

Human-Related Problems in Information Security Faced by Japanese, British and American Overseas Companies Because of Cultural Differences

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Corporations value information, like trade secrets are very important assets for their success. Most information security problems take place because of human errors. Human behavior must be the main concern of information security. Human behavior is influenced by national culture. That is why cultural differences can lead to unintentional security breaches in cross-cultural environments. This paper discusses the potential vulnerabilities found through the use of the proposed theory called Level of Potential (LoP). This proposed theory addresses the potential problems due to cultural differences. This paper discusses the potential problems that Japanese (JP), American (US) and British (UK) companies may face as investors when conducting business outside of their home countries. Potential problems and the theory are based on Hofstede's framework of cultural dimensions, which are Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance (UAI) and Long Term Orientation (LTO). Quantitative analysis of surveys conducted in nine countries as investee countries around the world show that Japan is advantageous since it faces fewer problems due to cultural differences than US and UK. US faces most problems with a very high level of occurrence. UK follows US by facing the most problems with a high severity and in the last place, Japan is found.

Keywords: information security management, overseas subsidiaries, cultural dimensions, potential problem

Introduction

Bean (2006) stated that 80% of identified causes of information leakages are due to human errors. As people act on their perceptions which may be influenced by their culture, it is natural to think that culture may have some relations with human errors, especially in cross-cultural environments. Extensive studies have been carried out on the cultural impact in the way of business in the fields like organizational behavior and human resources management. One of the objectives of these fields is to understand better the reasons behind

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employees' reactions. Asai, Liska Waluyan and others have focused on information security management (ISM) in cross-cultural environments. Asai and Waluyan have studied the cultural impact on ISM and measured its magnitude by applying a newly developed measure called Level of Potential (LoP).

The purpose of this paper is to present the potential problems that may occur concerning information security practices in cross-cultural environments. It discusses the application of the LoP theory to predict the potential problems that Japanese companies, American companies and British companies may face when conducting business abroad. This research may help investors in these countries to recognize and correct any attitudes that facilitate the occurrence of these potential problems.

In this paper, the first section titled "Cultural Dimensions" describes the framework of cultural dimensions by Hofstede, the second section titled "Research Characteristics" shows the research methodology used and explains the characteristics of the countries studied as well. In the third section titled "Level of Potential", the characteristics and LoPs of the investor countries in the investee countries are shown. The fourth section titled "Potential Problems" shows the logical predictions of severities based on the Level of Potential theory and the confirmation of the severities based on the surveys conducted in the studied investee countries. To finalize, in the last section titled "Conclusions", the conclusions of this work are shown.

Cultural Dimensions

There are many studies concerning cultural differences. Studies like the ones of Hofstede and Hofstede (2004), Hall (1976), Trompenaars (2002) and House (2004) are examples of the importance of studying cultural differences and the interest academia has taken on it. Hofstede's framework of cultural differences is adopted because it is the most comprehensive study concerning culture, it analyzed a large database which covered the cultural differences in all of the major countries. In this section Hofstede's framework of Cultural Dimensions will be explained. This framework is the basis for the Level of Potential theory used in the current research. Hofstede's framework measures a culture by giving it scores in five different dimensions. These dimensions are Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI) and Long Term Orientation (LTO). Each cultural dimension has a specific meaning and represents a different aspect of a culture. From this point forward, each cultural dimension will be explained according to Hofstede's framework.

Power Distance Index

This cultural dimension refers to the inequality in a society. Power is not always equally distributed amongst the members of a society, this cultural dimension measures the difference between the most powerful individual and the least powerful individual in a society. In Table 1, characteristics concerning this cultural dimension can be found for its highest level and its lowest level as well.

Table 1

PDI Definition for Extreme Levels

Level	PDI definition
High	The members expect that some individuals wield larger amounts of power than others
Low	Reflects the view that all people should have equal rights

Individualism

This cultural dimension refers to the degree in which the individuals of a society are integrated in groups. In Table 2, expected characteristics from a high individualistic society and a low individualistic society can be found.

Table 2

IDV Definition for Extreme Levels

Level	IDV definition
High	Ties between individualism are loose
Low	Ties between individualism are tight

Masculinity

This cultural dimension refers to the assertiveness and competitiveness in the members of a society. In Table 3, expected characteristics from a high masculine society and a low masculine society can be found.

Table 3

MAS Definition for Extreme Levels

Level	MAS definition
High	Stress on equity, competition and performance. Managers are expected to be decisive and assertive
Low	Stress on equality, solidarity and quality of work life. Managers use intuition and strive for consensus

Uncertainty Avoidance Index

This cultural dimension deals with a society's tolerance of uncertainty and ambiguity. It indicates the degree in which a culture makes its members feel comfortable or not about unstructured situations. In Table 4, expected characteristics from a society with high uncertainty avoidance and one with a low uncertainty avoidance index can be found.

Table 4

UAI Definition for Extreme Levels

Level	UAI definition
High	Many rules and low tolerance of deviant ideas; resistance to change
Low	Few rules and high tolerance of deviant ideas

Long Term Orientation

This cultural dimension deals with values such as perseverance through time. In Table 5, expected characteristics from a long term oriented society (high score in this cultural dimension) and a short term oriented society (low score on this cultural dimension) can be found.

Table 5

LTO Definition for Extreme Levels

Level	LTO definition
High	Persistence, ordering relationships by status, thrift and having a sense of shame
Low	Personal steadiness and stability, protecting your face, respect for tradition and reciprocation of greeting

Research Characteristics

This section explains the research method and characteristics applied in this research. Based on Hofstede's cultural dimensions explained in the previous section, the following steps were followed to measure cultural

differences for each country.

First, for each country, the scores of its cultural dimensions were studied and classified by level (Asai & Waluyan, 2008). This allowed establishing predictions on the behavior of the individuals of each country. Afterwards, the major investor countries in each of the studied investee countries were chosen for this research. Japan, US and UK are the most common investors in the countries discussed in this paper. The following step is to use the Level of Potential theory to predict the potential problems related to ISM that may occur because of cultural differences in the working environment of Japanese companies, American companies and British companies overseas. This theory was developed based on the assumption that high level managers in overseas subsidiaries are dispatched from their headquarters in their home country and that they are not interested in local culture. Then there may be a cultural gap between them and their local employees. By using formula (1), the level of potential was calculated for each cultural dimension.

$$LoP = |CD \text{ of an investor country} - CD \text{ of an investee country}| \quad (1)$$

where LoP = Level of potential, CD = Score of cultural dimension.

In the present case, the investor countries are Japan, US and UK. This will be addressed in the next section as the predictions made for the current research. Finally, surveys were conducted in each of the investee countries in order to confirm the predictions. The severities of each of the problems faced by the companies of the investor countries will be explained in the next section. In this case, the problems explained are those to be faced by Japanese companies, American companies and British companies conducting businesses in each of the studied countries. This paper is based on the research made in nine countries around the world, spread in four continents. These countries are Indonesia, Malaysia, Thailand, Venezuela, the East African Community, Brazil, India, China and Russia. These different countries have many different characteristics in their respective studies, they are explained from this point on. The explanation is ordered chronologically based on the time of their studies.

Indonesia

Indonesia is the first country in which the Level of Potential theory was studied (Asai & Waluyan, 2008). In this country, no survey was conducted; however, the Level of Potential theory was used to establish which problems are more likely to be faced by foreign companies conducting businesses there.

Malaysia

Malaysia is the first country in which a survey was conducted to see if the Level of Potential theory was applicable. In this country, 27 samples from Japanese companies were taken in the survey, 38 samples were taken from American companies and 21 from British companies (Asai & Waluyan, 2009).

Thailand

Being Japan the highest in the list of top investors in this country, Japanese companies were studied in this country. In the survey conducted in this country, 81 samples from Japanese companies were taken from the survey, 66 samples were taken from American companies and 34 samples were taken in the survey of British companies in this country (Asai, Siripukdee, Waluyan, & Noguera, 2009).

Venezuela

Being one of the biggest oil reserves worldwide, Venezuela is one country of big interest for any

investment opportunity. In this country's survey, 44 samples were taken from Japanese companies, however in the data analysis; samples were divided between managers (16) and employees (28) for a further study of their potential problems (Castillo, Waluyan, & Asai, 2009).

East African Community

In the case of the East African Community, a base country was selected to conduct the Level of Potential research. The country selected was Rwanda since it shares the same cultural dimensions with the other countries. In this country, a survey was conducted in the foreign companies operating there and 30 of their employees were involved in this survey (Asai & Hakizabera, 2010).

Brazil

Brazil has become one of the largest economies in South America, growing at least 5% annually, it has become of great interest for investor countries like Japan. In the survey conducted in this country, there were 20 respondents from Japanese companies and 20 from American companies (Waluyan, Blos, Noguera, & Asai, 2010).

India

This country has the world's 12th largest economy. Its large population of 1.1 billion people is continuously growing expanding its market opportunities (Asai & Fernando, 2011). In this country's survey for the Level of Potential study there were 30 respondents from Japanese companies, 39 from American companies and 30 from British companies.

China

This country has a big interest for Japan since it is its neighbor country and has sustained an economic growth of over 9.5% over the last 26 years. In the survey conducted for the Level of Potential study, there were 32 respondents from Japanese companies, 30 from American companies and 30 from British companies as well.

Russia

The economic growth of the Russian Federation has been great. It has averaged at 7% from 1998 and Russia has become in 2009 the largest natural gas exporter and the second largest exporter of oil. Asai, Fernando, and Castillo conducted a survey in this country for the Level of Potential study. There were 25 respondents from Japanese companies, 35 were from American companies and 34 respondents were from British companies.

In the next section, the Level of Potential theory and the information related to the investor countries studied in this research will be explained.

Level of Potential

As explained in the previous section, in this research, the Level of Potential theory will be explained. This theory allows managers from companies to understand by a simple numerical analysis, the differences between the culture of their own country and that of the country where they are carrying their business. From here on, the Level of Potential for the three investor countries studied in this research is calculated and explained.

Japan

Being one of the most developed nations in the world, this country has companies which have established businesses all around the world. In Table 6, the LoPs of Japan for each cultural dimension in each of the studied countries are shown.

Table 6

Level of Potential for Japan in the Investee Countries

C.D.	IDN	MYS	THA	VEN	EAC	BRA	IND	CHN	RUS
PDI	19	50	10	27	10	15	23	26	39
IDV	32	20	26	34	19	8	2	26	7
MAS	49	45	61	22	54	46	39	29	59
UAI	44	56	28	16	40	16	52	62	3
LTO			24		55	15	19	38	

Note. "C.D." stands for cultural dimension.

United States

This country is the first developed nation in the world. Being the leader in the open market and business locations in the world, this country also has companies which have expanded their businesses around the world by investing overseas. In Table 7, the LoPs of US for each cultural dimension in each of the studied countries are shown.

Table 7

Level of Potential for the United States in the Investee Countries

C.D.	IDN	MYS	THA	VEN	EAC	BRA	IND	CHN	RUS
PDI	33	64	24	41	24	29	37	40	53
IDV	77	65	71	79	64	53	43	71	52
MAS	16	12	28	11	21	13	6	4	26
UAI	2	10	18	30	6	30	6	16	49
LTO			27		4	36	32	89	

Note. "C.D." stands for cultural dimension.

United Kingdom

As one of the main European countries, the United Kingdom is another of the investor countries which are studied in this research. In Table 8, the LoP scores of UK for each cultural dimension in each of the studied countries are shown.

Table 8

Level of Potential for the United Kingdom in the Investee Countries

C.D.	IDN	MYS	THA	VEN	EAC	BRA	IND	CHN	RUS
PDI	38	69	29	46	29	34	42	45	58
IDV	75	63	69	77	62	51	41	69	50
MAS	20	16	32	7	25	17	10	0	30
UAI	13	1	29	41	17	41	5	5	60
LTO			31		0	40	36	93	

Note. "C.D." stands for cultural dimension.

In the next section, the LoPs shown in this chapter will be scaled down to a standard range of values for easier comparison with the severities found through the surveys carried out in the investee countries.

Potential Problems

In this section, the potential problems that can be present in the working environment of the foreign companies studied will be explained. At the beginning of this series of surveys, the authors carried out a pilot survey. The authors interviewed Japanese managers in Japan-based car makers in Malaysia and developed a list of potential problems. Afterwards, before starting our survey in Thailand, interviews were conducted on Thai employees working for foreign companies with the same list of potential problems and tuned them up. After the survey conducted in Thailand, the list of the potential problems tuned and brushed up based upon the experiences so far was used. In addition, international students from the investee countries, attending the university which the authors belonged to, were interviewed about their way of thinking and confirmed the appropriateness of the potential problems in their countries.

Logical Prediction of Severities Based on the LoP Theory

From here on, the level of potential theory will be explained according to each cultural dimension. In order to see easily the potentials (logically predicted severities) of problems, the LoPs for each problem are shown in tables. These values have been scaled to a linear scale between 0 and 1. This scale has been calculated by dividing the LoP of an investor country in each of its investee countries by the biggest LoP in the world for each cultural dimension. The lowest possible value is 0. This means that the Hofstede's score of an investor country is equal to that of an investee country. The highest value, i.e., 1.0 means the biggest difference for each cultural dimension. The biggest difference is between the highest Hofstede's score and the lowest in the world.

PDI. In Table 9, the scaled LoPs for the investor countries and the potential problems concerning PDI are shown. In this table, the problems which were not surveyed are identified by the blacked out cells, the same reference will be used in similar tables. From Table 9, it can be seen that UK has the highest potential to face problems concerning PDI. It can be seen because of the average in problems 1, 3 and 4 that this country may face these problems in most of the investee countries studied. In Venezuela, only the potential problems concerning Japan-based companies were surveyed, thus a comparison between investor countries concerning this investee country cannot be made.

IDV. In Table 10, the scaled LoPs for the investor countries and the potential problems concerning IDV are shown. From Table 10, it can be seen that US has the highest potential to face problems concerning IDV. It can be seen because of the average in problems 5, 6, 8 10 and 11 that this country may face this problems in most of the investee countries studied. It is followed by UK in the same problems; however this country exhibits the highest potential concerning problem 7. In contrast, Japan has the lowest LoPs in this cultural dimension as well.

MAS. In Table 11, the scaled LoPs for the investor countries and the potential problems concerning MAS are shown. From Table 11, it can be seen that Japan has the highest potential to face problems concerning MAS. It can be seen because of the average in all the problems and the individual values that Japan has the highest potential in this cultural dimension. In contrast, US and UK show the lowest values in this cultural dimension, thus having less potential to face these problems when investing in the studied countries.

Table 9

Scaled Levels of Potential for PDI of Investor Countries

Investor country	Investee country										
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Average
	Problem 1: Unequal distribution of knowledge about information security policy between managers and subordinates.										
JP		0.54	0.11	0.29	0.29		0.16	0.25	0.28	0.42	0.29
US		0.69	0.26				0.31	0.40	0.43	0.57	0.43
UK		0.74	0.31					0.45	0.48	0.62	0.52
	Problem 2: There is a tendency for managers to avoid supervising their employees as expected.										
JP				0.29	0.29						0.29
US											
UK											
	Problem 3: Not giving opinions to managers concerning ISM.										
JP								0.25			0.25
US								0.40			0.40
UK								0.45			0.45
	Problem 4: Less consulting or reporting on ISM incidents.										
JP								0.25			0.25
US								0.40			0.40
UK								0.45			0.45

Table 10

Scaled Levels of Potential for IDV of Investor Countries

Investor country	Investee country										
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Average
	Problem 5: Unintentional sharing of confidential information.										
JP		0.24	0.31				0.09	0.02	0.31	0.08	0.17
US		0.76	0.84				0.62	0.51	0.84	0.61	0.70
UK		0.74	0.81					0.48	0.81	0.59	0.69
	Problem 6: Less reporting or consulting on information security incidents.										
JP			0.31					0.02			0.16
US			0.84					0.51			0.67
UK			0.81					0.48			0.65
	Problem 7: Less task-centered and more oriented to a chat with coworkers or friends.										
JP				0.40	0.40		0.09			0.08	0.24
US				0.93	0.93		0.62			0.61	0.77
UK				0.91	0.91					0.59	0.80
	Problem 8: Concealing faults made by friends.										
JP			0.31				0.09	0.02	0.31	0.08	0.16
US			0.84				0.62	0.51	0.84	0.61	0.68
UK			0.81					0.48	0.81	0.59	0.67
	Problem 9: Lower priority to rules rather than friendship or feelings.										
JP				0.40	0.40						0.40
US											
UK											
	Problem 10: Lower priority to information security management.										
JP		0.24									0.24
US		0.76									0.76
UK		0.74									0.74
	Problem 11: Giving less opinion to managers concerning ISM.										
JP			0.31								0.31
US			0.84								0.84
UK			0.81								0.81

Table 11

Scaled Levels of Potential for MAS of Investor Countries

Investor country	Investee country										
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Average
	Problem 12: Less reporting or consulting on information security incidents.										
JP		0.50	0.68				0.51			0.66	0.59
US		0.13	0.31				0.14			0.29	0.22
UK		0.18	0.36							0.33	0.29
	Problem 13: Difficulty in confirming whether or not subordinates understand information security policy which has been explained.										
JP		0.50									0.50
US		0.13									0.13
UK		0.18									0.18
	Problem 14: Possibility of having disgruntled employees.										
JP		0.50	0.68							0.66	0.61
US		0.13	0.31							0.29	0.24
UK		0.18	0.36							0.33	0.29
	Problem 15: Lower priority to information security management.										
JP		0.50					0.51				0.51
US		0.13					0.14				0.14
UK		0.18									0.18
	Problem 16: Using any means to reach goals owing to High competitiveness.										
JP				0.24	0.24		0.51	0.43	0.32		0.35
US							0.14	0.07	0.04		0.09
UK								0.11	0.00		0.11
	Problem 17: Using company's information for own profit.										
JP				0.24	0.24						0.24
US											
UK											
	Problem 18: Giving less opinion to managers concerning ISM.										
JP			0.68							0.66	0.67
US			0.31							0.29	0.30
UK			0.36							0.33	0.34

UAI. In Table 12, the scaled LoPs for the investor countries and the potential problems concerning UAI are shown. From Table 12, it can be seen that Japan has the highest potential to face problems 19, 20 and 22 in this cultural dimension. It can be seen because of the average in all the problems as well as the individual values that Japan has the highest LoP concerning these problems. Secondly, it can also be seen that UK has the highest potential in problems 21 and 23.

LTO. In Table 13, the scaled LoPs for the investor countries and the potential problems concerning LTO are shown. From Table 13, it can be seen that UK has the highest potential to face the problems studied in this cultural dimension. It can also be seen that Japan has the lowest values in this cultural dimension.

Table 12

Scaled Levels of Potential for UAI of Investor Countries

Investor country	Investee country										
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Average
	Problem 19: Lower priority to information security policy.										
JP		0.54	0.27						0.60		0.47
US		0.10	0.17						0.15		0.14
UK		0.01	0.28						0.05		0.11
	Problem 20: Getting information too little.										
JP		0.54							0.60		0.57
US		0.10							0.15		0.13
UK		0.01							0.05		0.03
	Problem 21: Unwilling to follow information security policy without a complete understanding.										
JP				0.15	0.15		0.15			0.03	0.12
US							0.29			0.47	0.38
UK										0.58	0.58
	Problem 22: Less interest in ISM.										
JP			0.27					0.50			0.38
US			0.17					0.06			0.12
UK			0.28					0.05			0.16
	Problem 23: Less interest in information outside duties.										
JP			0.27								0.27
US			0.17								0.17
UK			0.28								0.28

Table 13

Scaled Levels of Potential for LTO of Investor Countries

Investor country	Investee country										
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Average
	Problem 24: Using previous company's confidential information.										
JP			0.20				0.13	0.16	0.32		0.20
US			0.23				0.31	0.27	0.75		0.39
UK			0.26					0.31	0.79		0.45
	Problem 25: Teaching how much information depends on the relationship rather than the principle of need-to-know.										
JP									0.32		0.32
US									0.75		0.75
UK									0.79		0.79

Confirmation of Severities Based on Surveys

This subsection confirms the correlation between the logical predictions and the surveyed results. This subsection also clarifies the problems in which there is a need to pay attention to. The results shown in this subsection are based on the data obtained through the surveys conducted in the nine investee countries. The results will be addressed on a cultural dimension-wise analysis as the predictions were explained in the same fashion. In the tables shown in the current subsection, the same scaled measurement for the surveyed data will be used. The severity of each potential problem in occurrence will be measured in the range of values between 0 and 1. The value of 0 means that according to the survey, none of the respondents were inclined towards

attitudes which might make this problem occur. The value of 1 implies that according to the survey, all of the respondents attitudes are definitely inclined to contribute to make this problem happen. Correlation coefficients are calculated for the problems which have severities values in 5 or more investee countries. This is to ensure the statistical reliability.

PDI-related potential problems. Table 14 summarizes the surveyed results concerning the dimension of Power Distance Index. In Table 14, it can be seen from the correlation coefficients that the LoPs in this cultural dimension are not found to be significantly related to the surveyed severities, however, it can be seen that UK has the highest correlation of values and Japan follows it. The reality of the potential problems studied concerning PDI can also be seen in Table 14. It can be stated based on Table 14 that concerning the unequal distribution of knowledge about information security policies in the company, Japan exhibits a higher severity than that of US and UK in countries like Malaysia, Brazil and India. Concerning problem 2, the severity shown by Japan is low as to indicate that this problem may exist for them in Venezuela. Problem 3 is more present in US companies in India and problem 4 is more present in UK companies in this country as well. Overall, it can be stated that Japan-based companies face the most problems in the most countries in this cultural dimension.

Table 14

Scaled Severities for PDI of Investor Countries

Investor country	Investee country											
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Correlation*	Average
	Problem 1: Unequal distribution of knowledge about information security policy between managers and subordinates.											
JP		0.45	0.25	0.28	0.28		0.50	0.33	0.70	0.25	0.05	0.38
US		0.35	0.25				0.48	0.15	0.77	0.26	-0.03	0.38
UK		0.43	0.28					0.23	0.72	0.26	0.13	0.38
	Problem 2: There is a tendency for managers to avoid supervising their employees as expected.											
JP				0.20	0.18							0.19
US												
UK												
	Problem 3: Not giving opinions to managers concerning ISM.											
JP								0.48				0.48
US								0.65				0.65
UK								0.60				0.60
	Problem 4: Less consulting or reporting on ISM incidents.											
JP								0.30				0.30
US								0.35				0.35
UK								0.38				0.38

Notes. * As to absolute value of coefficient, weak correlation = 0.1-0.3, medium correlation = 0.3-0.5, strong correlation = 0.5-1.0.

IDV-related potential problems. Concerning this cultural dimension, the potential problems that the investor countries may face are reflected in Table 15 along with the correlation coefficients to the LoPs for this dimension. From Table 15, it can be seen strong correlations of the severities with the LoPs for Japan. Medium correlations can be seen for US as well, meaning that the predictions for this cultural dimension were accurate to a certain extent. From Table 15, it can also be stated that UK faces the most problems concerning this cultural dimension in average. Japan faces problems 7 and 9, and US faces problems 6 and 10.

Table 15

Scaled Severities for IDV of Investor Countries

Investor country	Investee country											
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Correlation*	Average
Problem 5: Unintentional sharing of confidential information.												
JP		0.83	0.85				0.60	0.70	0.78	0.85	0.51	0.77
US		0.90	0.83				0.70	0.83	0.81	0.81	0.30	0.81
UK		0.83	0.85					0.80	0.77	0.82	0.07	0.81
Problem 6: Less reporting or consulting on information security incidents.												
JP			0.30					0.30				0.30
US			0.35					0.35				0.35
UK			0.28					0.38				0.33
Problem 7: Less task-centered and more oriented to a chat with coworkers or friends.												
JP				0.63	0.40		0.30			0.35	-	0.42
US							0.23			0.36		0.29
UK										0.39		0.39
Problem 8: Concealing faults made by friends.												
JP			0.50				0.35	0.63	0.80	0.75	0.16	0.61
US			0.75				0.33	0.68	0.76	0.59	0.48	0.62
UK			0.83					0.70	0.75	0.52	-	0.70
Problem 9: Lower priority to rules rather than friendship or feelings.												
JP				0.78	0.75							0.76
US												
UK												
Problem 10: Lower priority to information security management.												
JP		0.78										0.78
US		0.80										0.80
UK		0.73										0.73
Problem 11: Giving less opinion to managers concerning ISM.												
JP			0.30									0.30
US			0.28									0.28
UK			0.38									0.38

Notes. * As to absolute value of coefficient, weak correlation = 0.1-0.3, medium correlation = 0.3-0.5, strong correlation = 0.5-1.0.

MAS-related potential problems. Table 16 addresses the potential problems concerning MAS, their severities and the correlation coefficient with their corresponding predictions. For the only problem (problem 16) in which the correlation coefficient was calculated, it can be seen that Japan has a weak correlation between the LoPs and its severities. It can also be seen in Table 16 that US has the highest severities in most problems studied (problems 12, 13, 14, 15 and 16). Problem 17 only was studied in Japan-based companies in Venezuela, and concerning problem 18, UK has the highest severity.

UAI-related potential problems. In order to analyze the potential problems concerning this cultural dimension Table 17 is created. Correlation coefficients concerning this cultural dimension were not calculated because of the small number of samples existents. From Table 17, it can be seen that in average US and Japan have the same number of problems concerning this cultural dimension, problems 19 and 23 for Japan and problems 20 and 22 for US. Problem 21 is most likely to happen in UK-based companies.

LTO-related potential problems. To conclude this analysis, the potential problems concerning LTO are analyzed. Correlation coefficients concerning this cultural dimension were not calculated because of the small number of samples existent for their calculation. Concerning this cultural dimension, the problems and the severities values are shown in Table 18. From Table 18, it can be seen that problem 24 is more likely to happen in US-based companies. It can also be seen that problem 25 is more likely to happen in UK-based companies.

Investor-wise analysis of severities. About the US-based companies, it can be said that in most of the cultural dimensions US has the highest severities in 11 out of the 25 studied problems. They should specially pay attention to problem 24 which shows the highest average, 0.82, especially in Brazil with the high severity, 0.88, as well as problem 5 in Malaysia which shows the highest severity, 0.90.

Table 16

Scaled Severities for MAS of Investor Countries

Investor country	Investee country											
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Correlation *	Average
	Problem 12: Less reporting or consulting on information security incidents.											
JP		0.35	0.23				0.45			0.28	-	0.33
US		0.28	0.35				0.50			0.28	-	0.35
UK		0.30	0.28							0.30	-	0.29
	Problem 13: Difficulty in confirming whether or not subordinates understand information security policy which has been explained.											
JP		0.58										0.58
US		0.58										0.58
UK		0.55										0.55
	Problem 14: Possibility of having disgruntled employees.											
JP		0.73	0.25							0.30	-	0.43
US		0.78	0.25							0.33	-	0.45
UK		0.70	0.28							0.35	-	0.44
	Problem 15: Lower priority to information security management.											
JP		0.78					0.53					0.65
US		0.80					0.60					0.70
UK		0.73										0.73
	Problem 16: Using any means to reach goals owing to high competitiveness.											
JP				0.65	0.73		0.78	0.65	0.80		0.23	0.72
US							0.73	0.71	0.85		-	0.76
UK								0.53	0.79			0.66
	Problem 17: Using company's information for own profit.											
JP				0.53	0.48							0.50
US												
UK												
	Problem 18: Giving less opinion to managers concerning ISM.											
JP			0.30							0.40		0.35
US			0.28							0.42		0.35
UK			0.38							0.41		0.39

Notes. * As to absolute value of coefficient, weak correlation = 0.1-0.3, medium correlation = 0.3-0.5, strong correlation = 0.5-1.0.

Table 17

Scaled Severities for UAI of Investor Countries

Investor country	Investee country											
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Correlation [*]	Average
Problem 19: Lower priority to information security policy.												
JP		0.78	0.78						0.78		-	0.78
US		0.48	0.78						0.78		-	0.68
UK		0.70	0.78						0.82		-	0.76
Problem 20: Getting information too little.												
JP		0.70							0.60			0.65
US		0.73							0.65			0.69
UK		0.58							0.62			0.60
Problem 21: Unwilling to follow information security policy without a complete understanding.												
JP				0.38	0.40		0.45			0.53	-	0.44
US							0.43			0.55		0.49
UK										0.55		0.55
Problem 22: Less interest in ISM.												
JP			0.80					0.63				0.71
US			0.80					0.80				0.80
UK			0.78					0.73				0.75
Problem 23: Less interest in information outside duties.												
JP			0.73									0.73
US			0.70									0.70
UK			0.70									0.70

Notes. * As to absolute value of coefficient, weak correlation = 0.1-0.3, medium correlation = 0.3-0.5, strong correlation = 0.5-1.0.

Table 18

Scaled Severities for LTO of Investor Countries

Investor country	Investee country											
	IDN	MYS	THA	VEN-MAN	VEN-EMP	EAC	BRA	IND	CHN	RUS	Correlation *	Average
	Problem 24: Using previous company’s confidential information.											
JP			0.83				0.85	0.68	0.83		-	0.79
US			0.85				0.88	0.83	0.74		-	0.82
UK			0.88					0.65	0.80		-	0.78
	Problem 25: Teaching how much information depends on the relationship rather than the principle of need-to-know.											
JP									0.55			0.55
US									0.46			0.46
UK									0.58			0.58

Notes. * As to absolute value of coefficient, weak correlation = 0.1-0.3, medium correlation = 0.3-0.5, strong correlation = 0.5-1.0.

UK-based companies have the second place with the highest severities in eight out of 25 studied problems. Their highest risk is concerning problem 5 in which UK has the highest severity in average, 0.81. They should pay attention to this problem in Thailand especially, because it has the highest surveyed severity, 0.85.

It can be said that Japan-based companies are in an advantageous place compared to the other two investors. Japan is on the third place with highest severities in six out of 25 problems. Managers of Japan-based companies should pay attention to problem 24, which shows the highest average of severities, 0.79 in all the

surveyed problems. Concerning problem 24, they should especially pay attention to Brazil where they have the highest surveyed severity, 0.85 in the visiting countries. Brazil is followed by Thailand and China with severity of 0.83.

Conclusions

From the result of discussion in the previous section, it can be said that the Level of Potential theory is useful to a certain extent to recognize potential problems due to cultural differences in the workplace. Concerning human-related problems in information security faced by Japanese, British and American overseas companies because of cultural differences, surveys were carried out in the nine investee countries which are Indonesia, Malaysia, Thailand, Venezuela, The Eastern African Community, Brazil, India, China and Russia. From the analyses of the collected data, it can be concluded that:

US-based companies have the possibility of facing more risks due to employees' use of confidential information of their companies after moving to another company. US-based companies should pay attention also to the unintentional sharing of confidential information, especially they should pay attention to this problem in Malaysia.

UK-based companies face fewer risks than US-based companies. These companies should pay attention to the unintentional sharing of confidential information by their employees especially in Thailand.

Japan-based companies are in a better position overall. These companies face fewer problems due to cultural differences than the others. However, they should be careful about their employees using their confidential information after their employees move to another company, especially they should pay attention to this problem in Brazil, Thailand and China.

Overall, it can be said that US stands on the top concerning the level of risks faced when investing abroad. US is followed by UK in this matter. Japan is in an advantageous position compared to US and UK by facing fewer problems than them when investing abroad.

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