



## **Statistical Approach to the Analysis of Corporate Culture Interaction Process**

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### **ABSTRACT**

The study develops a method that enables to perform quantitative comparison of corporate cultures, mathematically assess the effectiveness of cross-cultural interaction and identify sources of potential conflicts. Research is based on the criteria of corporate culture differentiation developed by Geert Hofstede. Study applies traditional methods of statistic analysis, such as decile method, maxmin method and Gini coefficient in order to examine the differentiation of each criterion separately. Further on, multicriterial statistic methods are used to create graphic imprint of national corporate culture. Finally the two imprints are overlapped, which allows to identify sources of conflicts and measure overall effectiveness of cross-cultural interaction. The paper reflects a quantitative instrument that allows to measure cross-cultural conflictness and identify, which of the four criteria influences it the most. The method can be applied at any level, from measuring conflictness between two departments of a company to assessing return on investment of transnational companies coming to new markets. The study provides valuable information regarding the interaction of corporate cultures and enables to address this traditionally empiric question from statistical point of view.

**Keywords:** Cross-cultural Interaction, Corporate Culture, Differential Analysis, Interaction Efficiency, Cultural Criteria, Social Analysis

**JEL Classifications:** C15, M14, M54

### **1. INTRODUCTION**

Ongoing research carried out by many sociologists have illustrated that both intercultural and international relationships are getting stronger at present, this leads to a whole new approaches of relationships between countries across the globe. A case in example is the fact that some 30-40 years ago, most of the international interactions were limited to official, ambassadorial level, but now due to the process of globalization, the power of interstate infiltration has become much more resilient. Recent economic and social objectives, set by global organizations impose more strain on the process of international cohesion. This relation is now looked at in terms of productivity and the value of cost of a global team, and it is at this point that the issue of international struggle becomes very significant. It is evident that the existence of a poor environment at the firm is a major cause for undesirable ethical issues, low employee

output, reduced efficiency of product cost, and a rise in workforce gross revenue.

Cross-cultural inconsistency should also be considered as one of the most severe, although many a time underrated, hindrance for prospective financiers who would want to venture into businesses with high gross revenue. Moreover, improper company legislations, incapacity to adjust to company guidelines, procedures and principles accepted in the financed country can cause a major descent in the success of the business venture, despite having undertaken a comprehensive scrutiny of the financial component.

Besides, cross-cultural disparity enables tracking of the progress of underlying forces of the fundamental principles that guide man's activities. This investigation can be done both at domestic and at the international level provided there is

sufficient information and figures. Further, the investigation can be more interesting if one takes into account the fact that cross-cultural principles are not easily changed. Whereas the outward appearance of company values may change as time goes by, the basic structures are not easily affected by advances, which even though the cultural patterns may get modified, they enable investigators and financiers to predict company struggles and take note of which characteristics can be identified as key aspects for cross-cultural relations for the years to come. As a norm, company values of various nations have developed in many years under the guidance of various challenging elements. The progression of company values has gradually developed from virtually nothing to international appreciation of its significance and consideration that more effort needs to be used to nurture company values in the right sustenance mechanism that will majorly enhance corporate efficiency.

## 2. BACKGROUND OF CORPORATE CULTURE RESEARCH

Present day consideration to company values is normal and can effortlessly be clarified because improving cross-cultural communications and relations is the most basic method to improve the effectiveness of unwavering global funds increased tremendously over the past years.

The research on value systems, existing in local and international companies and on ways to make them communicate effectively has been performed by many experts. For instance, in 2013 Luigi Guiso, Paola Sapienza and Luigi Zingales have issued a research paper at National Bureau of economic research. The document, entitled “Corporate culture, societal culture, and institutions” considers cultural norms as one of the basic instruments that helps sustain formal institutions and foster intercultural cooperation. Cultural changes, being slower and occurring more rarely than those in legal sphere, are harder to identify in terms of their effect on nationwide scale. Within a company, however, they become more visible and measurable, which gives scientists an opportunity to study corporate culture itself as well as its influence on the life of corporation. As a result of their research, treat informal institutions, such as corporate cultures as important as formal ones in terms of fostering business development and national prosperity (Gioso et al., 2013).

Another research was held by McCoy et al. (2009). Researchers studied various ways to control corporate culture and measure its impact on the level of information security, accepted in different business environments. In order to prove that corporate governance can lead to improvements in security behaviors of employees, authors had first to check the previously existing theory claiming that organizational culture doesn't affect any aspect of organization at all. In order to do so, McCoy et al. (2009) developed a model, representing informational security attitudes, combined it with the model of culture, created by Geert and piloted their survey in several companies. Results they obtained, being controversial though, lead them to further questioning the existence of a relationship between organizational culture and information security attitudes.

Third project, worth being mentioned as one of recent corporate culture researches, was undertaken by Shinichi et al. (2007). Their study was set out to explore questions such as: “Does mission statement matter? If so, in what ways?” Using data on mission statements of 128 large Japanese firms, their paper aimed to show that corporate mission, as an aspect of corporate culture, has a significant impact on corporate policies that determine employment, board, and financial structures. Companies with strong mission, deriving from mature corporate culture, are more likely to retain incumbent employees, promote managers from within firms, and have less debt and a higher percentage of interlocking shareholdings than weak-mission firms. The research also confirms that corporate mission and its embedded policies contribute to better corporate performance. The paper suggests that the effect of explicit corporate mission and its implementation has practical impacts in corporate policies and business outcomes.

These investigations, however, scrutinize company values in experimental, qualitative point of view whereas figure based, measurable, quantitative methods are not widely used. This situation is wholly incorrect because only figures based methods of scrutiny help to identify the main characteristics of company values, developed in any particular set of people their number notwithstanding. Here, the investigators are enabled to evaluate the disparities of the scrutinized company values as relates to others. The measurable outcome consequently enable initial identification of feature based principles of company values that are dissimilar in the whole of cross-cultural relations and further expound on the processes needed to reduce undesirable effects of inter-ethnic disparity.

For us to investigate the level of strife of international company values, we have to initially categorize the fundamental disparity principle, taking note of the differences between company values. The much needed principle will assist in classification, arrangement and organization of international decision making pattern. Principles like this can be obtained in collective investigations carried out by Hofstede (2001), Hofstede et al. (2010), an investigator who is who is globally recognized for his concentration on company values and cross-cultural interactions. He has investigated both shared and differing characteristics of many company norms across the globe. This has enabled him to identify the main principle value systems according to the following:

- Power distance index (PDI)
- Individualism (IDV)
- Masculinity (MAS)
- Uncertainty avoidance index (UAI).

Following the above principles, the researcher was able to come up with character assessment that permit noting of the themes right power for the assessed issue. Hofstede has used his assessment method on more than 30,000 individuals from over 90 countries which provided him with an official mathematical explanation of company norms taking precedence in accessed nations categorized using 4 principles that take note of global expansion (Hofstede et al., 2002). In order to carry out a more profound scrutiny, we

need to specifically analyze the four principles so that we can note the value characteristics that they individually have.

PDI shows communal recognition of disparities. Thus, it shows the amount of collective inequity that will be approved by the community of the assessed country. Corporate entities in nations with significant amounts of PDI seem to be consolidated and have uprightly extended and graded form of organization. The decision making team generally massive and the remuneration has a major variation depending on the staff grade. Employees with low qualification are usually down the grading system whereas highly qualified ones are found at the top of the pyramid.

IDV, is different from socialism through the fact that it shows the level at which an individual is willing to participate in his specific cluster. Communities with weak ties among its people display a high level of IDV. Each person is to be liable for his life and that of his kin. Individuals are not tied to the corporate entities at which they are employed and so are the entities to the people. In communal organizations, from the day they are born, people are incorporated into specific clusters with good interactive relationships.

MAS and femininity show whether the part played by a person in the community is strict or flexible. A masculine society thinks that a man should behave like a man by getting money and taking care of his family and a woman should raise children. A feminine society takes these fundamental regulations but in a more subtle manner.

UAI displays communal acceptance of improbability in acceptance of an unclear prospects and the need to get the absolute truth. There is low UAI in the society if individuals if people are willing to live without caring for the future. On the other hand, if the UAI is high, individuals care more about what is to come, and need to make preparations for them to have resolutions.

According to the researcher, the amalgamation of these traits is enough to make one take note of company norms and can be used to scrutinize cross-cultural relations. However it should be noted that Hofstede only performed feature based assessment of the collected information while it is apparent that measurable assessment of figures in the data enables one to carry out profound scrutiny of inter-ethnic struggles, efficiency and variation. Therefore, for us to carry out deeper differential analysis of cross-cultural relations, we need to come up with task specific methodical system.

### 3. DIFFERENTIAL ANALYSIS OF CORPORATE CULTURE

For us to look into the disparities among company norms, we may utilize the previously used numerical assessments which will enable us to evaluate the disparities in all the four main principles that is PDI, IDV, MAS and UAI.

To do this simply, we need to compute the averages meaning the arithmetic average, mode, median, and their attached monetary

value as regards the aims of the investigation. On examining the average values, we come up with the following conclusions:

PDI with a minimum of 11 and a maximum of 104 has an average of 58.6 points which is close to the median of the interval. In the meantime, the mode for PDI is equal to 80 which is over 21% higher than the median. The outcomes may be clarified by previous communal contexts of this principle that indicates a dictatorial grading organizational structure that has worldwide dominance over the years together with a high level of communal disparities. Lately, the impact of these factors have gradually reduced but can be easily identified in decision making values more so in developing countries.

IDV has a minimum value of 6 with a maximum of 91. Here, the mean and the median are almost equal while the mode is as low as 20, which is 27% less than the median, and this point can be clarified in monetary terms. Showcasing distinct subjective values is unusual for most company norms since they are characterized by nations with developing economies. Employees are expected to be part of a team and accomplish goals as a group for them to achieve communal objectives. This social model leads to low value of the mode of IDV principle.

The MAS criteria has a proportional extent whereby the center is in the middle of the interval, mode, median, and the mean values within a 10% interval. The positioning of this principle can be clearly be seen as centered. Here, we find that values that have both high and low values of MAS are very extensive globally. The communal approach towards gender roles in the community deviates progressively from permanent to being totally flexible.

For UAI, the median value equal its mean, therefore the positioning of this principle is also centered. The mode is 86 and it exceeds its arithmetic mean by over 19%. This lack of consistency reflects on global company values for instance vagueness, an increased need to shun anxiety, the need to have communal assurance and an organized repetitive work.

This basic scrutiny of corporate differentiation criteria enables one to note the fundamental tendencies and traits which are familiar with all company values internationally. In order to describe and test the struggle associated with inter-ethnic relationships, we need to examine the disparity of each principle individually. Finding the disparities of each descriptive principle leads to the development of a polar standard as a source of inter-ethnic strife in many instances. There are three methods that are used to measure the disparities namely: Decile method, maximum method, calculation of Gini coefficient.

In order to minimize incorrect outcome, three tools are necessary for this investigation. The outcome of the calculation shows that PDI has the maximal differentiation while MAS and UAI are not highly differentiated. This coincides with the fact that UAI and MAS have a center extent and can be described in a communal character; at present, the business community is adversely affected by issues associated with grading discrimination that from the ones associated with a person's character in the community.

From the research we find that the differentiation between IDV values of assessed nations is greater compared to that of MAS and UAI. Inter-ethnic structures lead to increase strife due to undesirable character of staff in terms of the expression of idiosyncratic tendencies than character depending on other principles.

This investigation enables us to make conclusions about possible inter-ethnic strife because when the principle disparities increase, the chance that levels of cultural criteria in business relations will be polar or differ significantly. In this case business strife will be aggravated and the general output and employee effectiveness will be highly reduced.

Individual analysis of each corporate criteria enables us to note the main cause of company strife however it cannot show us the underlying reason for business relationships due to the fact that corporate criteria are reliant and the analysis should only be in synergy. Deeper analysis should therefore be done by the application of complex differential analysis.

#### 4. GRAPHIC IMPRINT OF CROSS-CULTURAL INTERACTION

In differential analysis, the key principles are studied separately to show general conflict tendency of corporate culture but it does not show corporate interaction in a complex way. Company values are only formed when the four criteria interact, so multi criteria methods needs to be applied in order for deep analysis to be possible. In this type of analysis, we will use Corporate Culture Surface, which is the surface of a polygon with vertices represented by the values of the four principles. The polar coordinate system will be used in this research as the values of the differentiation criteria are r coefficients that are used in calculating point position in the polar coordinate system.

The criteria in the analysis ideally are not to associate and therefore the polar graph of corporate culture surface would be a classic radar illustration and the degree between the four parts of the diagram would be equal to 90°. Nevertheless, the computations done have shown that the associations between value pools of 4 criteria is not equal to zero. Graphical representation showing the correlation between criteria is possible where the PDI axis is displayed as a vertical line (Figure 1). The degree between the four axes is shown as numbers and the smaller the degree the higher the correlation.

The next step is to convert values of the criteria appropriate for each nation into polar coordinates. The outcome is a graphic imprint of corporate culture that is “corporate culture surface” (Figure 2).

Numeric value of this surface equals 3092 units, calculated using polygon surface calculation formula.

The above graph shows that high values of Hofstede criteria characterize American corporate culture. This leads to a conclusion that American corporate culture is capable of

assimilating other ones, those, that have less articulated criteria, except for the cases when they have strong polar values of one or more criteria. Stated above can be demonstrated in a graph. For instance, cross-cultural cooperation of Japan and USA is displayed in Figure 3.

This interaction is known to be characterized by high level of conflict. Firstly, it is obvious from the graph that the overlap area

Figure 1: Criterial axis in polar coordinate system

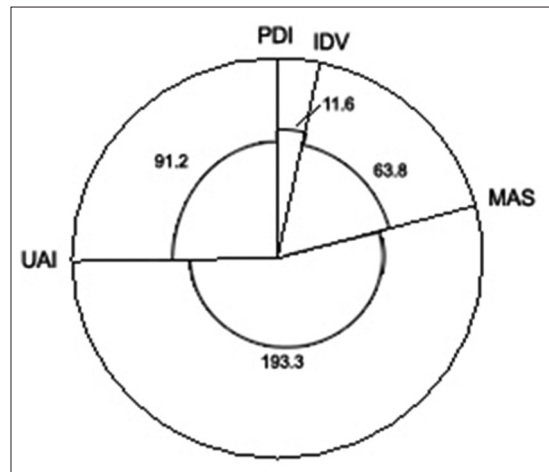


Figure 2: “Corporate culture surface” of USA

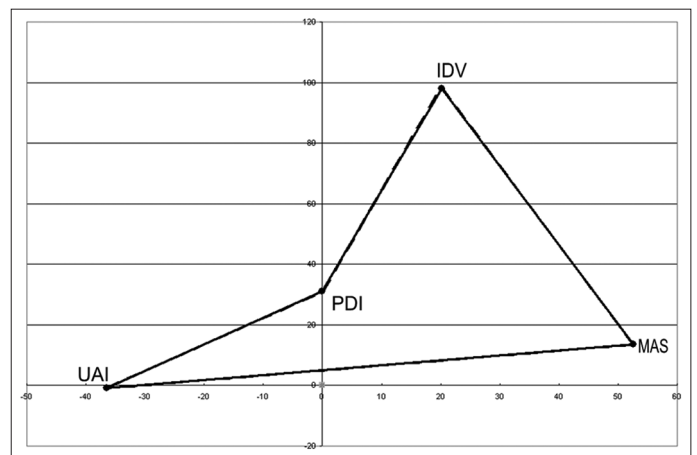
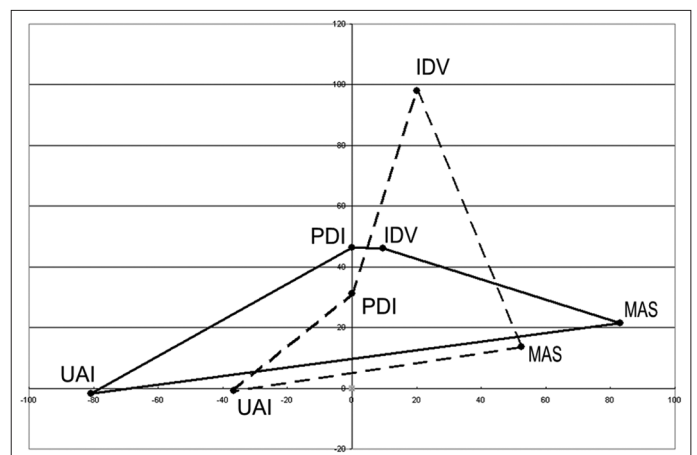
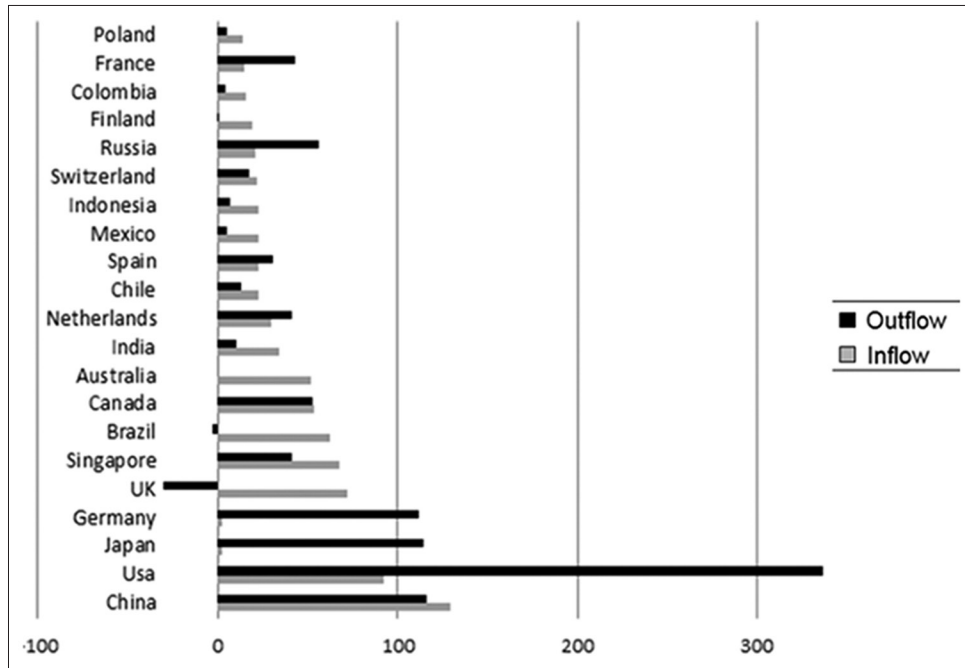


Figure 3: Corporate interaction of USA (dotted line) and Japan



**Figure 4:** Global streams of foreign direct investment in 2014, billion USD



Source: UNCTAD, 2015

of these two cultures is insignificant, comparing to total surface. Secondly, the values of MAS (83 for JNP vs. 53 for USA), IDV (46 vs. 98 respectively) and UAI (81 vs. 37 respectively), are significantly different. Three criteria out of four, thereby, have considerable discrepancy in this interaction. Corporate conflicts and overall inefficiency of this interaction are believed to be originated from these reasons. Level of conflictness in this interaction can be measured as a ratio of overlapping surface to total surface of both imprints.

The graphic system demonstrated above allows to consider any cross-cultural cooperation, measure its conflictness level and estimate main points of dissimilarity. Knowing that, it is possible now to analyze several cross-national pairs that are formed by the flow of foreign direct investments (FDI).

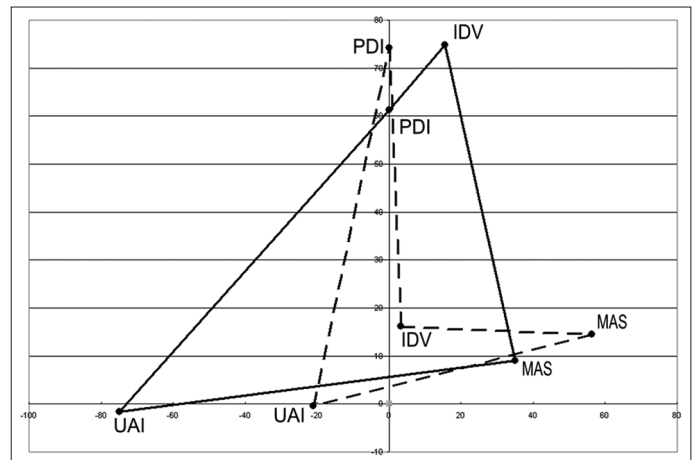
According to United Nations Conference on Trade and Development (UNCTAD’s) World Investment Report 2015, main global streams of FDI are shown in Figure 4.

The diagram shows that the countries with the largest inflow of FDI are China, USA, UK, Singapore and Brazil. Main exporters of FDI are USA, China as well, Japan and Germany. As an example, let us analyze the following pairs: France-China and Germany-Russia.

Graphical imprints of these interactions are demonstrated in Figure 5.

The graph demonstrates high level of conflictness in this interaction-imprint overlap area is meaningfully less than the overall area. IDV criterion influences it the most - (71 for France vs. 15 for China), as well as UAI (75 vs. 25 accordingly). French corporate culture tends to assimilate Chinese one-the overall area of French imprint is 3700 units, while Chinese - 1196 units.

**Figure 5:** Cross-cultural interaction of France (dotted line) and China

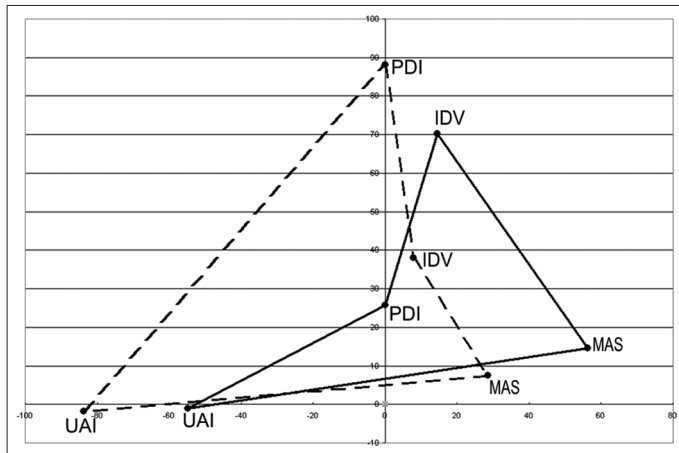


Russian - German cross-cultural interaction also has a high level of conflictness, although relatively smaller, comparing to France-China pair (Figure 6). Conflicts are mainly caused by PDI criterion (88 for Russia and 26 for Germany). Other criterion values have rather similar values, as an example, MAS value differs by 27 points only - 29 versus 56 respectively.

### 5. CONCLUSION

Corporate culture is an exceptional characteristic of any community which is designed by different subjective aspects for a period of time over the past years. More often than not it stays hidden and it is usually handled without appropriate consideration in many instances. Corporate culture affects all facets of human character and its main features cannot be easily influenced within a short time, even if the impact is strong. Many inter-ethnic conflict which could have been easily avoided have arose as a result of

**Figure 6:** Cross-cultural interaction of Russia (dotted line) and Germany



ignoring this important detail. This has been experienced by many multinational entities which have not been able to reach their expected economic outcome especially when working in a developing economy. Cross-cultural strife leads to enormous strain, breakdown and a huge reduction in output which further leads to a reduction in the return on investment of a multinational business venture, therefore, much consideration should be given to cross-cultural relations.

As a result, corporate culture is rarely quantifiable nor can one be said to be similar to others, however, widespread investigations have been carried out in this area. The above article presents a method to assess corporate cultures by looking into their graphic imprints. Cross-cultural interactions are understood and scrutinized in a simple and visual way through graphic interpretation of the corporate cultures imprints. The simple calculations and arithmetic methods defined in this piece enable

the assessment of general strife of cross-cultural relations and to take note of communal characters as an outcome of this struggle. Deeper analysis of international business relations has been facilitated through improved research of corporate culture surfaces and their interaction. This has also led to the estimation of various cross-cultural traits for instance ethnic integration, cross-cultural supremacy, impact of a single criterion on the whole multinational relationship, changing aspects of the criteria over a period of time and other impacts that are important for developing an efficient multinational and cross-cultural entities.

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