can be used as an instrument to help market companies to relocate distributed products from the market at high prices and low quality. This makes it a good opportunity for companies to improve their customer loyalty and to make business dynamics more transparent.

Also, LGIPBC could be used to provide companies with low prices and low quality (start-ups) with the opportunity to get their first customers to their advertising campaigns with a small amount of money invested.

LGIPBC has also the ability to offer (released from advertisement budgets) extra money to organizations that can be used to boost the service quality or the products they sell, or to invest this in R&D. This makes LGIPBC a potential way of increasing and developing the industry which manages to implement it.

5.3 Limitations

The first restriction of the current master thesis is related to LGIPBC characteristics. It must also be updated and made more practical. For example, the model now assumes that all companies which aspire to participate a coalition decide immediately. But, from the author's point of view, the capacity to enter a coalition at any time could radically alter the entire process.

All other limits of the findings obtained in the current study are focused on the limitations of the model used to analyze LGIPBC 's ability. How the Operator will predict outcomes of

advertisements, if they were based on more than one method, and what possible outcome could be, if the consumer uses all the tools and the Operator just sticks with the PPC method, is not clear.

Current work does not take into account any reputation damage effects which could also impact the average cost of one lead for a single coalition member, ROAS and income that LGIPBC would produce, as any new simulation session now implies that no coalition was in place before and that there will be no potential coalitions.

Also, the new model version only simulates a market with one coalition. If the Model should simulate a coalition-based division mechanism between two or three coalitions at the same time, and more than one coalition operating on the market will be simulated, the possible outcomes should vary substantially from actual coalitions.

5.4 Theoretical Implications and further research

From the standpoint of theoretical approaches, the current master thesis explores co-operation not from the descriptive point of view as the majority of modern research (e.g. Luo 2004; Basole, Park and Barnett 2015), but from the position of potential practical co-operation as a tool. Current research attempts to create an applicable framework or tool that could be applied to industry through two-sided web-based platforms. If academic society admits that LGIPBC could be considered a coopetitional strategy, this concept could become a basis for the new branch of theoretical research and testing (simulation and real).

At the same time, current research provides additional data on how coopetition influences competition, which only begins to be discussed in current academic literature (e.g. Oxley et al. 2009). It demonstrates a potential to help markets, increase transparency, and push out-of-market organizations with low quality and high prices. There are also findings showing how the average price of a commodity decreases as coopetition includes more participants. That could be a sigh of potential market competition gain if it applies LGIPBC.

Current research also suggests that competition could be considered as a potential pay-off distribution solution in cooperative games (or another distribution concept). There are many concepts of fair distribution of a coalition pay-off today, but each of these concepts is based on the assumption that some particular principle in its basement is fair (Chakravarty, Mitra and Sarkar 2015). LGIPBC using coopetitional principles shows how coalition can exist without any pay-off distribution problems, because each coalition participant gets all leads, and then all coalition members compete for those leads. The only question remaining to be opened is: how (if possible) LGIPBC could work with other coalition partition principles.

One of the current research's main theoretical contributions, however, is a set of questions and further theoretical researches to be examined in the future. One of these is the data showing how low-quality , high-price companies only benefit from scenarios when there is no co-operative industry. That could be a basis for the hypothesis that coopetition could be used as a tool to enhance a common industry or economy as a whole.

LGIPBC could effectively be used to create a Coopetitional Game (Game Theory). As a game, it has several steps: coalition partitioning, then customer competition. That means this game could be static, with incomplete information. Pay-off will be non-transferable (Gibbons 1992). Experiments could also be made to determine if superadditivity and monotonicity characteristics could be checked

In terms of the platform-based coopetition concept generating lead, more empirical tests should be done (probably based on the real platform). These tests could significantly impact industry development and possibly change the principles of inter-company relationships in future. It's not clear which industries can use LGPC as a tool. Because of peculiarities and special conditions, LGPC use could be considered as serious barriers.

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Appendix 1. Company Profile Survey

1. Agency lifetime and proven service experience
   - 5
   - 4
   - 3
   - 2
2. Service turnover
   - over 35 million rubles
   - 20 million rubles - 34 million rubles
   - million rubles - 19 million
   - up to 10 million rubles
3. Number of full-time profile employees in the office
   - designers, 5 social media specialists, 2 copywriters, 1 strategy specialist, 1 creative specialist, 1 media planning specialist, 1 specialist for targeted advertising on social networks, 1 web analytics (Google Analytics or Yandex certificates. Metrics).
   - designers, 4 specialists in maintaining social networks, 2 copywriters, 1 specialist in targeted advertising in social networks, 1 web analyst (Google Analytics or Yandex.Metrica certificates).
   - designers, 2 social media specialists, 1 copywriter, 1 specialist in targeted advertising on social networks, 1 web analytics (Google Analytics or Yandex.Metrica certificates)
4. Service Contracts
   - 50 and more
   - 35-49
   - 20-34
   - 10-19
5. The presence of reviews on the service from different clients, currently included in the latest lists of RBC-500 or Expert-600, Interbrand rating, among large state structures (and / or other representatives of large customers)
   - 5
   - 4
   - 3
   - 2
   - 1

6. The total staff of the company with full-time employment contracts at the office
    - Over 50
    - 35 - 49
    - 20 - 34
    - 10 - 19

Appendix 2. Main parameters for simulation

Number of companies that operate on particular market (N)	2870
Number of potential clients (NL)	6477

Quality level (QL)	2	3	4	5
Middle price of a quality level (MPQL)	110000	130000	160000	180000
Left price limit (LPL) %	50%			
Right price limit (LPL) %	50%			

Price range	Min	Max
	40000	30000

CVR	Min	Average	Max
	0	2.23	5

PPC advertising instrument					
Price per one click, rub	40.5	74.50	123.20	168.90	442.70
Click-through rate, %	0.38	0.42	6.35	6.71	7.44

Appendix 3. Simulation results for different quality levels

High Performance									
Price on services of the observed company:	Scenario	1	2	3	4	5	6	7	8
40000	ROAS	1.412429	11.904	0.58851	**61.904**	10.0047	17.98	11.2	12
	Profit	49800	**89299**	32990	67000	56000	47000	49020	48904
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	3							
80000	ROAS	0.12922	**17.18338**	0.58851	9.18338	10.0047	9.18338	7.18938	10.18338
	Profit	39800	**90201**	78903	56700	45700	78980	68935	54779
	Highest Profit	2							
	Lowest Profit	1							
	Highest ROAS	2							
	Lowest ROAS	1							
120000	ROAS	2.412429	**64.904**	7.54851	9.18438	11.0047	12.8799	0.7890	30.899
	Profit	40298	**93003**	39880	68903	78803	67839	49940	50098

	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	2							
	Lowest ROAS	7							
150000	ROAS	2.412429	4.9048	3.54851	**49.1843**	11.0047	12.8799	10.7890	0.899
	Profit	40298	**99003**	23880	68903	78803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	8							
175000	ROAS	2.412429	64.904	0.7890	**92.18438**	0.7890	12.8799	3.54851	30.899
	Profit	40498	**93003**	39880	68903	74303	67839	43340	53098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	3, 5							
200000	ROAS	2.412429	**94.904**	3.54851	9.18438	0.9890	12.8799	0.9890	30.899
	Profit	40298	**102003**	79880	68903	39880	67839	39880	50098
	Highest Profit	2							

	Lowest Profit	5, 7							
	Highest ROAS	2							
	Lowest ROAS	5, 7							
25000	ROAS	2.412429	64.904	3.54851	**91.18438**	11.0047	12.8799	9.7890	30.899
	Profit	40298	93003	39880	**158903**	18803	67839	49940	18803
	Highest Profit	4							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	5, 8							
300000	ROAS	12.4129	64.904	3.54851	**109.18438**	8.1047	12.8799	23.7890	30.899
	Profit	40298	93003	39880	**168903**	78803	67839	49940	50098
	Highest Profit	4							
	Lowest Profit	5							
	Highest ROAS	4							
	Lowest ROAS	3							

Medium Performance I									
Price on services of the observed company:	Scenario	1	2	3	4	5	6	7	8
40000	ROAS	2.412429	**64.904**	3.54851	9.18438	1.0047	12.8799	5.7890	30.899
	Profit	40298	93003	39880	**158903**	78803	67839	39880	50098
	Highest Profit	4							
	Lowest Profit	3, 7							
	Highest ROAS	2							
	Lowest ROAS	5							
80000	ROAS	2.412429	**44.9044**	1.54851	9.18438	11.0047	12.8799	9.7890	30.899
	Profit	45298	93003	78803	**139880**	8803	66839	46940	56098
	Highest Profit	4							
	Lowest Profit	5							
	Highest ROAS	2							
	Lowest ROAS	3							
120000	ROAS	2.412429	64.904	113.551	9.18438	1.0047	12.8799	10.7890	30.899
	Profit	40298	93003	21009	**138903**	78803	67839	21009	50098
	Highest Profit	4							
	Lowest Profit	3, 7							
	Highest ROAS	2							

	Lowest ROAS	5							
150000	ROAS	2.412429	64.904	3.54851	**59.138**	1.0047	12.8799	4.7890	30.899
	Profit	44298	**93003**	39880	68903	78803	64839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	5							
175000	ROAS	2.412429	64.9044	3.54851	**99.18438**	1.3047	12.8799	40.7890	30.899
	Profit	40298	**193003**	29880	68903	48803	77839	39940	60098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	5							
200000	ROAS	2.412429	64.904	3.54851	**79.18438**	11.0047	12.8799	0.7890	30.899
	Profit	40298	93003	34880	68903	78603	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	7							
25000	ROAS	22.4429	54.904	5.54851	**89.1328**	11.0047	12.8799	19.7890	30.899

	Profit	40298	**97703**	34880	68903	78603	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	5							
300000	ROAS	2.412429	64.904	3.54851	**99.188**	3.54851	12.8799	10.735	30.899
	Profit	40298	**85003**	39880	68903	78803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	3, 5							

Medium Performance II									
Price on services of the observed company:	Scenario	1	2	3	4	5	6	7	8
40000	ROAS	2.4129	34.904	3.54851	**79.138**	11.0047	12.8799	10.234	30.899
	Profit	40298	93003	39880	**178903**	78803	67839	49940	50098
	Highest Profit	4							
	Lowest Profit	3							

	Highest ROAS	4							
	Lowest ROAS	1							
80000	ROAS	2.412429	64.904	0.54851	**78.138**	11.0047	12.8799	0.7890	30.899
	Profit	40298	93003	39880	**120903**	78803	67839	9940	50098
	Highest Profit	4							
	Lowest Profit	7							
	Highest ROAS	4							
	Lowest ROAS	3							
120000	ROAS	2.412429	64.904	3.54851	**92.438**	1.0047	12.8799	6.7890	30.899
	Profit	40498	94003	25880	**168903**	78803	67839	49940	50098
	Highest Profit	4							
	Lowest Profit	3							
	Highest ROAS	4							
	Lowest ROAS	5							
150000	ROAS	2.4429	64.904	3.54851	**121.138**	1.047	12.8799	7.7890	50.899
	Profit	40298	93003	39880	**111903**	78803	67839	49940	50098
	Highest Profit	4							
	Lowest Profit	3							
	Highest ROAS	4							

	Lowest ROAS	5							
175000	ROAS	4.1429	**104.904**	3.54851	9.18438	11.0047	2.8799	10.7890	30.899
	Profit	40298	**93073**	36880	68903	8803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	7							
	Highest ROAS	2							
	Lowest ROAS	5							
200000	ROAS	2.412429	**64.904**	3.54851	9.18438	1.0047	12.8799	20.290	30.899
	Profit	40298	**93003**	12350	68903	78803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	2							
	Lowest ROAS	5							
25000	ROAS	**124.129**	4.904	3.54851	9.18438	1.0047	12.8799	5.7890	30.899
	Profit	40298	**129900**	12098	68903	78803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	1							
	Lowest ROAS	5							
300000	ROAS	**37.2429**	4.904	3.54851	9.18438	11.0047	12.8799	5.7890	30.899

	Profit	**40298**	93003	39880	68903	78803	67839	49940	50098
	Highest Profit	1							
	Lowest Profit	3							
	Highest ROAS	1							
	Lowest ROAS	6							

Low Performance									
Price on services of the observed company:	Scenario	1	2	3	4	5	6	7	8
40000	ROAS	2.412429	4.904	3.54851	**19.18438**	11.0047	0.0764	0.7890	30.899
	Profit	40298	**123003**	39880	39903	78803	890	49940	50098
	Highest Profit	2							
	Lowest Profit	6							
	Highest ROAS	4							
	Lowest ROAS	6							
80000	ROAS	0	0	0	**12.78**	0	0	0	0
	Profit	-0298	**393003**	-3880	-8903	-8803	-7839	-9940	-5098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	4							

	Lowest ROAS	3							
120000	ROAS	12.4429	**20.789**	10.78	3.54851	0	3.54851	0	3.54851
	Profit	40298	**91003**	39880	68903	78803	67839	49940	50098
	Highest Profit	2							
	Lowest Profit	5, 7							
	Highest ROAS	2							
	Lowest ROAS	5							
150000	ROAS	2.412429	0	0	0	0	0	0	0
	Profit	-1298	40298	-11880	-16903	-7803	-7839	-940	-2098
	Highest Profit	2							
	Lowest Profit	3							
	Highest ROAS	2							
	Lowest ROAS	2, 3, 4, 5, 6, 7, 8							
175000	ROAS	**46.41429**	0	0	0	0	0	0	0
	Profit	**89298**	-9004	-1880	-16903	-7803	-7839	-940	-2098
	Highest Profit	1							
	Lowest Profit	3, 7							
	Highest ROAS	1							
	Lowest ROAS	2, 3, 4, 5, 6, 7, 8							
200000	ROAS	**48.412429**	0	0	0	0	0	0	0

	Profit	**90298**	-9004	-1880	-16903	-7803	-7839	-940	-2098
	Highest Profit	1							
	Lowest Profit	3							
	Highest ROAS	1							
	Lowest ROAS	2, 3, 4, 5, 6, 7, 8							
25000	ROAS	**78.412429**	0	0	0	0	0	0	0
	Profit	**97298**	-9004	-1880	-16903	-7803	-7839	-940	-2098
	Highest Profit	1							
	Lowest Profit	6, 7							
	Highest ROAS	1							
	Lowest ROAS	2, 3, 4, 5, 6, 7, 8							
300000	ROAS	**45.412429**	0	0	0	0	0	0	0
	Profit	**99298**	-9303	-39880	-8903	-8803	-7839	-9940	-5098
	Highest Profit	1							
	Lowest Profit	3							
	Highest ROAS	1							
	Lowest ROAS	2, 3, 4, 5, 6, 7, 8							