

MODELING MLQ5X FOR INNOVATION AND VALUE CREATION

Juan Mejia-Trejo, Universidad de Guadalajara (CUCEA), México

Jose Sanchez-Gutierrez, Universidad de Guadalajara (CUCEA), México

Guillermo Vazquez-Avila, Universidad de Guadalajara (CUCEA), México

ABSTRACT

The Multifactor Leadership Questionnaire (MLQ 5X) Model by Avolio & Bass, (2004) currently is used to identify the leadership style on business practice. This document propose a complement of such model to encourage the Innovation Generation (IG) process and the Value Creation (VC). It's a descriptive and correlational study that analyzes the variables, dimensions and indicators about MLQ5X, identifying the relationship among IG and VC processes in the organizations. The methodology is based on a document review that involves MLQ5X and other authors related with IG and VC, for discovering the predominant Leadership styles (LD) such as: Transformational (TRFL), Transactional (TRSL) and Passive / Avoidant (PAVL). The final model, involves: 9 variables, 36 dimensions and 103 indicators and was applied to 200 managers from Software Developer Sector (SDS) firms in Guadalajara, Mexico (GM). The final highest positive correlations results were: TRSL (.213) and Output Items for IG (OIIG=.135).

Keywords: Leadership, MLQ5X, Innovation Generation, Value Creation.

RESUMEN

El Modelo de Leadership Multifactorial Questionnaire (MLQ 5X) realizado por Avolio & Bass , (2004) se utiliza actualmente para identificar el estilo de liderazgo en la práctica empresarial. Este documento propone un complemento de dicho modelo para fomentar el proceso de generación de la innovación (IG) y la Creación de Valor (VC). Es un estudio descriptivo y correlacional que analiza las variables, dimensiones e indicadores del MLQ5X, identificando la relación entre el IG y la VC en las organizaciones. La metodología se basa en una revisión documental de MLQ5X y otros autores relacionados con la IG , para descubrir los estilos de liderazgo predominantes (LD) , tales como : Transformacional (TRFL), transaccional (TRSL), Pasivo / evitación (PAVL) durante todo el proceso de IG y la VC. El modelo final, supone: 9 variables, 36 dimensiones y 103 indicadores y se aplicó a 200 gerentes de Sector Desarrollador Software (SDS) a las empresas en Guadalajara, México (GM). Los resultados finales, con altas correlaciones positivas fueron: TRSL (0.213) y de salida de productos por IG (OIIG = 0,135) .

Palabras Clave: Liderazgo,MLQ5X, Proceso de Generación de Innovación.

1.- INTRODUCTION

Innovation is the main key for the firms and nations for the development (INSEAD, 2013, OECD, 2005) but actually, the comprehension about how is created in a systematic form is still unknown for the firms. Many authors have described how to collect and use the data to identify components of a different innovation types (Rogers, 1962, Chesbrough, 2006; Shipp et al., 2008; McKinsey, 2008; OECD 2005), because is the principal driver for improving the competitiveness in the organizations and are considered in the present study as IG components. Other important factor, is the leadership concept , that has generated excitement and interest from ancient times, because is a complex issue finding out how certain individuals have the power of attraction and persuasion to achieve goals and objectives, with limited resources and how they exceed the expectations. The organizational world requires to identify the main characteristics that drive individuals to discover their skills (Petrick, et al.,1999) developing certain leadership style: Transformational, Transactional or Passive/Avoidant (Avolio & Bass, 1995, 2004); Avolio & Gibbons,1988; Bass, 1985; Bass & Avolio, 1990, 1997, 2006) able to create value (Bonel et al., 2003; Gale & Chapman, 1994) with innovation. Therefore, the challenge is to identify what IG components, LD style and indicators are predominant in the SDS (200 firms) in the GCM, considered as one of the most successful in the creation of value and innovation. This work is divided into: 1) contextual reference, research questions, hypotheses, research questions and rationale for the study; 2) the theoretical framework, which is a collection of concepts of leadership, value creation and innovation and closing with the design of the questionnaire; 3) methodology description; 4) analysis of results; 5) conclusions.

2.-CONTEXTUAL REFERENCE

One sector, that is considered successful, fast-growing and highly dependent on IG is the SDS. According to INEGI (2013), in GCM located in Jalisco state, there are around 200 firms that are directly or indirectly related with SDS, which have opportunities to develop them into the Digital Creative City program. The project, was officially announced on January 30, 2012 by President Felipe Calderon, to enable 1000 acres, with an investment close to 1000 million USD looking for create 20,000 jobs in 10 years. Disney, Pixar Studios and Disney already have shown interest in joining to the Jaliwood concept of Mexico, hence the importance of identifying and promoting in a systematic way, the major factors such as IG in SDS firms.

3.-RATIONALE OF THE STUDY, PROBLEM AND HYPOTHESES

According GDP (WB,2013) Mexico is placed in innovation as 14/90; INSEAD (2013) placed on site 63/142, but still so far away to represent an emergent economy. A real fact of this, is the competitiveness level, which is located on site 53/144 according the WEF (2013). Despite all above, there are some firms

well known as successful organizations, due to the practice of LD on IG and VC, and that they have reached to increase their level of competitiveness in recent times. Some of those firms are grouped in the SDS into GCM. So, our problem is described in a general question as:

GQ: What is the conceptual model that involves MLQ5X model on IG and VC in a SDS firm?.

The specific questions (as **SQ**), are:

SQ1: What is the scheme of the model?

SQ2: What are the variables, dimensions and indicators added on MLQ5x model to obtain a final questionnaire that encourage the IG and VC in a SDS firm?

SQ3: What are the variables, dimensions and indicators among MLQ5X, IG and VC with higher correlation in a SDS firm?

The general hypothesis (as **GH**), is: What is the most predominant leadership style (according the MLQ5x model) style to encourage the IG and VC in the SDS firms in GCM?

4.-LITERATURE REVIEW

This section analyze the concepts of leadership, value creation and innovation in order to find similar points to determine and describe the main variables and propose the conceptual model for its interrelationship.

4.1.-Leadership.- According to DRALE (2013), means: 1. m. lead. 2. m. Status of superiority which is a company, a product or an industry, within its scope. Today, we have recognized the advantage represented transformational leadership in innovation processes, due to the work of Avolio & Bass (2004). Sample's report (2007), for example, has the following profile of transformational leader: creating greater alignment around strategic visions and missions, their behavioral factors are associated with increased sales, transformational leadership explains between 45% and 60% levels of organizational performance; create greater unit cohesion, commitment and lower turnover, predicted higher levels of innovation in teams of R & D products, transformational leaders create safer working environments . Hence, is suggested to identify the level of transformation and transactional leadership qualities of the leaders of the organization using the tool known as the Multifactor Leadership Questionnaire (MLQ5x). This questionnaire has 4 variables that identify the type of leadership (Transformational/Transactional/Passive-Avoidant Behavior and Outcomes of Leadership style), 12 dimensions and 45 indicators.

4.2.-Innovation Process.-According to DRALE (2013) comes from the latin innovatio,-*ōnis* and means: 1. f. Action and effect to innovate. and 2. f. Creating or modifying a product. For the Oslo Manual (OECD, 2005, p.56) innovation is the introduction of a new or significantly improved product (good / service), process, a new marketing method, or a new organizational method in the internal business

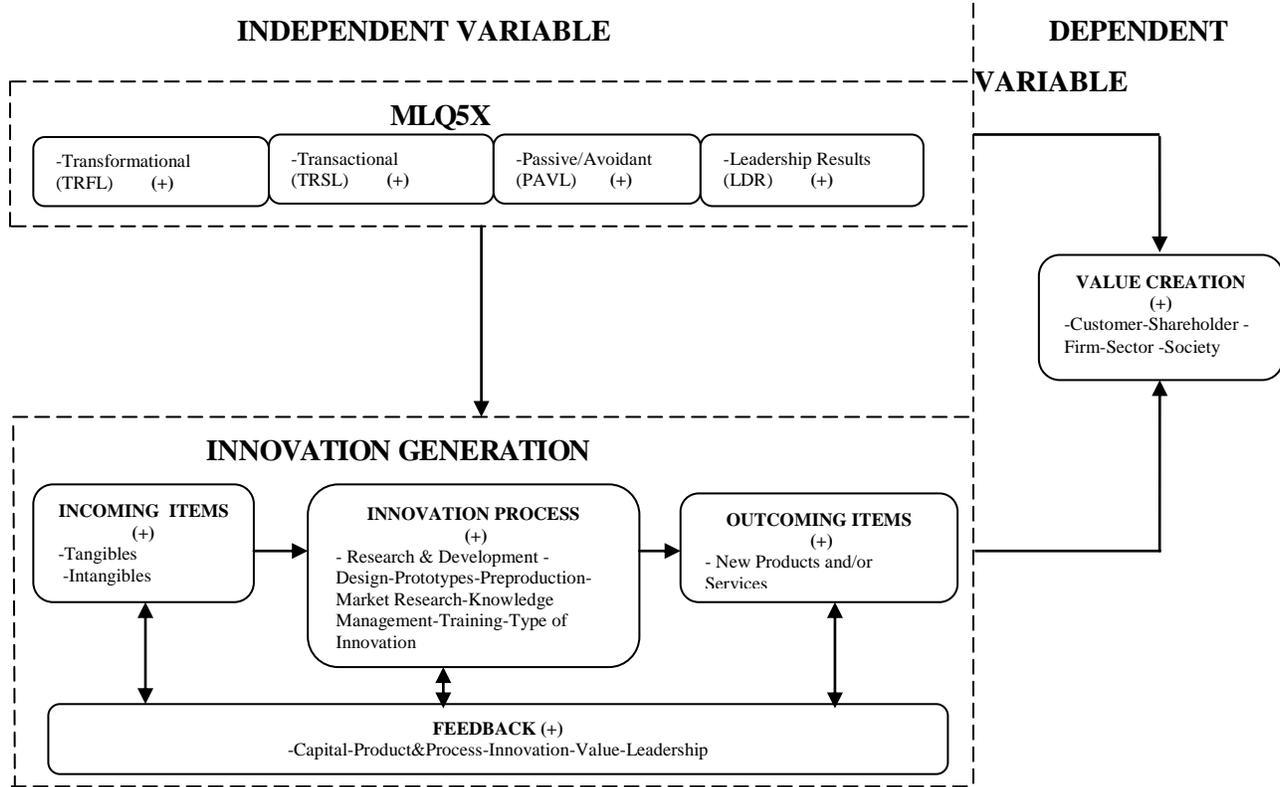
practices, the workplace organization or external relations, so it is not just limited to the field of technology, product or services. Also, OECD (2005, p.37) recognizes the process of creative destruction, enunciated by Schumpeter, which raises two types of innovations: the radicals that contribute to major changes in the world and, the incrementals, happening on an ongoing change process. The Rogers Innovation Bell (1962), divides the innovation market in : a.-the innovators (they are very careful to use the latest in technology, and very important to communicate and spread) ; b.- early adopters (people considered as opinion leaders and influence their environment but are very careful to suggest and / or use the latest innovations); c.-early majority (conservative people, but open to technological change with some level of careful to adopt it); d.-late majority (consumers particularly skeptical to the use of innovations until a large number of his acquaintances, has adopted it); 5.-the laggards (very traditional people maintaining the old forms; they hardly accept any changes and adapt to them until they become a habit even.). Afuah (1997), describes the importance to define the Lifecycle of Product (the start/end of the technologies).So, are involved 3 variables, 12 dimensions, 41 indicators.

4.2.1-Measuring the Innovation Generation.- In this context, it is recognized that it is a complex process and therefore its measurement (OECD, 2005, Shipp et al., 2008). However, the propose is to identify the major elements of the innovation generation in: 1).- Incoming items divided in tangibles-intangibles, (since equipment until intellectual capital (Lev, 2001)); 2).-The process based on close or open innovation concepts (Chesbrough, 2006);3).- The outcoming items characterized by concepts suggested by OECD (2005) and the McKinsey Report (2008) aimed to measure the new products or services characteristics designed by innovation;3).- The feedback line to the leadership, that is described for 1 variables, 5 dimensions, 9 indicators .

4.2.2-Value Creation.- Bonel (et al.,2003); Gale & Chapman (1994) define it as the set of economic goods or any other type of utility (power or prestige) that pursuing the owners and managers of an organization as well as products, and services offered by the organization . The beneficiary has value not only to customers but also shareholders, the organization, the industry and society. It consists in 1 variable, 7 dimensions, 8 indicators.

As a result of the documental analysis, we obtained the **Scheme 1**.

Scheme 1.-General Conceptual Model that involve MLQ5x on IG and VC



Source: Own by Authors adaptation

5.-METHODOLOGY

The subject of study were the 200 firms managers from the SDS placed in GCM. The results were analyzed through statistical inference tools, contained in the SPSS program. This is a descriptive, correlational and transversal study; it is based on MLQ5x model and documental research on IG concepts about its components, to design a complementary questionnaire with added variables, dimensions and indicators that encourage the relationship between MLQ5X and the IG.

6.-ANALYSIS OF RESULTS

Table 1 shows variables, dimensions and indicators which describes the detailed conceptual model taking as foregoing, the **Scheme 1** with 9 variables, 36 dimensions and 103 indicators.

VARIABLE	DIMENSION	INDICATOR	ITEM	AUTHOR
1.- TRANSFORMA	1.-Idealized Influence-	Instills pride in me for being associated with him/her.	1	

TRANSFORMATIONAL LEADERSHIP (TRFL)	Idealized Attributes (IA)	Goes beyond self-interest for the good of the group.	2	Avolio & Bass, (2004); Sample, (2007)
		Acts in ways that builds my respect.	3	
		Displays a sense of power and confidence.	4	
	2.-Idealized Influence-Idealized Behaviors (IB)	Talks about their most important values and beliefs regarding education.	5	
		Specifies the importance of having a strong sense of purpose.	6	
		Considers the moral and ethical consequences of decisions.	7	
		Emphasises the importance of having a collective sense of mission.	8	
	3.- Inspirational Motivation (IM)	Talks optimistically about the future.	9	
		Expresses confidence that goals will be achieved.	10	
		Talks enthusiastically about what needs to be accomplished.	11	
		Articulates a compelling vision for the future.	12	
	4.- Intellectual Stimulation (IS)	Re-examines critical assumptions to question whether they are appropriate.	13	
		Seeks differing perspectives when solving problems.	14	
		Suggests new ways of looking at how to complete assigned tasks.	15	
		Gets me to look at problems from many different angles	16	
	5.-Individual Consideration (IC)	Treats me as an individual rather than just a member of the group.	17	
		Helps me to develop my strengths	18	
		Spends time teaching and coaching.	19	
		Considers me as having different needs, abilities and aspirations from others.	20	
	2.- TRANSACTIONAL LEADERSHIP (TRSL)	6.-Contingent Reward (CR)	Makes clear what one can expect to receive when performance goals are achieved.	
Provides me with assistance in exchange for my efforts.			22	
Discusses in specific terms who is responsible for achieving performance targets.			23	
Expresses satisfaction when I meet expectations.			24	
7.- Management by Exception: Active (Mbe-A)		Focuses attention on irregularities, mistakes, exceptions, and deviations from standards.	25	
		Concentrates his/her full attention on dealing with mistakes, complaints and failures.	26	
		Keeps track of all mistakes.	27	
		Directs my attention toward failures to meet standards.	28	
3.- PASSIVE/AVOIDANT LEADERSHIP (PAVL)	8.- Management by Exception: Passive (MBE-P)	Fails to interfere until problems become serious.	29	
		Waits for things to go wrong before taking action.	30	
		Demonstrates his firm belief that "what is not broke do not fix".	31	
		Demonstrates that problems must become chronic before taking action.	32	

	9.-Laissez-Faire (LF)	Avoids getting involved when important issues arise.	33	
		Is absent when needed.	34	
		Avoids making decisions.	35	
		Delays responding to urgent questions.	36	
4.- LEADERSHIP RESULTS (LDRS)	10.-Extra Effort (EE)	Get others to do more than they expected to do	37	
		Heighten others' desire to succeed	38	
		Increase others' willingness to try harder	39	
	11.- Effectiveness (EFF)	Are effective in meeting others' job-related needs?	40	
		Are effective in representing others to higher authority?	41	
		Are effective in meeting organizational requirements?	42	
		Leads a group that is effective	43	
	12.- Satisfaction (SAT)	Uses methods of leadership that are satisfying	44	
Work with others in a satisfactory way		45		
5.-VALUE CREATION (VC)	13.-Emotions & Desires of the Customer	The innovation actions are aimed to increase the Emotions & Desire of the Customer	46	Bonel (et al.,2003); Gale, B.T.; Chapman W.R. (1994)
	14.-Cost & Risk	The Cost is the main constraint to implement actions to increase the value	47	
		The Risk is the main constraint to implement actions to increase the value	48	
	15.-Customer	The innovation actions are aimed to increase the Customer value.	49	
	16.- Shareholder	The Innovation actions are aimed to increase the Shareholder value	50	
	17.-Firm	The innovation actions are aimed to increase the value of the Firm	51	
	18.-Sector	The innovation actions are aimed to increase the value of the Sector	52	
19.-Society	The innovation actions are aimed to increase the value to the Society	53		
6.-INCOMING ITEMS (IIIG)	20.-Tangibles	Provides the most sophisticated equipment to support innovation time creating value	54	Shipp (et al. 2008); McKinsey (2008)
		Invests in Research, Development and Innovation creating value	55	
		Assigns staff to Research & Development and Innovation creating value	56	
	21.- Intangibles	Makes efforts to use and / or generate Patents creating value	57	
		Makes efforts to create and / or improve Databases creating value	58	
		Makes efforts to create and / or improve organizational processes, creating value	59	
		Makes efforts to use the most of the knowledge and skills of staff, creating value	60	
		Makes planned decisions to increase its availability to the risk, creating value	61	
	22.-Research & Development + Innovation	Makes actions to improve existing processes of Research & Development + Innovation, creating value	62	Shipp (et al.,2008); Chesbroug

7.- INNOVATION PROCESS (IPIG)	23.-Design	Makes actions to improve the existing design	63	h (2006); McKinsey (2008); OECD (2005); Rogers (1962)	
	24.-Prototypes	Makes actions to develop prototypes for improvement, creating value	64		
	25.-Pre-Production	Makes improvement actions to pre-production, creating value	65		
	26.-Market Research		Makes to investigate market needs of obsolete products, creating value	66	Rogers (1962)
			Makes to investigate the needs actions and / or market changes for innovators, creating value	67	
			Makes to investigate needs and / or market changes for early adopters, creating value	68	
			Makes to investigate needs and / or market changes for early majority, creating value	69	
			Makes to investigate needs and / or market changes for late majority, creating value	70	
			Makes to investigate needs and / or market changes for laggards, creating value	71	Afuah (1997)
			Makes to investigate the onset of a new technology, creating value	72	
			Makes to investigate the term of a technology, creating value	73	
		27.- Knowledge Management		Documents market knowledge, creating value	74
			Documents the knowledge of their employees to apply in their processes, creating value	75	
			Encourages the exchange of information within your company, creating value	76-	
	28.-Marketing		Decides actions to improve or introduce new forms of marketing, creating value	77	Lev (2001)
			Seeks to be new or improved in the World (Radical Innovation), creating value	78	
			Seeks to be new or improved to the Firm (Incremental Innovation), creating value	79	
			Seeks to be new or improved in the region (Incremental Innovation), creating value	80	
			Seeks to be new or improved in the industry (Incremental Innovation), creating value	81	
	29.-Training	Makes actions to train the staff continuously (Incremental Innovation), creating value	82	OECD (2005)	
30.-Type of Innovation		Makes actions to innovate in technology	83		
		Makes actions for innovation in production processes, creating value	84		
		Makes actions to improve or introduce new products forms, creating value	85		
		Makes actions to improve or introduce new forms of service, creating value	86		
		Makes actions to improve or introduce new organizational structures and functions, creating value	87		
		Innovation activities tend to be rather radical, creating value	88		
		Innovation activities tend to be incremental, creating value	89		
8.-	31.-New products/	Detects the projected level of revenues generated by innovation, creating value	90	Shipp (et	

OUTCOMING ITEMS (OIIG)	and/or services	Detects the projected customer satisfaction level generated by innovation, creating value	91	al. 2008); Reporte McKinsey (2008);Lev (2001)
		Detects the projected sales percentages levels generated by innovation, creating value	92	
		Detects the level of the number of launches of new products/services in a period ended generated innovation, creating value	93	
		Detects the net present value of its portfolio of products / services in the market generated by the innovation, creating value	94	
9.-FEEDBACK ITEMS (FBKIG)	32.-Capital	Based on the results identifies intellectual capital dedicated to innovation for its improvement, creating value	95	Lev(2001) ; Shipp (et al. 2008); OECD (2005); Bonel (et al.,2003)
		33.-Product & Process	Based on the results identifies the stages of new or improved process for upgrading, creating value	
	34.-Innovation		Based on the results identifies attributes of new or improved product / service for its improvement, creating value	
		Based on the results identifies the stages of new or improved form of marketing for improvement, creating value	98	
		Based on the results identifies the stages of new or improved technology for improvement, creating value	99	
		Based on the results identifies the stages of the new or improved structure and functions of the organization to its improvement, creating value	100	
	35.-Value	Based on the results identifies the type of innovation (radical or incremental) that has given best results, creating value	101	
		Based on the results identifies the new or improved value proposition (benefits / costs) for its completion, creating value	102	
	36.-Leadership	Based on the results identifies the leadership style practiced by their commanders for their improvement, creating value	103	

Source: Authors by own adaptation

DATA ANALYSIS

About the statistical inference tools from SPSS program, were obtained: Alpha Cronbach's test around 0.857; Kolmogorov-Smirnov as a distribution normality test with more than $p > 0.05$: LG (0.058); LD (0.575). Pearson Correlation is presented in **Table 2**; Coefficients by Enter Method are shown in **Table 3**; Model Summary is presented in **Table 4** and finally, ANOVA in **Table 5**.

Table 2.-Pearsons Correlation

	VC	IIIG	IPIG	OIIG	FBKIG	TRFL	TRSL	PAVL	LDRS	
Pearson Correlation Coefficient	VC	1	.399**	.497**	.427**	.425**	.521**	.509**	.068	0.253**
	IIIG	.399**	1	.807**	.259**	.427**	.597**	.530**	.018	.203**
	IPIG	.497**	.807**	1	.385**	.590	.783**	.710**	.034	.216**
	OIIG	.427**	.259**	.385**	1	.553**	.548**	.419**	.111	.314**
	FBKIG	.425**	.427**	.590**	.553**	1	.659**	.554**	.005	.273**

	TRFL	.521**	.597**	.783**	.548**	.659**	1	.670**	.040	.349**
	TRSL	.509**	.530**	.710**	.419**	.554**	.670**	1	.060	.290**
	PAVL	.068	.018	.034	.111	.005	.040	.060	1	-.034
	LDRS	.253**	.203**	.216**	.314**	.273**	.349**	.290**	-.034	1

** Correlation is significant at 0.01 (unilateral)

Source: Results in SPSS program

Table 3.- Coefficients by Enter Method (a)

Model	Unstandardized Coefficients		Standardized Coefficients	t.	Sig.
	B	Std. Error	Beta		
1 Constant (b)	.778	.385		2.021	.045
IIIG	.044	.073	.060	.604	.547
IPIG	.085	.120	.099	.708	.480
OIIG	.135	.056	.182	2.409	.017
FBKIG	.016	.064	.021	.245	.807
TRFL	.116	.097	.131	1.189	.236
TRSL	.213	.087	.216	2.453	.015
PAVL	.041	.092	.027	.450	.653
LDRS	.056	.072	.050	.775	.439

(a) Dependent Variable: VC; (b) Predictors: (Constants), LDRS,PAVL,IIIG,OIIG,TRSL,FBKIG,TRFL,IPIG

Source: Results in SPSS program

Table 4.- Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error for estimate
1	.593(a)	.352	.325	.5045

(a) Predictors: (Constants), LDRS,PAVL,IIIG,OIIG,TRSL,FBKIG,TRFL,IPIG (b) Dependent Variable: VC
Source: Results in SPSS program

Table 5.- ANOVA (a)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	26.430	8	3.304	12.981	0.001(b)
Residual	48.613	191	0.255		
Total	75.043	199			

(a) Dependent Variable: VC ; (b) Predictors: (Constants), LDRS,PAVL,IIIG,OIIG,TRSL,FBKIG,TRFL,IPIG.
Source: Results in SPSS program

7.-DISCUSSION AND CONCLUSIONS

The **GQ**, involving the relationship about MLQ5x on IG applied for the SDS in GCM is reached at 100% when is responded: firstly, resolving the **SQ1** with the **Scheme 1** with 9 variables, 36 dimensions and 103 indicators. Secondly, resolving the **SQ2** with the description of variables in **Table 1**, from the theoretical framework. **SQ3** is reached when we obtained **Table 2** about the leadership style, with highest positive correlations on TRFL and TRSL; the lowest positive correlation was on PAVL, even a little negative in the relation PAVL-LDRS (-.034). However, acting all together, from **Table 3**, we have with highest value

TRSL (.213) on contradiction with the academy definition around TRFL as a principal IG driver. Therefore, **GH** is responded from **Table 3** values, with TRSL (.213) as the most predominant leadership style. The R square value in **Table 4** shows the amount of variance in the dependent variable that can be explained by the independent variables, in this case: 0.352; The R value (0.593) indicates the multiple correlation coefficient between all the entered independent variables and the dependent variable. The Adjusted R (**Table 4**) Square adjusts for a bias in R2 as the number of variables increases. With only a few predictor variables, the adjusted R square should be similar to the R square value. It is recommended to take the adjusted R square value when we have a lot of variables. The Std. Error of the Estimate is a measure of the variability of the multiple correlations. **Table 5**, the regression line predicted by the independent variables, explains a significant amount of the variance in the dependent variable. It would normally be reported in a similar fashion to other ANOVAs: $F(8,199) = 12.981$; $p < 0.05$. Dividing the Sum of squares by the degrees of freedom (df) gives us the Mean Square or variance. We can see that the Regression explains significantly more variance than the error or Residual. We calculate R square by dividing the Regression Sum of Squares by the Total Sum of Squares ($26.430/75.043=0.352$). **Table 3**, explains from Unstandardized Coefficients the final equation as conclusion:

$$\mathbf{IG = 0.778 + 0.044 \text{ IIIIG} + .085 \text{ IPIG} + .135 \text{ OIIG} + .016 \text{ FBKIG} + .116 \text{ TRFL} + .213 \text{ TRSL} + .041 \text{ PAVL} + .056 \text{ LDRS.}}$$

The Standardized Beta Coefficient column shows the contribution that an individual variable makes to the model. The beta column is the average amount the dependent variable increases when the independent variable increases by one standard deviation (all other independent variables are held constant). As these are standardized we can compare them. t tests are performed to test the two-tailed hypothesis that the beta value is significantly higher or lower than zero. This also enables us to see which predictors are significant. Given the results, for the SDS firms in GCM, the TRSL (.213) is the most predominant leadership style according to the MLQ5x against the TRFL and PAVL. The most important IG component is the OIIG (.135) because the firms are more interested in results rather than the rest of IG components (eg. IIIIG=0.044; IPIG=.085; FBKIG=.016).

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Author Profile:

Dr. Juan Mejia-Trejo earned his Ph.D. at the Instituto Politecnico Nacional, Mexico, D.F. in 2010. Currently he is Titular Research Professor of Marketing and International Business Department at Universidad de Guadalajara-CUCEA, and Mercados y Negocios Review editorial board member.

Dr. Jose Sanchez-Gutierrez earned his Ph.D. at the Instituto Politecnico Nacional, Mexico, D.F. in 2005. Currently he is a Chair of Marketing and International Business Department at Universidad de Guadalajara-CUCEA, President of the Red Internacional de Investigadores en Competitividad, and Managing Editor of the Mercados y Negocios Review.

Dr. Guillermo Vazquez-Avila earned his Ph.D. at the Instituto Politecnico Nacional, Mexico, D.F. in 2005. Currently he is a Titular Research Professor of Marketing and International Business Department at Universidad de Guadalajara-CUCEA, and Mercados y Negocios Review editorial board member.