A Study on Collectivism and Group Decision-Making: An International Comparison of Japan, China, and Russia using a Gaming Simulation

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ABSTRACT

International comparative research was conducted on the degree of collectivism and the methods of group decision-making in Japanese, Chinese, and Russian firms, using a gaming simulation we developed called MBABEST21. As a result of our quantitative and qualitative analyses, it was found that: the degree of collectivism obeyed the inequality China>Russia>Japan; teams whose members rated each other highly for fulfilling their respective roles in the gaming exhibited good game results; and group decision-making is not stressed in Russian firms, but is stressed to an extreme degree in Chinese companies.

INTRODUCTION

The purpose of this research was to conduct an international comparison of group decision-making at Japanese, Chinese, and Russian firms. This research also extends the research in Morita et al. (2010). It was decided to focus on Japan, China, and Russia because, even though the countries of Asia are rapidly developing economically, there has not been a sufficient accumulation of research on those Asian countries compared to research comparing Japan and the US in terms of group decision-making in firms.

In Morita et al. (2010), experiments were conducted on working MBA students and data was gathered, and the results were analyzed to explore whether differences are evident in the efficiency (satisfaction) of group decision-

making in Japan, China, and Russia. Working MBA students were selected as the experimental subjects because it was felt that MBA students with experience working in a company would accurately reflect the decision-making style of each country. In fact, when the same type of experiments were conducted on MBA students and undergraduates, the results showed a considerable difference between the two. By using MBA students as subjects, it should be possible to obtain results closer to the group decision-making in firms.

In the experiments on MBA students, the students played a business game we developed called MBABEST21, and analysis was conducted based on questionnaire surveys administered before and after the experiment. The business game involves decision-making by teams, and thus is likely to be an appropriate method of capturing the characteristics of group decision-making. Efficiency was measured based on the results of questionnaire surveys administered before and after the business game. More specifically, subjects were asked questions about their preferences for group decision-making such as "When making a decision at work, do you prefer to decide on your own or to consult with somebody else?"

Experiments using this business game were conducted on 111 Japanese MBA students (at Aoyama Gakuin University in Tokyo), 44 Chinese MBA students (at Northeastern University in Shenyang), and 12 Russian MBA students (at Moscow University in Moscow). However, since the sample size for Russia was small, the results for Russia are only used for reference.

The following findings were obtained by analyzing the experiment results. The Japanese teams conducted decision-making with stress on consensus, and they were determined to have a high degree of emergence due to decision-making as a team. In the Chinese teams, in contrast, it was determined that teams members adequately played their respective roles, and actively cooperated with other members. The common point between the two countries was that they were evaluated to have "few conflicts of opinion between team members in decision-making."

Thus there were few conflicts of opinion within the groups in both countries, but the reasons for this were found to be different. In Japan the reason was the stress on consensus, whereas in China it was due to the members' commitment to fulfilling their respective roles.

This research extends the above research methodology of Morita et al. (2010) in the following ways. First, analysis was conducted using a questionnaire survey based on the Hofstede model for the Individualism-Collectivism dimension (which is thought to be intimately related to group decision-making) in order to detect the characteristics of subjects from each country before measuring group decision-making using the gaming simulation. In this research, analysis was conducted based on the Hofstede model because it is the pioneering research which has most systematically and quantitatively captured organizational culture through a large-scale survey. Already, more than

30 years have passed since the Hofstede surveys, and the economic and social situation have changed. Therefore, it is significant to validate the model again based on the latest data.

Next, in this research, decision-making in corporate organizations is measured in a controlled experimental environment using a gaming simulation conducted at the same time as the questionnaire surveys. More specifically, the results of Morita et al. (2010) are replicated with regard to efficiency of group decision-making. The robustness of the findings obtained last year is examined, and the relationship with the results (win/loss) of the gaming simulation, which was not conducted in last year's research, are also discussed.

Furthermore, in this research, we provide a more in-depth discussion based on a qualitative interview survey of the nature of the Chinese group decision-making style, and the likely reasons for the differences with the Japanese group decision-making style.

As far was we have investigated, we have found no previous research on organizational decision-making which simultaneously uses the following 3 approaches in a short time frame as in this research: (1) Quantitative questionnaire survey beforehand, (2) Laboratory experiment, and (3) Qualitative analysis based on interviews. Therefore, this research is novel in that way.

COMPARISON BY COUNTRY OF INDIVIDUALISM AND COLLECTIVISM

This section discusses the country-specific differences in the latent individualism/collectivism of subjects, based on the research of Hofstede. Data was collected prior to the controlled experiment on group decision-making using a gaming simulation.

HOFSTEDE'S INDIVIDUALISM INDEX

From 1967 to 1973, Hofstede (1980, 2001) administered a questionnaire survey to about 110,000 employees working for IBM in 40 countries, in order to measure differences in culture due to the country. Four dimensions were identified as a result: Power Distance (PDI), Uncertainty Avoidance (UAI), Individualism (IDV), and Masculinity (MAS). Another indicator—Long Term Oriented (LTO)—was added due to a survey in 1994, and thus culture is captured with five dimensions.

In Morita et al. (2010) it was found that members of Chinese teams rated their cooperation with their own team members higher than Japanese team members. In that research, a hypothetical model was developed which suggests that, when building cooperation between team members for this sort of group decision-making, in Japan subjects build cooperative relationships by stressing consensus, while in

China subjects build cooperative relationships by clarifying roles and then committing themselves to those roles.

Country-specific variables or variables which express the culture of the country (particularly its corporate organizational culture) are likely to have an effect on building cooperative relationships for group decision-making. Among those variables are the five dimensions of organizational culture identified by Hofstede (1980, 2001), and of those we focus on Individualism (IDV). The following discusses how this dimension differs between Japan and China based on data obtained from the questionnaire administered before the game.

QUESTIONS FOR MEASURING COLLECTIVISM

In order to identify the five dimensions mentioned above, Hofstede asked subjects to answer many questions. To construct a variable expressing Individualism, Hofstede had subjects indicate the subjective importance they assigned to the following 14 questions.

BQ1. Have challenging work to do—work from which you can get a personal sense of accomplishment? (Challenging)

BQ2. Live in an area desirable to you and your family? (Desirable Area)

BQ3. Have an opportunity for high earnings? (Earnings)

BQ4. Work with people who cooperate well with one another? (Cooperation)

BQ5. Have training opportunities (to improve your skills or to learn new skills)? (Training)

BQ6. Have good fringe benefits? (Benefits)

BQ7. Get the recognition you deserve when you do a good job? (Recognition)

BQ8. Have good physical working conditions (good ventilation and lighting, adequate work space, etc.) (Physical Condition)

BQ9. Have considerable freedom to adopt your own approach to the job. (Freedom)

BQ10. Have the security that you will be able to work for your company as long as you want to? (Employment Security)

BQ11. Have an opportunity for advancement to higher level job? (Advancement)

BQ12. Have a good working relationship with your manager? (Manager)

BQ13. Fully use your skills and abilities on the job? (Use of Skills)

BQ14. Have a job which leaves you sufficient time for your personal of family life? (Personal Time)

Subjects were asked to answer the above questions with a 5 point scale, with 1 point indicating "of very little or no importance" and 5 points indicating "of utmost importance to me." Here the points are assigned in the reverse way from Hofstede's survey, where 5 points indicate "of very little or no importance" and 1 point indicates "of utmost importance to me." The questions for the replication of the survey in Morita et al. (2010) examined in the

following section use a 7 point scale with 7 indicating the highest evaluation, and thus the scoring was reversed to avoid confusing the subjects.

Furthermore, to eliminate effects due to English comprehension skills, the above questions, the questionnaire administered in the following section, and the interview were translated into the subjects' native language by research collaborators in each country. The subjects also responded in their native language.

ANALYSIS RESULTS

Hofstede (1980) conducted factor analysis on the response results to the above questions. As the first factor, he identified a factor indicating Individualism, and as the second factor, he identified a factor indicating Masculinity.

According to Hofstede's definition, in Individualism the interests of the individual take precedence over the interests of the group, and in Collectivism, the interests of the group take precedence over the interests of the individual.

With Individualism, there is a tendency to stress Personal Time (BQ14), Freedom (BQ9), and Challenging (BQ1), and to not stress Training (BQ5), Physical Condition (BQ8), and Use of Skills (BQ13). Conversely, Collectivism does not stress Personal Time (BQ14), Freedom (BQ9), and Challenging (BQ1), but does stress Training (BQ5), Physical Condition (BQ8), and Use of Skills (BQ13).

Stressing Personal Time, Freedom, and Challenging emphasizes the independence of the employee from the organization. Stressing Training, Physical Condition, and Use of Skills is taken to indicate dependence of the employee on the organization because these items are supplied by the organization to the employee. Hofstede listed the items in Table 1 as the results which Individualism and Collectivism have on an organization.

As a result of conducting factor analysis on the above questions, the factor of Masculinity was identified as the second factor. According to Hofstede's definition, Masculinity places relative stress on Earnings (BQ3), Recognition (BQ7), Advancement (BQ11), and Challenging (BQ1), while Femininity places relative stress on Manager (BQ12), Cooperation (BQ4), Desirable Area (BQ2), and Employment Security (BQ10). Hofstede listed the items in Table 2 as the results which Masculinity and Femininity have on an organization.

The above questions are important for anyone, and thus the effects of "yes man" style acquiescence can appear in the responses. To exclude those effects, Hofstede used a unique approach where he standardized values using the mean and standard deviation for all questions for each country, performed conversion by multiplying by 100 and adding 500, and then indicated the resulting data. Factor analysis was then conducted based on this standardized data for 40 countries, and the factors of Individualism and Masculinity were identified. However, when we attempted to reproduce the same factor analysis in this research, there

was no data except the means for 3 countries, and thus it was impossible to carry out the factor analysis. Thus we first tested the means and mean differences of each country for each question (see Table 3).

However, for Chinese subjects we include data for subjects of an experiment with a different scenario (USB memory market in China) in addition to data for subjects of the gaming experiment conducted in the next section. Here we measure cultural characteristics of subjects prior to conducting the gaming simulation, and the number of subjects was increased (to 47) in order to ensure robustness of results while increasing the sample size. Also, no significant difference was detected between means for the pre-experiment questionnaire for the two scenarios in China.

The items stressed by Japanese subjects are Challenging (BQ1), Use of Skills (BQ13), and Recognition (BQ7), and the items comparatively not stressed are Employment Security (BQ10), Benefit (BQ6), and Physical Condition (BQ8). The items stressed by Chinese subjects are Challenging (BQ1)，Training (BQ5), and Manager (BQ12), and the items comparatively not stressed are Physical Condition (BQ8), Freedom (BQ9), and Employment Security (BQ10). For Russia, there are only 12 subjects and thus the data is given only for reference, but the items stressed by Russian subjects are Challenging (BQ1), Cooperation (BQ4), Training (BQ5), and Freedom (BQ9). Conversely, the items comparatively not stressed are Personal Time (BQ14), Benefits (BQ6), and Physical Condition (BQ8).

As a result of testing the difference in means between Japan and China, it was found that Chinese subjects significantly stress Training and Physical Conditions (items indicating Collectivism) while Japanese subjects significantly stress Personal Time (an item indicating Individualism). Therefore between the two countries, China has a relatively stronger tendency toward Collectivism. These results are the same as the rank of indicators for Individualism (IDV) in Japan and China given by Hofstede (Table 4). Hofstede asserts that countries with greater economic maturity show a stronger tendency toward individualism, and the results of this research support that assertion.

In terms of items stressed by Masculinity, the results showed that China places significant relative stress on Earnings (BQ3). In terms of items stressed by Femininity, China places relatively more stress on Desirable Area (BQ2), Cooperation (BQ4), Employment Security (BQ10), and Manager (BQ12), and thus from an overall perspective,

Key difference between collectivist and individualist societies
Table 1

Low Individualism (IDV)	High Individualism (IDV)
Emphasis on belonging to organization: membership ideal.	Emphasis on individual initiative and achievement: leadership ideal.
Involvement of individuals with organizations primarily moral.	Involvement of individuals with organizations primarily calculative.
Belief in group decision.	Belief in individual decisions.
Employees expect organizations to look after them like a family - and can become very alienated if organization dissatisfies them.	Organizations are not expected to look after employees from the cradle to the grave.
Organization has great influence on members' well-being.	Organization has moderate influence on members' well-being.
Employees expect organizations to defend their interests.	Employees are expected to defend their own interest.
Policies and practices based on loyalty and sense of duty	Policies and practices should allow for individual initiative.
Promotion from inside.	Promotion from inside and outside.
Promotion on seniority.	Promotion on market value.
Less concern with fashion in management ideas.	Managers try to be up-to-date and endorse modern management ideas.
Policies and practices vary according to relations (particularism)	Policies and practices apply to all.

Note: Extracts taken by the authors from Fig. 5.6 and 5.8 in Hofstede (1980).

the results indicate that China has a tendency toward Femininity.

When comparing Japan and Russia for reference, Russia significantly stresses Training (BQ5) among items indicating Collectivism, but in terms of Individualism, Russia exhibits relative stress on Freedom (BQ9).

Earlier it was noted that many countries were not surveyed in this research, and thus it is not possible to reproduce the factor analysis from the response results for the administered questionnaires. However, it is important to compare with values for Individualism (IDV) and Masculinity (MAS) in past previous research. Thus, in this research, a different approach is taken. The factor loadings of Hofstede are used as is, and a method for finding indicators of Individuality (IDV) and Masculinity (MAS) is employed.

More specifically, factor score coefficients are determined from the factor loadings presented by Hofstede, and then standardization is done using the mean and standard deviation for all questions for each country. The resulting values are then converted in a unique way by multiplying by 100 and adding 500, and then IDV and MAS indicators are obtained from the factor score coefficients for the converted data. However, for the necessary factor loadings, only the parts where the factor loadings are high for the first and second factor are clearly indicated in the previous studies by Hofstede (1980, 2001), and factor loadings for all questions are not presented. Therefore, it is not possible to replicate the results.

Thus Fujita (1999) shows a reproduction method for finding the factor loadings for each question from the Hofstede data. This research also replicates the factor analysis using the data of Hofstede (2001) based on Fujita (1999). All of the factor loadings for each question were found, and IDV and MAS indicators were found from the factor scoring coefficients (see the values in parentheses in Table 4).

The same rank relationships of Individualism and Masculinity between Japan and China were obtained as in the past previous research of Hofstede. Compared to China, Japan had relatively higher individualism, and there was no reversal in rank. When the values of Individuality indicators (IDV) were compared with previous research, there was a tendency for values to increase overall for both countries. This result suggests that in developing countries such as China and Russia, the tendency toward Individualism has increased compared to past surveys. In Hofstede's previous research, Masculinity (MAS) exhibited a high value because almost all of the subjects were men, but in this survey using MBA students as subjects, the percentage of women was higher than in Hofstede's research, and thus it is likely the Masculinity value decreased. Also, if the current state of women's penetration into society is reflected, it is likely that Masculinity (MAS) has decreased from the IBM survey results in corporate organizations.

Key differences between masculinity and femininity societies
Table 2

Low Masculinity (MAS)	High Masculinity (MAS)
Service ideal.	Achievement ideal.
Interdependence ideal.	Independence ideal.
Intuition.	Decisiveness.
Leveling; don't try to be better than others.	Excelling;: try to be the best.
Some young men and women want careers, others do not.	Young men expect to make a career; those who don't see themselves as failures.
Organization should not interfere with people's private lives.	Organization interests are a legitimate reason for interfering with people's private lives.
More women in more qualified and better-paid jobs.	Fewer women in more qualified and better-paid jobs.
Women in more qualified jobs not particularly assertive.	Women in more qualified jobs are very assertive.
Lower job stress.	Higher job stress.
Less industrial conflict.	More industrial conflict
Appeal of job restructuring permitting group integration.	Appeal of job restructuring permitting individual achievement.

Note: Extracts taken by the authors from Fig. 6.4 and 6.6 in Hofstede (1980).

Descriptive statistics and testing of mean differences for the questionnaire of Hofstede
Table 3

Questionnaire	Dimension		Japan	China	Russia	Difference (Japan minus China)	Difference (Japan minus Russia)	Difference (China minus Russia)
AQ1. Challenge	Individualism Masculinity	Mean	4.44	4.52	4.58	-0.08	-0.14	-0.06
		SD	0.661	0.612	0.9			
		N	97	99	12			
AQ2. Desirable Area	Femininity	Mean	3.32	3.92	3.58	-0.6	-0.26	0.34
		SD	0.941	0.922	0.793	**		
		N	97	99	12			
AQ3. Earnings	Masculinity	Mean	3.87	4.08	4.08	-0.21	-0.21	0
		SD	0.759	0.695	0.515	*		
		N	97	99	12			
AQ.4 Cooperation	Femininity	Mean	4.08	4.41	4.42	-0.33	-0.34	-0.01
		SD	0.745	0.623	0.669	**		
		N	97	98	12			
AQ5. Training	Collectivism	Mean	3.23	4.51	4.25	-1.28	-1.02	0.26
		SD	1.026	0.56	0.452	**	**	
		N	97	99	12			
AQ6. Benefits		Mean	3.07	4.08	3	-1.01	0.07	1.08
		SD	1.111	0.742	0.953	**		**
		N	97	98	12			
AQ7. Recognition	Masculinity	Mean	4.11	4.26	3.92	-0.15	0.19	0.34
		SD	0.748	0.708	0.669			
		N	97	99	12			
AQ8, Physical Condition	Collectivism	Mean	3.21	3.7	3.17	-0.49	0.04	0.53
		SD	0.978	0.839	0.577	**		*
		N	97	99	12			
AQ9. Freedom	Individualism	Mean	3.76	3.78	4.25	-0.02	-0.49	-0.47
		SD	0.774	0.777	0.622		*	*
		N	97	99	12			
AQ10. Employment Security	Femininity	Mean	2.86	3.84	3.25	-0.98	-0.39	0.59
		SD	1.07	0.817	0.866	**		*
		N	97	99	12			
AQ11. Advancement	Masculinity	Mean	4.13	4.28	3.75	-0.15	0.38	0.53
		SD	0.656	0.822	0.965			*
		N	97	98	12			
AQ12. Manager	Femininity	Mean	3.76	4.43	3.42	-0.67	0.34	1.01
		SD	0.609	0.556	0.996	**		**
		N	97	99	12			
AQ13. Use of Skills	Collectivism	Mean	4.41	4.36	4.17	0.05	0.24	0.19
		SD	0.608	0.562	0.389			
		N	97	99	12			
AQ14. Personal Time	Individualism	Mean	3.55	4.09	3	-0.54	0.55	1.09
		SD	0.947	0.809	0.953	**		**
		N	97	99	12			

Note: ** indicates significance at the 1% level, and * indicates significance at 5% level.

EXPERIMENTAL RESULTS ON GROUP DECISION-MAKING—COMPARISON OF JAPAN, CHINA AND RUSSIA

Group decision-making experiments were conducted on MBA students from 3 countries in 2010. This section describes the experiments—including the 2009 results reported in Morita et al. (2010)—and provides some discussion.

STATEMENT OF HYPOTHESIS

The experimental design and hypothesis are the same as in Morita et al. (2010).

Before the game starts, students in each team are asked to decide on their own on a CEO (to be the superior) and a CMO (Chief Maketing Officer), CPO (Chief Product Officer), CFO (Chief Financial Officer), and CRO (Chief Research & Development Officer) as roles to handle other tasks.

The problem addressed by this experiment is the possibility of eliminating adverse effects of group decision-making and stimulating effective interaction by adopting a business game as the setting for group decision-making. The hypothesis was formulated as follows. This hypothesis was developed based on group decision-making theory in Iwai (2007a).

Hypothesis
"There are differences in the effectiveness of group decision-making between Japan, China, and Russia."

In the experimental design for this paper, it was decided (due to the closed model) to assume that there is no difference of subject's capabilities between countries, because homogeneous MBA students were used as subjects in the three countries. Here, the following questions were prepared as indicators for measuring effectiveness. In a questionnaire given before the game, subjects were asked whether or not they prefer group decision-making, and afterward they were asked various questions about decision-making through the course of the game. The questions asked before and after the game are indicated below. Subjects were asked to answer with a 7 point scale, with 7 points indicating maximum agreement, and 1 point indicating maximum disagreement.

BQ15. When making a decision at work, do you prefer to decide on your own or to consult with somebody else?

AQ1. Were you able to advance through the game in cooperation with other team members?

AQ2. Were you able to perform the role you were assigned?

AQ3. Were your teammates cooperative with you?

AQ4. Did your teammates perform the roles they were assigned?

AQ5. Did you have any differences of opinion with teammates in decision-making?

AQ6. Do you think that through consulting with teammates you were able to make better decisions than you would have been able to make alone?

AQ7. Were team decisions made democratically through mutual agreement?

AQ8. Did any ideas that you would not have thought of alone come up in discussions with teammates?

BQ indicates a question asked beforehand, and AQ indicates a question asked afterward.

For these questions, higher numeric values indicate higher effectiveness in group decision-making. Each subject's higher satisfaction means higher effectiveness of group decision making.

EXPERIMENTAL DESIGN

The following experimental design was devised to experimentally verify the hypothesis.

(1) Game specifications

The business game MBABEST21 (Table 5) used in the demonstration experiment is a frame game which enables free and flexible development of games using actual business cases studies (Iwai 2007b).

(2) Game scenario and course

This experiment used a market growth curve estimating the initial product life cycle of a plausible next-generation PDA (2009) and e-book reader (2010) at the time of the experiment, and the interest and tax rates in the

Hofstede's five cultural dimensions
Table 4

Country	PDI	IDV	MAS	UAI	LTO
Japan	54	46 (59)	95 (63)	92	80
China	80	20 (50)	66 (51)	30	118
Russia	93	39 (50)	36 (59)	95	

Note: The figures in parentheses are for the IDV and MAS dimensions found in this research.

Japanese market (2009) and in the Chinese market (2010). Both products were used because it is a comparatively homogeneous product in the various countries. It was decided to play the game with the same interest and tax rate conditions in all countries at the same year to keep those factors from affecting game results. During the course of the game, management decision-making (deciding variables such as product pricing, production volume, R&D expenditures, and marketing expenditures) is done in quarterly units, and decision-making for the next quarter is done based on financial statements and rankings of management indicators for all companies. The game progresses as this process is repeated each quarter. When managers of different departments in the same company make a decision, they do so as a group, in a competitive environment with other competing companies. Their decisions are based on the financial statements and ranking reports reported each quarter. This game was played twice by each team. The first time, it was played for two quarters as practice, and the second time, decisions were made for 4 or 5 quarters. The response variable was taken to be maximization of cumulative net profit at the end of the game.

(3) Overview of conducted experiment

Table 6 gives an overview of the experiment (2009, 2010 Japan) conducted with MBA students in Japan (Aoyama Gakuin University), the experiment (2009, 2010 Russia) conducted with MBA students in Russia (Moscow State University), and the experiment (2009, 2010 China) conducted with MBA students in China (North Eastern University). Both Japanese and Chinese students were homogeneous since these students had just started MBA program. On the other hand Russian students are the second year students in MBA and the number of Russian Students was small, those results were not used for hypothesis testing.

(4) Method of collecting variables

The response variable in this business game can be regarded as the outcome variable of decision-making in the closed model. In MBABEST21, the input/output variables

of subjects are automatically recorded in the computer as the game progresses, and thus they can be used as is.

The survey form was filled out by subjects immediately after decision-making in the two games. Evaluation was done subjectively by the subjects.

COMPARISON OF SUBJECT RESPONSES BY COUNTRY

Table 7 shows the response results to post-test questions for the 3 countries. In the comparisons by country, Japan did not rank first among the 3 countries for any question, and its scores were low overall. On the other hand, Russia ranked first among the 3 countries for 7 of the 8 questions, and scored high overall. China came in between the other two countries.

Here we will summarize the results for each question. For the question BQ15 "When making a decision at work, do you prefer to decide on your own or to consult with somebody else?" Russia and China tended to prefer group decision-making, while Japan tended to choose almost the middle between individualism and collectivism. For AQ1 "Were you able to advance through the game in cooperation with other team members?" both Russia and China were close to the highest possible score. For AQ2 "Were you able to perform the role you were assigned?" Russia and China scored high, while Japan scored relatively low with a value roughly in the middle of the scale. For AQ3 "Were your teammates cooperative with you?" all countries scored highly, and there was no great difference between the three. For AQ4 "Did your teammates perform the roles they were assigned?" Japan scored somewhat low compared to Russia and China. For AQ5 "Did you have any differences of opinion with teammates in decision-making?" Japan tended to answer in the negative compared to the other two countries. For AQ6 "Do you think that through consulting with teammates you were able to make better decisions than you would have been able to make alone?" Japan scored somewhat low compared to Russia and China. For AQ7 "Were team decisions made democratically through mutual agreement?" all countries scored

Gaming simulation specifications
Table 5

Gaming Development Tool	MBABEST21
Product	Next-generation e-Book Reader
Market	Consumer market somewhere in Asia
Number of period	1 quarter × 4 periods
Input variables	Selling price, production volume, R&D expenditures, marketing expenditures, factory expansion investment, short term debt
Output reports	Income statement, Balance sheet, Cash flow statement, Team ranking report
Exogenous variables	Market growth rate, Interest, Tax rate

Comparison of three experiments
Table 6

	2009 Japan	2009 Russia	2009 China
Experiments Place	Japan (Oiso)	Japan (Tokyo)	China (Shenyang)
Subjects	Japanese	Russian	Chinese
	New MBA students	MBA students	New MBA students
Number of subjects	111	12	44
Game scenario	Next-generation PDA	Same as at left	Same as at left
Required experiment time	3 hours	Same as at left	Same as at left
Number of trials	2 (Same members in 1st and 2nd trial)	Same as at left	Same as at left
Number of competing teams	25 companies	5 companies	10 companies
Students per team	4 or 5	3	4 or 5
Team selection	Recommended by others	Same as at left	Same as at left
Form of organization	Hierarchical	Same as at left	Same as at left
Experiment location	On-campus lab (Japan)	Same as at left	On-campus lab (China)
Game facilitator	1 university instructor	1 university instructor	2 university instructors

	2010 Japan	2010 Russia	2010 China
Experiments Place	Japan (Oiso)	Japan (Tokyo)	China (Shenyang)
Subjects	Japanese	Russian	Chinese
	New MBA students	MBA students	New MBA students
Number of subjects	97	12	56
Game scenario	New Book Reader	Same as at left	Same as at left
Required experiment time	3 hours	Same as at left	Same as at left
Number of trials	2 (Same members in 1st and 2nd trial)	Same as at left	Same as at left
Number of competing teams	24 companies	4 companies	13 companies
Students per team	4 or 5	3	4 or 5
Team selection	Recommended by others	Same as at left	Same as at left
Form of organization	Hierarchical	Same as at left	Same as at left
Experiment location	On-campus lab (Japan)	Same as at left	On-campus lab (China)
Game facilitator	1 university instructor	1 university instructor	2 university instructors

Note: For Experiment 2009 Russia, the experiment was conducted with a total of 5 teams, including 4 teams made up of Russians, 1 computer team and 1 Japanese team (with 3 members). The questionnaire was administered only to the 12 members of the Russian teams.

highly, and there was no great difference between the three. For AQ8 "Did any ideas that you would not have thought of alone come up in discussions with teammates?" there was no great difference between the 3 countries, but they all scored relatively low compared to the other questions.

Next, we shall examine whether there are any differences in results due to the year when the experiment was conducted. For all countries, there were no major differences in scores due to the year of the experiment for any question, and the results showed almost the same values. However, variation due to the year was evident in the same country for AQ5 "Did you have any differences of opinion with teammates in decision-making?" and AQ8 "Did any ideas that you would not have thought of alone come up in discussions with teammates?"

RELATIONSHIP BETWEEN GAME RESULTS AND

SUBJECT EVALUATIONS

In all experiments, the evaluation scale for determining winning or losing of the game was the cumulative net profit when the game ended. Subjects were instructed before the game began to make decisions with the goal of maximizing cumulative net profit.

This section shows the results of calculating rank correlations (Kendall TauB) between the cumulative net profit for each team (which is the response variable of the game) and the mean evaluation by the subjects of each team, and examines the relationship between the two. Rank correlation was used because the cumulative net profit values vary greatly between games and thus it is difficult to make simple comparisons with absolute values, and because in almost all cases subjects made decisions while paying more

Descriptive statistics on questions for improving efficiency
Table 7

		BQ15	AQ1	AQ2	AQ3	AQ4	AQ5	AQ6	AQ7	AQ8
Japan 2009	Mean	3.86	5.95	4.59	6.32	5.77	3.53	5.77	6.19	5.89
	SD	1.735	1.025	1.391	0.798	1.221	1.613	1.401	0.879	1.123
	N	109	111	111	111	111	110	111	111	111
Japan 2010	Mean	4.78	5.73	4.31	6.1	5.61	3.01	5.57	5.99	5.3
	SD	1.66	1.229	1.402	0.895	1.132	1.41	1.62	1.046	1.445
	N	97	97	97	97	97	97	97	97	96
China 2009	Mean	4.5	6.48	6.09	6.43	6.41	4.59	6.05	6.05	5.2
	SD	1.899	1.023	0.91	0.998	0.923	1.743	1.275	1.18	1.564
	N	44	44	44	44	44	44	44	44	44
China 2010	Mean	5.73	6.41	6.05	6.54	6.3	4.71	6.46	6.34	5.66
	SD	1.396	0.93	0.999	0.538	0.807	1.486	0.808	0.769	1.339
	N	49	56	56	56	56	56	56	56	56
Russia 2009	Mean	4.42	6.83	6.25	6.83	6.58	5.67	6.42	6.33	5.67
	SD	1.975	0.389	0.866	0.577	0.793	1.303	0.996	0.778	1.969
	N	12	12	12	12	12	12	12	12	12
Russia 2010	Mean	5.58	6.83	5.58	6.58	6.5	4	6.42	6.42	6.42
	SD	1.379	0.389	1.084	0.515	0.522	2.216	1.165	0.9	0.9
	N	12	12	12	12	12	12	12	12	12
Total Average	Mean	4.59	6.1	5.05	6.33	5.95	3.81	5.91	6.15	5.6
	SD	1.797	1.095	1.469	0.822	1.112	1.727	1.388	0.959	1.377
	N	323	332	332	332	332	331	332	332	331

attention to the rank of their team than to the absolute value of cumulative net profit.

In Japan, a significant but weak positive correlation was evident between cumulative net profit and AQ1 "Were you able to advance through the game in cooperation with other team members?" In Russia and Japan, a significant positive correlation was evident between cumulative net profit and AQ2 "Were you able to perform the role you were assigned?" A significant positive correlation was evident in Japan and China (2009) between cumulative net profit and AQ3 "Were your teammates cooperative with you?" but there was no correlation in the case of China (2010). A significant positive correlation was evident in Japan, Russia (2009), and China (2009) between cumulative net profit and AQ4 "Did your teammates perform the roles they were assigned?" No significant correlation was seen in any experiment between cumulative net profit and AQ5 "Did your teammates perform the roles they were assigned?" In all experiments except Russia (2010), a significant correlation was evident between cumulative net profit and AQ6 "Do you think that through consulting with

teammates you were able to make better decisions than you would have been able to make alone?" A significant correlation between cumulative net profit and AQ7 "Were team decisions made democratically through mutual agreement?" was evident only in Japan (2009), and the results showed variation in the sign of the correlation coefficient between experiments. A significant but weak positive correlation was evident in Japan for AQ8 "Did any ideas that you would not have thought of alone come up in discussions with teammates?"

Looking at each country, Japan had a comparatively large number of teams (24), and partly for that reason a weak but significant positive rank correlation with cumulative net profit at the end of the game was evident for all questions except AQ5 "Did you have any differences of opinion with teammates in decision-making?" Also, the correlation coefficients had almost the same value in 2009 and 2010. In China, a weak but significant positive rank correlation with cumulative net profit at the end of the game was evident for the two questions AQ4 "Did your teammates perform the roles they were assigned?" and

Rank correlations regarding game results and questions for improving efficiency
Table 8

Countries	N	rank correlation coefficient	AQ1	AQ2	AQ3	AQ4	AQ5	AQ6	AQ7	AQ8
Japan										
2009	24	Kendall τ	0.33	0.32	0.48	0.30	0.08	0.31	0.40	0.41
		p value	0.03*	0.03*	0.00**	0.05*	0.60	0.04*	0.01**	0.01**
2010	24	Kendall τ	0.39	0.28	0.39	0.29	-0.08	0.35	0.21	0.36
		p value	0.01**	0.06	0.01**	0.05*	0.60	0.02*	0.18	0.02*
China										
2009	10	Kendall τ	-0.14	0.19	0.66	0.57	-0.22	0.57	-0.02	-0.16
		p value	0.59	0.46	0.01**	0.02*	0.37	0.02*	0.93	0.53
2010	13	Kendall τ	-0.05	0.22	0.00	0.32	-0.12	0.39	0.22	0.30
		p value	0.80	0.30	1.00	0.14	0.58	0.07	0.30	0.16
Russia										
2009	4	Kendall τ	0.00	0.91	0.24	0.91	0.55	0.91	0.91	0.33
		p value	1.00	0.07	0.65	0.07	0.28	0.07	0.07	0.50
2010	4	Kendall τ	0.00	1.00	0.18	0.00	-0.33	0.55	-0.71	0.55
		p value	1.00	.	0.72	1.00	0.50	0.28	0.18	0.28

Note: ** indicates significance at the 1% level, and * indicates significance at 5% level.

AQ6 "Do you think that through consulting with team-mates you were able to make better decisions than you would have been able to make alone?" The sign of the correlation coefficient tended to be the same regardless of the year. Since there were only 4 teams for Russia, the results are given here only for reference.

COMPARISON BY YEAR OF POST-EXPERIMENT QUESTIONS BETWEEN JAPAN AND CHINA

In this section, the results of group decision-making, including the results reported in Morita et al. (2010), are evaluated for Japan and China using variance analysis. As shown in Table 9, response results from the subjects of the two countries were evaluated by the year of the experiment (2009, 2010). Evaluation was done by the year of the experiment in order to check whether consistent results transcending the year appear in measurement of group decision-making for the two countries.

The results are as shown in Table 10. While there was a significant difference between the two countries for AQ1, AQ2, AQ3, AQ4, AQ5, and AQ6, no significant difference was evident for the year or the interaction. Therefore, there were no differences due to the time of the experiment, and we were able to confirm the robustness of these questions.

The main factors for AQ7 and AQ8 are not significant, and thus the responses to these two questions are situational, and exhibit a tendency to differ depending on the year.

In testing the difference of means (Table 11), there was a significant difference in both 2009 and 2010 for AQ1 (5% significance), AQ2 (1% significance), AQ4 (5% significance), and AQ5 (1% significance). In all of these cases, the mean for China exceeded the mean for Japan.

Factors between subjects
Table 9

Item	Category	N
Country	China	95
	Japan	208
Year	FY2009	158
	FY2010	145

Variance analysis for questions on improving efficiency
Table 10

		df	F	P	
BQ15	Country	1	12.637	0.000	**
	Year	1	27.724	0.000	**
	Country * Year	1	0.747	0.388	
	Error	299	(2.844)		
AQ1	Country	1	16.577	0.000	**
	Year	1	0.428	0.513	
	Country * Year	1	0.808	0.369	
	Error	299	(1.236)		
AQ2	Country	1	94.206	0.000	**
	Year	1	1.053	0.306	
	Country * Year	1	0.581	0.446	
	Error	299	(1.657)		
AQ3	Country	1	6.634	0.01	**
	Year	1	0.133	0.72	
	Country * Year	1	2.914	0.09	
	error	299	(0.683)		
AQ4	Country	1	24.859	0.00	**
	Year	1	0.592	0.44	
	Country * Year	1	0.161	0.69	
	error	299	(1.180)		
AQ5	Country	1	53.304	0.00	**
	Year	1	1.349	0.25	
	Country * Year	1	2.328	0.13	
	error	299	(2.407)		
AQ6	Country	1	10.811	0.00	**
	Year	1	0.262	0.61	
	Country * Year	1	2.796	0.10	
	error	299	(1.911)		
AQ7	Country	1	0.420	0.52	
	Year	1	0.043	0.84	
	Country * Year	1	3.500	0.06	
	error	299	(0.936)		
AQ8	Country	1	1.978	0.16	
	Year	1	0.198	0.66	
	Country * Year	1	9.305	0.00	**
	error	299	(1.810)		

Note: ** indicates significance at the 1% level, and * indicates significance at 5% level.

Testing of mean differences regarding questions for improving efficiency in Japan and China
Table 11

	2009		2010	
	difference	(Japan minus China)	t-value	p
BQ15		-0.638	-2.002	0.04
AQ1		-0.531	-2.911	0.00
AQ2		-1.496	-7.858	0.00
AQ3		-0.117	-0.762	0.44
AQ4		-0.643	-3.553	0.00
AQ5		-1.064	-3.613	0.00
AQ6		-0.280	-1.197	0.23
AQ7		0.144	0.829	0.40
AQ8		0.687	2.657	0.01

Note: ** indicates significance at the 1% level, and * indicates significance at 5% level.

DISCUSSION

First, we shall examine the robustness of the experimental methodology, which is the analysis methodology we adopted. In terms of distinguishing features of the evaluation by subjects of post-game questions, the response trends for each country were the same in both 2009 and 2010. When comparing 2009 and 2010, there were some differences in the game scenario, but the same gaming software was used in all cases, and the input items, output items, and response variables were the same. Furthermore, the subjects were MBA students at the same universities. For the above reasons, it is possible to conclude that our

experimental methodology—where efficiency relating to group decision-making is measured for subjects from different countries based on gaming simulations—is a stable and robust technique.

Previously, when measuring decision-making inside an organization, the typical methods have been to select a random sample from a fixed population and measure using questionnaires, or to conduct a case study employing participant observation for a limited set of firms. However, simply comparing the multiple survey subjects with those methodologies is not easy because the external environments are different. In this case, evaluation was done after having subjects from different countries play games with similar scenarios, and thus it was possible to measure dif-

ferences while controlling the external environment. Differences due to degree of language understanding were eliminated by providing the experiment explanation and questionnaires in the native languages of the participants.

Next, we examine the implications of the results obtained from analysis of the relationship between game results (response variable given by the game) and evaluations by the subjects.

As has been pointed out by McKinney and Dill (1966), Norris and Niebuhr (1980), Wolfe, Bowen and Roberts (1989), and Iwai (2009), there is not necessarily a fixed relationship between the response variable from gaming and evaluations by subjects. Even if the same game is played by the same population, the relationship is unstable, and there are many cases where it does not exhibit a fixed trend. However, as shown in this section, the experimental game was played two times each in 3 countries, for a total of 6 times, and in the results, a significant positive correlation was evident for Japan, Russia (2009), and China (2009) between cumulative net profit and AQ4 "Did your teammates perform the roles they were assigned?" For China (2010) there was also a positive correlation, although it was not statistically significant. This shows that teams where subjects rated their fellow team members highly for performing their assigned roles had better game results. For Japan and China, there was also a positive rank correlation for AQ6 "Do you think that through consulting with teammates you were able to make better decisions than you would have been able to make alone?"

On the other hand, there was no significant correlation between the pre-experiment question BQ15 "When making a decision at work, do you prefer to decide on your own or to consult with somebody else?" and the responses to any of the AQ's.

From this it can be determined that the responses to the post-experiment questions regarding group decision-making primarily reflected the effects which the gaming simulation had on the subject more than the attitude which subjects had beforehand toward group decision-making. Therefore, the responses for AQ4 and AQ6 in this case reflect the results of the gaming simulation.

The implication of these facts is that, in order for the MBA students from 3 countries to effectively carry out group decision-making, it is important for the team members to work hard at their assigned roles, and for other members to highly rate that activity.

However, the cause and effect relationship between the game's response variable and the post-experiment questions should be carefully examined. That is, it is not clear whether a high evaluation was obtained because good results were achieved in the game, or whether good results were achieved because the team members carried out their respective assigned roles.

QUALITATIVE ANALYSIS BASED ON INTERVIEWS

In the previous section, we tried an approach based on quantitative analysis where we administered questionnaires to subjects before and after the gaming simulation, and analyzed the results. For this section, we tried a qualitative analysis approach where we conducted interviews after the gaming simulation, and here we report on the results of that qualitative analysis.

Qualitative analysis was conducted in order to discover points which cannot be captured with quantitative analysis. In quantitative analysis, problems are examined based on an analytic framework or analytic perspective established beforehand by the analyst, but in qualitative analysis, it is possible to discover new points not intended by the analyst beforehand.

This sort of qualitative analysis is not performed in experiments on Japanese MBA students. This is partly because we the analysts are Japanese, and can to a certain extent predict the results, but it was mostly due to a lack of preparation. We feel there is a need to conduct qualitative analysis on Japanese MBA students in the next experiment.

In the experiments on Russian MBA students, there was no deep consideration of the approach to qualitative analysis, and thus the approach was preliminary. More specifically, the following two questions were asked of Russian students after the end of the experiment: "How do you make group decision-making in Russian Companies?", "Are there any difference in group decision-making in the Russian and Japanese companies?" The students were asked to freely respond to these two questions.

For the latter question, the Russian students were unfamiliar with Japanese companies, and thus it was not possible to obtain clear responses. However, it was possible to obtain fairly clear answers from the Russian students for the former question.

In Russian firms, the decision-making is top-down, and decision-makers who have decision authority make decisions alone. Group decision-making, particularly decision-making stressing consensus, generally does not happen.

This kind of response agrees with the common view that strong leaders tend to be preferred for top management positions.

Next we conducted the same sort of qualitative analysis for Chinese MBA students. One point we reflected on is that Russian students were only asked to respond orally, and thus it was not possible to hear the opinions of all of the subjects. Furthermore, since there were many Chinese students (55), listening to them all freely express their opinions were not realistic in terms of feasibility, and survey efficiency/effectiveness. Thus the following method was adopted.

(1) Explanation of the survey purpose and questions by the instructor, (2) Filling out the questionnaire form

(free answer), (3) Collection of questionnaire forms, and interviewing and obtaining further information for responses regarded as suitable by the instructor due to their content, and for responses regarded as needing supplemental explanation. The time allocation for each section was (1) 10 minutes, (2) 15 minutes, and (3) 35 minutes, and the entire process was completed in about 1 hour. We feel that by adopting this method we were able to efficiently collect the necessary data regardless of the large number of subjects to be interviewed.

The following were the seven questions in this free answer questionnaire survey. Question 0: Description of current job (the interviewees were new MBA students, and all had jobs). Question 1: Under what conditions do you make decisions in a group? Question 2: How are decisions made when decision-making in a group? Question 3: How do you resolve conflicts which arise between group members? Question 4: Which is more important for generating new ideas, working in a group or working as individuals? Question 5: Is decision-making in a group important for you to make a decision? Question 6: Do you think there are differences in the method of decision-making between Japanese and Chinese companies?

A distinctive result of this free answer questionnaire comes from Question 5. The number of subjects who answered that decision-making in a group is extremely important or important was 50 out of 55, or more than 90%. Of the five subjects who did not answer that it was extremely important or important, one wrote that "In general it is important, but in some cases it is also important to take a stand as an individual," and another wrote that "The best ideas are produced by incorporating the opinions of individuals." These answers too did not deny the importance of group decision-making in Chinese firms. Therefore, only three subjects explicitly did not ascribe importance to group decision-making. These subjects wrote: "For me, group decision-making is not important" (civil servant above the section manager level), "In general, I decide by myself" (finance department manager), and "It depends on the specific situation" (assistant manager of consumer department). Thus it is clear that a majority of managers in Chinese firms believe that group decision-making is important.

Now, why do Chinese managers feel that group decision-making is important? Many of the subjects simply responded only with the word "Important" in the free answer questionnaire, but a number of subjects clearly indicated a reason. On the one hand, some subjects expressed the opinion that group decision-making improves feasibility, e.g.: "The policy or strategy cannot be executed if group decision-making is not done," "It improves feasibility," and "It is easier to cooperate with other people by listening to different opinions." Other subjects expressed the opinion that it is useful for generating ideas, e.g.: "Good ideas are produced by incorporating the opinions of others," and "By listening to the opinions of others, you can obtain ideas you never would have thought of yourself."

This can also be confirmed from the results for Question 4. When asked "Which is more important for generating new ideas, working in a group or working as individuals?" many subjects responded that working in a group is more important. However, more than a few subjects expressed the opinion that working as an individual is more important.

In the responses to Question 3 —"How do you resolve conflicts which arise between group members?"—the most frequent response was that the conflict is carefully reviewed, and then the final decision is made by a superior. This is natural because it involves deciding based on work responsibilities. However, the next most frequent response was that the conflict is resolved by majority vote. A distinctive point is that majority vote is used as the final decision method in cases where work responsibilities and roles are not clear.

Finally, to summarize the above, we shall describe the experience of an interviewed manager who had experience working at a Japanese company, a Chinese state-owned enterprise, and a Chinese private firm. The Japanese company is characterized by its frequent use of group decision-making, and when a big problem occurs, they often ask for instructions from the main office in Japan (through teleconferencing). In contrast, at the state-owned enterprise instructions (decisions) from above are important, and there are no cases where subordinates communicate with each other and make decisions. In the Chinese private firm, superiors listen carefully to the opinions of their subordinates, but they make the final decision.

Interview-based analysis like the above reveals two cases: those where group decision-making is used to improve feasibility and those where group decision-making is used to generate and refine ideas. These approaches are often mixed, but in China the basic approach is for superiors to make decisions as individuals, and to only listen to their subordinates opinions for reference. Among workers at the same level, final decisions are made by majority vote.

In this survey, it was found that the decision-making style is likely to be different in foreign-owned companies, state-owned enterprises, and private firms, but China is a geographically huge country, and thus there may be regional differences between the north, south, and other regions. Huo and Randall (1991) have verified and pointed out regional differences in organizational culture inside China by using Hofstede's analysis. This issue will also need to be considered in the future.

CONCLUSIONS AND ISSUES FOR THE FUTURE

This research attempts to make an international comparison of group decision-making between Japan, China, and Russia by using a gaming simulation we developed

called MBABEST21. The conclusions reached in this report can be summarized as follows:

(1) An attempt was made to measure Individualism-Collectivism and Masculinity-Femininity based on the prior research of Hofstede. The results showed that the ranking of Individualism between the countries at the time of this research was the same as in the past prior research of Hofstede. In this survey, Individualism exhibited a relatively high value compared to the prior research of Hofstede. This result reflects social and economic changes. Particularly in China and Russia, the degree of Collectivism has declined due to economic development.

(2) Experiments using the same gaming simulation as last year's research (Morita et al. 2010) were also conducted this year. Almost the same results as last year's research were obtained. Thus it was possible to show the robustness of our research approach as an analysis methodology for group decision-making.

(3) We attempted an analysis of the relationship between game results (amount of cumulative net profit) and the post-experiment questions to subjects, which could not be analyzed in last year's research due to the small sample size. As a result, we reached the conclusion that, in Japan and China, teams whose members rated each other highly for fulfilling their respective roles exhibited good game results. In other words, there was found to be a strong relationship between the degree to which members fulfill their roles and game results.

(4) The results of qualitative analysis based on interviews with Russian MBA students indicated that Russian firms place no stress at all on group decision-making. In contrast, the results of qualitative analysis based on interviews with Chinese MBA students showed that Chinese firms place an extremely high degree of importance on group decision-making. Qualitative analysis was not conducted in Japan, but prior research on decision-making in Japan reached the conclusion that group decision-making is stressed in Japanese companies.

Two reasons were discovered for why Chinese companies regard group decision-making as important: because it improves the ability to implement the decision, and because incorporating the opinions of others helps to generate good ideas.

Conclusions such as the above were reached as a result of this research, but the following points can be raised as issues for the future.

(1) We were only able to address two of the five cultural dimensions asserted by Hofstede, but this analysis can be deepened by examining other dimensions. In particular, it was found from interview-based qualitative analysis that, for Russia in particular, group decision-making is more closely related with Power Distance (PDI) than with Individualism-Collectivism. Therefore, further analysis of the relationship between group decision-making and other such cultural dimensions will be needed.

(2) We feel we were able to establish a methodology for analyzing group decision-making using gaming simula-

tion. Thus there is a need to extend the validity of the methodology by applying analysis based on it to countries other than China and Russia.

(3) There was found to be a strong relationship between the degree to which members fulfilled their duties and game results, but the cause and effect relationship between the two was not clarified in this analysis. A cause and effect model should be developed by using techniques such as path analysis.

(4) In this research, it was only possible to do qualitative analysis based on interviews with Chinese MBA students. It should be possible to establish the hypothesis through analysis using the same methodology with Japanese students.

Although the above issues for the future remain, we believe we have successfully established a methodology and obtained new findings through the analysis in this research.

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