

A Study on Competition Supremacy over Cooperation

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ABSTRACT

Many complex tasks are supposed to embody a speed-accuracy trade-off which proposes within work teams cooperative rewards promote accuracy, whereas competitive rewards promote speed. But on the implementation side managers are suspicious about the accuracy of limited outcomes. To test the idea a research had been organized using the most popular strategic online game platform between the years 2014 and 2017. After the validation of measures a series of regression analysis was conducted to test the hypotheses and to define the direction of relations. The obtained data from the primary data were confirmed the predicted proposal of supremacy of competition over cooperation between work team members. The reward structure, the competitive past, and the tendency of trust between the members of work teams seem to have minor performance effects comparing the degree of competition. In the research model design some crucial conditions such as randomly assigning teams to conditions, randomly assigning people to teams, obtaining objective measures of accuracy and speed, and creating objectively identical task demands have been met. The study was one of the first attempts to propose managers to choose competition which lose strength by co-experience of employees and mechanic organizational performance.

Keywords: Competitive Rewards, Organizational Performance, Work Teams, Competitive Past of Team Members.

INTRODUCTION

Human beings historically gained ascendancy over other livings thanks to cooperation in great gatherings. Solidarity and collaboration sub items of cooperation have got lots of advancements for sure. But the binding effect of religion as a supreme idea should have been too subjective human beings had chosen capitalist system and had been seeking small communities as common denominator. This diversion created competition and opposing the expectations it increased innovation and improvement. Human brain also works reiterating the same questions by different neural teams looking in different angles to the same matter in competition with each other. At the very point even the most powerful artificial intelligence could not exceed the brain of three years old child probably because the cooperative programs run by one after the other one (Makridakis, 2017). The forecasts about the transformation from artificial to super-intelligence point out the far future. So, those obliged to make decision about the priorities when faced with a dilemma should exercise the main challenge. When no dilemma challenges the managers in a chaotic way choosing both cooperation and competition (i.e. coopetition) might be able to advance the quality and increase the performance in the same time. Coopetition term was used by Ray Noorda founder and CEO of Novell Company for the first time in 1980's (Dagnino, & Padula, 2002). The first part of the study is about the relation between components of coopetition which was named as a new model of doing business. Then in the second part before the conclusion the question how the decision makers might act if a dilemma is in force have been estimated and answered by a time series analysis. The forecast in the near future might be one of the very useful tools for both human resources and the line directors when faced with the overlapping problem of individual and group points.

LITERATURE

Teamwork in Network Based Structures

A definition of network based structure: the organization structure of which allowed the common efforts of the independent small but highly capable team members to create and refine information enough to capture competitive advantage (Hasan, Warne & Crawford, 2007). In this way of organization workers with of small agile and self-directed teams' cooperation efforts leverage information. One of the toughest challenges is to quit the hierarchical command and control culture designed by the rules in organization and depends on the share of information culture of cooperative slightly bounded self-directed teams. Because sharing of information in multi-unit organizations was supposed to depend on the formal hierarchical structure. However, the information collected by informal and side bounds constitutes the centre of coordination mechanism and have seen more effective than the formal way of information sharing (Tsai, 2002). The informal social relationships between team members competing with each other might not be effective when trying to reach internal resources but increase the sharing of information when the objective is market share.

Network based structures compete in different ways. As an efficiency ranking between teams considering the quality of coordination mechanisms is possible it is possible to assess the effect of inter team competition on this ranking. These calculations when made for inner organization team competition it clearly showed that social relationship increased while, formal hierarchical structures decreased information sharing (Tsai, 2002). An observation on cooperation in network structures complementing resource based view of the firm was the nature of relationships between teams was more effective than that of the resources (Lavie, 2006).

The relationships alike are generated between member organizations' managers in the competition networks formed up for strategical purposes. Despite in case the objective is market share the support of social relationships on information sharing being a rule, cooperation maintains resources for competitive advantage by getting the network based resources available for organizations (Gnyawali et al., 2006). If organizations could achieve the dominant position in competition network they can reach better competitive capabilities and advantages. The organizations reach competition profits depending on their capabilities in cooperation networks.

Coopetition

The two components of cooperation namely cooperation and competition pushes one another like two similar poles which are hard to get close with electricity loadings. Though they might be thought related when talking about implementation competition can lower cooperation and vice versa. It was asserted that organizations might bear a loss in risk-profit equality, and the contribution-reward ratio is generally hard to estimate and balance (Walley, 2007). Additionally cooperation is criticized as it is only a type of secret agreement in hard times when trading is in trouble, not being scientifically scrutinized, and only named as an idea in the mind (Liu, 2013). Moreover because of the estimated positive relationship between competition and innovation organizations seeking to be different for competitive advantage tend to hide and not to share the information of their primary capability (Knudsen, 2007; Gunduz, 2013).

The studies about information sharing showed that comparing the new team members with a cooperative past with the current members of the team, the new team members with a competitive past could access less information sharing no matter lowering general performance of team (Lin et al., 2010). Despite team behaviour and perceptions experienced quite enough investigation the researches are insufficient on the business effectiveness of the team members comparing cooperation experienced separately and face to face. Virtual team studies are less and known with vague results. Whereas information technologies produced solutions for geographic diversity and communication to information sharing of co-worker teams on virtual networks (Shachaf, 2008). Virtual teams in solidarity especially heading to a common objective compose suitable and covered subjects for cooperation research.

THEORY AND HYPOTHESIS BUILDING

The headings like “digital game and education supported by smart toys” have risen to notice recently. Number of scientific researches under this heading estimated to exercise the top acceleration (from 0.81 % to 3.82 %) before others (Yu-Chen et al., 2012). This result show that the teachers set up gaming-like training environment to attract attention of students whose gaming experiences are already more advanced on the training scope. Despite a great ignorance in the research literature is rife in developed and in developing countries the firms from gaming market have a target group frequently playing on network every day (Sey, 2014). The relationship between development and game could be summarized under for headings: 1. Leisure, 2. manufacturing gaming products, 3. purchasing games for training, 4. gaming services. The leisure games like Tetris and Snake are not very popular unless the people who could not acquire smart phones. The ascending hedonic use of smart phones, computers, and tablets such as gaming, has its roots from easy access to expensive technologies such as instrument (cost of data, wave length, control type, and battery life) support (Walton et al., 2012). The limited numbered and accurate researches on the subject supports the idea “the will of entertainment between the low-income citizens of developing countries is more crucial than other perceived needs” (Sey, 2014). It is necessary to study and understand not only the war games which possess positive results but all the humorous human attitudes, and to qualify games not as a special task but as a source. The games’ being mostly downloaded applications proves not only individuals learn ability to creatively overcome borderline cases but also cannot keep away from game life-long (Donner, 2010). One which is inevitable for personal development should not be counted irrelevant socio-economically. In this respect the game not allowed for leisure time, but should be taken as a respected right, and the personal and collective time spent should find acceptance socially and institutionally.

The networks games have the facility to improve inter cultural communication and understanding. As the eastern cultures opt for majority, the cooperation, and loyalty their perception of relevance is very mature. Conversely western societies opt for personal independence and competition attitude. However when competition and cooperation perceptions are inspected it is only the acts which can be seen. Of course it should be noted that difference between individuals are bigger than that of between societies. It was stated generally for the organizations the rewards for competition increase quality whereas rewards for cooperation increase production speed (Beersma vd., 2003). If there could be reconciliation between two motivation branches which is doubtful now, it would be possible both quality and amount in other words innovation and market leadership could be maintained. But when there is a conflict between the two branch and organizations could not find enough resources to feed two strategies decision makers had to decide and solve this dilemma. They should choose based their priorities in mind whether cooperation or cooperation. An applied game should exercise the issue within an example of such an embedded environment: 1. Conflict (with other team or teams around), 2. Information sharing (to invert a dynamic issue included very fragmented and domestic view to a

general case and examine it), 3. Coordination and cooperation in a competitive environment (coopetition), 4. Timely and just decision making (the need to balance time required for both situation awareness and pressure to avoid losing to active issues). It would be possible to test the propositions in this environment by scrutinizing personal and team behaviours:

Hypothesis 1. The performance of members of emerging project organizations and teams positively related to competitive behaviours in long term.

Hypothesis 2. To succeed emerging project organizations and teams needs more competition between their members than cooperation.

METHODOLOGY

The study is an exploratory type of research. Independent from environmental factors the proposition competitive behaviours of project organization or team members contribute to both individual and corporate success more than the cooperative behaviours have been tested.

SAMPLE AND DATA COLLECTION

For experiment exposition using primary and secondary data; the sample size for time series analysis calculated with criterion of generalizability in uncertain ratios. It was assumed standard deviation and variance of population have to be estimated. Sample size calculated according to $e=0.04$ and $\alpha=0.05$ level. Even if there were no information about ratios π ($1-\pi$) could be maximum ($0.5*0.5=0.25$), and the worst case could be taken securely. So the sample size for the least number meeting the criterion should be decided as $n= \pi(1-\pi)/ (e/z)^2= 0.5*0.5/(0.04/1.96)^2= 600$ (e stands for acceptable error, z value is the standard deviation of target reliability level). Population was assumed to be homogeny. Data collection platform was chosen as the most earning strategy game named “Clash of Clans” which is free to download. The global average of the consumers of the Game is 33 (Kooti et al., 2017).

All the personal and group data is recorded transparently, all achievement rewards and rankings details are achievable in the Game. Thanks to globally and unlimited number of friend lists screening desired number of player accounts is possible on this network based gaming platform. Consumer accounts are allowed both global and intra-Clan communication in the Game. The achievements of the 614 consumer accounts in 25 Clans which were randomly chosen as sample of the research which will last between 2014-2017 (in Clan Wars the rivals are assigned by the program in the servers situated globally) were recorded once in every month in first six months and afterwards once per six months.

Competitive or cooperative behaviour selection based on the assumption that 0-2 shift between clans could be acceptable to be cooperative. The point is some obligatory problems might occur such as leadership mistakes, selection the sex of friends and so on. The player

changing one or two clans can be still a royal one. But three or more shifts were taken as the indicator of preference of personal competition.

Demographic characteristics of the communicated (approximately 70%) members of 25 Clans were: 18% were above 40 years of age, 21% were between 35- 40 years old, 35% were between 30-34 years old, 8% were between 25-29 years old, 18% were younger than 25 years. Educations of the sample group were: 27% master's degree, and 20% undergraduate degree. Public workers with salary were 39% (including municipality workers), private sector workers were 32%, company owners and self-employment were 5%, retired and unemployed were 8%, and students were 16%. These characteristics were gathered by verbal communication in virtual network the accuracy was not certain.

There is two type of battle: personal and Clan wars. Every war, duty and donation brings experience points which accumulate to raise the level. Using four types of resources consumer accounts improves their village defence buildings and assault soldiers. Moving success rankings of consumer accounts and clans are updated globally and there is not an end for the Game.

Natural experimental exposition had been used in the time series analysis. The consumers were not told that their accounts were being examined to get rid of the test effect. The consumers speaking foreign languages were not been able to communicate only the position and acquired advancements had been noted monthly in first 6 months, and once per 6 months in the rest of 3 years. Every observation was subjected to the same statistics tool and 25 Clans were chosen randomly between the similar beginner Clans by the match making programme in 2014. Thus the tool effect had no influence on the results.

FINDINGS

The average of personal achievement values were shown by Table 1. While lots of reward integrated in the game every achievement and reward in personal or Clan (team) level reflected in the general level. So both the levels raising by personal experience points (not limited to but have been seen max. 253) and the Clan levels by the Clan experience points (actually max. 14) were chosen metrics. The achievement of the Clan affects individual members positively by special perks.

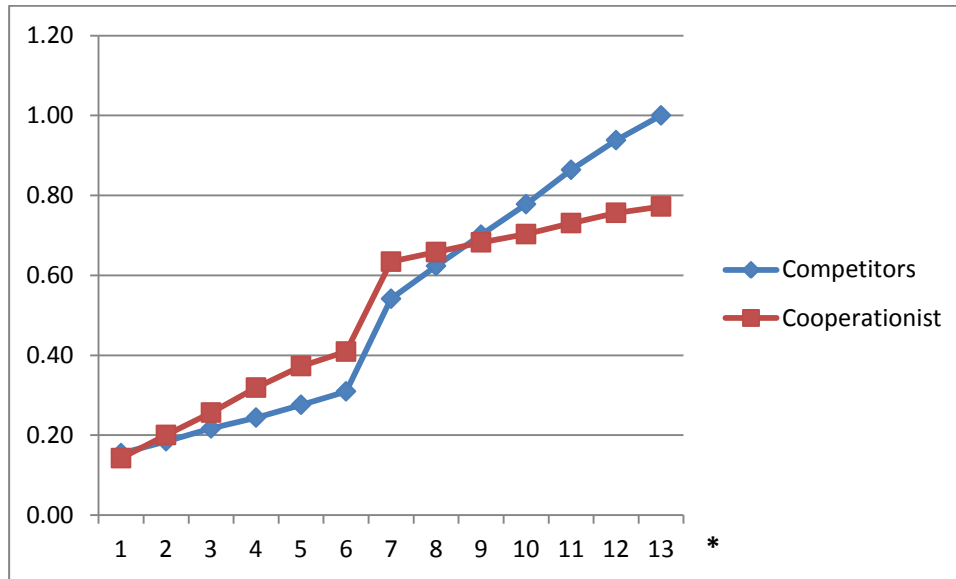
Table 1: Achievements of Competitive and Cooperative Members

Time Personal Charecteristics	(experience points)													
	2014/1	14/2	14/3	14/4	14/5	14/6	2014/12	2015/1	2015/2	2016/1	2016/2	2017/1	2017/2	
Competitors	28.15	33.56	39.38	44.32	50.12	56.22	98.33	113.23	127.44	141.32	156.93	170.43	181.66	
Cooperationist	25.87	36.40	46.58	57.94	67.74	74.32	115.19	119.55	123.99	127.71	132.72	137.39	140.28	

n: 614

As could be seen on Table 1 the success of cooperationists in the beginning slowly descending and afterwards were left aside by competitors. Figure 1, might be more informative with graphic exhibition of this progress.

Figure 1: Achievements of Competitive and Cooperative Members



* For 6 months noted at the end of every month and for the rest of four years once at the end of 6 months.

Figure 1 shows that in the beginning cooperationist team members’ advance by a bigger acceleration. For the first six months the average ascending was 8 level per month whereas 4.67 for competitors. But at the end of the first year the leading position have shifted to competitors’ side. During the rest of the time interval average experience level increase radically descended below 0.14 level per six months and cooperationists have been left aside of competitors whose steadily ascended levels by nearly 2.78 every six months.

Hypothesis 1 stated that the performance of members of emerging project organizations and teams positively related to competitive behaviours in long term. Despite it is not possible to confirm if the duration were short term but it is clearly confirmed for the long term. Hence at the end of the time series the members with competitive behaviours are at higher levels of the ranking scale supporting H_1 and rejecting H_0 null hypothesis.

The achievements of teams composed of competitors and cooperationists were shown by Table 2. Just like the players, Clans also gains experience points having a corporate identity even when the members change. This can be perceived as project organization or team equivalent. Though the sum of experience points of the members differs every shift time the experience points of the Clan is completely independent and the advancement of the members have not any

effect or contribution to the Clan. The experience level of the Clan is the result of being a competitive team under the name of Clan.

The same situation is valid for Table 2 with the results of members' of the team. The teams composed of members whose behaviours are competitive were slow runners in the first one and a half year but afterwards the situation changed radically starting half of the way point.

Table 2: Achievements of Teams composed of Competitors and Cooperationists

Time	(experience points)												
	2014/1	14/2	14/3	14/4	14/5	14/6	2014/12	2015/1	2015/2	2016/1	2016/2	2017/1	2017/2
Teams composed of Competitors	1.00	1.00	1.00	1.40	1.50	2.25	3.58	4.25	6.02	8.26	9.60	10.15	10.95
Teams composed of Cooperationists	1.00	1.00	2.00	2.33	3.40	3.66	4.20	5.00	5.75	5.80	5.85	6.25	6.75

n: 25

Figure 2: Achievements of Teams composed of Competitors and Cooperationists

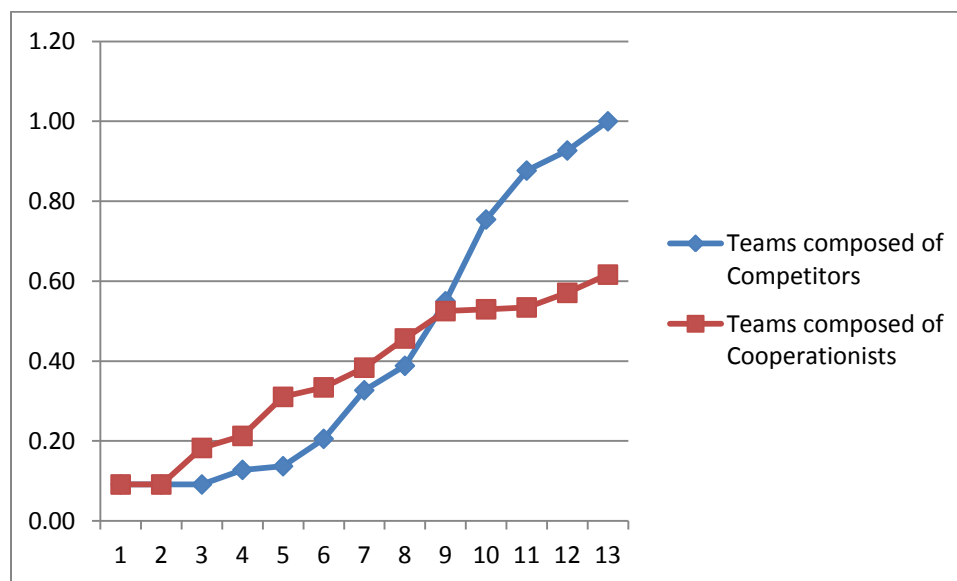


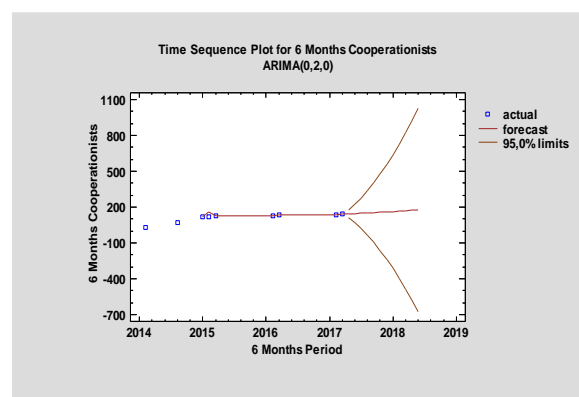
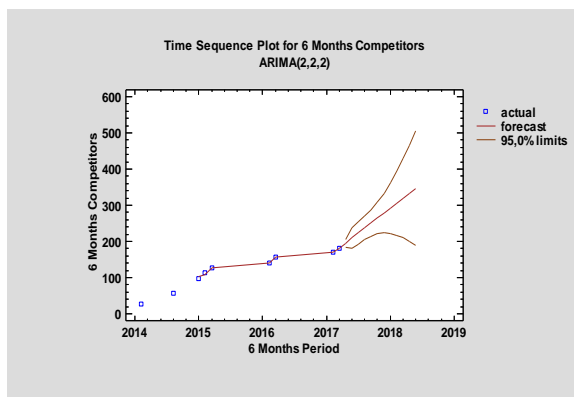
Figure 2 shows teams composed of competitive members gaining supremacy over time. Teams composed of cooperationist members have reached an average monthly (0.2 levels) improvement within the first 9 months. Their averages for the first 6 months (0.44 levels) were

very high. Afterwards advancement nearly stopped and crawled with a humble slope (0.04 levels per month) up. Competitor member weighed teams have never stopped and steadily ascended with a constant average slope (0.21 levels per month) upwards. In the comparison it was quite slow than cooperationists weighed teams in the first six months but stability brought the success.

Thus at team level the same view faced us. Cooperationists weighed teams were successful in short term while the opposite is true for long term. At the end of time and in long term the competitive and liberal player members of the teams clearly have positive contribution to advancement of the teams. So, Hypothesis 2 which stated emerging project organizations and teams needs more competition between their members than cooperation to succeed was supported by the research records.

The results were clear for the hypothesis in four years but “in longer terms what will possibly be?” question should be enlightened. So the estimates follow.

Figure 3: Estimate Model Intervals for Achievements of Competitors and Cooperationists



Forecast Summary for Competitors:
 Forecast model selected: ARIMA(2,2,2)
 Number of forecasts generated: 12
 Number of periods withheld for validation: 0

Forecast Summary for Cooperationists:
 Forecast model selected: ARIMA(0,2,0)
 Number of forecasts generated: 12
 Number of periods withheld for validation: 0

The table below summarizes the performance of the currently selected model in fitting the historical data. It displays: RMSE: the root mean squared error, MAE: the mean absolute error, MAPE: the mean absolute percentage error, ME: the mean error, MPE: the mean percentage error. Each of the statistics is based on the one-ahead forecast errors, which are the differences between the data value at time t and the forecast of that value made at time $t-1$. The first three statistics measure the magnitude of the errors. A better model will give a smaller value. The last two statistics measure bias. A better model will give a value close to 0.

Table 3: Estimate Models for Achievements of Competitors and Cooperationists

Competitors	
<i>Statistic</i>	<i>Period</i>
RMSE	3,21277
MAE	1,42439
MAPE	1,24512
ME	0,17716
MPE	0,0937646

Cooperationists	
<i>Statistic</i>	<i>Period</i>
RMSE	14,1215
MAE	6,9
MAPE	5,74808
ME	-6,50857
MPE	-5,45194

Table 4: ARIMA Model Summary (Competitors)

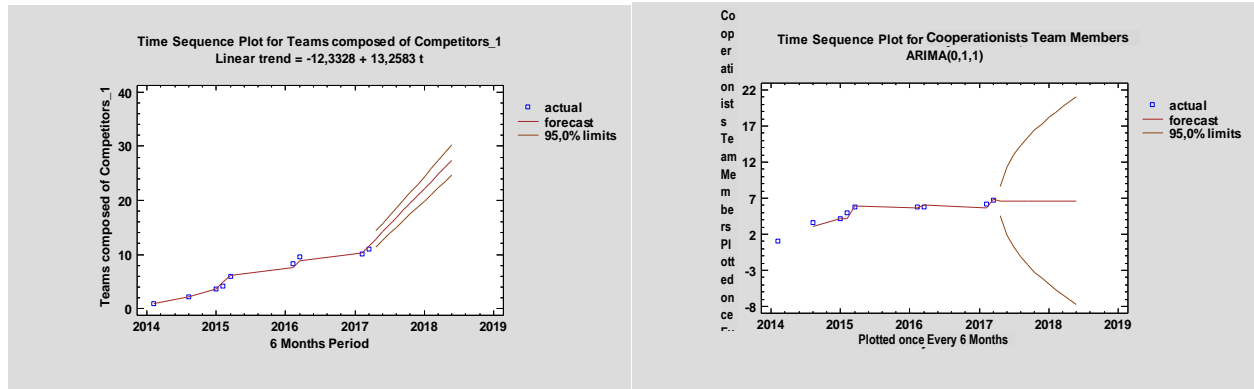
<i>Parameter</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>t</i>	<i>P-value</i>
AR(1)	0,183409	0,0687775	2,66669	0,075904
AR(2)	-0,37343	0,0476386	-7,83882	0,004324
MA(1)	-0,371993	0,286041	-1,30049	0,284322
MA(2)	2,53297	0,3342	7,5792	0,004765

	<u>Competitors</u>	<u>Cooperationists</u>
Backforecasting	: yes	: yes
Estimated white noise variance	: 10,3625, degrees of freedom: 3	: 199,416 with 7 degrees of freedom
Estimated white noise standard deviation	: 3,21908	: 14,1215
Number of iterations	: 50	: 1

This procedure will forecast future values of competitors for 6 months. The data cover 9 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. The output summarizes the statistical significance of the terms in the forecasting model. Terms with P-values less than 0,05 are statistically significantly different from zero at the 95,0% confidence level. The P-value for the AR(2) term is less than 0,05, so it is significantly different from 0. The P-value for the MA(2) term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 3,21908.

The estimated standard deviation of the input (Cooperationists) white noise equals 14,1215.

Figure 4: Estimate Model Intervals for Achievements of Teams composed of Competitors and Cooperationists



Forecast Summary for Teams of Competitors:

Forecast model selected: Linear trend= $-12,3328+13,2583t$
 Number of forecasts generated: 12
 Number of periods withheld for validation: 0

Forecast Summary for Teams of Cooperationists:

Forecast model selected: ARIMA (0,1,1)
 Number of forecasts generated: 12
 Number of periods withheld for validation: 0

The models summaries represent the achievement estimates of the teams could forecast the near future. And the area of possibility was not very different from that of the team members' personal achievements. This also could be taken as an overlap of project organization and worker targets, thanks to the competitive environment.

Table 5: Estimate Models for Achievements of Teams composed of Competitors and Cooperationists

Teams composed of Competitors	
Statistic	Period
RMSE	0,511698
MAE	0,333765
MAPE	5,36945
ME	-1,97373E-16
MPE	-0,135065

Teams composed of Cooperationists	
Statistic	Period
RMSE	0,444821
MAE	0,322061
MAPE	6,37438
ME	0,208133
MPE	4,45669

Table 6: Trend Model Summary for Teams composed of Competitors

Parameter	Estimate	Std. Error	t	P-value
Sabit	-12,3328	0,940437	-13,1139	0,000003
Eğim	13,2583	0,6606	20,0701	0,000000

Table 7: ARIMA Model Summary for Teams composed of Cooperationists

<i>Parameter</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>t</i>	<i>P-value</i>
MA(1)	-1,08249	0,155877	-6,94448	0,000222

ARIMA Model Summary:

Back forecasting : yes
Estimated white noise variance : 0,758384 with 7 degrees of freedom
Estimated white noise standard deviation: 0,870853
Number of iterations : 14

It is understood from the explanations of the statistical method that the models with minimum error terms produce statistically significant and reliable results. The data gathered for four years from 2014 until 2017 assured that competitor members contribute more to the teams; in other words the teams composed of members with competitor behaviours would be more successful and more gainful than the teams composed of members with cooperationist behaviours.

The reward structure of the game has been changed by the patches to the program in time. The members with competitor past have been reconnected to the same old Clans in solidarity to act, and no remarkable descending in social communication could be noted. The information sharing has not decreased. Moreover when the success achievements graphs have been checked it was impossible to see these negative determining factors. There were no fluctuations on the graph.

CONCLUSIONS AND IMPLICATIONS

The main purpose of this study was to shed light on the difference in the achievements of the organizations when composed of competitors or cooperationists. Though prior Works in the economy (Chen et al., 2007), and strategic management (Gunduz, 2013; Tsai, 2002) disciplines highlighted the value of the competition, few studies included how to manage competitive behaviour in organization with systematic simulations. The results produced by this work might be useful for both human resources professionals and line managers by giving a hint about the value of competitive and comparatively individualist behaviours. It was clearly showed that cooperation caused inertia after a certain period and the progression deflated in a while. These findings oppose the conventional way of thinking for highlighting the crucial organizational commitment and loyalty. Cooperation is advantageous in short term in project organization and teams. For organizations with the competitors such as neighbours, suppliers, customers, and other groups worth competing could be cooperated to increase profits (coopetition) but it was asserted that the quality of competitor groups within the organization was worthier than that of cooperationists (Tauer, 2004). With the current study proved that not for only creating innovations which would bring difference and long term profitability but also in team-work requiring solidarity, the members with competitor behaviours should be trusted. This finding will

ease to assume the people freely looking for job vacancies in the sector market, improving social relationships for personal purposes, believing not only the organizational rewards but also believing the self-difference are precious, with medium level commitment not being ambitious for reward, education, expectation of higher position may contribute organizational achievements. The organizations have to support cooperationists for short term and the competitive members in long term.

The time series analysis methodology used was both by the generalizability with the sample size and by making good use of mobile network gaming integrated in our daily activities could be odds. But still there were some limitations. Partially biased sampling might be in force for the server to select close geographic region. Despite the leadership formations and the languages used in the rival clans were diverse, representation of the globe would be limited. A win – lose game set up in the research tool used so win – win style environments (such as cooperation) ignored in the research scope. Following research may include planning environments of compromise to advance the research. Another subject for following studies might answer the question of how much manager motivation could be maintained by competition. These researches should examine and decide priority to the importance of industrial and top management competition tendency. If the answer would be top management team inner competition, other less important variables of this study such as reward system and competition past effects on sharing of information should be revisited.

This study generated results at least in two levels. First, in project organizations the members with competitive behaviour did not acted or be acted inimically in fact they were more supportive for the long term profitability than the cooperationist members. Secondly, if the competitors who implemented similar projects co-operate and experience enough respect from rival group, the cooperation within organizations may really become a fruitful business model. This study suggests to the cooperative organization members not to act tendentiously but act as if they are new co-workers with a cooperationist past and share all the information on time. The breadth of the managers would find reflection in the climate of the organization, and may be in net result.

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