INNOVATION GENERATION AND LEADERSHIP ON VALUE CREATION: THE CASE OF SOFTWARE DEVELOPER SECTOR IN GUADALAJARA, MÉXICO

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ABSTRACT

This document is a descriptive and correlational study that aims to discover and analyze the elements that characterize the Innovation Generation (IG) and leadership (LD) on Value Creation (VC) in the organizations. The methodology is based on the application of Oslo Manual Statements (2005) and other authors around IG, and the Manual Short Multifactor Leadership Questionnaire (MLQ 5XLD) of Avolio & Bass, (2004), for discovering the predominant components about IG, and the LD type: Transformational (TRFL), Transactional (TRSL), Passive / Avoidant (PAVL) throughout the VC accomplishment. The final model, is described with 45 indicators for MLQ5xLD, 50 indicators for IG, and VC with 8 indicators, add up 103 indicators, with 36 dimensions and 9 variables. The final questionnaire was applied to 200 managers belonging to firms of the Software Developer Sector (SDS), as a study subject in Guadalajara City, Mexico (GCM). The study concluded with the discovery of TRSL (.213) as a predominant MLQ5XLD and Output Items for IG (OIIG=.135) as IG indicator, with the highest positive correlationas with VC in SDS at GCM.

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

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 and LD for VC 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 and LD on VC in SDS firms.

3. PROBLEM, HYPOTHESES AND RATIONALE OF THE STUDY

According INSEAD (2013), in innovation México is placed on site 63/142 and a GDP (WB,203) placed as 14/190 , 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 a successful organizations, due to the practice of LD and IG for 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 IG with LD on VC in a SDS firm?** So, the specific questions (as **SQ**), are: **SQ1:** What is the scheme of the model?; **SQ2**: What are the variables, dimensions and indicators as IG components with LD based on MLQ5x to obtain a final questionnaire that rationale the VC in a SDS firm?; **SQ3:** What are the variables, dimensions and indicators, from IG and LD based on MLQ5X that have a higher correlation with VC indicators in a SDS firm?. The general hypothesis (as **GH**), is: What is the most predominant MLQ5xLD style and the most predominant IG component on 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. 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.

4.1.1 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 .

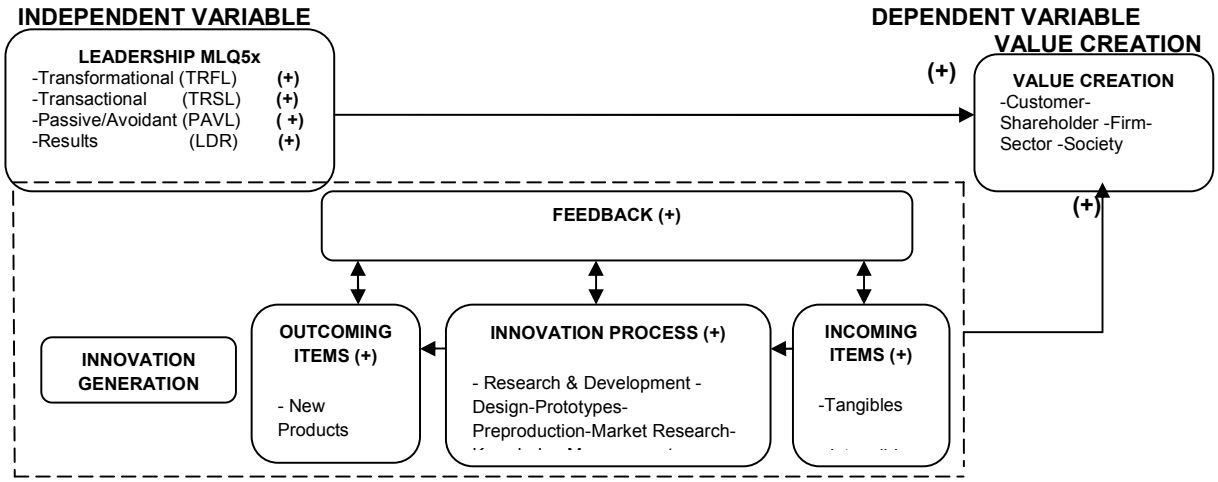
4.2. Leadership.- According to DRALE (2013), means: 1. m. *lead.* 2. m. *Status of superiority which is a company, a product or an industry, within its scope*. Today, we have recognized the advantage represented transformational leadership in innovation processes, due to the work of Avolio & Bass (2004). 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.

4.3. 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 IP with the MLQ5x for VC in a firm.



Source: Own by Authors adaptation

5. METHODOLOGY

This is a descriptive, correlational and transversal study; it is based on IG concepts about its components, MLQ5x LD model and documental research, to design a complementary questionnaire to obtain the other variables, dimensions and indicators for value creation. The subject of the 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.

6. ANALYSIS OF RESULTS

Table 1, shows a table that involve: 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.- TRANSFORMATIONAL LEADESRSHIP (TRFL)	1.-Idealized Influence-Idealized Attributes (IA)	Instills pride in me for being associated with him/her.	1	Avolio & Bass, (2004); Sample, (2007)
		Goes beyond self-interest for the good of the group.	2	
		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.	21	
		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 LEADERSHIO (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	
7.- INNOVATION PROCESS (IPIG)	22.-Research & Development + Innovation	Makes actions to improve existing processes of Research & Development + Innovation, creating value	62	Shipp (et al.,2008);Chesbrough (2006); McKinsey (2008); OECD (2005); Rogers (1962)
	23.-Design	Makes actions to improve the existing design	63	
	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	
		Makes to investigate the needs actions and / or market changes for innovators, creating value	67	Rogers (1962)
		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	
		Makes to investigate the onset of a new technology, creating value	72	Afuah (1997)
		Makes to investigate the term of a technology, creating value	73	
	27.- Knowledge Management	Documents market knowledge, creating value	74	OECD (2005)
		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	OECD (2005)
		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	
	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.- OUTCOMING ITEMS (OIIG)	31.-New products/ and/or services	Detects the projected level of revenues generated by innovation, creating value	90	Shipp (et al. 2008); Reporte McKinsey (2008);Lev (2001)
		Detects the projected customer satisfaction level generated by innovation, creating value	91	
		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);
	33.-Product & Process	Based on the results identifies the stages of new or improved process for upgrading, creating value	96	
		Based on the results identifies attributes of new or improved product / service for its	97	

		improvement, creating value		Bonel (et al.,2003)
	34.- Innovation	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	
		Based on the results identifies the type of innovation (radical or incremental) that has given best results, creating value	101	
	35.-Value	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

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: VC (0.082); IG (0.058); LD (0.575). Pearson Correlation is presented in **Table 2;** Summary is presented in **Table: 3**; ANOVA in **Table 4** and finally, Coefficients are shown 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.- 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 4.- 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

Table 5.- 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

7. DISCUSSION AND CONCLUSIONS

The **GQ**, involving the relationship about IG and MLQ5x LD on VC for the SDS in GCM is reached at 100% when is responded, the **SQ1**: obtaining the **Scheme1** with 9 variables, 36 dimensions and 103

indicators; **SQ2**: with the description of variables in **Table 1**; **SQ3:** from **Table 2,** we have highest positive correlations between two variables: VC-TRFL (.521), and VC-OIIG (.497); the lowest positive correlations were: VC-PAVL (.068) and VC-IIG (.399);however, acting all together, from **Table 5**, we have with highest value TRSL (.213), and OIIG (.135). **GH:** from values of **Table 5**, TRSL (.213) and OIIG (.135). The R square value in **Table 3** 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 3**) 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 correlation. **Table 4**, 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 5**, explains from Unstandardized Coefficients the equation: **VC= 0.778+0.044 IIIG+.085 IPIG+ .135 OIIG+ .016 FBKIG+ .116 TRFL+ .213 TRSL+ .041 PAVL+ .056 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. Note the largest influence on the VC, OIIG (.135) and TRSL (.213). 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 MLQ5X LD style against the TRFL suggested by the academy. 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. IIIG=0.044; IPIG=.085; FBKIG=.016).

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