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**Project Management Deployment: The Role of Cultural Factors**

**Project Management Deployment: The Role of Cultural Factors**

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## **Abstract**

This paper investigates the role of cultural factors as possible partial explanation of the disparity in terms of Project Management Deployment observed between various studied countries. The topic of culture has received increasing attention in the management literature in general during the last decades and in the Project Management literature in particular during the last few years. The globalization of businesses and worldwide Governmental / International organizations collaborations drives this interest in the national culture to increase more and more. Based on Hofstede national culture framework, the study hypothesizes and tests the impact of the culture and development of the country on the PM Deployment. 74 countries are selected to conduct a correlation and regression analysis between Hofstede's national culture dimensions and the used PM Deployment indicator. The results show the relations between various national culture dimensions and development indicator (GDP/Capita) on the Project Management Deployment levels of the considered countries.

## **Keywords**

Project Management Deployment, Disparity, Cultural Factors, PMDI Index.

## Introduction

The Project Management (PM) discipline is undergoing important growth worldwide and continues its advancement, supported by the growing recognition of corporations, governments and academics during the last few decades (Kloppenborg and Opfer, 2002).

This growth, called PM Development can be better perceived through the analysis of two different aspects of growth:

- PM Advancement, which describes and analyzes the PM theoretical and practical knowledge; and;
- PM Deployment, which describes and analyses the size of the human resources involvement and indicates the acceptance and adoption of the PM discipline by the individuals and groups.

Hofstede (1984) stressed on the relation between the management (therefore, the project management) theories and practices and the culture concept: “a management technique or philosophy that is appropriate in one national culture is not necessarily appropriate in another” (p.1). As the management activity is made by people (than by other socio-technical resources) who are very much influenced by their values and beliefs, no management activity can be “culture-free”. Project GLOBE (House, Hanges and Ruiz-Quintanilla, 1997), compared about 18,000 middle managers from 62 countries. The results show that the Culture is linked to the behavior in organizations and to the management differences. Muller and Turner (2004) presented an empirical study that touched the Communication management knowledge Area (as

per the PMI PMBoK© Guide), classified as the most significant impact of all knowledge areas (PMI) on project results (measured in earned value terms). This study demonstrated the influence of Hofstede's cultural dimensions on the communication preferences between the Project Owners and Project Managers. Archibald (1991) stated that the international project management practices and the related formalization require significant adjustments in attitudes that affect the organization and the project teams. The cultural factors create barriers to these required changes and need substantial effort to overcome or mitigate. Newman and Nollen (1996) argued that universalism and dominance of U.S management practices is no longer a matter of fact. "Differences in national cultures call for differences in management practices" (p.1), and could create serious barriers to the deployment of project management. Wang and Liu (2007) presented the opposition to full Project Management Deployment from China case by emphasizing on the need for an organization to adopt the PM approach along with the development of shared cultural values compliant with the country's national culture. Shore and Cross (2005) explored and demonstrated the impact of national culture in the management of large-scale projects.

The literature involving directly the culture concept and Project Management Deployment is scarce, but the cross-cultural studies addressing the issues of management, business and international business, globalization, organizations, team behaving, leadership, communication, and other fields indirectly connected to Project Management discipline do exist abundantly. They provide supporting evidence of the possible impact of the culture on PM Deployment. This is what we propose to address in this paper. In a given country, can PM Deployment be partially impacted by the national culture? and how?

## Hofstede's Cultural Dimensions, GDP/Capita and Hypotheses Development

Hofstede (1982) considers that the human behavior is not random, but predictable, and individuals carry mental programs that are observed indirectly through their behaviors. The partial existence of mental programs that characterize uniquely each individual is complemented by the existence of other shared mental programs that characterize the group and the human specie. An important part of these mental programs is learned and transferred through social processes that happen during our entire lives. The description of Hofstede's mental programs is based on *values* and *culture*. A *value* represents "a broad tendency to prefer certain states of affairs over others" (p.18) and *culture* is a "the collective programming of the mind which distinguishes the members of one human group from another" (p.21). Hofstede cultural framework, supported by his international study made between 1968 and 1973, suggested four cultural dimensions: power distance, individualism-collectivism, uncertainty avoidance and masculinity-femininity.

Hofstede's dimensions of value have been criticized for their: limited ability to extend the dominant values present within a multinational organization to represent cultural values of a country and limited scope in methodology and measurement (Chanchani and Theivanathampillai, 2002). But, Chanchani and Theivanathampillai (2002) recognized that Hofstede's framework has been largely adopted by the business literature and studies for its simplicity, identification of dominant themes and understanding of cultural changes. A large number of comparative studies, where 140 studies have been cited by Hofstede, provide strong evidence for the validity of Hofstede's framework (Lim, Leung, Ling Sia and Lee, 2004). The

study of cultural distance has gained broad interest in international business research (Ricks, Toyne and Martinez, 1990) and has been used to explain a wide range of Multi National Enterprises (MNEs) strategies and organizational characteristics (Thiany, Griffith and Russel, 2005).

In light of the above, we consider Hofstede's cultural dimensions are supported enough to study the impact of the national culture on the PM Deployment object of our paper. Furthermore, we have proceeded with a detailed review of the *Culture's Consequences* publication (Hofstede, 2001) to investigate Hofstede's thoughts, reflections and observations during his review of 140 other studies that he found to be significantly correlated to one or more of the Hofstede's national culture dimensions. We summarize here after some important statements which we believe valuable for our research design setup:

- The four national culture dimensions are supposed to represent independent dimensions (p.60) with the exception of the *Power Distance* and *Individualism* dimensions which show high correlation across the studied countries
- The correlation pattern among the national culture dimensions depends on the set of countries selected for the study.
- Hofstede states that "Validation studies in which external data are correlated with the four dimensions should always take possible intercorrelation between the dimensions into account" (Hofstede, 2001) (pp.60-62).

One other important statement of Hofstede indicated that there is an impact of GNP/Capita on the correlation between the *Power Distance* and *Individualism* dimensions. If one controls the GNP/Capita variable (by separating wealthy from poor countries), the correlation between the *Power Distance* and *Individualism* dimensions becomes insignificant (p.60). Therefore, the GDP/Capita is added as a fifth factor, in addition to the four culture dimensions, to study its impact on the Project Management Deployment and to control the possible correlation that may exist between these culture dimensions in our set of countries. We should note that we have considered the GDP/Capita similar to the GNP/Capita in terms of compliance with Hofstede's related statement (See the GDP vs. GNP given here after).

#### **Power Distance dimension (Power Distance Index PDI)**

The Power Distance dimension is defined by (Hofstede and Hofstede (2005, p.46) as “the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally”. The PDI score informs us about the dependence relationships in a country. In high PDI countries, organizations are supposed to be hierarchically structured, power strongly centralized, subordinates are supposed to be dependent on their bosses, wait to be asked what to do, and avoid direct communication and disagreeing with them. They would not support a consultative mode of management. They accept inequality in power, decision making, privileges, initiating actions, supervision, control and judgment, as permanent roles and difficult to change (Hofstede and Hofstede, 2005).

The Project Management is based on fairly decentralized structure favoring high Project Manager's authority and control over budget and resources (Project Management Institute, 2004,



p.28), with focus on formal and informal communication (p.221) and lesson learned as important organizational process assets. It promotes consultative management and roles changes in accordance with the need of the project's objectives (p.199). The dependence team members- project manager, the interpersonal skills (p.15), are more pragmatic business oriented than emotional oriented. The relationship, interpersonal and professional issues resolutions is favored through clear written procedures that avoid possible power abuse. Thus, the Project Management discipline is expected to be deployed in small Power distance countries better than in large power distance countries. That is,

*Hypothesis H1: The Project Management Deployment is negatively related to the Power Distance of a country.*

### **Individualism versus Collectivism dimension (Individualism Index IDV)**

The Individualism / Collectivism dimension is defined by Hofstede and Hofstede (2005, p.76) as "Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family.

Collectivism, as it's opposite, pertains to societies in which people from birth onward are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty". The IDV score inform us about the individualism (high score) or collectivism (low score) profile of a country. In a high IDV country, personal time, freedom and personal challenges are more important for people than training and physical conditions of the work environment. The emotional mutual support ties are loose, but the professional ties are strong and dictated by the individual interests. Express clearly and directly

one's thought is encouraged. Tell the truth about one's feeling and accepting feedbacks and criticism constructively are appreciated and honest. Confrontation leads to problems resolution and higher truth. In individualist countries people tend to communicate verbally when they meet and they are characterized by a low-context communication environment. In collectivist countries, the natural persons are worthy of trust than a legal entity (company), and the personal relationship should be established first (Hofstede and Hofstede, 2005).

The Project Management relies on the pre-defined roles and competencies of the project team members (Project Management Institute, 2004, pp.199-207) and therefore do not consider the interests of emotional in-groups collectivist relationship. The complementarily and accountability of project team members are a must to ensure the time, cost, schedule paradigm. Each team member is directly and individually responsible of the completion of his part of the job. The quality control (International Project Management Association, 2006, p. 48) and change management (Project Management Institute, 2004, p.96) strategies and procedures support a direct, clear identification and formalized reporting of the problems. The projectized organizations have identified career paths (Hoffman, Boyle and Maturo, 2004) and encourage competitions and challenges between the project teams' members. The project team is dismantled at the end of the project, and the team members are re-assigned to other teams (Project Management Institute, 2004, p.5) making emotional in-group loyalty hard to build and favoring one's experiences and personal achievement as the only security of next jobs. The project team is generally reallocated to new physical location at the beginning and during the project life making less dependency on the work place physical conditions and resources. The networking is an important communication channel for the project managers and team members

(p.207). By its technical nature, the Project Management is a low-context communication environment in which the necessary amount of information is coded in the written or verbal messages. The contractual management (p.269) aspect of the project management prevails largely over the personal relationship management aspect and make of the company or organization delivering the project as the sole source of trust and fairness in the business relationship. Thus, the Project Management discipline is expected to be deployed in Individualist countries better than in Collectivist countries. That is,

*Hypothesis H2: The Project Management Deployment is positively related to the Individualism of a country.*

### **Masculinity versus Femininity dimension (Masculinity Index MAS)**

Hofstede and Hofstede (2005, p.120) defined this dimension as “A society is called masculine when emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life. A society is called feminine when emotional gender roles overlap: both men and women are supposed to be modest, tender, and concerned with quality of life”. The MAS score inform us about the Masculine (high score) or Feminine (low score) profile of a country. In a high MAS country the men are supposed to be competitive looking for earnings and advancement, while women are modest looking for good social relationships, solidarity and equality. Business conflicts are handled with “fights” and confrontation in masculine countries, but with compromise and negotiations in feminine countries. Organizations in masculine countries tend to reward the good results in accordance with people performances,

while in feminine countries; the reward schemes are more shaped with needs and equality (Hofstede and Hofstede, 2005).

The Project management approach offers a framework that supports managing adequately the human resources factors (Project Management Institute, 2004, p.213) such as interpersonal relationships, issues resolution, team-building activities, ground rules, recognition and rewards, etc. that may be impacted with the gender roles divergence (masculinity) or convergence (femininity) in a country. The project management can be implemented in adequate environments that comply with the underlying dimension pole (masculinity or femininity) of the country. The Project Management discipline is expected to be deployed independently of the Masculine and Feminine dimension of the countries. That is,

*Hypothesis H3: The Project Management Deployment is not related to the Masculinity / Femininity of a country.*

### **Uncertainty Avoidance dimension (Uncertainty Avoidance Index UAI)**

The Uncertainty Avoidance dimension is defined by Hofstede and Hofstede (2005, p.167) as “the extent to which the members of a culture feel threatened by ambiguous or unknown situations”. The UAI score inform us about the level or strength of anxiety (resulting from this feeling) of a country. A low index indicates low feeling of threatening by uncertainties, and high index indicates the contrary. In high UAI score countries, people are worried about what may happen and generally are under nervous stress and in need for written and verbal rules for predictability. People look for minimum change of employers and prefer long-term

employment. They are expressive (talk with hands, high voices and gesticulations), aggressive and emotional. The countries with weaker UAI scores have lower sense of urgency, and are willing to take risks more frequently (job change or engaging in activity with no rules) (Hofstede and Hofstede, 2005).

The Project management framework offers a structured organization in accordance with the project constraints, needs and objectives (Project Management Institute, 2004, p.28). The rules and procedures are set in accordance with the environment in which a real project will be performed (p. 46). No written or formal rules are created just to answer the emotional need of team members. Within the PM framework, the uncertainty (as anxiety from unknown risk) is simply addressed with a prudent response of allocating general contingency (p.240) such as reservation of extra budget added to the project budget. The risk (known measurable event and not uncertainty) management constitutes an important part of the activity of project management (p.237). The project is by definition a limited in time undertake which ends the current job of the team members and oblige them to search for other projects and other jobs (p.5). It does not guarantee the long-term employer / employment expected by high UAI countries. Thus, the Project Management discipline is expected to be deployed in weak Uncertainty Avoidance countries better than in strong Uncertainty Avoidance countries. That is,

*Hypothesis H4: The Project Management Deployment is negatively related to the Uncertainty Avoidance of a country.*

## **Growth Domestic Production Per Capita (GDP / Capita)**

The main objective for the introduction of the GDP/Capita in our analysis is to control the possible correlations between the culture dimensions as we have explained above. Furthermore, the GDP/Capita constitutes an important composite indicator to consider within this study. In fact, additional factors other than the national culture dimensions, such as the economical, technological, educational and other national characteristics may also affect the PM Deployment of a country. The Gross Domestic Product based on purchasing-power-parity per capita (GDP/capita) is often used as an indicator of the standard of living in a country and is incorporating indirectly some of those national characteristics influencing factors.

The Gross domestic product (GDP) is defined as (Encyclopædia Britannica, 2008) the “total market value of the goods and services produced by a nation's economy during a specific period of time. It includes all final goods and services—that is, those that are produced by the economic resources located in that nation regardless of their ownership and that are not resold in any form. GDP differs from gross national product (GNP), which includes all final goods and services produced by resources owned by that nation's residents, whether located in the nation or elsewhere”. Developing the various approaches used to measuring the GDP such as the expenditure method, the income method (Wikipedia, 2008) and the long-term projection methods (Hawksworth, 2006) is outside the scope of this study, but a closer look at the structures and calculation components of these methods shows the important amount of national characteristics information contained within the GDP/Capita indicator.

The Project Management discipline is expected to be deployed in high GDP/Capita countries better than in low GDP/Capita countries.

*Hypothesis H5: The Project Management Deployment is positively related to the GDP / Capita.*

## **Research Design**

Figure 1 summarizes and graphically illustrates our proposed hypotheses.

Our research design is setup to analyze the possible correlations between six variables in three sets of selected countries. The considered variables are:

- The Project Management Deployment Index *PMDI* (defined below). This variable constitutes the dependent variable.
- The four national culture dimensions of Hofstede: Power Distance (PDI), Individuality (IDV), Masculinity (MAS) and Uncertainty Avoidance (UAI). They constitute the independent variables (culture dimension).
- The GDP/Capita: See definition here above. It constitutes an independent variable (socio-economic development dimension)

The three sets of selected countries considered are:

- All the selected countries presented in Table 1 (74 countries).
- The group of (40) forty countries entitled Low-GDP group having a GDP/capita less than 21,000 US\$ (which is the GDP/capita mean of the set of all countries. See Table 3)
- The group of (34) thirty-four countries entitled High-GDP group and having a GDP/capita more or equal than 21,000 US\$.

### **Project Management Deployment Index *PMDI***

The measurement of the Deployment dimension of the Project Management development is based on the *Project Management Deployment Index PMDI* introduced with Bredillet, Ruiz and Yatim (2008). It is defined as the Level or the Degree of Deployment of Project Management within a country (or Group) by dividing the total number of the Project Management certified individuals within this country (or Group) by the total population of that country (or Group) during a given point in time (a year). The number of certified individuals worldwide, reaching about 350,000 by end 2006 (Bredillet et al., 2008) should reflect the worldwide direct implication of the individuals and therefore the country.

### **Data Collection**

The data concerning the number of certified project managers are collected from the PMI© (Project Management Institute, 2007) and IPMA (International Project Management Association, 2007) for the year 2007. The PMI certified managers are those qualified as Project



Manager Professionals PMP© by PMI organization and the IPMA certified managers are those qualified at the levels A, B, C and D of the IPMA organization. The cumulative number of certified individuals considered in our study amounts to about 325,000 Project Management credentials which represent a high significant part of the worldwide certified Project Managers. It should be noted the possible overlapping between the two qualifications (same certified Project Managers from both PMI and IPMA) but we consider this as non significant for the results of our study. The data concerning the countries populations for 2007 are collected from US Census Bureau (2008) and The *PMDI* data are collected from (Bredillet, et al., 2008). The data concerning the GDP/Capita development index are collected from the GDP based on purchasing-power-parity (PPP) per capita GDP from the International Monetary Fund for the year 2007 (IMF International Monetary Fund, 2007).

The scores of the four (4) national culture dimensions are collected from Hofstede and Hofstede (2005, pp.43, 78, 120, 168). We should stress on two important elements in Hofstede's data: The first one is that 57 countries out of the selected 74 countries in this study were calculated from IBM data base (collected between 1967 and 1973), the other 17 countries data were calculated by replications or based on informed estimates (p.42). The second remark is the old date of the main Hofstede's data which may be contested after more than 30 years. But, as cultures change only slowly over time and, in case of change, the relative ranking of the national cultures is invariant as the factors of changes operates in general in the same way on all the countries (Chan, Lin and Mo, 2003), we consider Hofstede's data valid for our study.

Hofstede's cultural scores for Belgium consider two different regions with different scores, the Flemish Belgium and the Walloon Belgium. Switzerland was also scored differently for the French Switzerland and for the German Switzerland regions. We kept these separations in regions, and we adapted (in prorate to their populations) the *PMDI* index for each region. Hofstede's cultural scores considered the studied Arab countries (Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia and United Arab Emirates) as one single region having identical score for each cultural dimension. The IDV score of 38 for example have been assigned to all of these Arab countries. For the purposes of this paper, we have considered 7 different Arab countries having identical cultural dimension scores. The *PMDI* data were available independently for each of these countries.

### **Data Treatment Tools**

The test of our Hypotheses is performed using the Bivariate correlation procedure of SPSS V17.0 which computes the strength and direction of the linear associations (correlation) between the studied variables. The partial correlation and stepwise linear regression calculations are also performed using SPSS V17.0.

### **Samples Selection**

74 countries are selected for the study based only on the availability of Hofstede's national culture scores for all of them. The availability or not of the PMI and / or IPMA figures has not been a selection criteria of the considered countries. Table 1 present the detailed data of our analysis.

## Findings and Analysis

### Set of All Countries

This part of the study considers the set of all countries grouping 74 countries as listed in Table 1.

### *Descriptive statistics*

Table 2 gives a summary of the Project Management Deployment *PMDI* distribution among the considered countries. Table 2 shows the non uniformity of this distribution across various nations. More than 32% (24 countries) record a *PMDI* less than 10, more than 70% (53 countries) recorded a *PMDI* less than 100, while 21 countries only recorded a *PMDI* higher than 100 with 3 countries recoding a very high *PMDI* score of more than 500. Table 3 shows the basic descriptive statistics (mean and standard deviation) of the studied variables, while Table 4 present the correlation coefficients of these variables.

### *Correlation coefficient analysis*

The correlation coefficients shows significant correlations (2-tailed with  $p < .01$ ) between our dependent variable *PMDI* and the Power Distance dimension PDI (-.552), the Individualism / Collectivism dimension IDV (.454), the Uncertainty Avoidance dimension UAI (-.418), and no significant association with the Masculinity / Femininity dimension. The correlation coefficient between *PMDI* and GDP/Capita is quite high (.590).

The results displayed in Table 4 confirm our five hypotheses as expected in the context of the set of all considered countries: The Project Management is better deployed in countries having low Power Distance (with negative significant correlation), Individualism (positive significant correlation), and low Uncertainty Avoidance (negative significant correlation) scores. The Project Management is better deployed in countries having higher GDP/Capita (positive significant correlation). The Project Management Deployment is not impacted by the Masculinity / Femininity dimension. Furthermore, the GDP line of Table 4 suggests a clear inter-correlation between the GDP/capita at one hand and the Power Distance PDI (-.598) and Individuality IDV (. 575) at the other. This inter-correlation may lead to a false correlation between these dimensions (PDI and IDV) and our dependent variable *PMDI*, giving that the correlation coefficient between GDP and *PMDI* is quite high (0.590).

The IDV line of Table 4 suggests other inter-correlation between the Individuality (IDV) and the Power Distance (PDI) variables. The coefficient of correlation between these two variables is significantly quite high (-.624). In order to test for the existence of any false relationship (high significant correlation) in Table 4, we have proceeded with a partial correlation test that controls the effect of the GDP/Capita variable on the other variables.

#### *Partial correlation and stepwise linear regression*

The result of the new correlation coefficients is presented in Table 5. Table 5 clearly shows the important decrease of the correlation coefficient (with non significance) between the Individualism IDV and the *PMDI* eliminating the IDV dimension from being on the list of significantly correlated national culture dimensions with *PMDI*. In order to eliminate these inter-

correlation between the culture dimensions (as suggested by (Hofstede, 2001) p.62)) we have proceeded with a stepwise linear regression model built with the data of our six (6) variables including *PMDI* as the dependent variable, the national culture variables (PDI, IDV, UAI, MAS) and the GDP/capita as the independent variables.

The regression model resulted is summarized in Table 6. It does reject the tow national culture dimensions variables IDV (for multi-colinearity reason as explained here above) and MAS (for non significant correlation at the zero-order correlation level). The resulting model is summarized in the following formula:

$$\text{Formula (1): } PMDI(\text{country, year}) = 284.46 + 0.004 * GDP/Capita(\text{country, year}) - 2.156 * UAI(\text{country, year}) - 1.931 * PDI(\text{country, year})$$

Where:

*PMDI*(country, year), is the resulting *PMDI* score for the considered “country” at the time “year”

GDP/Capita(country, year), is the GDP based on purchasing-power-parity (PPP) per capita in US\$ for the considered “country” at the time “year”

UAI, is the Uncertainty Avoidance Index score for the considered “country” at the time “year”

PDI, is the Power Distance Index score for the considered “country” at the time “year”.

The resulting model explains statistically ( $F=23.25$  with significance of  $p=.000$  at .01 level) the variation in the *PMDI* for about 48% (Adjusted  $R^2=0.478$ ). The model enhances our estimation error from 161.59 (see Std. deviation of *PMDI* in Table 3) to 116.78 (see Std. Error in Table 6).

### *Findings and Discussions*

Taking into account the full set of countries considered under our study, the above leads us to state the results of our analysis as:

*Finding 1: Considering all countries (whatever their GDP/capita scores are): The Project Management is better deployed in countries having low Power distance and low uncertainty avoidance scores. The Project Management Deployment is not impacted by the Individualism and the Masculinity / Femininity Dimensions.*

The GDP/capita shows a positive standardized regression coefficient of 0.387 offering important evidence on the influence of the good wealth of the country on the Project Management Deployment:

*Finding 2: Considering all countries (whatever their GDP/capita scores are): The Project Management is better deployed in countries having higher national GDP/Capita*

The countries having High GDP/Capita with low uncertainty avoidance and low power distance are expected to welcome the Project Management Deployment whatever their

masculinity or individualism dimension scores. This can explain the case of France and Germany presented at the beginning of this paper. France and Germany have the same national wealth (measured with a similar High GDP/Capita around 33,000 US\$), but an important difference in the PM Deployment (measured with the *PMDI* Index) is recorded:  $PMDI_{PMI+IPMA}$  (France, 2007) = 45.84 and  $PMDI_{PMI+IPMA}$  (Germany, 2007) = 200.19. A look at the national culture Power distance and uncertainty avoidance dimensions scores allows us to see clearly (Table 1) the advantage of Germany having PDI=25 (France PDI=68) and UAI=65 (France UAI=86) in compliance with our findings.

In Table 1 we locate the countries having low Power Distance scores ( $PDI < 51$ ) and low Uncertainty Avoidance scores ( $UAI < 51$ ): There are (12) countries including Jamaica, South Africa, New Zealand, Sweden, Canada, UK, Finland, Netherlands, Denmark, USA, Norway and Ireland. All of them have relatively high *PMDI* scores ranging from 33 for Jamaica up to 516 for Denmark. Except for Jamaica ( $PMDI=33.09$  and  $GDP/Capita=4,654$  US\$) and South Africa ( $PMDI=28.82$  and  $GDP/Capita=13,845$  US\$), the others have  $GDP/Capita$  greater than 26,000 US\$ and *PMDI* greater than 130.

Looking at the countries having high Power Distance scores ( $PDI > 50$ ) and high Uncertainty Avoidance scores ( $UAI > 50$ ): There are (43) countries grouping:

- Countries with *PMDI* greater than 100: Switzerland French, South Korea, Taiwan, Japan and UAE, all having high  $GDP/Capita$  which supports their high

*PMDI* scores except for Switzerland French which needs more analysis as for the reasons of having *PMDI*=405.71 with a GDP/Capita=14,207 US\$.

- Countries with *PMDI* between 20 and 99: Brazil, Uruguay, Belgium Walloon, Croatia, Poland, Saudi Arabia, Slovakia, Kuwait, Belgium Flemish, Portugal, Czech Republic, Slovenia, Spain, and France all supported by a moderate GDP/Capita between 10,000 US\$ and 33,000 US\$
- Countries with *PMDI* less than 20: Nigeria, Bangladesh, Pakistan, Guatemala, Ecuador, Egypt, Lebanon, Morocco, Serbia, Peru, Venezuela, Colombia, Iran, Panama, Thailand, Turkey, Bulgaria, Romania, Mexico, Russia, Chile, Libya, Malta and Greece, all having relatively low GDP/Capita of less than 14,000 US\$ except for Malta and Greece which need more analysis to understand better their low *PMDI* scores.

Grouping the countries by other variations of scores like ( $PDI < 51$  and  $UAI > 50$ ) or ( $PDI > 50$  and  $UAI < 51$ ) could offer further information and clarification about the *PMDI* scores and its link with the GDP/Capita. The above findings and results confirm the role of the GDP/Capita as a control variable and support the discussion made in our hypothesis definition and research design. Furthermore, we present in the following sections the analysis of the two sets of countries: The Low-GDP set (group of countries having their GDP/Capita values less than or equal to the mean GDP/Capita of the selected 74 countries) and the High-GDP set (group of countries having their GDP/Capita values greater than the mean GDP/Capita of the selected 74 countries). The mean GDP/Capita values of the selected 74 countries amounts 21,000US\$ (See Table 3).



## **Set of High-GDP/Capita Countries**

This part of the study considers only the set of High-GDP countries grouping a set of 34 countries.

### *Correlation coefficient analysis*

The correlation analysis presented in Table 7 for the High-GDP countries shows interestingly the results found so far (Finding 1) with the national culture dimensions: A correlation of the PM Deployment with low Power Distance and low Uncertainty Avoidance, with no correlation with the Individualism and Masculinity dimensions. We should notice, compared to Table 4 including all countries, the lower correlation of *PMDI* with PDI and the higher correlation with UAI. Concerning the GDP/Capita, and contrary to Finding 2, there is no significant correlation between GDP/capita and the *PMDI*. We notice also the absence of any significant correlation between GPD/Capita and all of the culture dimensions.

### *Analysis results and findings*

Taking into account the High-GDP set of countries, the above leads us to state the results of our analysis as:

*Finding 3: In High-GDP countries (having GDP/capita greater than 21,000 US\$): The Project Management is better deployed in countries having low Power distance and low uncertainty avoidance scores. The Project Management Deployment is not impacted by the Individualism and the Masculinity / Femininity Dimensions.*

*Finding 4: In High-GDP countries (having GDP/capita greater than 21,000 US\$): The Project Management is not impacted by the wealth of the country.*

In other terms, the PM Deployment is related in High GDP countries to low power distance and low uncertainty avoidance.

### **Set of Low-GDP/Capita Countries**

This part of the study considers only the set of the Low-GDP countries grouping asset of 40 countries (see here above).

#### *Correlation coefficient analysis*

The correlation analysis presented in Table 8 for the Low-GDP countries shows more interesting results that contradict our general findings (Finding 1) for the culture dimensions: the PM Deployment is correlated with the Individualism national culture dimension IDV with a significant positive coefficient of .442 (2-tailed with  $p < .01$ ). There is no correlation with the other culture dimensions. As for the High-GDP set of countries, there is no significant correlation between GDP/capita and *PMDI* index.

According to (Hofstede, 2001) (p.219) statement, the validity of the IDV correlation with *PMDI* is supported only when it shows a stronger zero-order correlation with *PMDI* than the other culture dimensions and the GDP/capita, which is our case in Table 8.

### *Analysis results and findings*

Taking into account the Low-GDP set of countries, the above leads us to state the results of our analysis as:

*Finding 5: In Low-GDP countries (having GDP/capita less than 21,000): The Project Management is better deployed in countries having high Individualism scores. The Project Management Deployment is not impacted by the Power distance, Uncertainty avoidance and the Masculinity / Femininity Dimensions.*

*Finding 6: The Project Management Deployment is not impacted by the wealth of the country.*

In other terms, the PM Deployment is supported in low GDP countries by high individualism.

### **Overall Results**

The Low-GDP countries are looking for innovations, new technologies and new management approaches. In the absence of adequate resources and economic stability at the country level, the Individuality dimension seems to be the only supportive cultural dimension that assists the country in its PM Deployment. While, within the High-GDP countries, the Power Distance PDI and Uncertainty Avoidance UAI dimensions are the supportive cultural dimensions for the PM Deployment. The absence of MAS dimension in both groups of countries leads us to suppose that it may constitute a third level of cultural support that may occur after a certain

stability of the two dimensions PDI and UAI. Further studies in this direction could help clarifying empirically this classification of the national culture dimensions by the societies depending on their economic wealth situation and its impact on various fields including the Project Management.

Figure 2 is summarizing the results.

### **Limitations**

This study should be considered with some limitations resulting mainly from the use of the concepts of *PMDI* Index for the PM Deployment measurement and of the Hofstedes national culture dimensions framework.

1-By definition, *PMDI* does not reflect the full picture of the PM Deployment. It should integrate other factors than the certified credentials from various PM certification bodies (Bredillet, et al., 2008).

2 - *PMDI* has been calculated based only on the Certifications delivered by the Project Management Institute under the program (PMP®) certification and the IPMA (levels A,B, C and D) excluding some other certifications such as CAPM® and PgMP® from PMI and PRINCE2™ and MSP™ from OGC (OGC, 2002). The former certifications shows non significant figures in 2007, while for the later it the figures estimated (no official figures are available) tend to indicate that the certification s have been so far mostly issued in the United Kingdom.

3 - Hofstede's framework has been largely criticized for its limited scope in methodology and measurement (Chanchani and Theivanathampillai, 2002).

4 – The dimensions scores are collected mainly from Hofstede data base built since more than 35 years ago. As stated by Hofstede and Hofstede (2005, p.42), 57 countries out of the selected 74 countries in this study were calculated from IBM data base (collected between 1967 and 1973), the other 17 countries data were calculated by replications or based on informed data. The scores may have been changed over time in any direction.

5 - The number of selected countries is 74 which may be considered not enough to validate our findings.

6 – It should be noticed that these findings have no predictive validity. Formula (1) provides an illustration of the findings at a given time.

### **Conclusions**

This paper provided empirical evidence showing the impact of national culture on the PM Deployment level in the considered 74 countries. The key findings show that:

- The PM Deployment is negatively correlated with the power distance and negatively correlated with the uncertainty avoidance, but not correlated with the individuality or with the masculinity dimensions.
- The PM Deployment found positively correlated with the GDP/capita.

Furthermore, in-depth analysis of 2 groups of the considered countries provided better view of the impact of the national culture dimensions on the PM Deployment. The PM Deployment is:

- In High-GDP countries (Group of countries having their GDP/Capita greater than 21,000 US\$): negatively correlated to the power distance and negatively correlated to the uncertainty avoidance dimensions.
- In Low-GDP countries (Group of countries having their GDP/Capita less than or equal 21,000 US\$): positively correlated to the individualism dimension.
- In both High and Low GDP countries groups: The control variable GDP/capita found not to be correlated with the PM Deployment.

The separation between the High-GDP and Low-GDP countries is very important as it shows a different cultural reaction to the PM Deployment depending on the economical situation of the country.

These findings contradict a general assumption stating that Low-GDP countries resist to the PM Deployment more than the High-GDP countries may do for cultural reasons. Our findings provide evidences that national culture in both High and Low GDP countries impact differently the PM Development. Depending on the targeted country (region or group), one should take into consideration the correct cultural dimension to consider for analysis of phenomena related to or involving PM Deployment.

## **Further Researches**

The findings of this paper should have consequences for the researchers, practitioners and policy makers working on the field of PM Development (and specifically PM Deployment) and national culture as they offer new perspectives of addressing the PM Deployment with the national culture dimensions and the development levels of the targeted countries. They offer the possibility of analyzing, with cultural perspective, the PM certification growth and impact suggesting perhaps better adaptation to the cultural settings of the considered country or social group.

Other studies analyzing and comparing PM Deployment and its relation to performance within groups of international organizations in relation to their cultural settings, as well as the performance of industrial sectors in relation to their organizational culture, could be undertaken.

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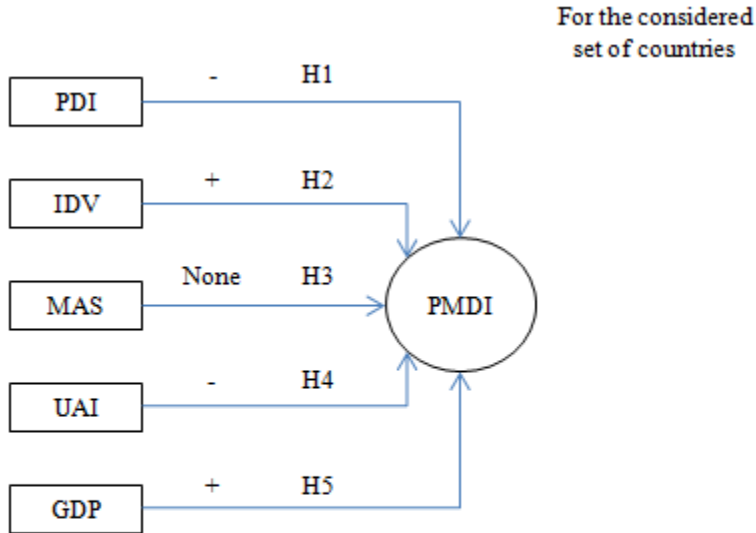
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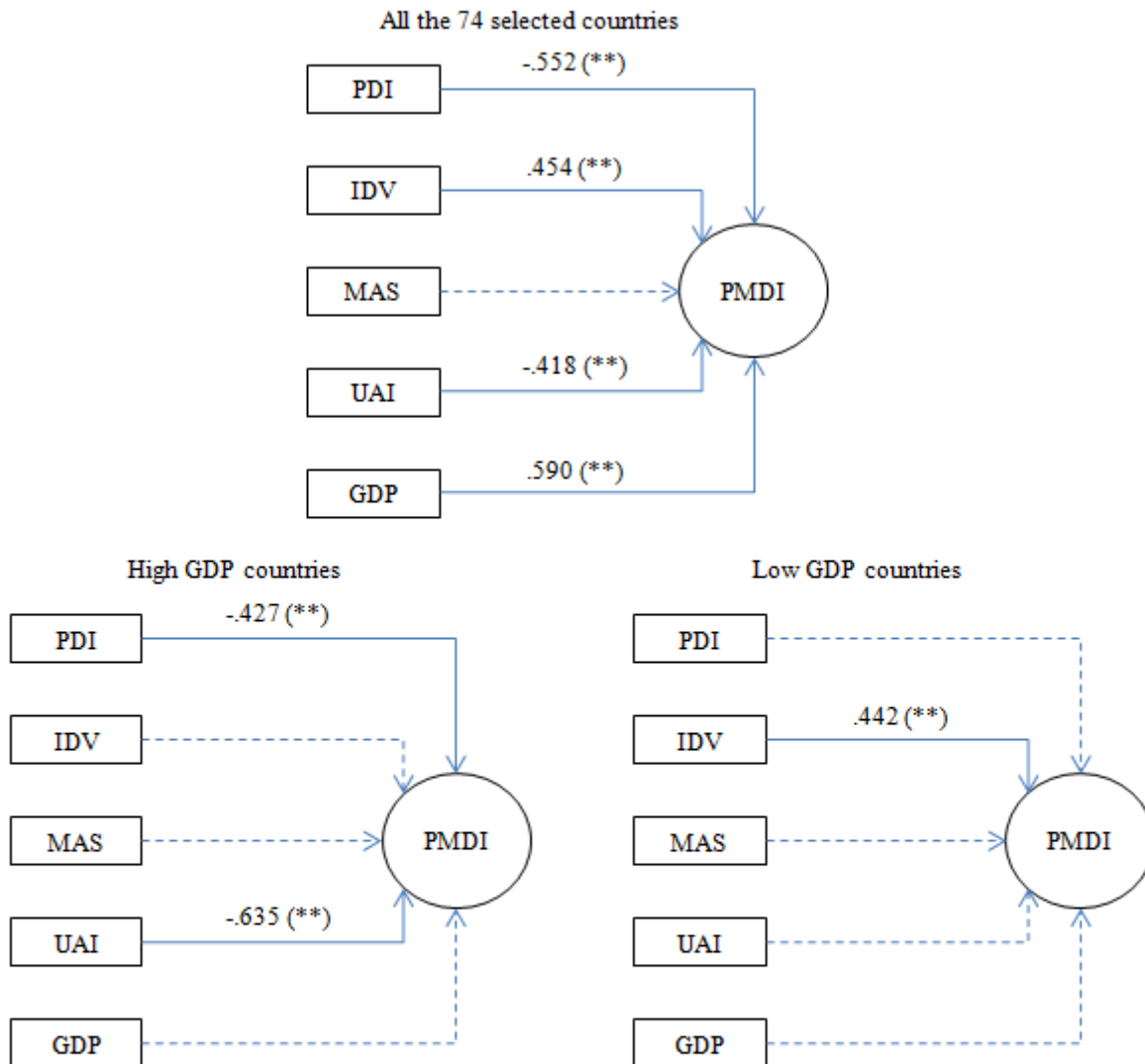
## Tables and Figures

Figure 1. Graphical view of the proposed Hypotheses for any set of the considered countries



The considered SET of countries could be: All countries, Low-GDP Countries or High-GDP countries;  
The arrows indicate positive (+) or negative (-) correlation expected;  
None indicates no correlation expected

Figure 2. Graphical summary view of the results - 3 sets of countries



The arrows indicate significant correlation with its value;

The dashed line indicates no correlation;

High-GDP countries: Countries having GDP/Capita > 21,000US\$ in 2007

Low-GDP countries: Countries having GDP/Capita ≤ 21,000US\$ in 2007

PMDI: Indicates the Project Management Deployment Index, Dependent Variable

GDP: Indicates the GDP/Capita, Independent and Control variable

PDI, IDV, MAS, UAI: Indicate the national culture dimensions of Hofstede, Independent Variables.

Table 1. Selected countries scores 2007: Hofstede's National Culture dimensions, GDP based on PPP /Capita and *PMDI* for PMI & IPMA

Country	PDI Index Score	IDV Index Score	UAV Index Score	MAS Index Score	PMP© Certified 2007	IPMA Certified 2007	Population , Millions 2007	PMDI (PMI+IPMA) 2007 Score	GDP/Capita US Dollar
Bangladesh	80	20	60	55	4		150.448	0.027	2,270
Libya	80	38	68	53	2		6.037	0.331	14,108
Guatemala	95	6	101	37	6		12.728	0.471	4,547
Vietnam	70	20	30	40	44		85.262	0.516	3,716
Iran	58	41	59	43	45		65.398	0.688	9,127
Estonia	40	60	60	30	1		1.316	0.760	21,860
Morocco	70	46	68	53	29		33.757	0.859	6,003
Indonesia	78	14	48	46	249		234.694	1.061	4,684
Nigeria	77	20	54	46	179		135.031	1.326	1,281
Pakistan	55	14	70	50	295		164.742	1.791	2,943
Thailand	64	20	64	34	152		65.068	2.336	9,715
Malta	56	59	96	47	1		0.402	2.488	23,454
Ecuador	78	8	67	63	46		13.756	3.344	5,021
Turkey	66	37	85	45	280		71.159	3.935	9,816
Philippines	94	32	44	64	388		91.077	4.260	5,738
Bulgaria	70	30	85	40	25	12	7.323	5.053	10,973
Chile	63	23	86	28	91		16.285	5.588	13,745
Peru	64	16	87	42	191		28.675	6.661	7,410
Serbia	86	25	92	43	9	63	10.150	7.093	7,265
Venezuela	81	12	76	73	191		26.024	7.340	8,125
Argentina	49	46	86	56	346		40.302	8.585	17,559
Russia	93	39	95	36	397	913	141.378	9.266	13,432
Colombia	67	13	80	64	427		44.380	9.622	8,891
Mexico	81	30	82	69	1063		108.701	9.779	11,880
Romania	90	30	90	42	137	95	22.276	10.415	11,079
Greece	60	35	112	57	127	0	10.706	11.862	35,167
Lebanon	80	38	68	53	50		3.926	12.737	5,965

Country	PDI Index Score	IDV Index Score	UAV Index Score	MAS Index Score	PMP© Certified 2007	IPMA Certified 2007	Population , Millions 2007	PMDI (PMI+IPMA) 2007 Score	GDP/Capita US Dollar
India	77	48	40	56	12814	1907	1129.866	13.029	4,183
Panama	95	11	86	44	49		3.242	15.113	9,395
Egypt	80	38	68	53	623	766	80.335	17.290	5,272
Spain	57	51	86	42	571	339	40.448	22.498	29,148
China	80	20	30	66	18757	13480	1321.852	24.388	8,788
Hungary	46	80	82	88	98	149	9.956	24.809	21,040
Costa Rica	35	15	86	21	109		4.134	26.367	12,683
South Africa	49	65	49	63	1015	253	43.998	28.820	13,845
Malaysia	104	26	36	50	718		24.821	28.927	12,754
Brazil	69	38	76	49	5471	103	190.011	29.335	10,637
Italy	50	76	75	70	1344	402	58.148	30.027	32,319
Saudi Arabia	80	38	68	53	892		27.601	32.318	17,196
Jamaica	45	39	13	68	92		2.780	33.092	4,654
Poland	68	60	93	64	603	817	38.518	36.866	16,599
Uruguay	61	36	100	38	135		3.461	39.010	12,917
Croatia	73	33	80	40	65	131	4.493	43.620	15,733
Israel	13	54	81	47	283		6.427	44.035	33,299
France	68	71	86	43	1375	1546	63.718	45.842	33,078
Slovakia	104	52	51	110	22	284	5.448	56.173	20,002
Kuwait	80	38	68	53	141		2.506	56.275	21,418
Belgium Flemish	61	78	97	43	363		6.131	59.275	21,449
Belgium Walloon	67	72	93	60	253		4.261	59.275	14,905
Czech Republic	57	58	74	57	99	563	10.229	64.720	25,346
Portugal	63	27	104	31	321	414	10.643	69.061	23,867
Slovenia	71	27	88	19	24	124	2.009	73.660	26,576
Luxembourg	40	60	70	50	44		0.480	91.624	87,400

Country	PDI Index Score	IDV Index Score	UAV Index Score	MAS Index Score	PMP© Certified 2007	IPMA Certified 2007	Population , Millions 2007	PMDI (PMI+IPMA) 2007 Score	GDP/Capita US Dollar
Norway	31	69	50	8	491	111	4.628	130.080	47,098
Australia	36	90	51	61	2957		20.434	144.709	34,943
Japan	54	46	92	95	21076		127.433	165.388	34,024
Taiwan	58	17	69	45	3221	1066	22.859	187.542	32,490
Sweden	31	71	29	5	902	892	9.031	198.647	36,687
Germany	35	67	65	66	3926	12570	82.401	200.192	33,023
Netherlands	38	80	53	14	718	2720	16.571	207.476	38,252
South Korea	60	18	85	39	10249		49.045	208.972	25,840
New Zealand	22	79	49	58	861		4.116	209.195	26,994
United Arab Emirates	80	38	68	53	1072		4.444	241.224	35,516
Hong Kong	68	25	29	57	2030		6.980	290.814	41,614
Finland	33	63	59	26	158	1489	5.238	314.405	37,957
United Kingdom	35	89	35	66	3735	18687	60.776	368.927	37,328
Switzerland French	70	64	70	58	312	761	2.644	405.710	14,207
Switzerland German	26	69	56	72	579	1413	4.911	405.710	26,384
United states	40	91	46	62	129378	187	301.140	430.248	44,765
Singapore	74	20	8	48	2118		4.553	465.187	36,286
Ireland	28	70	35	68	712	1258	4.109	479.425	47,169
Canada	39	80	48	52	16961		33.390	507.964	36,984
Denmark	18	74	23	16	471	2351	5.468	516.082	38,438
Austria	11	55	70	79	305	5751	8.200	738.556	38,474

PMDI: The Project Management Deployment Index as defined in (Bredillet, et al., 2008)

GDP/Capita US\$: The GDP/Capita collected from the (IMF International Monetary Fund, 2007)

Table 2. Distribution of Project Management Deployment Index *PMDI* among selected countries in 2007

PMDI Ranges	Number of Countries	% Percentage	Countries names
[0, 10[	24	32.43%	Bangladesh, Libya, Guatemala, Vietnam, Iran, Estonia, Morocco, Indonesia, Nigeria, Pakistan, Thailand, Malta, Ecuador, Turkey, Philippines, Bulgaria, Chile, Peru, Serbia, Venezuela, Argentina, Russia, Colombia, Mexico
[10, 20[	6	8.11%	Romania, Greece, Lebanon, India, Panama, Egypt
[20, 30[	7	9.46%	Spain, China, Hungary, Costa Rica, South Africa, Malaysia, Brazil
[30, 50[	8	10.81%	Italy, Saudi Arabia, Jamaica, Poland, Uruguay, Croatia, Israel, France
[50, 100[	8	10.81%	Slovakia, Kuwait, Belgium Flemish, Belgium Walloon, Czech Republic, Portugal, Slovenia, Luxembourg
[100, 300[	11	14.86%	Norway, Australia, Japan, Taiwan, Sweden, Germany, Netherlands, South Korea, New Zealand, United Arab Emirates, Hong Kong
[300, 500[	7	9.46%	Finland, United Kingdom, Switzerland French, Switzerland German, United states, Singapore, Ireland
>= 500	3	4.05%	Canada, Denmark, Austria
Totals:	74	100.00%	

Table 3. Basic descriptive statistics of the studied variables – All selected countries

	N	Minimum	Maximum	Mean	Std. Deviation
PDI	74	11	104	61.15	21.755
IDV	74	6	91	44.03	23.266
UAI	74	8	112	67.34	22.856
MAS	74	5	110	50.47	18.280
GDP	74	1281	87400	21010.14	15087.696
PMDI	74	.03	738.54	108.2462	161.59097
Valid N (listwise)	74				



Table 4. Correlation coefficients between the studied variables – All selected countries

		PDI	IDV	UAI	MAS	GDP	PMDI
PDI	Pearson Correlation	1	-.624**	.200	.125	-.598**	-.552**
	Sig. (2-tailed)		.000	.087	.290	.000	.000
	N	74	74	74	74	74	74
IDV	Pearson Correlation	-.624**	1	-.187	.120	.575**	.454**
	Sig. (2-tailed)	.000		.111	.310	.000	.000
	N	74	74	74	74	74	74
UAI	Pearson Correlation	.200	-.187	1	-.056	-.157	-.418**
	Sig. (2-tailed)	.087	.111		.634	.183	.000
	N	74	74	74	74	74	74
MAS	Pearson Correlation	.125	.120	-.056	1	-.055	.084
	Sig. (2-tailed)	.290	.310	.634		.644	.479
	N	74	74	74	74	74	74
GDP	Pearson Correlation	-.598**	.575**	-.157	-.055	1	.590**
	Sig. (2-tailed)	.000	.000	.183	.644		.000
	N	74	74	74	74	74	74
PMDI	Pearson Correlation	-.552**	.454**	-.418**	.084	.590**	1
	Sig. (2-tailed)	.000	.000	.000	.479	.000	
	N	74	74	74	74	74	74

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 5. Partial Correlation Coefficients - GDP as control variable - All selected countries

Control Variables			PDI	IDV	UAI	MAS	PMDI
GDP PDI	Correlation		1.000	-.428	.135	.115	-.308
	Significance (2-tailed)		.	.000	.256	.333	.008
	df		0	71	71	71	71
IDV	Correlation		-.428	1.000	-.120	.185	.173
	Significance (2-tailed)		.000	.	.313	.117	.143
	df		71	0	71	71	71
UAI	Correlation		.135	-.120	1.000	-.066	-.408
	Significance (2-tailed)		.256	.313	.	.581	.000
	df		71	71	0	71	71
MAS	Correlation		.115	.185	-.066	1.000	.144
	Significance (2-tailed)		.333	.117	.581	.	.225
	df		71	71	71	0	71
PMDI	Correlation		-.308	.173	-.408	.144	1.000
	Significance (2-tailed)		.008	.143	.000	.225	.
	df		71	71	71	71	0

Table 6. Stepwise linear regression model – PMDI Dependent variable, GDP, PDI and UAI independent variables - All selected countries

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.706 <sup>c</sup>	.499	.478	116.78551

**ANOVA<sup>d</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	951429.839	3	317143.280	23.253	.000 <sup>c</sup>
	Residual	954719.937	70	13638.856		
	Total	1906149.776	73			

c. Predictors: (Constant), GDP, UAI, PDI

d. Dependent Variable: PMDI

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
3	(Constant)	284.435	75.420		3.771	.000
	GDP	.004	.001	.387	3.660	.000
	UAI	-2.156	.611	-.305	-3.529	.001
	PDI	-1.930	.791	-.260	-2.439	.017

a. Dependent Variable: PMDI

Table 7. Correlation coefficients between the studied variables – High GDP/capita countries set (more than 21,000 US\$)

		PDI	IDV	UAI	MAS	GDP	PMDI
PDI	Pearson Correlation	1	-.599**	.332	-.015	-.265	-.427*
	Sig. (2-tailed)		.000	.055	.933	.130	.012
	N	34	34	34	34	34	34
IDV	Pearson Correlation	-.599**	1	-.254	.108	.132	.134
	Sig. (2-tailed)	.000		.148	.545	.458	.451
	N	34	34	34	34	34	34
UAI	Pearson Correlation	.332	-.254	1	.153	-.318	-.635**
	Sig. (2-tailed)	.055	.148		.388	.067	.000
	N	34	34	34	34	34	34
MAS	Pearson Correlation	-.015	.108	.153	1	-.043	.158
	Sig. (2-tailed)	.933	.545	.388		.808	.372
	N	34	34	34	34	34	34
GDP	Pearson Correlation	-.265	.132	-.318	-.043	1	.271
	Sig. (2-tailed)	.130	.458	.067	.808		.122
	N	34	34	34	34	34	34
PMDI	Pearson Correlation	-.427*	.134	-.635**	.158	.271	1
	Sig. (2-tailed)	.012	.451	.000	.372	.122	
	N	34	34	34	34	34	34

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Table 8. Correlation coefficients between the studied variables – Low GDP/capita countries set (less than 21,000 US\$)

		PDI	IDV	UAI	MAS	GDP	PMDI
PDI	Pearson Correlation	1	-.159	-.023	.274	-.034	-.046
	Sig. (2-tailed)		.326	.887	.087	.834	.778
	N	40	40	40	40	40	40
IDV	Pearson Correlation	-.159	1	-.022	.345*	.533**	.442**
	Sig. (2-tailed)	.326		.893	.029	.000	.004
	N	40	40	40	40	40	40
UAI	Pearson Correlation	-.023	-.022	1	-.371*	.346*	.003
	Sig. (2-tailed)	.887	.893		.018	.029	.985
	N	40	40	40	40	40	40
MAS	Pearson Correlation	.274	.345*	-.371*	1	.170	.158
	Sig. (2-tailed)	.087	.029	.018		.295	.330
	N	40	40	40	40	40	40
GDP	Pearson Correlation	-.034	.533**	.346*	.170	1	.301
	Sig. (2-tailed)	.834	.000	.029	.295		.059
	N	40	40	40	40	40	40
PMDI	Pearson Correlation	-.046	.442**	.003	.158	.301	1
	Sig. (2-tailed)	.778	.004	.985	.330	.059	
	N	40	40	40	40	40	40

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).