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SUCCESS FACTORS FOR TEAMS IN BUSINESS GAME DYNAMA

Abstract

The current article is based on data from Dynama business games conducted in two Estonian institutions of higher education (Estonian Business School (EBS) and Estonian Entrepreneurship University of Applies Sciences) between years 2012 and 2016. The research questions that this paper attempts to explore look at the relationship between the results obtained by different teams in business game Dynama and their teams' characteristics. The paper also shows how the volume of market research information used affects the results obtained by different teams in the business game. This research of implementational nature primarily helps to develop the teaching methods and basis for team composition in business game Dynama with the purpose of supporting the course and achieving the learning outcomes in a more effective way. The research results may also be of interest to those who use and research business games as a teaching tool. The variables employed in this study enabled us to compare our research with that conducted by A.-E. Lerviks and M. Paltschik at Hanken School of Economics and Business Administration in 1982.

Keywords simulation game, business game Dynama, teamwork, teaching methods of business

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INTRODUCTION

According to some authors (see e.g. Jenkins, 1998; Wolfe, 1993), the history of simulation games dates back thousands of years. In the context of higher education, computer-based simulation games began gaining popularity in 1950s in the US and spread quickly across the world in 1970s and 1980s. Even though research into simulation- and business games evolved already in 1970ies (Faria, 2000), it has not developed into a distinct research area. Research into digital games, specifically, is a relatively new area which calls for diverse methodological approaches (Lankoski & Björk, 2015).

Therefore, even though simulations games are spreading as a research object and tool, their primary purpose still remains to offer students the possibility to acquire new knowledge and skills in fun (Jakubowski & Ryfa, 2017), "close-to-life" management situations (Klein & Fleck, 1990; Ben-Zvi, 2006; Martin, 2000; Kross & Liivat, 2015) with the aim of developing their analytical and teamwork skills which enable better management decisions.

The purpose of this research is twofold. We first aim at identifying the relationship between the results obtained by different teams in business game Dynama and their teams' characteristics. Second, we identify how the volume of market research information used affects the results obtained by different teams in the business game.

The background information of the team members included academic achievement of team members and previous work experience. In our research we focused on the following variables: number of members in the team, gender of team members, level of education (undergraduate, graduate, etc.) and nationality. The market information used in decision making during the game represents the volume of market research acquired (purchased) by a team.

The variables employed in this study enabled us to compare our research with that conducted by A.-E. Lerviks and M. Paltschik at Hanken School of Economics and Business Administration in 1982. The study by Lerviks and Paltschik among 39 teams showed that of all the observed variables, only expenditure made on acquiring market information impacted the final result of the game (Lerviks & Paltschik, 1982). Our research was striving to find similar associations between the game results and the teams' variables as well as market information acquired by the teams.

1. RESEARCH DESIGN

1.1. Research object

This research included data from 28 Dynama business games conducted in two Estonian institutions of higher education (Estonian Business School (EBS) and Estonian Entrepreneurship University of Applies Sciences) between years 2012 and 2016. The sample of the research included 713 students divided into 140 teams. Of the 28 games, 22 were conducted among undergraduate and 6 among graduate students. 17 games were conducted in Estonian and 11 in English. In addition to Estonians, Finnish full time students at Estonian Business School as well as international exchange students also participated in the games. We identified no statistically significant differences between universities, nationalities or levels of education, which is why we treat the sample as one.

By nature, this empirical research represents a deductive analysis and a census because it contains a collection of standardized data from a large amount of people. Our research partly resorts to documented data on the entire population in our study and partly to self-selected sample. Data was analyzed using statistical methods. A quantitative analysis was used to identify associations and their strength, but also to construct the forecasting models.

The 95% confidence level and the 5% error margin with 713 students requires a sample size of 250 students.

1.2. Business game Dynama

The model of Dynama's business game is based on a long-term research into consumer behavior and has been created by professor Alf-Eric Lerviks at Hanken School of Economics and Business Administration (Lerviks, 2004).

Estonian Business School (EBS) has used this business game as an independent subject of 4.5 ECTS. The main reason for including this business environment simulation in the study program is to create an opportunity for the students to understand the relationship between managerial decisions and a company's economic results as well as to enable the students to get a wholesome picture of the running of a business (Kross & Liivat, 2013).

Students are allocated into teams who represent the management (the Board) of five competing companies on the market. The main issues which the teams must handle during the game are those related to marketing and market- and competitor analysis, demand forecasting, product lifecycle and positioning, pricing of product portfolio and products, analysis and evaluation of consumer behavior, financial analysis and the planning of expenditure and revenue. The business game lasts for three days and 27 game periods, and students are requested to prepare for each day a homework in the form of a thorough analysis of market information. The game constitutes an intensive competition where the main aim of each team is to obtain better economic results than their competitors. During the game the teams have to make hundreds of quick strategic and tactical decisions. At the

end of the game the teams are mostly evaluated based on the accumulated profits and quality of homework.

This research uses business game Dynama as a tool to identify the association between the teams' characteristics and final results obtained in the game.

1.3. Data on games and players

Documentation and recorded aggregate data of 28 games served as an input into data collection and the players. The following will describe the data and data selection principles for this research.

In terms of general data for the game, one of the variables we used was work experience of the players. This variable was evaluated by study groups and students in the teams had to indicate their work experience by "2" or the lack of it by "1".

Lerviks and Paltchik (1982) aimed at finding out whether players with education in economics ensured a better result in the business game, but found no statistically significant associations. Our research was carried out in an environment where students were still in the process of acquiring their education in business. It is for this reason that the players' work experience was studied via self-reported evaluations. We assumed that the existence of work experience contributes to achieving a better final result at the end of the game.

Concerning the players, the following data was taken into consideration:

- Individual grade point average (GPA).

Data was collected on students' academic achievement; based on the individual GPAs, each team received an average GPA.

We assumed that teams with higher individual GPAs would achieve better results at the end of the game.

- Absence – shows how many days students have been absent from game days.

Absence characterizes a team's discipline. The game days are intensive and the attendance of all team members is important since every member of the team contributes to the discussion and decision making with his/her knowledge and competencies. We assumed that teams with lower level of discipline would do worse than those with higher level of discipline.

The following data was used to characterize teams:

- team's average grade point (GPA) – arithmetical average of team members' GPAs;
- size of the team – number of members in each team;
- gender composition of the team – how many male and female students were in the team;
- volume of market research information acquired – during game periods 8-18, teams have the possibility to purchase and acquire different market research information which describe general situation on the market and competitors' activities. The volume of market research information acquired is expressed in the expenditure made on acquiring such information;
- points obtained for homework – points obtained for three home works (a maximum of 45 points, each homework worth 15 points).

This research aims at finding out whether teams of students with higher academic achievement do better in the game and what associations can be identified between academic achievement and Dynama business game. The purpose of identifying the associations between the numbers of members in the team and the results of the game was to find out an optimum team size. Additionally, in order to identify a possible association between the results of the game and the team' gender composition, data was collected on teams' gender composition.

The teams had the possibility to acquire market information between periods 8-18. The choice was between eight different market research data which provide information on competitors' market share and advertising costs, market segments

and products, and demand and competitors' prices. Since this is a complicated game and all companies' decisions impact the market situation simultaneously, acquiring market information and making the right decisions based on the information play a crucial role. Lerviks and Paltschik (1982) also state that the volume of market information acquired has a strong association with the result obtained at the end of the game. Put differently, the more market information a team decides to acquire, the better the final result it achieves. In our research we used normalization to ensure the comparability of the volume of market information acquired by teams in different study groups.

Data on the number of points achieved for homework may help to draw conclusions on how well-prepared teams are for game days. We assumed that teams who scored relatively higher for homework were better-prepared for the game and consequently achieved better final results.

Concerning the game results, the following data was used:

- accumulated profits – accumulated net profits in euros made by the end of the game (27th period);
- place achieved in the game based on accumulated profits – indicates each of the five teams' place based on accumulated profits;
- total number of points obtained (participation + homework + bonuses) – includes points obtained for participation in the game, points for homework as well as bonus points. Bonus points (1-5 points) were allocated to teams for outstanding performance during the game.

Treating accumulated profits as the main criterion for teamwork success is based on the rules of the game – one of the objectives for the management of each company is to achieve at least 10% annual return on owners' equity. To contextualize this, it means that a company's owners' equity must increase from the initial 19.7 million to at least 35 million euros. However, relying on the increased owners' equity alone is not adequate while evaluating the teams' activities because every game is unique and how it progresses depends to a large extent on the decisions taken by the teams. For example the prices of the products have a substantial impact on the company's profit and the prices may differ substantially in different games. The so called skimming strategy (high prices and high profit margins) usually leads to a situation where all 5 teams achieve a relatively high profit by the end of the game. Thus, achieving a high profit in absolute numbers does not necessarily depend on the players' skills or the teams' outstanding economic decisions, but the peculiarities of the game itself. Therefore, one should not make final conclusions based on large profit made by the teams who achieved the last place at the end of the game. To handle this concern, we additionally used normalized accumulated profits as an indicator of success.

1.4. Data analysis

In order to ensure that the accumulated profits and expenditure made on acquiring market information are comparable across different games, we resorted to normalization. This means that every teams' deviation from the average value of the teams in one game was analyzed. Following Lerviks and Paltschik (1982), we also resorted to the formula developed by Bass and Wilkie (1973) as indicated below.

$$NV_{ijk} = \frac{V_{ijk}}{\sum_{j} V_{ijk}}, \quad (1)$$

where k – number of game, j – number of team in game, i – variable, V – observed variable value, NV – normalized variable value.

The data set was organized using Microsoft Excel 2010 and SPSS. Correlation analyses, regression analyses and *t*-tests were applied to the data set.

Using regression analysis, we constructed three models where we resorted to the following dependent variables:

- final position in the game;
- normalized accumulated profits;
- total accumulated points.

Table 1. Descriptive statistics for teams

Variables	Min	Max	M	SD
Accumulated profits (eur)	–22.00	102.40	30.685	21.843
Normalized accumulated profits	–0.55	0.66	.199	0.148
Expenditure on market information (eur)	124.00	2552.00	1103.221	559.337
Normalized expenditure on market information	0.03	0.43	.201	0.090
GPA for team	2.50	5.00	3.505	0.511
Team size	2.00	8.00	5.093	1.169
Points for homework	26.00	45.00	38.443	4.262
Number of absences	0.00	6.00	.779	1.126

2. RESULTS

2.1. Team characteristics and market information

We identified the impact of team characteristics (variables) and market information acquired on game results during 28 games (140 teams). 713 students participated in the games. 45% (321 students) of them were female and 55% (392 students) were male. 108 were mixed teams, 32 were composed of only female or male members. 100 teams had previous work experience. Accumulated profits obtained by 140 teams varied between 124,000 and 2,552,000 euros. The teams consisted between 2 to 8 members. The points obtained for homework varied between 26 and 45. Absence from games varied from no absence to six absences. Descriptive statistics characterizing the teams is available in Table 1 below.

2.2. Comparison of successful and unsuccessful teams

Using *t*-test for independent variables, we compared the characteristics of successful and unsuccessful teams and expenditure made on acquiring market information by the following criteria:

1. teams on the 1st and the 5th final place;

2. teams who obtained the 10th largest profit and the 1st position; teams who obtained the 10th smallest profit and the 5th position;

3. teams who obtained the 10th largest normalised profit and teams who obtained the 10th smallest normalized profit.

While comparing teams on the 1st and the 5th place, statistically significant differences emerged in terms of expenditure made on acquiring market information, points achieved for homework and absences. Successful teams spent more on buying market information than unsuccessful teams (M = 1380, SD = 557 and M = 928, SD = 478, respectively) (t = 3.297, df = 54, p = .000). This association is also verified by the comparison of normalized spending on acquiring market information (teams on the 1st place M = .249, SD = .086, and teams on the 5th place M = .173, SD = .081); (t = 3.315, df = 54, p = .002). Successful teams (M = 40.5, SD = 4.87) scored higher points for homework than unsuccessful teams (M = 36.8, SD = 3.72) (t = 3.305, df = 54, p = .002). Successful teams also has fewer absences (M = 0.500, SD = .938) than unsuccessful teams (M = 1.250, SD = 1.506) (t = –2.258, df = 54, p = .029).

Although statistically not significant, successful teams' GPA (M = 3.61, SD = .56) also stands higher compared to unsuccessful teams (M = 3.48, SD = .44). It was also evident that players in successful teams have more work experience (M = 1.37, SD = .49) than those in unsuccessful teams (M = 1.29, SD = .46) and successful teams had fewer female players (M = .40, SD = .25) than unsuccessful teams (M = .49, SD = .32). Table 2 below outlines the comparison's statistics.

Using *t*-test, we also compared 10 most successful teams (Success group 1) with 10 least successful teams based on earned accumulated profits. The *t*-test on independent variables (expenditure made on acquiring market information; normalized expenditure made on acquiring market information; team's GPA; points achieved for homework; number of absences) indicated statistically significant differences in terms of expenditure made on acquiring market information, points achieved for homework and proportion of female students in

Table 2. Comparison of teams on the 1st and 5th place

Variables	Place	M	SD
Accumulated profits (eur)	1	50.470	19.373
	5	11.900	15.502
Normalized accumulated profits	1	0.346	0.119
	5	0.049	0.143
Total accumulated points	1	94.630	6.077
	5	82.070	4.430
Expenditure on market information (eur)	1	1379.470	557.068
	5	928.320	478.550
Normalized expenditure on market information	1	0.249	0.086
	5	0.173	0.081
GPA for team	1	3.611	0.557
	5	3.477	0.440
Work experience	1	1.370	0.490
	5	1.290	0.460
Points for homework	1	40.530	4.869
	5	36.750	3.728
Number of absences	1	0.500	0.938
	5	1.250	1.506
Team size	1	4.930	1.172
	5	5.070	1.274
Mixed team	1	0.830	0.379
	5	0.710	0.460
Proportion of females in the team	1	0.398	0.252
	5	0.488	0.321

a team. Expenditure on market information was nearly twice as large among successful teams as among unsuccessful teams (M = 1609, SD = 561 and M = 886, SD = 506, respectively) (t = 3,028, df = 18, p = .007). This significant difference was also validated by the normalized expenditure made on obtaining market information (M = .279, SD = .0.71 for successful and M = .169, SD = .093 for unsuccessful teams; t = 3.115, df = 20, p = .006). Successful teams scored nearly 5 points more for homework than unsuccessful teams (M = 41.9, SD = 2.92; M = 36.2, SD = 3.36, respectively; t = 4.047, df = 18, p = .001). As opposed to unsuccessful teams (M = 1.10, SD = 1.29), members of successful teams did not miss a single game day (M = .00, SD = .00) (t = –2.703, df = 18, p = .024).

Table 3. Comparison of 10 most successful (Success group 1) and 10 least successful (Success group 2) teams based on accumulated profits

Variables	Success group	M	SD
Accumulated profits (eur)	1	71.780	17.706
	2	–3.330	8.817
Normalized accumulated profits	1	0.350	0.069
	2	–0.074	0.179
Total accumulated points	1	96.100	3.348
	2	80.400	3.565
Expenditure on market information (eur)	1	1609.700	561.511
	2	885.800	506.141
Normalized expenditure on market information	1	0.279	0.071
	2	0.169	0.093
GPA for team	1	3.571	0.589
	2	3.376	0.524
Work experience	1	1.400	0.516
	2	1.400	0.516
Points for homework	1	41.900	2.923
	2	36.200	3.360
Number of absences	1	0.000	0.000
	2	1.100	1.287
Team size	1	4.800	1.135
	2	5.000	1.700
Mixed team	1	0.800	0.422
	2	0.900	0.316
Proportion of females in the team	1	0.240	0.162
	2	0.533	0.287

Table 4. Comparison of 10 most successful and 10 least successful teams based on normalized accumulated profits

Variables	Success group	M	SD
Accumulated profits (eur)	1	49.350	26.460
	2	–4.560	7.648
Normalized accumulated profits	1	0.495	0.094
	2	–0.081	0.174
Total accumulated points	1	92.900	6.226
	2	80.500	3.598
Expenditure on market information (eur)	1	1073.100	336.441
	2	1101.100	569.307
Normalized expenditure on market information	1	0.207	0.065
	2	0.208	0.115
GPA for team	1	3.830	0.723
	2	3.208	0.451
Work experience	1	1.500	0.527
	2	1.300	0.483
Points for homework	1	40.400	3.098
	2	36.000	3.232
Number of absences	1	0.300	0.675
	2	1.600	1.174
Team size	1	4.900	1.449
	2	4.900	1.524
Mixed team	1	0.700	0.483
	2	0.700	0.483
Proportion of females in the team	1	0.488	0.332
	2	0.493	0.362

In case the teams had equal number of members, successful teams has one female member less than unsuccessful teams (M = 0.24, SD = .16 and M = 0.53, SD = .29, respectively; t = –2.806, df = 18, p = .014). Table 3 below illustrates the descriptive statistics.

T-test was used to compare 10 most successful and 10 least successful teams based on normalized accumulated profits. Statistically significant differences emerged in terms of the team's average GPA, points achieved for homework and number of absences. Expenditure made on acquiring market information did not emerge as statistically important to determine the success of teams. The average GPA of successful teams was nearly 0.6 points higher than that of unsuccessful teams (M = 3.83, SD = .72 and M=3.21, SD = .45, respectively) (t =2.309, df = 18, p = .036). Successful teams additionally stand out by having achieved nearly 5 points higher than unsuccessful teams for homework (M = 40.40, SD = 3.10 and M = 36.00, SD = 3.23, respectively) (t = 3.108, df = 18, p = .006). Absences among successful teams were significantly fewer than among unsuccessful teams (M = .30, SD = .68 and M = 1.60, SD = 1., 17, respectively) (t = –3.036, df = 18, p = .009).

Expenditure made on acquiring market information (which emerged as non-significant in this case) were even somewhat higher among unsuccessful than successful teams (M = 1101, SD = 569 and M = 1073, SD = 336, respectively). This is also true for normalized expenditure made on acquiring market information. However, it must be pointed out that standard deviation for volume of market information acquired was more than 200,000 euros higher for unsuccessful teams compared to successful ones. Standard deviations also stand considerably different in terms of normalized volume of market information acquired. This may have been caused by an exception in the sample which does not allow for an adequate result. Nevertheless, to achieve adequate results, we additionally compared the lower and the upper quartile of normalized profits. Quite as expected, the statistically significant difference emerged in terms of expenditure made on acquiring market information (upper quartile M = 1310, SD = 562; lower quartile M = 1000, SD = 503; t = 2.417, df = 68, p = .018) and normalized expenditure made on acquiring market information (upper quartile M = .239, SD = .090; lower quartile M = .184, SD = .084; t = 2.609, df = 68, p = .011). Descriptive statistics appear in Tables 4 and 5 below.

Table 5. Comparison of upper and lower quartiles based on normalized accumulated profits

Variables	Success group	M	SD
Expenditure on market information (eur)	1	1309.943	562.129
	2	999.676	503.433
Normalized expenditure on market information	1	.239	.090
	2	.184	.084

3. RESULTS

Correlation analysis was used to illustrate the associations between team characteristics (variables), expenditure made on acquiring market information and game results.

Normalized accumulated profits show a positive and statistically significant correlation with normalized expenditure made on acquiring market information ($r = .173$, $N = 138$, $p < .05$). Total accumulated points achieved in the game similarly show a positive and statistically significant correlation with both absolute expenditure and normalized expenditure made on acquiring market information ($r > .317$, $N = 138$, $p < .01$). This indicates that teams who made a bigger profit and achieved higher total summative points in the game spent more money on acquiring market information. There is a positive and statistically significant correlation also between normalized profits and points achieved for homework ($r = .314$, $N = 138$, $p < .01$). This means that teams which earned bigger profits were also better at homework. The final place achieved in the game is statistically significantly correlated with expenditure made on obtaining market information, normalized expenditure made on obtaining market information and points achieved for homework ($r > –.293$, $N = 138$, $p <.01$). It shows that the less resources a team spent on acquiring market information and the lower the points a team achieved for homework, the worse the final place achieved in the game.

There is a negative statistically significant correlation between absences and normalized accumulated profits ($r = –.199$, $N = 138$, $p < .05$), but also between absences and amount of total accumulated points achieved in the game ($r = –.286$, $N = 138$, $p < .01$). The same is also true for absences and points achieved for homework ($r = –.234$, $N = 138$, $p < .01$). Of the factors contributing to the teams' success, there is a positive, statistically significant correlation between absences and the final place achieved in the game ($r = .212$, $N = 138$, $p < .05$). Thus, the more times the team members were absent, the less points the team achieved for homework and the worse the final result of the game.

Total accumulated points show a positive, statistically significant correlation with the team's GPA ($r = .365$, $N = 138$, $p < .01$) and work experience ($r = .180$, $N = 138$, $p < .05$). The higher the team's GPA and in case the team has work experience, the better the final accumulated points for the game. This is also confirmed by a positive, statistically significant correlation between the team's GPA and points achieved for homework ($r = .421$, $N = 138$, $p < .01$). It must be noted that in comparison, this correlation is relatively strong.

Our regression analysis aimed at finding out the extent to which statistically significant factors enable to forecast the game results. Independent variables were the following:

- expenditure made on acquiring market information;
- normalized expenditure made on acquiring market information;
- team's GPA;
- points achieved for homework (only in the case of final place achieved at the end of the game and normalized accumulated profits);
- number of absences (only in the case of final place achieved at the end of the game and normalized accumulated profits).

To forecast the final place achieved at the end of the game, the only variables included in the model

Table 6. Models for game results based on team characteristics and market information acquired

Independent variable	B	Beta	t	p
Place achieved in game R2 = .154, F(2.138) = 11.083, p < .000				
Expenditure on market information	–.001	–.213	–2.305	.023
Points for homework	–.104	–.287	–3.102	.002
Normalized profits R2 = .099, F(1.139) = 15 130, p < .000				
Points for homework	.011	.314	3.890	.000
Summative points R2 = .256, F(3.137) = 15.567, p < ,000				
Team GPA	3.783	.286	3.633	.000
Expenditure on market information	.004	.307	4.120	.000
Absences	–.947	–.158	–1.999	.048

were expenditure made on acquiring market information and points achieved for homework (see Table 6, rows 2-3). The final model displays an average correlation between the dependent variable and independent variables (R = .411). Based on the determination coefficient, one can claim that independent variables together describe the variation of the dependent variable by a slightly more than 15%. Based on the model's standard deviation we may state that in reality the final place achieved is averagely 1.5 places different from the place calculated using the model.

To forecast normalized profit, the only variable which remained in the model was points achieved for homework (see Table 6, row 4). The final model displays an average correlation between the dependent variable and independent variables (R = .314). Based on the determination coefficient, one can claim that independent variables together describe the variation of the dependent variable by a slightly more than 10%. Based on the model's standard deviation we may state that in reality normalized profits are different by 0.14.

To forecast total accumulated final points, the variables which remained in the model were the team's GPA, expenditure made on acquiring market information and absences (see Table 6, lines 5-8). The final model displays an average correlation between the dependent variable and independent variables (R = .506). Based on the determination coefficient, one can claim that independent variables together describe the variation of the dependent variable by a slightly more than 26%. Based on the model's standard deviation we may state that in reality the total accumulated final points are different by nearly 6 points.

4. FINDINGS

Based on correlations analysis and results in the models it became clear that a team's success in the game is mostly dependent on the expenditure made on acquiring market information, points achieved for homework and absences. Points achieved for homework, which contribute to the amount of total accumulated points, are, in their turn, connected to the team's GPA.

A larger expenditure on acquiring market information enables the teams to achieve better results at the end of the game. A strong relationship between acquiring market information and game results was also confirmed in research by Lerviks and Paltschik (1982). The teams which spent more heavily on acquiring market information were in possession of more data concerning the events in the game and the market and competitors, and thus developed an advantage over their competitors. However, it must be borne in mind that the amount of money spent on obtaining market information alone does not warrant a good result at the end of the game. Turning the market information to one's advantage requires thorough analysis and synthesizing of the data.

Even though the comparison based on the accumulated profits of 10 most successful and 10 least successful teams showed that successful teams spent nearly twice as much on acquiring market information, we did not observe such great difference while comparing the normalized accumulated profits of the teams in the two success groups. One must probably account for the fact that games with high profit margins are accompanied by expenditure which is higher than usual, including expenditure made on acquiring market informa-

tion. Additionally, teams taking the leading positions based on profit usually have relatively more financial resources to make expenditures while the other teams are trying to optimize their costs.

Higher points achieved for homework indicate a thorough analysis and sufficient preparation for game days which, in its turn, probably avails a better final result. There was also a statistically significant association between the amount of market information obtained and homework. This means that teams who spent more on market information are likely to achieve higher points for homework and are, in its turn, likely to achieve better results at the end of the game. Thus the benefit of a proper market information analysis is primarily manifested in the points achieved for homework.

The teams with bigger number of absences (and lower level of discipline) were less successful. A comparison of accumulated profits made by 10 successful and 10 unsuccessful teams showed that there were no absences among the former. There could be several reasons why absences from game days are associated with the final result of the game – better discipline, bigger sense of responsibility and the fact that success in the game motivates to do better and be more active. Bad results are usually accompanied by an overall decrease in a team's motivation, thus inhibiting synergy or strive for a common goal. Fewer absences contribute to successful results because team members are more committed and informed and there are fruitful discussions with more ideas.

Teams with higher GPA achieve higher points for homework and have a better final result. However, the team's GPA is not directly related to the final place achieved in the game. The reason for this could be that teams with higher GPA tend to work more diligently on homework and points achieved for homework contribute to the final result of the game. Based on the results, we recommend that diligent students with higher GPA should be included in every team. If success of the game is defined by the final result, several of our analyses showed that the team's GPA is closely associated with success. It is most probably important for student with personal high GPA to do well, which is why they make an extra effort. This finding in our research is supported by Faria (1986), according to whom academic achievement and results in business games imitating the business environment are closely associated.

A comparison of descriptive statistics of successful and unsuccessful teams showed that the proportion of females in successful teams is smaller. Having compared accumulated profits of the two sets of success teams it became evident that when teams had an equal number of members in it, teams which had averagely one female member less were more successful. Since such a significant association emerged only in terms of accumulated profits, one may speculate that study groups which achieved higher accumulated profits contain a larger proportion of male students. This may also be due to male students' general tendency to be less risk averse or the fact that male students tend to rather go for a strategy of high prices and high profit margins whereas female students frequently "play safe" and resort to the strategy of cost optimization. The latter speculation is supported by the fact that teams with more females members tend to purchase less market information. It is possible that female students make more emotional decisions or consider it less important to thoroughly analyze market research data. However, all methods used to compare successful and unsuccessful teams showed that the proportion of female students is smaller in successful teams. However, one should not make conclusive decisions and/or choices based on existing research results and we suggest that this finding represents an opportunity for further research. However, while composing teams for business games in the future, it is worth making sure that there are mixed teams of e.g. 2 female and 3 male students.

CONCLUSION

This research and its results proved once more that simulations used in study processes serve well also research purposes. Our results confirmed that the factors contributing to success in business game Dynama are acquisition of adequate information (volume of market research information obtained),

quality of homework and team discipline. Additionally, achievement of a good final result is positively impacted by high academic achievement and earlier work experience. The size of the team, team members' nationality and level of education (undergraduate, graduate) do not have a significant effect on the final result. It was surprising to discover that successful teams have a smaller proportion of females in it than males.

The results of this research enable us to improve the aspects related to the organization of and teaching methods for this business game.

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