

2015

Decision-Making Strategies in Business Simulation Environment: A Cultural Approach

Henrik Kallio

Aalto University School of Business, henrik.kallio@aalto.fi

Follow this and additional works at: <http://aisel.aisnet.org/iris2015>

Recommended Citation

Kallio, Henrik, "Decision-Making Strategies in Business Simulation Environment: A Cultural Approach" (2015). *Issue Nr 6 (2015)*. 4.
<http://aisel.aisnet.org/iris2015/4>

This material is brought to you by the Scandinavian (IRIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in Issue Nr 6 (2015) by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Decision-Making Strategies in Business Simulation Environment: A Cultural Approach

Henrik Kallio

Department of Information and Service Economy
Aalto University School of Business
henrik.kallio@aalto.fi

Abstract. Business-simulation games are a new type of study environment for real-time decision-making strategies. This study focuses on a simulated business game called RealGame, which operates as clock-driven in real time. This game is designed as a business process and operations-management learning environment. The purpose of this study, thus, is to analyze decision-making strategies and their relation to participants' cultural backgrounds. For this purpose, we derive from the literature three different decision-making strategies (vigilant, hyper-vigilant, and passive) and compare how these are related to the decision-making team's cultural background. Results show that diverse cultures (individualist and collectivist) prefer, to some extent, different decision-making strategies. For academics, these results open up new research areas: to study how certain decision-making strategies emerge in simulation environments. The results also benefit practitioners, as they may be interested in developing a deeper understanding of the behavior in real-time organizational decision-making contexts.

Keywords: individualism; collectivism; cross-cultural decision-making; business-simulation games; multinomial logistic regression analysis.

1 Introduction

Recent research has revealed that culture has an impact on decision-making [1]. A particularly interesting context to study decision-making is via cross-cultural team,

where the decision-makers have different cultural backgrounds. One of the important aspects in cross-cultural analysis is the division between Western and non-Western cultures. It has been shown that the Western world's representatives have more individualist perceptions of the self; on the other hand, those coming from the non-Western world often prefer a collectivist consciousness [2]. These kinds of differences potentially result in different types of decision-making strategies, which may favor more or less individualist or collectivist orientation. In these circumstances, one important question is whether these different decision-making strategies are reflected in decision-making behavior, and, if they are, how might they be studied?

This study focuses on different decision-making strategies in a real-time decision-making environment called RealGame. RealGame is a business-simulation game that operates in a real-time manner. Basically, the data in our research context is generated from business game participants' decisions, which are recorded into a database during simulation gaming sessions. This database has several attributes such as time stamps, which indicate a particular decision is being made along with the type of decision. This information is then possible to link to the decision-making groups' demographic and socioeconomic factors and also to different performance indicators of the decision-making groups' simulation companies. The motivation for the study is that this kind of data enables a more realistic analysis of real-time decision-making and taking into account factors such as national culture. As a simulated reality, the rich business game data can open up a totally new and unstudied environment to research decision-making; it also has the potential to give academics and business leaders new insights, which can greatly enhance our understanding of decision-making in real-time settings. This allows us to formulate the research question: Does the team's cultural background (whether there are individualists/collectivists decision-makers in teams) affect the adopted decision-making strategy in a real-time business-simulation environment such as RealGame?

This paper is organized as follows. First, the theoretical background underlying this research will be introduced (business-simulation games and cross-cultural decision-making). Then, in Section 4, a set of testable hypotheses will be formulated along with relevant theoretical motivations. In Sections 5 and 6, the sample and measures of this study are presented. Then, in Section 7, the data analysis is conducted and important statistics are presented. Finally, conclusions are given in Section 8.

2 Business Simulation Games

According to Klabbers [3], games could be defined as something that is played just for the fun of it. Elgood [4] described a game to include at least some of the following features: 1) humanly controlled with opponents whose actions have an impact on other players and the environment; 2) winning and competitiveness are emphasized; 3) humor and enjoyment are emphasized; and 4) a continuous cycle of decision-making and notification of a decision's impact on the results in order to improve behavior. The literature offers several definitions of games designed for business simulations. For instance, Greenlaw et al. [5] defined a business game as a "sequential decision-making exercise structure around a model of business operation in where those participating in the game are assuming a role of managing simulated operation." Keys and Wolfe [6] defined management games as a "simplified simulated experiential environment, which contains enough verisimilitude or illusion of reality and responses like those in real-world are possible for those participating on exercise." Business games may have industrial, commercial, or financial grounds [4].

Gredler [7] has presented a classification of experiential simulations into the following categories: 1) data-management simulations; 2) diagnostic simulations; 3) crisis management simulations; and 4) social-process simulations. Business-simulation games are typically data-management simulations. For data-management simulations, it is normal that those participating in the simulation are often acting in a team, which consists of managers or planners. This team is then presumed to manage a company by allocation and controlling economic resources in the game. This is often achieved by controlling a number of variables. All these activities are typically linked to each other in order to enable reaching the company's goal. The purpose is to enhance the decision-making skills of those who are participating in business simulation and often in situations where limited information and time are forming the core of the context [8].

Business-simulation games also can be called managerial microworlds [9]. In these kinds of worlds, managers are more freely able to test different kinds of actions and strategies because there is no real risk of losing business in the real-life context. These simulations thus offer an extraordinary environment for managers to test and learn about the consequences of their decisions. Often these environments also offer an opportunity for long-term learning where managers can, via systematic methods, test different types of business strategies and scenarios.

3 Cross-Cultural Decision-Making

When considering cross-cultural decision-making environments, a distinction is made between the Western world's individualist perception of the self, and the non-Western world's view of the collectivist consciousness [2]. Moreover, countries can be divided

into collectivists and individualists (see [10]; see also Hofstede's scale of individualism and collectivism [11]): individualist perception lies for example in the United States of America, Canada, Western Europe and Australia, while collectivist countries are, for instance, China, Japan, Taiwan, Venezuela, India, and all non-European tribal cultures (see [2], [12], [13], [14]). This is somehow rough and perhaps oversimplifying division but is operable in this study with many different countries from both sides; this division also is used in previous research, as will be shown later in this chapter.

Remarks have been made considering differences. People from individualist countries are trying to prevent friction, which means attempting to control situations by deep exploration and information gathering [15]. Individualists are likely to be achievement-oriented [16] and more risk-taking, which can lead to expansive-decisive decision-making behavior. In general, they are likely to prefer active, assertive, and confrontational behavior in conflicts and are more confident in their decisions (see [12] and [17]). On the other hand, collectivists pay attention more to social aspects of the decision-making problem [16]. They value more security and are likely to be risk-avoiding but also will more likely follow passive, collaborative, and avoidance strategies [17]. It also has been found that, in organizations, the mentioned division has implications [18].

Previous studies have reported a number of factors affecting decision-making behavior, such as gender and age [19]. Especially important is the role of culture (see, e.g., [20,21]). These types of individual differences also have been notified in the conflict model of decision-making [22]. This model copes with how stress in a decision-making situation is handled and what kind of influence it has on how decisions are made. Hofstede's [23] argument is that there are different goals, attitudes, beliefs, and behaviors in different countries. He states that five important dimensions are likely to affect beliefs and behaviors: power distance (social acceptance of a nonequal distribution of power), individual/collectivism (whether the focus is in individual or group at responsibility and action), masculinity/femininity (the extent of differences for defined roles of gender), uncertainty avoidance (in the case of uncertainty and ambiguity the extent society feels uncomfortable or threatened), and long-term orientation/short-term orientation (the extent to which society accepts or rejects long-term traditional values). These dimensions have been shown recently to affect how decisions are made in different cultures [24]. Hofstede [25] also argued that the individualist-collectivist dimension stresses differences between cultures that prioritize more individual needs, goals, and rights. On the other hand, collectivists are giving more value to community needs, obligations, and responsibilities.

Janis and Mann [22] noted a number of decision-making styles in situations where stress plays a role; thus, a *vigilant* decision-making style seemed most effective. It is

defined as a methodological approach utilizing a number of discrete stages that clearly link defined objectives to a consideration of a range of options with the final decision-making emerging from careful assessment of the ramifications of each decision alternative. *Hyper-vigilance* is a decision-making behavior where a great amount of stress or decision conflict is placed on influencing behavior, and the decision-maker feels stress in regards to insufficient time or information, which typically leads to impulsive and inefficient decision-making. *Buck-passing* refers to a way of avoiding responsibility for a decision and suggesting that someone else is responsible. *Procrastination* is a style where any attempt of decision-making has been put off; thus, in this situation, the decision-making process itself is too challenging, which leads to the decision being delayed or totally rejected (ibid).

Different cultures utilize different decision-making styles; for example, Mann et al. [12] found that collectivist non-Western cultures were more likely to obey hyper-vigilant decision-making behavior. Also, Brew et al. [26] found similar results where collectivists scored higher in the nonvigilance dimension and lower in the vigilance dimension than did Western individualists. Mann et al. [12] also noted some differences between genders: males scored lower on buck-passing and hyper-vigilance than did females. In regards to vigilance behavior, no differences were found. However, it should be kept in mind that several studies have found no differences between the genders in decision-making (see list from [24]); although Brown et al., [24] did find some differences in decision-making behavior and culture. The authors confirmed that hyper-vigilance was more dominant for collectivists in their sample. Also, gender was investigated, and Brown et al. [24] found that hyper-vigilance also was more typical for females; furthermore, buck-passing for females received empirical support. These may relate to findings that give support that females have lower decision-making self-esteem than males [27].

4 Development of Research Hypotheses

Ohbuchi et al. [17] studied American (individualists) and Japanese (collectivists) and noted four major decision-making tactics: conciliation, assertion, third-party intervention, and avoidance. The conciliation tactic is defined in their study as the consolidation of one and other's goals or to indirectly communicate one's expectations. The assertion tactic is defined as the act of strongly asserting one's request. The third-party intervention means an attempt to seek help or advice. Avoidance is a passive tactic, which is used to avoid confrontation. Conciliation and assertion are direct tactics, while the third-party intervention and avoidance are

indirect tactics. The study by Ohbuchi et al. demonstrated that individualists preferred assertive tactics while collectivists relied more on avoidance tactics.

Another study by Mann et al. [12] investigated decision-making styles and confidence. The study focus was on individualism-collectivism dimension; thus, three Western countries represented individualism (USA, Australia, and New Zealand) and three non-Western countries represented collectivism (Japan, Hong Kong, and Taiwan). The study measured confidence in one's own decision-making ability, which was linked to different decision-making coping patterns. These patterns were based on vigilance, hyper-vigilance, buck-passing, and procrastination. Vigilance was defined as careful decision-making, hyper-vigilance as panicky decision-making style, buck-passing as avoiding making decisions and shifting responsibility to someone else, and procrastination as escaping (avoidance) [22]. Mann et al. [12] found that individualists were more confident about their decision-making abilities. Collectivists scored higher in three patterns: hyper-vigilance, buck-passing, and procrastination. On the other hand, no differences were found in vigilance between collectivists and individualists.

Yi et al. [2] conducted a study in five different countries using college students as study subjects. This study found five distinguishable decision-making styles: cooperative, collaborative, avoidant, competitive, and dominant. The results were, in some sense, controversial. For example, it was found that a country classified as collectivist (Korea) revealed to have strong tendencies toward individualism and somehow, surprisingly, had the highest score for dominant decision-making, while Americans received the second highest scores. Still, an interesting result is that, in competitive decision-making styles, the Koreans and Japanese scored the highest; on the other hand, Canadians and Americans scored the lowest. Avoidant decision-making style was most typical for the Chinese. When considering these results, it should be noted that there were some important aspects, which would have needed more control in the study setting: for example, the attitudes of the groups and subcultures.

Goss [14] used in his study Mann's [28] decision-making questionnaires (DMQI and DMQII), which are widely used to evaluate decision-making strategies of diverse cultures. These questionnaires are based on [22] the conflict theory of decision-making. The questionnaires measure different aspects: DMQI measures self-esteem as a decision-maker and DMQII measures different styles of decision-making. The decision-making questionnaire (DMQ) has seven subscales: 1) self-esteem; 2) vigilance; 3) hyper-vigilance; 4) defensive avoidance; 5) rationalization; 6) buck-passing; and 7) procrastination. Research has found that there exists a modest relationship between self-esteem and different decision-making styles (vigilance, hyper-vigilance, and defensive avoidance), although contradictory results have also been shown [28].

Interestingly, self-esteem also has been shown to be possibly culture-related; thus, it may vary by culture [28]. The study found that Asians scored higher in such decision-making styles as buck-passing, avoidance, and hyper-vigilance. These were related to the fact that Westerners (Americans and New Zealanders) received higher scores in confidence than non-Westerners. Thus, a linkage between culture and self-esteem (confidence) was found. Similar results were also confirmed by King et al. [29] who studied Cherokee Native Americans and Australian college students. The collectivists (Cherokees) favored more negative decision-making strategies (hyper-vigilance, defensive avoidance, rationalization, buck-passing, and procrastination) while individualists used more positive decision-making strategies (self-esteem and vigilance). However, this study emphasized that a positive or negative decision-making strategy is dependent on culture. Thus, a strategy that is labeled as negative (such as buck-passing) may be a good strategy for collectivists who want to involve the whole group into the decision-making process, thus taking responsibility to share decision-making with the group.

G ss et al. [30] implemented a decision-making study in a dynamic simulated environment. Students were used as decision-makers: they were asked to imagine being the director of a textile company. The students came from one individualist country (Germany) and one collectivist country (India). Functioning of the company was based on a computer simulation (microworld). G ss et al. [30] found no significant differences between individualist and collectivist cultures in strategic or tactical errors or in the decision-making behavior. However, one significant difference was found: the individualists were more successful in simulation: individualists followed a different strategy in gaming than the collectivists. The individualists used more expansive and risky decision-making strategies (more production and selling), whereas collectivists used defensive-incremental ones (slowly increasing production, thus coordinating production and sales better than individuals). A distinction between vertical and horizontal individualism [31] (vertical/horizontal classification is also for collectivists, but this division is not in scope of this study due to data limitations) has been detective, and, on this basis, individualist countries can be divided into countries presenting more vertical individualism (North America) and horizontal individualism (Nordic countries). Horizontal individualism highlights more equality between humans while vertical individualism stresses hierarchy [31]. Thus, we can formulate the following hypotheses:

Hypothesis 1. Those simulation game teams, which have at least one collectivist (non-Western) participant, are more likely following a passive or hyper-vigilant type of decision-making pattern in a real-time decision-making environment.

Hypothesis 2. Those simulation game teams, which have at least one North American participant, are more likely following a vigilant type of decision-making pattern in a real-time decision-making environment.

Hypothesis 3. Those simulation game teams, which have at least one Nordic participant, are more likely following a vigilant type of decision-making pattern in a real-time decision-making environment.

A study by The Hofstede Centre [11] reasoned that Western Europe could be seen as its own group of individualists; in other words, those individualists are outside of Europe or North America.

Hypothesis 4. Those simulation game teams, which have at least one Western European participant, are more likely following a vigilant type of decision-making pattern in a real-time decision-making environment.

Hypothesis 5. Those simulation game teams, which have at least one individualist participant outside of North America or Europe, are more likely following a vigilant type of decision-making pattern in a real-time decision-making environment.

5 Sample

Data used in this study are collected from a business-simulation game called RealGame, and it includes a total of 23 simulation game training sessions from a large international manufacturing organization. Participants are, thus, involved in real business life. The training modules were part of the mid-management development program in the company during 2008–2011. As much as 407 employees participated in these 23 sessions. The participants were placed in teams of two to three people, which were then running their own simulation game company; the companies' tasks were to introduce different kinds of bikes into the market. There were in total 144 in two to three member teams. The teams competed against each other inside their training session in an imaginary environment, which was suited for the case company so that the cause and effect relationships along the supply chain were near to the participants' real-world context.

The data has adequate background information on $n = 141$ teams, the majority of which 114 (81%) are three-person teams and 27 (19 %) are two-person teams. As previously mentioned, the business-simulation game is able to save all the actions the group makes into a separate database. These actions are made during the simulation session and can be menu selections (reports and graphics), window activations, or

actual operation-specific decisions (normally, a numerical value entered for the decision in question). Each action in the log file has time stamps: the simulation's internal time and the real-world time.

6 Measures and Manipulation

In this research, decision-making patterns are defined as follows. A *vigilant decision-making pattern* is when the proportion of decisions is high and the total amount of all actions made during gaming is high. *Hyper-vigilant decision-making patterns* are when the proportion of decisions is high but the total amount of all actions is low. A *passive decision-making pattern* refers either to a *buck-passing decision-making pattern*, where the proportion of decisions is low and the total amount of all actions is high, or to *procrastination decision-making pattern*, where the proportion of decisions and total amount of all actions is low. This logic follows the idea of Albaum et al. [22] who detected different decision-making styles in situations where stress plays a role. Further, G ss [30] rationalized that the correlation between decisions and other types of actions is indicative of decision-making style in regards to whether it can be claimed to be as stable or non-stable (changing).

To create these variables, which describe turning decision-making patterns into data to use in analysis, there is first a need to recognize from the log-file which logs are attached to different decisions and which to different actions. Here, decisions refer to those actual game actions, which are operation-specific decisions, and by actions we mean the rest. These are summarized at the end of the simulation game. Based on the distribution of the total amount of all actions and of the proportion of decisions from all actions, we are able to set thresholds that are used in classifying whether the decision-making group's decision-making pattern is vigilant, hyper-vigilant, or passive (buck-passing or procrastination). Based on analysis of distributions, it is decided that the thresholds should be based on median values of the total amount of all actions (1 670) and proportion of decisions (0.1871). Median values are typical in studies; for example, in marketing they are often used as thresholds when dichotomies are created (for example, heavy users versus low users, see [31]). Classifications for different decision-making strategies are given in Table 1.

Table 1. Classifications of different decision-making strategies in RealGame.

	Proportion of decisions < 0.1871	Proportion of decisions \geq 0.1871
Total amount of all actions < 1 670	Passive (Procrastination) $N = 28$	Hyper-vigilant $N = 42$

Total amount of all actions \geq 1 670	Passive (Buck-passing) $N = 43$	Vigilant $N = 28$
------------------------------------------	------------------------------------	----------------------

Table 1 shows that 28 teams are using a vigilant decision-making strategy (total amount of all actions \geq 1 670 and proportion of decisions \geq 0.1871); 42 are using a hyper-vigilant decision-making strategy (total amount of all actions $<$ 1 670 and proportion of decisions \geq 0.1871); 43 are using a buck-passing decision-making strategy (total amount of all actions \geq 1 670 and proportion of decisions $<$ 0.1871); and 28 teams are using a procrastination strategy (total amount of all actions $<$ 1 670 and proportion of decisions $<$ 0.1871). Thus, 71 teams are using a passive decision-making strategy (buck-passing or procrastination).

Our data presents the following nationalities in teams (Table 2).

Table 2. Nationalities presented in teams.

	No players in team	One player in team	Two players in team	Three players in team
Australia or Republic of South Africa	123	18	0	0
China	100	37	4	0
Eastern Europe	127	14	0	0
Far East	121	18	2	0
North America	88	38	10	5
Nordic	33	84	18	6
Western Europe	72	51	18	0

Table 2 shows that, for example, there are 72 teams without participants from Western Europe and 51 teams with one player from Western Europe. Based on the classification by Hofstede (see [11]), there are teams with at least one individualist (139) and with at least one collectivist (67). There is, however, distinction between vertical and horizontal individualism [32], and, on this basis, we take North America as its own group (vertical individualism) and, on the other hand, Nordic as its own

(presenting more horizontal individualism). It also can be detected, based on [11], that Western Europe could be treated as a separate group of individualists. Finally, we form our own individualist group from countries outside of Europe or North America (Australia and Republic of South Africa).

7 Data Analysis and Results

Multinomial logistic regression analysis is conducted in which the dependent variable is the style of decision-making in three categories ($Y=1$ as vigilant, $Y=2$ as passive, and $Y=3$ as hyper-vigilant). Dummy-coded binary independent variables are presenting the type of teams (at least one player from the respective group): 1) collectivists; 2) North American individualists; 3) Nordic individualists; 4) Western European individualists; and 5) other individualists (Australia and Republic of South Africa). A multinomial logistic regression model is used to classify multiclass problems where there are more than two discrete outcomes [33]. A multinomial logistic model estimates the probabilities of different outcomes of a categorically distributed dependent variable based on a set of independent variables, which is a generalization of a logistic regression model for problems with multiple classes [33]. Thus, the purpose is to study how independent variables presenting different individualism/collectivism-classifications affect adoption of decision-making strategies with respect to other decision-making strategies. This means that, in this study, we receive from multinomial logistic regression analysis three different models (vigilant versus passive, vigilant versus hyper-vigilant, and passive versus hyper-vigilant). Model log likelihood ratio value is 14.43 ($p = 0.1544$).

Table 3. Multinomial logistic regression: Vigilant (response) versus passive.

Independent Variable	Coefficient
Intercept	1.90***
Collectivists	0.06
North American Individualists	0.27
Nordic Individualists	0.13
Western European Individualists	0.61**
Other Individualists	0.85
Model Log Likelihood Ratio	14.43

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$

Based on the results (Table 3) we have one statistically significant independent variable (at the 5% level of risk), Western European individualists ($p = 0.0239$). The result means that teams with at least one participant from Western Europe are more likely using the passive decision-making strategy (odds ratio 3.39) compared with the vigilant decision-making strategy.

Table 4. Multinomial logistic regression: Vigilant (response) versus hyper-vigilant.

Independent Variable	Coefficient
Intercept	1.69***
Collectivists	0.17
North American Individualists	0.42
Nordic Individualists	0.02
Western European Individualists	0.84***
Other Individualists	1.39**
Model Log Likelihood Ratio	14.43

* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$

Based on the results (Table 4), we have two statistically significant independent variables (at the 5% level of risk), Western European individualists ($p = 0.0064$), and other individualists ($p = 0.0171$). The result means that those teams with at least one player from Western Europe (odds ratio 5.38) or from other individualists countries outside North America or Europe (odds ratio 15.87) are more likely using the hyper-vigilant decision-making strategy compared with a vigilant decision-making strategy.

Table 5. Multinomial logistic regression: Passive (response) versus hyper-vigilant.

Independent Variable	Coefficient
Intercept	-0.21
Collectivists	0.11
North American Individualists	0.15
Nordic Individualists	0.15

Western European Individualists	0.23
Other Individualists	0.53*
Model Log Likelihood Ratio	14.43
* $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$	

Based on the results (Table 5), we have no statistically significant independent variables at the 5% level of risk. At a 10% level of risk, we have one significant variable: other individualists ($p = 0.0860$). This means those teams with at least one player from individualist countries outside North America or Europe are more likely using a hyper-vigilant decision-making strategy (odds ratio 2.89) compared with a passive decision-making strategy. However, this result needs to be considered with caution.

Hypothesis 1. This hypothesis claims that those simulation game teams, which have at least one collectivist participant, are more likely following a passive or hyper-vigilant type of decision-making pattern in a real-time decision-making environment. In analysis, this does not receive support.

Hypothesis 2. This hypothesis claims that those simulation game teams, which have at least one North American participant, are more likely following a vigilant type of decision-making pattern. This does not receive support in our analysis.

Hypothesis 3. This hypothesis argues that those simulation game teams, which have at least one Nordic participant, are more likely following a vigilant type of decision-making pattern. This does not receive support in analysis.

Hypothesis 4. This hypothesis claims that those simulation game teams, which have at least one Western European participant, are more likely following a vigilant type of decision-making pattern. This does not receive support at a 5% level of risk which is contrary to expected. It was found that these teams are more likely using passive (parameter estimate 0.61, $p = 0.0239$) or hyper-vigilant (parameter estimate 0.84, $p = 0.0064$) decision-making strategy than vigilant one.

Hypothesis 5. This hypothesis claims that those simulation game teams, which have at least one individualist participant outside of North America or Europe, are more likely following a vigilant type of decision-making pattern. This does not receive support at a 5% level of risk which is also contrary to expected. It was detected that these teams were more likely favoring a hyper-vigilant (parameter estimate 1.39, $p = 0.0171$) decision-making strategy than vigilant. Also some indication was found that

these teams were more likely using a hyper-vigilant (parameter estimate 0.53, $p = 0.0860$) decision-making strategy than passive strategy.

8 Discussion and Conclusions

This study focuses on how culture affects decision-making. Previous studies have found that there exists a connection between culture and decision-making (see, for example, [1], [12], and [24]). An important cultural dimension in the literature is the distinction between the Western and non-Western world's views: the Western view stresses the individualist approach, while the non-Western stresses the collectivist approach [2].

The research question in this paper is whether a team's cultural background (whether there are individualist/collectivist decision-makers in teams) affects the adopted decision-making strategy in a real-time business-simulation environment such as RealGame. RealGame operates as clock-driven [34]. Teams were labeled to individualists/collectivists based on the presence of at least one participant from the respective class. Decision-making strategies were derived from the total amount of all actions made during the simulation and the proportion of decisions from those actions. Multinomial logistic regression analysis was performed. Preliminary results show some evidence that the formation of a simulation-playing group may have had an effect on what kind of decision-making strategy is used. The results do not support some previous studies based on static questionnaire data, where it has been found that those teams labeled "collectivist" are more likely using a passive or hyper-vigilant decision-making strategy. Further, no support was found that North American or Nordic individualists would prefer a vigilant decision-making strategy. Interestingly, it was found that one group of individualists (Western European) more likely preferred a passive or hyper-vigilant strategy than a vigilant one, which is contrary to that of previous studies. Also, other groups of individualists (teams with at least one participant from Australia or the Republic of South Africa) were more likely to use a hyper-vigilant than vigilant decision-making strategy; thus, support was found that a hyper-vigilant strategy was preferred compared with passive. These results have theoretical and practical implications. Decision-making patterns in a real-time business-simulation environment may differ from previous non-real-time studies. Secondly, from a practical point of view, multinational organizations can utilize these findings, for example, in designing of work teams.

This study has limitations. First, in data there were quite a few culturally homogeneous teams and proxy classification was created (individualism/collectivism) based on the prior literature. It would have been more beneficial to have teams with the same cultural origin and, thus, be more reliable about the team's label. The

division is still based on previous research being reliable enough to label different countries into categories used in this study. Often these kinds of classifications are natural simplifications and should be understood by keeping this in mind. The same goes for our classification of decision-making strategies: it is more likely a normative vehicle than something accurately covering all nuances (see [35] for more information). From data used in this study, it is impossible to detect and control the previous experience in intercultural settings for single players who form the teams. Because our data is log-type, it is then quantitative research, which proved possible in this context of study. In future research, this approach could be combined with a qualitative approach and, thus, gather some deeper information and understanding in regards to decision-making in intercultural teams. Also, interesting topic would be differences between decision-making strategies and performance in simulation.

References

1. Hudlicka, E.: Cross-Cultural Decision-making Strategies: Modeling Cultural and Personality Biases in Decision-Making. *Advances in Cross-Cultural Decision-Making* Schmorrow, D. and Nicholson, D. (eds). CRC Press, Taylor & Francis Group (2011)
2. Yi, J.S., Park, S.: Cross-Cultural Differences in Decision-Making Styles: A Study of College Students in Five Countries. *Social Behavior and Personality*, vol. 31, pp. 35–48 (2003)
3. Klabbers, J.: Three Easy Pieces: A Taxonomy of Gaming. In Saunders, Danny and Severn, Jackie (eds.) *The International Simulation & Gaming Research Yearbook: Simulations and Games for Strategy and Policy Planning*. Kogan Page, London, pp. 16–33 (1999)
4. Elgood, C.: *Using Management Games*. 2nd ed., Gower Press, Aldershot, Hampshire, England (1996)
5. Greenlaw, P.S., Herron, L.W., Rawdon, R.H.: *Business Simulation in Industrial and University Education*. Prentice-Hall, Inc., Englewood Cliffs, N.J. (1962)
6. Keys, B., Wolfe, J.: The Role of Management Games and Simulations in Education and Research. *Journal of Management*, vol. 16, pp. 307–336 (1990)
7. Gredler, M.E.: Educational Games and Simulations: A Technology in Search of a (Research) Paradigm. In Jonassen, David H. (ed.) *Handbook of Research for Educational Communications and Technology*. Simon & Schuster Macmillan, New York (1996)
8. Whicker, M. L. and Sigelman, L.: *Computer Simulation Applications, An Introduction*. Sage Publications, London (1991)
9. Senge, P. M., Lannon, C.: Managerial Microworlds. *Technology Review*, vol. 93, pp. 62-68 (1997)
10. Hofstede, G., Hofstede, G.J., Minkov, M.: *Cultures and Organizations: Software of the Mind*, 3rd ed., McGraw-Hill (2010)
11. The Hofstede Centre: <http://geert-hofstede.com/countries.html>
12. Mann L., Radford, M., Burnett, P., Ford, S., Bond, M., Leon, K., Nakamura, H., Vaughan, G., Yang, K.-S.: Cross-cultural differences in self-reported decision-making style and confidence. *International Journal of Psychology*, vol. 33, 325–335 (1998)

13. Sue, D.W.: Multicultural Organizational Consultation: A Social Justice Perspective. *Consulting Psychology Journal: Practice and Research*, vol. 60, 157–169 (2008)
14. G ss, C.D.: Decision-making in individualistic and collectivist cultures. *Online Readings in Psychology and Culture*, International Association for Cross-Cultural Psychology (2004)
15. Strohschneider, S., G ss, D.: The Fate of the Moros: A Cross-Cultural Exploration of Strategies in Complex and Dynamic Decision-Making. *International Journal of Psychology*, vol. 34, pp. 252–252 (1998)
16. Triandis, H.C.: Theoretical and Methodological Approaches To the Study of Collectivism and Individualism. In U. Kim, H.C. Triandis, C. Kagitcibasi, S.-C. Choi, G. Yoon (eds.) *Individualism and Collectivism. Theory, Method and Applications*, pp. 41–51. Thousand Oaks, CA: Sage (1994)
17. Ohbuchi, K.-I., Fukushima, O., Tedeschi, J.T.: Cultural Values in Conflict Management: Goal Orientation, Goal Attainment, And Tactical Decision. *Journal of Cross-Cultural Psychology*, vol. 30, pp. 51–71 (1999)
18. Gelfand, M.J., Bhawuk, D.P.S., Nishii, L.H., Bechtold, D.J.: Individualism and Collectivism. In House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W. and Gupta, W. (eds.) *Culture, Leadership, and Organizations*. Sage Publications, Inc. (2004)
19. Saad, G., Eba, A., Sejean, R.: Sex Differences When Searching for a Mate: A Process-Tracing Approach. *Journal of Behavioral Decision-Making*, vol. 22, pp. 171–190 (2009)
20. Albaum, G., Herche, J., Yu, J., Evangelista, F., Murphy, B. Poon, P.: Differences in Marketing Managers' Decision-Making Styles Within the Asia-Pacific Region: Implications for Strategic Alliances. *Journal of Global Marketing*, vol. 2, pp. 63–78 (2007)
21. Leo, C., Bennett, R., Hartel, C.E.: Cross-Cultural Differences in Consumer Decision-Making Styles. *Cross-Cultural Management*, vol. 12, 32–62 (2005)
22. Janis, I.L., Mann, L.: *Decision-Making: A Psychological Analysis of Conflict, Choice, and Commitment*. New York, Free Press (1977)
23. Hofstede, G.: *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations*. Thousand Oaks, CA, Sage Publications, 2nd ed. The Hofstede Centre. <http://geert-hofstede.com/countries.html>. (2001)
24. Brown, J., Abdallah, S.S., Ng, R. Decision-Making Styles East and West: It Is Time To Move Beyond Cross-Cultural Research? *International Journal of Sociology and Anthropology*, vol. 3, 452–459 (2011)
25. Hofstede, G.: *Cultures and Organizations: Software of the Mind*. Beverly Hills, CA, Sage (1980)
26. Brew, F., Hesketh, B., Taylor, A.: Individualist-Collectivist Differences in Adolescent Decision-Making and Decision Styles with Chinese and Anglos. *International Journal of Intercultural Relationships*, vol. 25, 1–19 (2001)
27. Ramanigopal, C.S.: Self-Esteem and Decision-Making Styles of School Teachers. *Journal of the Indian Academy of Applied Psychology*, vol. 34, pp. 145–150 (2008)
28. Mann, L.: *Flinders Decision-Making Questionnaire I and II*. Unpublished Questionnaires, School of Social Sciences, Flinders University of South Australia (1982)
29. King, J., Tempel, K., Draguns, J.: Cross-Cultural Decision-making Strategies: Contrasts Between Cherokee Native American and Australian College Students. *Advances in Cross-Cultural Decision-Making*. Schmorrow, D. and Nicholson, D. (eds). CRC Press, Taylor &

Francis Group (2011)

30. Goss, D., Strohschneider, S., Halcour, D.: Strategies in Complex and Dynamic Decision-Making: Cross-Cultural Analyses Between India and Germany, Institut für Teoretische Psychologie, Otto-Friedrich Universität, Bamberg, Germany (2000)
31. Triandis, H.C., Gelfand, M.J.: Converging Measurement of Horizontal and Vertical Individualism and Collectivism. *Journal of Personality and Social Psychology*, vol. 74, pp. 118-128 (1998)
32. Verhoef, P.M., Donkers, B.: Predicting Customer Potential Value an Application in the Insurance Industry. Erasmus Research Institute in Management, Report Series Research In Management (2001)
33. Greene, W.H. *Econometric Analysis* (7th ed.). Boston Pearson Education (2012)
34. Lainema, T.: Enhancing Organizational Business Process Perception – Experiences from Constructing and Applying a Dynamic Business Simulation Game. *Turku School of Economics, Series A-5* (2003)
35. Khaled, R., Barr, P., Biddle, R., Noble, J., Fischer, R.: Game Design Strategies for Collectivist Persuasion. In the Proceedings of the 36th International Conference and Exhibition on Computer Graphics and Interactive Techniques (2009)