

## Los factores determinantes del modelo de negocios abierto The determinant factors of open business model

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**Palabras Clave:** factores determinantes; modelo de negocios abierto; tecnologías de información

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### Resumen

Desde principios del siglo XXI, varios autores afirman que los modelos de negocio abiertos (OBM) permiten a una organización ser más eficaz en la creación y la captura de valor siendo un requisito previo para el éxito de las asociaciones de co-desarrollo. Como resultado de las tendencias de: crecientes costos de desarrollo y ciclos de vida de los productos/servicios más cortos, las empresas encuentran cada vez más difícil justificar las inversiones en innovación. El OBM resuelve ambas tendencias, subrayando los términos: "*ecosistema de la industria*" y/o "*modelo de negocio colaborativo*". No sólo cambia el proceso de innovación, sino que también modifica a las propias organizaciones mediante la reconfiguración de sus cadenas de valor y redes. Para las empresas, crea una lógica heurística basada en el actual modelo de negocio y tecnología para extenderlas, con estrategia, al desarrollo de la innovación para crear valor y aumentar los ingresos y beneficios. Enfatiza tanto las relaciones externas así como la gobernabilidad, como valiosos recursos con varios roles que promueven la competitividad corporativa. Por lo tanto, para un sector especializado de alta tecnología como lo es el de las tecnologías de la información de la zona metropolitana de Guadalajara (ITSMZG), exponemos el siguiente problema de investigación: ¿Cuáles son los factores determinantes de la OBM como modelo empírico que se aplicó en el ITSMZG?

### Método

Como se ve, esta investigación tiene como objetivo plantear, los factores determinantes de la OBM como un modelo empírico que sea aplicado en el ITSMZG. Se trata de un estudio documental para seleccionar las principales variables entre los especialistas de las ITSMZG que practican el proceso OBM mediante el proceso de jerarquía analítica (AHP) y el Panel de Delphi a fin de contrastar los términos académicos con la experiencia de los especialistas. Es un estudio descriptivo, exploratorio, correlacional, transeccional, cualitativo-cuantitativo para obtener un

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cuestionario final en escala Likert, con confiabilidad a través de prueba piloto (Alfa de Cronbach > 0.7), aplicado entre enero 2015-mayo 2016 a una población total de: 600 especialistas en el ITSMZG (150 profesores de IT; 150 representantes de consultores de firmas IT como “*parte consultora*” ; 290 CEO PyME y 10 CEO de empresas grandes como parte de “*toma de decisiones*”, con 1 año en el mercado, 80% con licenciatura, 20% con postgrado, 20% mujeres y 80% hombres). Se diseñó un modelo de ecuaciones estructural de primer orden (SEM) como técnica de análisis factorial confirmatorio (CFA), mediante el software EQS 6.1 para analizar las variables subyacentes de OBM, y determinar un modelo final.

## **Resultados**

El resultado es un modelo empírico de OBM, que consiste en 5 principales factores: administración del negocio (BMG, 10 variables/76 indicadores), estrategia (STR, 3 variables/14 indicadores), tecnología (TEC, 3 variables/24 indicators), nuevos emprendimientos (NWE, 3 variables /7 indicadores) y orientación de la innovación abierta (OIO, 3 variables/18 indicadores).

## **Conclusión**

Aunque el modelo empírico final de OBM tiene un efecto positivo significativo entre sus variables, también mostró diferentes niveles de carga de factores, lo que significa oportunidades para mejorar el modelo para el ITSMZG.

## **Abstract**

Since the beginning of the XXI century, several authors affirm that open business models (OBM) enable an organization to be more effective in creating as well as capturing value and are a prerequisite for successful co-development partnerships. As a result of both trends, the rising development costs and shorter product/service lifecycles, companies are finding it increasingly difficult to justify investments in innovation. The OBM solve both trends, underscoring the terms: “*industry ecosystem*” and/or “*collaborative business model*”. Not only it changes the innovation process but it also modifies organizations themselves by reconfiguring value chains and networks. For the firms, it creates a heuristic logic, based on the current business model and technology to extend them with strategy, to the development of innovation to create value and increasing revenues and profits. It emphasizes the external communities with governance as

valuable resources with several roles that promote corporate competitiveness. So, for a specialized sector with high technology such as the information technologies sector of metropolitan zone of Guadalajara (ITSMZG), we posed the next research question: Which are the determinant factors of the OBM as an empirical model to be applied at the ITSMZG?

## Method

As you see, this research is aimed to pose, the determinant factors of the OBM as an empirical model to be applied at the ITSMZG. This is a documentary study to select the main variables among specialists in ITSMZG practicing the OBM process using analytic hierarchy process (AHP) and Delphi's Panel to contrast the academic terms with the specialists experience. It's a descriptive, exploratory, correlational, cross-sectional, qualitative-quantitative study to obtain a final questionnaire in Likert scale, with reliability tested through a pilot survey (Cronbach's  $\alpha > 0.75$ ), applied during Jan. 2015-May 2016 to the total population asked: 600 specialists of ITSMZG (150 IT teachers and 150 representatives of consulting firms as "*consultant part*"; 290 IT SME CEO and 10 IT LE CEO as the "*decision-making part*", since 1 year in the market, 80% with bachelor degree, 20% with postgrade, 20% women and 80% men). It was designed a first-order structural equation modeling (SEM) as a confirmatory factor analysis (CFA) technique, using the EQS 6.1 software to analyse the OBM underlying variables, to determine a final empirical model.

## Results

The result is an empirical OBM based on 5 main factors: business management BMG (10 variables/76 indicators), strategy (STR, 3 variables/14 indicators), technology (TEC, 3 variables/24 indicators), new entrepreneurs (NEW, 3 variables /7 indicators) and open innovation orientation (OIO, 3 variables/18 indicators), empirically proved for the ITSMZG.

## Conclusion

Although the final empirical OBM has a significant positive effect among its variables, also showed different levels of factor loadings, meaning opportunities to improve the model for the ITSMZG.

**Keywords:** determinant factors; open business model; information technologies.

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## **Introduction**

Jalisco state, placed in Mexico, has the most representative cluster of Information Technologies Sector located into the Metropolitan Zone of Guadalajara, Mexico (ITSMZG), home of the Mexico's "Silicon Valley". The ITSMZG is dedicated to develop new technologies in: design software, TV, cinema, advertising to videogames, digital animation, interactive multimedia and e-learning, among others. It has around 200 IT firms that exports 2,000 billion usd annually on high value-added services, almost a third of the national total. The ITSMZG generates 20,000 jobs in the state, while coupled entire electronics industry, the workforce exceeds 100,000 posts (Economista, 2016). The ITSMZG, is characterized by the high OBM practices, so they are interested to analyse all the determinant factors related to improve all about the OBM process. The ITSMZG knows several aspects of OBM and their practices, so they need an empirical scale model as a first settlement to be adapted and applied.

## **Problem, Rationale of the Study and Hypotheses**

The problem is proposed as a general question (GQ): Which are the determinant factors of OBM as an empirical model for the ITSMZG? The rationale of the study is due to the interest of the ITSMZG to know how measure the main variables of OBM process to do suggestions for the improvement of the model.

To solve the problem, we posed the next specific questions (SQ):

SQ1.-Which are the variables proposed for the general conceptual model?;

SQ2.-Which are the relationships of these variables?;

SQ3.-Which are the most relevant variables of the model?

## **Literature Review**

Since the first years of the XXI century, for the academic and the professional world, there has been a frequent mention of the term "*business model*". Specially today, that digital media in access and transmission data offer the great possibility of being networked (anywhere, any-time)

managers and academics have speculated about which business models have led to spectacular successes and which have been used by organisations that have withered and died. The question of which business models are effective in this age of fast and dramatic change clearly occupies the minds of many. The business models have surged into the management vocabulary. But, there is still a lot of confusion about what business models are and how they can be used. The main facts, is that they are an strategical reference and have a powerful role in corporate management. While other authors have recently offered definitions of business model, none appear to be generally accepted (Shafer et al.,2005). Likewise steadily pace, the concept has been evolving as far the open innovation has been implemented by the firms due internet and information technologies. However, the authors show different definitions and point of views about what OBM is, therefore the objective of this article is to propose a framework for OBM.

We made a documentary study to determine the open business models factors (OBM), among 97works from 1998 (Shafer et al., 2005) until nowadays (Weiblen, 2014), selecting 26 documents (from 2006 until 2016) with detailed description about OBM. See Table 1.

**Table 1.** Open Model Business definitions.

No.	Year	Authors (Year)	Definition of business model	Business model elements	Variables standarization by concept
1	2006	Chesbrough (2006)	It's fragmented in: <i>"technologies require appropriate business models to give them value"... "companies must develop more open business models if they are to make the most of the opportunities offered by Open Innovation"</i>	.Value proposition .Target market segment; .Value chain structure .Value network position .Economic model t o extract value to succeed. .Second markets .Technologies based on market .Technologies based on poliicies of the firm. .External resources and capabilities and barriers .Intellectual property .Costs .Shorter product life cycles .6 types of business models based on differentiation .Implementingg the open business models	.Value proposition.(VPR) .Market segmentation.(MKS) .Technology based on market (TECM) .Tecnology based on policies (TECP) .Key activities.(KA) .Key resources.(KR) .Intellectual property rights.(IPR) .Revenues per IPR (RIPR) .Cost structure.(CST) .Lean-Startup (LST)
2	2007	Chesbrough (2007)	It's fragmented in : <i>"Companies must open their business models by actively searching for and exploiting outside ideas and by allowing unused internal technologies to flow to the outside, where other firms can unlock their latent economic potential"</i>	. The business model is adapted to OBM .Capture value .Rising development cost .Shorter product lifecycles .Revenues due intellectual property rights .Ability to experiment with the business model	.Strategy on OBM (SOBM) .Orientation of business model (ORBM) Value proposition.(VPR) .Cost structure.(CST)

			<p><i>“Open business model enable an organization to be more effective in creating as well as capturing value”</i></p> <p><i>“As a result of both trends-rising development costs and shorter product lifecycles-companies are finding it increasingly difficult to justify investments in innovation. Open business models address both effects”</i></p> <p><i>“Open innovation models also attack the revenue side for instance licensing technologies the ability to experiment with their business models ”</i></p>	<p>.Technologies based on policies of the firm</p> <p>. Technologies based on market</p>	<p>.Intellectual property rights.(IPR)</p> <p>.Revenues per IPR (RIPR)</p> <p>.Strategy on IPR (SIPR)</p> <p>.Technology based on policies (TECP)</p> <p>Technology based on market (TECM)</p> <p>.Lean Startup(LST)</p>
3	2007	Chesbrough & Schwartz, (2007)	<p><i>“Open business models are a prerequisite for successful co-development partnerships”</i></p>	<p>.The same business model adapted to OBM</p>	<p>. .Strategy on OBM (SOBM)</p> <p>.Orientation of business model (ORBM)</p> <p>Partnership.(PTS)</p>
4	2008	Vetter et al., (2008)	<p><i>“Open business models are roles that emerge around a shared technical infrastructure.”</i></p>	<p>. Technologies based on policies of the firm</p>	<p>.Technology based on policies(TECP)</p>
5	2009	Sandulli & Chesbrough, (2009)	<p><i>“Companies are beginning to share their internal resources with a third party to create value, or the reverse, companies are beginning to incorporate external resources in their own business model. These new business models have been defined by Chesbrough as open business models.”</i></p>	<p>.Resources</p> <p>.Capabilities</p> <p>.Value creation</p> <p>.Partnership</p>	<p>.Key resources. (KR)</p> <p>.Key activities.(KA)</p> <p>.Value proposition.(VPR)</p> <p>.Partnership.(PTS)</p>
6	2009	Wang et al., (2009)	<p><i>“The so called 'open business model' is different from the current business model a company has constructed and allows internal and external knowledge to penetrate in the operations of companies.”</i></p>	<p>.The same business model adapted to OBM</p>	<p>.Strategy on OBM (SOBM)</p> <p>.Orientation of business model (ORBM)</p> <p>.Key resources.(KR)</p> <p>.Key activities.(KA)</p>
7	2010	Davey, Brennan, Meenan, & McAdam, (2010)	<p><i>“A successful open businessmodel creates heuristic logic that connects technical potential with the realization of economic value.”</i></p>	<p>.The same business model adapted to OBM</p>	<p>.Strategy on OBM (SOBM)</p> <p>.Orientation of business model (ORBM)</p> <p>.Value proposition.(VPR)</p>
8	2010	(Chanal & Caron-Fasan)	<p><i>“Open business models can include external communities as valuable resources.”</i></p>	<p>.The same business model adapted to OBM</p>	<p>.Strategy on OBM (SOBM)</p> <p>.Orientation of business model (ORBM)</p> <p>.Partnership.(VPR)</p>
9	2010	Soloviev,	<p><i>“The main advantage of the</i></p>	<p>.The same business model</p>	<p>.Strategy on OBM</p>

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		Kurochkin, Rendiuk, & Zazuk (2010)	<i>open business model is that this model involves the value creation by the efforts of a large community of developers."</i>	adapted to OBM .Value creation .Community	(SOBM) .Orientation of business model (ORB) .Value proposition.(VPR) .Platform-Channels.(PTF) .Governance.(GOV)
10	2010	Smith et al. (2010)	<i>"The business model plays a central role in the open-innovation paradigm, some authors argue that firms are more innovative when they adopt open business models."</i>	. The same business model adapted to OBM	.Strategy on OBM (SOBM)
11	2011	Po-Young & Wan-Chen (2011)	<i>"As an extension of open innovation, open business models underscore a concept of industry ecosystem."</i>	.The same business model adapted to OBM	.Staregies on OBM (SOBM) .Orientation of business model (ORB) .Platform-channels.(PTF)- Governance (GOV)
12	2011	Alexy & George (2011)	<i>"The structures and mechanisms by which firms access knowledge outside their organizational boundaries to create value for the firm, sometimes by ceding control of product development pathways and its own intellectual property rights, are referred to as open business models."</i>	.Value proposition .Intellectual property rights	.Value proposition.(VPR) .Intellectual property rights(IPR) .Revenues per IPR (RIPR) .Strategy on IPR (SIPR) .Orientation of business model (ORB)
13	2011	Cheng (2011)	<i>"an open business model serves as an organising principle for structuring and coordinating various resources and functional units "</i>	.Governance	.Platform-channels. (PTF) .Governance(GOV)
14	2011	Chih-Ming & Huan.-Fang (2011)	<i>"The open business model transforms innovation and technology into economic results. Using a combination of innovative strategies and continuously integrating internal and external resources, the open business model promotes corporate competitiveness, establishes anetwork of collaboration relationships, and forms intercommunication platform models [...]"</i>	.Business model .Technologies based on policies of the firm .Strategy .External/internal resources .Network	.Technology based on policies (TECP) .Strategies about OBM (SOBM) .Key activities.(KA) .Key resources.(KR) .Platform-Channels (PTF) .Governance.(GOV)
15	2011	Romero & Molina, (2011)	<i>Seen as equivalent to a "collaborative business model" in value networks and value co-creation with customers.</i>	.Business model .Value proposition .Networks .Customer relationships	.Value proposition (VPR) .Platform-Channels.(PTF) .Governance (GOV) .Customer relationships management(CRM)
16	2012	Purdy,	<i>"open business models enable</i>	.The same business model	.Strategy on OBM

		Robinson, & Wei, (2012)	<i>firms to maximize the benefits of openness while limiting the risks. Synonymous use with open firm business model”</i>	adapted to OBM .Risk	(SOBM) .Orientation of business model (ORBM)
17	2012	Jagoda, Maheshwari, & Gutowski, (2012)	<i>“firms can better negotiate competitive pressures by making the boundaries of an organization open and more permeable to a bidirectional flow of innovative ideas. According to Chesbrough, there are two types of openness: outside in and insideout.”</i>	.Key resources .Key activities .Technologies based on policies of the firm	.Key resources.(KR) .Key activities.(KA) .Technology based on policies (TECP)
18	2012	Sheets & Crawford, (2012)	<i>“Open business models involve the organizational use of external as well as internal ideas and resources, and of external as well as internal pathways for deploying them to create and capture value.”</i>	.Value creation/capture .Key resources	.Value proposition. (VPR) .Key resources(KR)
19	2012	Storbacka, Frow, Nenonen, & Payne, (2012)	<i>“Business models are typically designed around over-riding design themes [...].We suggest that one over-riding theme can be ‘co-creation’ and argue that a focal actor wishing to engage in co-creation needs to design an ‘open’ business model that permits other actors to influence specific design elements.”</i>	.Value co-creation .Partnership	.Value proposition (VPR) .Partnership.(PTS)
19	2012	Wang & Zhou (2012)	<i>“open innovation players select a proper business model to unlock the value of technology, which could be called as the open-innovation-based business model.”</i>	.The same business model adapted to OBM .Technologies based on policies of the firm	.Strategy on OBM (SOBM) .Orientation of business model (ORBM) .Technology on policies (TECP) .Value proposition.(VPR)
20	2013	Frankenberger, Weiblen, & Gassmann, (2013)	<i>“Researchers on open business models outline even more explicitly the need for external collaboration by arguing that open business models lead to value creation and capturing by ‘systematically collaborating with outside partners’ (Osterwalder and Pigneur 2010: 109).”</i>	.Business model .Value capture/ creation .Partnership	.Value proposition.(VPR) .Partnership.(PTS)
21	2013	(Holm et al., 2013)	<i>Open business models are explicitly defined in a broad sense: “Although based in part on innovation management research [ . . . ], here we expand [the concept of openness] to the more generic concept of a business model.”</i>	.The same business model adapted to OBM .Value creation, delivery and capture	.Strategy on OBM (SOBM) .Orientation of business model (ORBM) .Value proposition.(VPR)
22	2013	Saebi & Foss (2013)	<i>“systematically linking open innovation strategies to core business model dimensions,</i>	.Content .Structure .Governance Market-based	.Strategy about OBM (SOBM) .Platform-Channels



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			<i>notably the content, structure, governance of transactions”</i>	innovation strategy with strategies: .Crowd-based innovation strategy .Collaborative innovation strategy .Network-based innovation strategy	(PTF) .Governance(GOV)
23	2014	Gay (2014)	<i>“dominant partners use to capture value/innovation as they interact with, or invest in, smaller entrepreneurial firms.”</i>	.Value proposition creation/value capture .Networking dynamics .Timming .Technologies based on policies of the firm .Business strategy	.Value proposition.(VPR) .Platform-Channels.(PTF) Governance.(GOV) .Technology based on policies(TECP) .Strategy about OBM(SOBM)
24	2014	Demil, & Lecocq, X. (2014)	<i>“Not only this open movement changes the innovation process but it also modifies organizations themselves by reconfiguring value chains and networks, leading to what is called open business models”</i>	.Value capture/value creation .Intellectual property rights Value chains .Networks	.Value proposition.(VPR) .Intellectual property rights.(IPR) .Revenues per IPR (RIPR) .Starategy on IPR (SIPR) .Orientation of business model (ORBM) .Platform-Channels.(PTF) Governance.(GOV)
25	2014	Weiblen, T. (2014).	<i>“the term ‘openness’ in open business models is grounded on the logic of the firm’s collaboration with its ecosystem.”</i>	.Business models .Value creation .Network	.Value proposition.(VPR) .Platform-Channels.(PTF). Governance.(GOV)
26	2016	Kotmann & Piller (2016)	<i>Open business models trigger firms to establish more sustainable businesses that allow external stakeholders to take a share in the obtained profits</i>	. Nine archetypes of Business models .Value chain with manufacturer reference .External partners in production- consumption-circulation -Implications among firm-consumer relationships-consumer communities-sustainability of business model-product innovation-.	.Value proposition.(VPR) ..Partnership.(PTS) .Costumer relationship managemen (CRM)

**Note:** VPR. Value proposition; MKS.Market segmentation; TECM.Tecnology based on market; TECP. Tecnology based on policies of the firm.; SOBM.Strategy on OBM.; IPR.Intellectual property rights; ORBM.Orientation of OBM.; SIPR.Strategy on IPR.; GOV.Governance; PTF.Platform-Channels.; PTS.Partnership.; KR.Key resources; CRM.Customer relationship management; RIPR.Revenues per IPR; KA.Key activities; LST.Lean stat-up.; CST.Cost structure.

**Source:** Weiblen (2014) updated with own adaption.

With these results, we proceeded to detect the more relevant variables by mean of a variable standardization by concept, in order to gather them in little common groups according the open business definitions. This represents the academic vision. See Table 2.

**Table 2.** OBM Variables mentioned for each author analyzed.

Item	Variables	Authors numbered as the Table 1																								TOT			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		25	26	
1	CRM															X											X	2	
2	CST	X	X																									2	
3	GOV									X			X	X	X									X	X	X		7	
4	IPR	X	X									X												X			4		
5	KA	X				X	X							X			X										5		
6	KR	X				X	X							X			X	X									6		
7	LST	X	X																							X	3		
8	MKS	X																									1		
9	ORB M		X	X			X	X	X	X		X				X					X	X		X			11		
10	PTF									X		X		X	X	X							X	X	X		8		
11	PTS			X		X						X							X	X				X			6		
12	RIPR	X	X										X											X			4		
13	SIPR		X									X	X														3		
14	SOBM		X	X			X	X	X	X	X	X			X		X					X	X	X			13		
15	TECM	X	X																								2		
16	TECP	X	X		X									X			X							X			6		
17	VPR	X	X			X		X	X	X		X			X			X	X	X	X	X	X	X	X	X	17		
		10	10	3	1	4	4	3	3	5	1	4	5	2	6	4	2	3	2	2	2	2	3	3	5	7	3	3	
<b>TOTAL</b>																										<b>100</b>			

**Notes:** CRM.Customer relationship management; CST.Cost structure; GOV.Governance; IPR.Intellectual property rights; KA.Key activities; KR.Key resources; LST.Lean start-up ; MKS.Market segmentation; ORBM.Orientation of OBM.; PTF.Platform-Channels.; PTS.Partnership; RIPR.Revenues per IPR; SIPR.Strategy on IPR.; SOBM.Strategy on OBM.; TECM.Tecnology based on market; TECP. Tecnology based on policies of the firm; VPR.Value proposition.  
**Source:** Own.

This vision was faced to the empirical point of view (empirical vision) of 5 renowned specialists at ITSMZG in the practice of OBM. Using AHP technique (Saaty, 1997) and Focus Group Delphi’s Oracle we weighed and determined the most important variables to use in our conceptual model. Even more, the specialist recommended 5 underlying factors, for best variables grouping to explain the OBM: business management BMG, strategy (STR), technology (TEC), new entrepreneurs (NWE) and open innovation orientation (OIO). See Table 3.

**Table 3.** AHP or Saaty’s Theorem to identify variables and factors of OBM.

Objective		Open Business Model (OBM)			
Alternatives	Factor as Empirical vision	Variable as Academic vision		Frecquency as Academic vision	AHP weighing as an empirical vision
	BMG	1	VPR	17	0.1
	STR	2	SOBM	13	0.09
	OIO	3	ORBM	11	0.09
	BMG	4	PTF	8	0.08
	OIO	5	GOV	7	0.08
	BMG	6	KR	6	0.07
	BMG	7	PTS	6	0.07
	TEC	8	TECP	6	0.07
	BMG	9	KA	5	0.07
	NWE	10	IPR	4	0.06
	BMG	11	RIPR	4	0.06
	NWE	12	LST	3	0.05
	STR	13	SIPR	3	0.04
	BMG	14	CRM	2	0.03
	BMG	15	CST	2	0.02
	TEC	16	TECM	2	0.01
BMG	17	MKS	1	0.01	
		TOTAL		100	1.00

**Notes:** BMG. Business model generation; CRM.Customer relationship management; CST.Cost structure; GOV.Governance; IPR.Intellectual property rights; KA.Key activities; KR.Key resources; LST.Lean start-up ; MKS.Market segmentation; NWE.New entrepreneurship; OIO. Orientation of the innovation; ORBM.Orientation of OBM.; PTF.Platform-Channels.; PTS.Partenrship; RIPR.Revenues per IPR; STR. Strategy; SIPR.Strategy on IPR.; SOBM.Strategy on OBM.; TEC. Technology; TECM.Tecnology based on market; TECP. Tecnology based on policies of the firm; VPR. Value proposition.

**Source:** Own.

So, we started to describe the underlying factors (BMG, STR, TEC, NEW, OIO) grouping our variables with their principal features, under the OBM vision, as:

## Open Business Model (OBM) Factor

With the increased adoption of open innovation practices, “*open business models*” (OBM) have emerged as a new design theme (Chesbrough, 2006). As we’ve see, exist a lot of definitions to be analyzed depending the point of view of the researcher, for example Weiblen (2014) refers in its study of open business model definitions, among 13 papers and three groups of concepts:

*“a) Same: for seven of the papers, it was not possible to spot a notable difference between open innovation and open business model. The concepts are used almost synonymously .b)OBM = BM based on OIN: in two of the papers, the authors see a firm using open innovation principles as one that implements an open business*

*model but the differentiation is made. c) OBM = BM adjusted to OIN: four papers adopt a slightly different standpoint. Here, certain adjustments to the firm's business model have to be made to accommodate for the incorporation of open innovation into R&D.*

*As the last two groups show, there is a slight difference in meaning, but the border between open innovation and the open business model concept is hard to draw. Before taking up this point in the discussion of the results, the remaining papers of the literature base, which take a broader perspective on the open business model, are presented.”*

Despite the mentioned above, to facilitate our point of view of conceptual OBM, in this paper, we propose to use the Osterwalder & Pigneur (2010) definition of business model: “A *business model describes the rationale of how an organization creates, delivers, and captures value*”. If we see the Table 4 we found out in an implicit form, the 9 blocks of the Osterwalder & Pigneur's (2010) model: VPR, MKS, PTF, KA, KR, CRM, RIPR, CST and therefore we can call these group of variables the business management (BMG) factor. Although some authors, such as Euchner and Ganguly (2014) comment about this part of the model: “*it misses the key dynamic elements of working business models— it does not represent coherence (or the relationship among elements); it does not represent the competitive position (which is off the canvas); and it does not quantify the economic leverage points*”. But, we consider that it can be well complemented, with the remaining variables which are grouped, as follows: TECM, TECP variables group we can call as a technology (TEC) factor; SOBM, SIPR variables group as a strategy (STR) factor; IPR, DIV variables group we can call as a new entrepreneurships (NWE) factor and finally, ORBM, GOV variables group we can call as a open innovation orientation (OIO) factor.

## **The Business Model Management (BMG) Factor**

As we mention above, this article is based and adapted to the Osterwalder & Pigneur (2010) model, more recognized as Business Model Generation. See Table 4.

**Table 4.** The Business Model Model Generation as Business Model Management Factor.

PTS	KYA	VPR	CRM	MKS
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	KYR		PTF	
CST		RIPR		

**Note:** CRM.Customer relationship management; CST.Cost structure. ; KA.Key activities; KR.Key resources; MKS.Market segmentation; PTF.Platform-Channels; PTS.Partership; RIPR.Revenues per IPR; VPR. Value proposition;  
**Source:** Osterwalder & Pigneur (2010) with own adaption

The proposed conceptual OBM is adapted and explained as follows:

-The market segmentation (MKS) as the basis to define the services and products specialized to offer to the customer according Osterwalder & Pigneur (2010) and being: mass market, niche market, segmented market, diversified market, multi-sided platforms (or multi-sided markets). The key questions to be solved are: For whom are we creating value? Who are our most important customers?. It represents the opportunity to analyze, different application of the technology besides the current market such as the discovering and developing new markets or for licensing other firm’s market (Osterwalder & Pigneur, 2010; OECD, 2008).

-The value proposition (VPR) is the core of any business and is characterized by: newness, performance, customization, “*getting the job done*”, design, brand status, price, cost reduction, risk reduction, accesibility, convenience /usability. The key questions to be solved: are: what value do we deliver to the customer? which one of our customer’s problems are we helping to solve?, which customer needs are we satisfying?,what bundles of products and services are we offering to each Customer Segment? (Osterwalder & Pigneur, 2010). The model includes the user a source of innovation to create value, as a tool to capture value (Von Hippel 2005). A growing number of research and development-driven companies are located in knowledge-based ecosystems. Value creation by these ecosystems draws on the dynamics of single firms (interacting and partnering) as well as the ecosystem at large (Van der Borgh et al. 2012).

-The customer relationship management (CRM). This section describes the types of relationships it wants to establish with specific customer segments, being for instance: *personal assistance, dedicated personal assistance, self-service, automated services, communities, co-creation*. Special attention represents the *co-creation* relationship because in the world of Web 2.0 has considerably increased the possibilities of user involvement in the production process and, thereby, has given rise to new forms of *co-creation* (OBM with customers). Because the roles of consumers, (or *prosumers*) have radically changed, specific challenges have emerged, being the main challenges: incentives, risks and costs, IPRs. (Rayna & Styriukova, 2014).The

types of relationships might be driven by the following motivations: *.customer acquisition; customer retention; .boosting sales (upselling)*. It includes key questions to be solved: through which channels do our customer segments want to be reached?, how are we reaching them now?, how are our channels integrated?, which ones work best?, which ones are most cost-efficient? how are we integrating them with customer routines? (Osterwalder & Pigneur, 2010).

-The channels based on platforms (PTF). This block describes how a company communicates with and reaches its customer segments to deliver a value proposition. It's used for raising awareness among customers about a company's products and services, helping customers evaluate a company's value proposition allowing customers to purchase specific products and services delivering a value proposition to customers and providing post-purchase customer support. It involves key questions to be solved: through which channels do our customer segments want to be reached? , how are we reaching them now? , how are our channels integrated? which ones work best?, which ones are most cost-efficient?, how are we integrating them with customer routines? . It's highly recommended, to be close to customers and providers follow the channel fases, such as: awareness, evaluation, purchase, delivery and after sales with the own (or with partners) resources and capabilities (Osterwalder & Pigneur, 2010; OECD, 2008).

-The revenues streams (RIPR) is adapted from the original Osterwalder & Pigneur (2010) model representing the cash a company generates from each customer segment (costs must be subtracted from revenues to create earnings) specially differenced here, from IPR due the intellectual capital of the firm (mainly based on technology) and taking different forms, such as: assets sales, usage fee, subscription fee, lending/renting/leasing, licensing, brokerage fees, advertising, and several forms of pricing (static/dynamics) (Osterwalder & Pigneur, 2010). This variable represents a great chance, for the organizations based on de IPR protection as: patents, trademarks and copyrights, for commercialising them using *patent pools* or *cross-licensing portfolios*, for instance (OECD, 2008). Based on IPR, some key question to be solved are: for what value are our customers really willing to pay?, for what do they currently pay?, how are they currently paying?, how would they prefer to pay?, how much does each RIPR contribute to overall revenues?

-The key resources (KYR). In OBM there's no more the most important assets required to make a business model work (Chesbrough, 2006) due the capability of the firm to access to the

external resources of its partners. But every OBM, requires it. These resources allow an enterprise to create and offer a VPR, reach markets, maintain relationships with MKS, and earn revenues involving tangible (buildings, infrastructure, labs, etc) and intangible (data, information, talent personnel, etc.) assets. KYR can be physical, financial, intellectual, or human; also can be owned or leased by the company or acquired from key partners (Osterwalder & Pigneur, 2010). Some key questions to be solved are: what key resources do our value propositions require? , our distribution channels? customer relationships?, revenue streams based on IPR? If we opening up, we see that a conceptual OBM might includes various perspectives: (1) globalization of innovation, (2) outsourcing of R&D, (3) early supplier integration, (4) user innovation, and (5) external commercialization and application of technology (Gassman, 2006) in own or partners labs (Asakawa et al. 2010) to apply the KYR in optimal conditions

-The Key Activities (KYA) there's no more the most important assets required to make a business model work (Chesbrough, 2006) due the capability of the firm to access to external activities of its partners. It describes the most important things a company must do to make its OBMs work as the most important actions a company must take to operate successfully. They are required to create and offer a VPR, reach markets, maintain CRM, and earn revenues. Some key activities for instance are: *production, problem solving and platform network*. Key questions to be solved are: what key activities do our value propositions require?, our distribution channels?, customer relationships?, revenue streams? (Osterwalder & Pigneur, 2010). For instance, about the key activities involving knowledge, exists an spatial clustering of economic activity and its relation to the spatiality of knowledge creation in interactive learning processes. It questions the view that tacit knowledge transfer is confined to local milieus whereas codified knowledge may roam the globe almost frictionlessly. Some studies highlight the conditions under which both tacit and codified knowledge can be exchanged locally and globally (i.e. cluster and network innovation systems) (Bathelt et al. 2004). There is currently a broad awareness of OBM and its relevance to corporate R&D. The implications and trends that underpin OBM are actively discussed in terms of strategic, organizational, behavioral, knowledge, legal and business perspectives, and its economic implications as key activities (Enkel et al. 2009). Previous studies have firmly established the technological gatekeeper to be a key node in the innovation process as key activities (acquiring, translating, and disseminating external information throughout the R&D unit) (Whelan et al. 2010). Besides, several studies argue that a key activity of a firm is to

recognize the value of new, external information, assimilate it, and apply it to commercial ends is critical to its innovative capabilities (Cohen & Levinthal, 1990; OECD, 2008) called commonly as absorptive capacity in an OBM. Some special conditions for instance, the pool of scientist, clusters and academic institutes, near to markets and production facilities are key factors to do investments for activities aimed to R&D, in other countries (Schwaag 2006; INSEAD et al., 2006). Companies base their decisions to locate R&D as the key activities on a variety of factors, principally: market potential, quality of R&D staff, university collaboration, and intellectual property protection. While lower cost can be a consideration (i.e. outsourcing) this is generally less important than other factors. (Thursby & Thursby 2006; Kuemmerle 1997; Dunning & Narula 1995). Existence acknowledge that some degree of outsourcing can further corporate creativity and that virtuality makes sense under certain conditions. But every company, they contend, needs to tailor its organization to its own operations and its unique sources of innovation (Chesbrough & Teece, 2002).

-The Partnerships (PTS) represent the network of suppliers and partners that make the business model work companies forge partnerships for many reasons, and partnerships are becoming a cornerstone of many business models. Companies create alliances to optimize their business models, reduce risk, or acquire resources. There are four different types of partnerships: a) Strategic alliances between non-competitors, b) Coopetition: strategic partnerships between competitors; c) Joint ventures to develop new businesses; d) Buyer-supplier relationships to assure reliable supplies (Osterwalder & Pigneur, 2010). The motivations to do it are: reduction of risk and uncertainty, optimization and economy of scale, acquisition of particular resources and activities. Our conceptual OBM is completely supported by partnership especially in the partnership with *sub-national* or *regional innovation systems* (OECD, 2008b; Cook, 2005; Beckan et al. 2004) as well as the relationship of University-Government-Organization (Triple Helix) (Etzkowitz & Leydesdorff, 1995), and recently, the society (Miller et al., 2016).

-The cost structure (CST) determines all costs incurred to operate the OBM. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs. Such costs can be calculated relatively easily after defining KYA, KYR, and PTS. There are several types of costs, such as: *cost-driven*, *value-driven*, *fixed costs*, *variable costs*, *economies of scale*, *economies of scope*. Some questions to be solved are: what are the most important costs inherent



in our OBM?, which KYR are most expensive?, which KYA are most expensive?. Some authors (Remneland-Wikhamn & Knights, D. 2012) have called this *transaction cost economics* (TCE) and consider that has had a strong impact on theories of economic exchange but also on OBM, even though the relationship is often implicit rather than explicit. The key questions to be resolved are: who are our key partners? who are our key suppliers?, which key resources are we acquiring from partners?, which key activities do partners perform?

Hence, our hypothesis is:

H1. Higher level of BMG higher level of OBM at ITSZMG.

## The Strategy (STR) Factor

The strategy (STR) in regard of the match to OBM is likely to be an important antecedent to open innovation performance, because the “... *essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit*” (Teece, 2010). These set of manners are proposed in our model to be implemented as:

SOBM.- Which is aimed to determine 4 OBM strategies, according Saebi & Foss (2013).

See Table 5.

**Table 5.** Strategies for OBM.

	<b>Market-based innovation strategy</b>	<b>Crowd-based innovation strategy</b>	<b>Collaborative innovation strategy</b>	<b>Network-based innovation strategy</b>
Business model dimensions	Efficiency-centric OBM	User-centric OBM	Collaborative OBM	Open platform business model
Content	-Efficiency-centered value proposition, enabled by reduction in transaction and coordination costs	.User-centered value proposition, input from communities of users	.Radical innovations and opening up of new target segment	.Business model acts as open-innovation platform for multiple stakeholders
Structure	-Redefinition of role of internal R&D system -Efficiency-centered structure	-Ideation phase of innovation process "outsourced" to the crowd	-Users / suppliers / customers / competitors become key partner in innovation process	-Re-organization of the production & distributional system -Need for complementary internal network
Governance	-Monetary remuneration for external knowledge provider -Use of "integration experts" to absorb market-available knowledge	- Monetary prizes or recognition for external knowledge providers -Incentives to engage and manage communities of users for own employees	-Contract based, sharing of rewards on organizational level with external knowledge provider -Incentives for own employees to engage with lead users and alliance partners	-Provide incentives for own employees to engage with multitude of knowledge partners (individuals, companies, communities) -Re-distribution of risks & rewards

**Source:** Saebi & Foss (2013).

However, it still has a lot to study and learn about the implications of these strategies because, for instance user-centric OBM in the specific context of project-based firms can show negative interactions are related to the client's attempts to reduce costs through tender-based competition to push down prices, or through contracts that push the risk onto the contractors, owing price competition with negative impact in innovation (Hopkins et al. 2010).

SIPR.- National surveys of R&D labs across the manufacturing sectors in several industrialized countries (i.e. USA and Japan) show that intraindustry R&D knowledge flows and spillovers are greater, and the appropriability of rents due for patents and intellectual property take an strategical importance for innovation (Coehn et al. 2002). The value of the open innovation approach is now widely recognized, and the practice has been extensively researched, but still very little is known about the relative impact of firm-level and laboratory-level open innovation policies and practices on R&D performance (Asakawa et al. 2010) that most be involved in an OBM, to get competitive advantage (Rohrbeck, et al. 2009). Even more, the secrecy of vital process of the firm must be protected (OECD, 2008).

Hence, our hypothesis is:

H2. Higher level of STR higher level of OBM at ITSZMG.

## **The Technology (TEC) Factor**

It's one of the most important factors in OBM. It's an asset that firms use such as: *technology in-licensing*, *technology licensing*, and *technology out-licensing* (Chesbrough & Kardon–Crowter, 2006). Based on the results, we distinguished the next variables around TEC:

TECM.- How the technology is created by the own firm's capabilities and resources, or how the firm uses its own capabilities to do alliances to get external technology and the fact to aim to own market or other markets, represent the core of the open innovation in this matter (Chesborough, 2003) and is strategic integrate it onto the OBM. Besides, acquiring external knowledge, many firms have begun to actively commercialize technology, for example, by means of out-licensing. This increase in inward and outward technology transactions reflects the new paradigm of open innovation. Most prior research into open innovation is limited to theoretical considerations and case studies, whereas other lines of research have focused either on external technology acquisition or exploitation (Lichtenthaler & Holger 2009).

TECP.- Companies have historically invested in large research and development departments to drive innovation and provide sustainable growth. What is emerging is a more OBM, where companies recognize that not all good ideas will come from inside the organization and not all good ideas created within the organization can be successfully marketed internally. To date, Open Innovation concepts have been regarded as relevant primarily to “*high-technology*” industries. Even more, without knowing it, there are several companies that are already applying many concepts in a wide range of industries (Chesbrough & Kardon –Crowter, 2006). So, it’s an important matter the regulation of how to use the technology, by mean of firm’s policies.

Hence, our hypothesis is:

H3. Higher level of TEC higher level of OBM at ITSZMG;

## **The New entrepreneurships (NWE) Factor**

-The new entrepreneurships (NWE) successfully achieved are a good indicator of any OBM, such as the *spin-in*, *spin-out* and *spin-off* in certain period. Hence, we propose in our conceptual OBM:

-The intellectual property rights (IPR) supported by the activities, policies, process, etc. involved in the firm to create: patents, trademarks and copyrights. The effective management of IP is crucial for identifying useful external knowledge and particularly for capturing the value of a firm’s own IPR; hence, the protection of IPR attracts more attention, especially in emergent countries, because their weak reinforcement. Empirical studies on the impact of IPR of foreign R&D have generally provided evidence that the protection has a positive impact on inward R&D, especially in largest companies. However, the opposite occurs in in the SMEs that they may face greater risk in collaborations with largest companies because they typically have fewer resources and limited expertise in this issue (OECD, 2008). As we saw, the IPR must be included in our conceptual OBM, because is one of the most important outcomes.

-Lean start-up (LST). It’s a term that brings together the principles of customer development, agile methodologies and lean practices. By using short and frequent cycles for tests and corrections, this approach aims at changing the way firms are built and products are designed, helping companies to succeed in a business landscape riddled with risk. Particularly, it seeks to minimize costs, waste and time to market, giving new products the best possible chance

to get off the ground and into the hands of customers. Even though the lean start-up approach is still in an embryonic stage, it has attracted much attention in recent years among entrepreneurs, technologists and investors. Yet, this research topic certainly constitutes an interesting research stream to better understand the process of starting up a new venture. According to Ries (2011), the rationale behind the lean start-up approach is to optimize the utilization of scarce resources by using smaller and faster iterations for testing a vision continuously so as to get a desired product to customers' hands faster. To accomplish this goal, lean start-ups strive to minimize the expenditure of resources for anything but the creation of value for the customer. (Trimi & Berbegal-Mirabent, 2012).

Hence, our hypothesis is:

H4. Higher level of NWE higher level of OBM at ITSZMG

## **The Open Innovation Orientation (OIO) Factor**

-The OI orientation (OIO). We consider it is one of the most important factors in our conceptual model, because it is here, where the executives can decide at the beginning with the OBM, the course of the firm in the OIN process. To achieve this, we propose

-The orientation of business model (ORBM). Some studies show that OIN usually falls into lower performance by the definition of how the knowledge flows. In this sense, for OIN is categorized into *knowledge exploration, knowledge retention, and knowledge exploitation* (Lichtenthaler, 2009). Firms integrate knowledge exploitation and knowledge exploration *to maximize their technological capabilities and competencies* (Lichtenthaler, 2008). In this sense Chien-Tzu & Wan Fen (2014), summarize that *knowledge exploitation* reflects: the innovation practices to systematize purposive outflows of knowledge as well as the firm's behavior to be efficient, implementing and improving the production. By other hand, the *knowledge exploration* refers to: purposive inflows of knowledge as well as the firm's behavior for discovering and experimenting due the risks that are being taken. Other exploratory studies have examined the corporate venturing as an effective means of technology acquisition (spinning in) and technology divestment (spinning out) establishing the drivers for, and benefits of, these approaches as strategic tools for deriving greater value from R&D; identifying current good practices; and understanding the barriers to progress (EIRMA, 2003)

-Governance (GOV) might be one of the most important variables due the participants in the OBM process may belong to organizations with different structures and goals. For instance, several large companies with R&D are usually managed through central governance system. Some OBM governance issues that may need to be addressed include ownership and decision rights, issue escalation, organizational structure, resource commitments and potential timing, termination rights and conditions. Partners may wish to develop operating procedures that include standards for collecting, storing and sharing data. Establishing clear roles and responsibilities for collaboration team leaders and members for each step of the joint discovery, development, and delivery process are also important. (Deloitte, 2015). Finally, all governance system must be regulated by rules of ethics. The part of ethics in our conceptual OBM consists of three principal components: *expectations, perceptions and evaluations* that are interconnected by five sub-components: *society expects; organizational values, norms and beliefs; outcomes; society evaluates; and reconnection aspiring* (Svensson & Wood, 2007). The model aspires to be highly dynamic due the continuous and an iterative process. There is no actual end of the process, but a constant reconnection to the initiation of successive process iterations of the business ethics of conceptual OBM. The principals and sub-components of the model construct the dynamics of this continuous process. Hence, our hypothesis is:

H5. Higher level of OIO higher level of OBM at ITSZMG.

## **The Key performance Indicators of each factor**

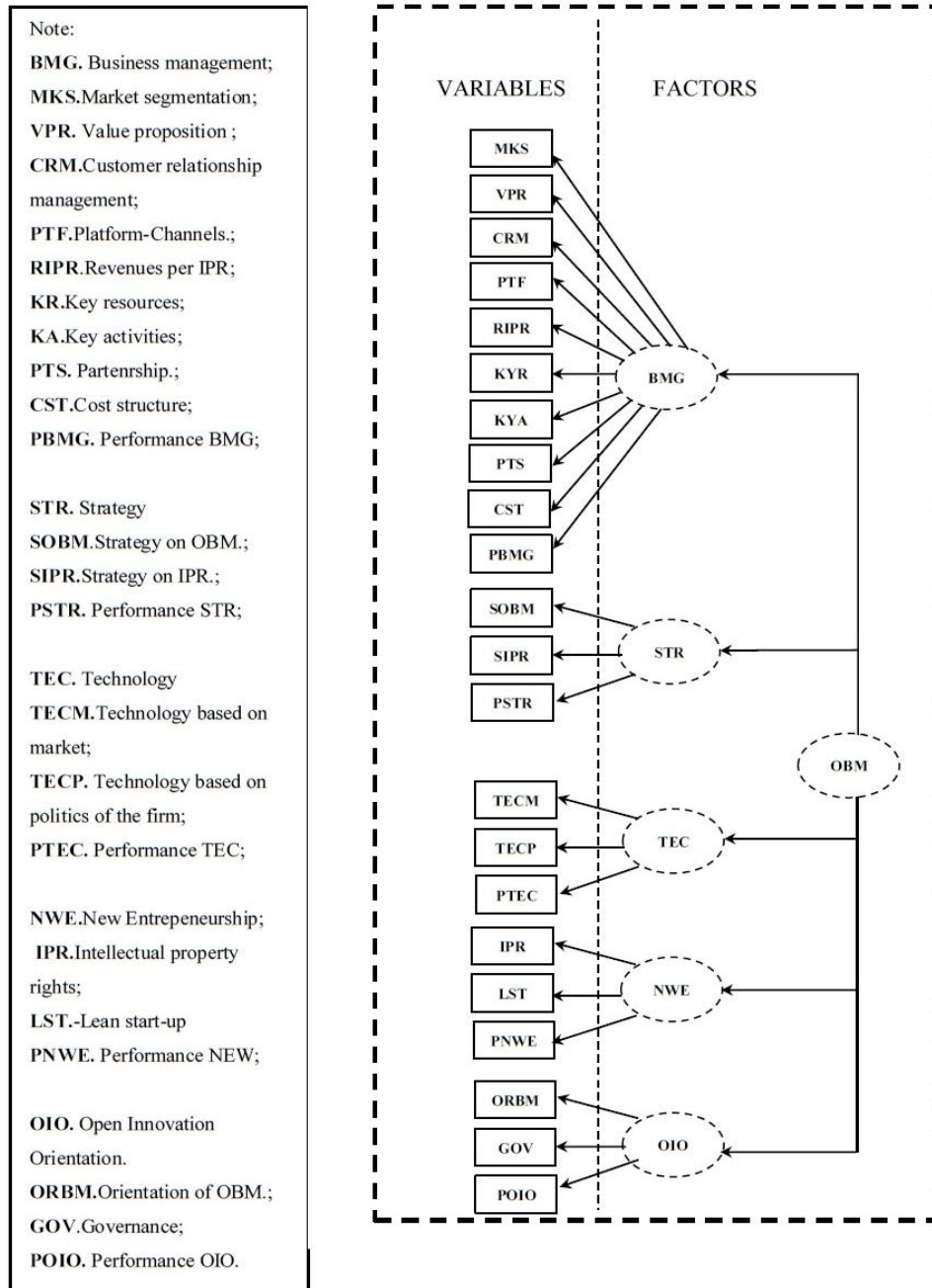
It is essential that measurement be timely. Today, a KPI (key performance indicators) provided to management that is more than a few days old is useless. KPIs are prepared in real time, with even weekly ones available by the next working day. Many KPI project teams will also, at first, feel that having only 10 KPIs is too restrictive and may wish to increase KPIs to 30. With careful analysis, that number will soon be reduced to the 10 suggested unless the organization is made up of many businesses from very different sectors; in that case, the 10/80/10 rule can apply to each diverse business, providing it is large enough to warrant its own KPI rollout. In this article we only require to the firms if they use some KPI because most of them are financial and confidential. Hence we propose a KPI for each factor such as: strategy (PSTR), technology (PTEC), business model management (PBMG), new entrepreneurships (PNWE) and finally, open

innovation orientation (OIO) (Parmented, 2010). The mentioned KPI's could establish the relationship between outbound open innovation (indicating an inside-out process) and firm performance. In particular, it suggests that outbound open innovation may have positive and negative effects on firm performance based on potential benefits and risks of transferring technology. To what degree these effects materialize depends on internal factors .Consequently, a proficient internal management of outbound open innovation is critical to avoid its potential risks and to capture its substantial benefits. In this regard, future research may substantially deepen the insights into the relevance and role of outbound open innovation (Lichtenhauler, 2015). In order to promote and ensure the performance of OBM, an assessment framework and the evaluation indicators are required (Chien-Tzu & Wan Fen, 2014). All mentioned above would be serve as a feedback to control the OBM process as an Innovation Busines Model (Mejía et al. 2014).

Please, see Scheme 1 for the general conceptual model and the Appendix 1 for the final detailed questionnaire.

# The determinant factors of open business model

Scheme 1. General Conceptual Model



Source: Own.

## Method

We show the Table 6 with a summary of the test and values used in this research.

**Table 6.** Technical Research Data, Test and Values used in this Research.

Technical Research Data		
Features	Survey	
Universe	1000 specialists in business design at ITSMZG	
Scope	Metropolitan Zone of Guadalajara, México	
Sample Unit	600 specialists at ITSMZG ITSMZG involving: 150 IT teachers; 150 representatives of consulting firms; 290 IT SME CEO and 10 IT LE CEO	
Collection Method of Data	e-Mail/ Inquiry	
Scale	Likert 5	
Date of Fieldwork	January-2015-May-2016	
Total of interviews	680	
Test used in this Research	Value /Description	Author
Ratio NC/VoQ= Number of cases (NC) & Variables Of Questionnaire (VoQ)	NC= 600 (>=100 and <=1000) specialists at ITSMZG VoQ = 22 Ratio NC/VoQ= 600/22=27>10 (>10 recommended by Hair, 2014)	Hair et al.(2014)
CFA (Confirmatory Factorial Analysis ) by Maximum Likelihood Method, and Covariance Analysis by EQS 6.1 software	To verify the Reliability and the Validity of the Measurement Scales	Bentler, (2006); Brown, (2006); Byrne, (2006)
Cronbach's Alpha (CHA) and Composite Reliability Index (CRI)	CHA (Per Factor Via SPSS) & CRI>=0.7 / Reliability of the Measurement Scales	Bagozzi & Yi, (1988); Nunnally & Bernstein,(1994); Hair et al., (2014)
Mardia's Normalized Estimate.(M)	M>5.00 / Distributed as a unit normal variate such that large values reflect significant positive kurtosis and large negative values reflect significant negative kurtosis. Bentler (2006) has suggested that in practice, values >5.00 are indicative of data, that are non-normally distributed	Bentler (2006); Byrne, (2006)
The Satorra–Bentler scaled statistic (S-B $\chi^2$ )	S-B $\chi^2$ .- By specifying ME=ML, ROBUST, the output provides a robust chi square statistic ( $\chi^2$ ) called. This is to minimize the outliers and achieve goodness of fit	Satorra & Bentler, (1988)
Normed Fit Index (NFI)	NFI>=0.8 and <=.89. / Index used for more than two decades by Bentler and Bonett's (1980) as the practical criterion of choice, as evidenced in large part by the current "classic" status of its original paper (Bentler, 1992; and Bentler & Bonett, 1987, cited by Byrne, 2006). However, NFI has shown a tendency to underestimate fit in small samples,	Bentler & Bonnet,(1980) ; Byrne (2006)
Comparative Fit Index (CFI)	CFI>=0.8 and <=.89. Bentler (1990, cited by Byrne, 2006) revised the NFI to consider sample size and proposed the Comparative Fit Index (CFI). Values for both the NFI and CFI range from zero to 1.00 and are derived from comparison between the hypothesized and independence models, as described previously. As such, each provides a measure of complete covariation in the data. Although a value > .90 was originally considered representative of a well-fitting model (see Bentler, 1992, cited by Byrne, 2006), a revised cutoff value close to 0.95 has been advised (Hu & Bentler, 1999, cited by Byrne, 2006). Although both indexes of fit are reported in the EQS output, Bentler (1990, cited by Byrne,2006) suggested that the CFI should be the index of choice	
Non-Normed Fit Index (NNFI)	NNFI>=0.8 and <=.89. It is a variant of the NFI that takes model complexity into account. Values for the NNFI can exceed those reported for the NFI and can also fall outside the zero to 1.00 range.(Byrne, 2006)	
Root Mean Square Error of Approximation (RMSEA)	RMSEA>=0.05 and <=0.08 / The RMSEA considers the error of approximation in the population and asks the question, "How well would the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available?" (Browne & Cudeck, 1993, pp. 137-8, cited by Byrne, 2006). This discrepancy, as measured by the RMSEA, is expressed per degree of freedom, thus making it sensitive to the number of estimated parameters in the model (i.e., the	Hair et al, (2014); Byrne, (2006); Chau, (1997); Heck, (1998)



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	complexity of the model). Values less than .05 indicate good fit, and values as high as .08 represent reasonable errors of approximation in the population (Browne & Cudeck, 1993, cited by Byrne, 2006). Addressing Steiger's (1990, cited by Byrne, 2006) call for the use of confidence intervals to assess the precision of RMSEA estimates, EQS reports a 90% interval around the RMSEA value. In contrast to point estimates of model fit (which do not reflect the imprecision of the estimate), confidence intervals can yield this information, thereby providing the researcher with more assistance in the evaluation of model fit.	
Convergent Validity (CV)	All items of the related factors are significant ( $p < 0.01$ ), the size of all standardized factorial loads are exceeding 0.60 (Bagozzi & Yi, 1988) the extent to which different assessment methods concur in their measurement of the same trait (i.e., construct)—ideally, these values should be moderately high (Byrne, 2006)	Bagozzi & Yi, (1988); Byrne, (2006)
Variance Index (VEI)	VEI > 0.50 / In all paired factors as constructs. In a matrix representation, The diagonal represents the (VEI), while above the diagonal part presents the variance (the correlation squared); below the diagonal, is an estimate of the correlation of factors with a confidence interval of 95%. See the Table. <i>Discriminant validity of the theoretical model</i> mentioned below.	Fornell & Larcker, (1981)
Discriminant Validity (DV)	DV / It is the extent to which independent assessment methods diverge in their measurement of different traits—ideally, these values should demonstrate minimal convergence.(Byrne, 2006). DV is provided in two forms: First, with a 95% interval of reliability, none of the individual elements of the latent factors correlation matrix contains 1.0 (Anderson&Gerbing, 1988). Second, VEI between the each pair of factors is higher than its corresponding VEI (Fornell&Larcker, 1981). Therefore, based on these criteria, different measurements made on the scale show enough evidence of reliability, CV and DV. See the Table. <i>Discriminant validity of the theoretical model</i> mentioned below.	Byrne, 2006; Anderson & Gerbing,(1988 ); Fornell & Larcker,(1981 )
Nomological Validity (NV)	It is tested using the chi square, through which the theoretical model was compared with the adjusted model. The results indicate that no significant differences are good theoretical model in explaining the observed relationships between latent constructs	Anderson & Gerbing,(1988 ); Hatcher, (1994)

**Author:** Several authors, by own adaption.

About the reliability and validity of the measurement scales, it was used the Confirmatory Factor Analysis (CFA) by mean of the maximum likelihood method with EQS 6.1 software (Bentler 2006; Brown, 2006; Byrne, 2006). Cronbach's alpha and the Composite Reliability Index (CRI) (Bagozzi & Yi, 1988) were used as a techniques to prove the reliability of the measurement scales where all the values exceeded the recommended value of 0.7 for both measurements, which indicates that there is evidence and justifies internal reliability of the scales (Hair et al., 2014). It represents the variance extracted from the group of the observed variables and the fundamental construct (Fornell & Larcker, 1981), particularly, values 0.6 are desirable (Bagozzi & Yi, 1988).The settings used in this study were: the Normed Fit Index (NFI), the Non-Normed Fit Index (NNFI), the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) (Bentler & Bonnet, 1980; Byrne, 2006; Bentler, 1990; Hair et al. 2014; Chau 1997; Heck, 1998). Values of NFI, NNFI and CFI between 0.80  $\geq$  and  $\leq$  0.89 represent a reasonable fit (Hair, et al., 2014) and  $\geq$  0.90 represents an evidence of a good fit of the theoretical model (Byrne, 2006). RMSEA < 0.08 are acceptable (Hair et al., 2014). The CFA results are presented in Table 7.

**Table 7.** Internal Consistence and Convergent Validity Evidence of the Theoretical Model.

Factor	Item	Variable	Factor Loading>0.6 (a)	Robust t-Value	Average Factor Loading	Cronbach's Alpha>=0.7 (b)	CRI (b)	AVE>0.5 (c)
STR	1	SOBM	0.701***	1.000a	0.713	0.718	0.719	0.670
	2	SIPR	0.824***	57.666				
	3	PSTR	0.616***	9.651				
TEC	4	TECM	0.680***	1.000a	0.702	0.710	0.718	0.689
	5	TECP	0.733***	27.854				
	6	PTEC	0.695***	17.941				
BMG	7	MKS	0.823***	1.000a	0.706	0.711	0.727	0.678
	8	VPR	0.950***	68.010				
	9	CRM	0.680***	27.739				
	10	PTF	0.703***	21.236				
	11	RIPR	0.603***	7.078				
	12	KYR	0.634***	7.120				
	13	KYA	0.610***	7.051				
	14	CST	0.715***	49.401				
	15	PTS	0.741***	56.501				
NWE	16	POBM	0.604***	7.041	0.708	0.712	0.719	0.601
	17	IPR	0.694***	1.000a				
	18	DIV	0.730***	6.959				
OIO	19	POBM	0.700***	6.361	0.719	0.721	0.725	0.645
	20	ORBМ	0.803***	1.000a				
	21	GOV	0.692***	18.467				
	22	POIO	0.664***	9.327				
Results: (S-BX <sup>2</sup> with df= 205) = 135.604; df=155; p < 0.000; NFI = 0.802; NNFI = 0.813; CFI = 0.818; RMSEA = 0.064 Conclusion: the relationships among the variables and dimensions, have good adjustment and a good fit to the data; hence, exist enough evidence of convergent validity and reliability, which justifies the internal reliability of the scales (Nunnally & Bernstein, 1994; Hair et al., 2014).								

**Notes:** \*\*\* Parameters constrained to the value in the identification process = p < 0.01

a. According Bagozzi & Yi, 1988.

b.- According Hair 2014.

c.- Average Variance Extracted (AVE), according Fornell & Larcker, 1981.

**Source:** Own.

Additionally, Cronbach's alpha and the CRI exceed the value of 0.70 recommended by Hair (2014) and the Average Variance Extracted (AVE) was calculated for each pair of constructs, resulting in an AVE more than 0.50 (Fornell & Larcker, 1981). As evidence of convergent validity, the results pointed out that all of the CFA items factor related are significant (p < 0.001) and the magnitude of all the factorial charges is superior of 0.60 (Bagozzi & Yi, 1988).

Likewise, all the items of related factors are significant (p < 0.001). The size of all the standardized factorial loads are above the value 0.60 (Bagozzi & Yi, 1988).

These values indicate that there is enough evidence of convergent validity and reliability, which justifies the internal reliability of the scales (Nunnally & Bernstein, 1994; Hair et al., 2014). Regarding the discriminating validity of the theoretical model, the evidence is shown in Table 8.

**Table 8.** Discriminant Validity Measuring of the Theoretical Model.

Factor	STR	TEC	BMG	NWE	OIO
STR	0.670	0.088	0.066	0.067	0.030
TEC	0.450-0.736	0.689	0.071	0.054	0.051
BMG	0.779-0.965	0.415-0.620	0.678	0.087	0.061
NEW	0.677-0.702	0.814-0.905	0.421-0.599	0.601	0.043
OIO	0.667-0.805	0.704-0.866	0.705-0.815	0.698-0.801	0.645

**Note:** The diagonal represents the Average Variance Extracted (AVE), whereas above the diagonal part presents the Variance (the correlation squared). Below the diagonal, it is shown the correlation estimation of the factors with a confidence interval of 95%.

**Source:** Own.

1.-It can be seen the confidence interval test (Anderson & Gerbing, 1988), which establishes that, with an interval of 95% of reliability, none of the individual elements of the latent factors of the correlation matrix has the value of 1.0.

2.-It can be seen the extracted variance test (Fornell & Larcker, 1981) which indicates that the variance extracted between each pair of constructs is higher than their corresponding AVE. Therefore, according to the results obtained from both tests, it can be concluded that both measurements show enough evidence of discriminating validity from the theoretical model.

## Results

In order to prove the hypotheses presented in the theoretical model, a structural equations modeling (SEM) with software EQS 6.1 by means of CFA of first order was applied (Bentler, 2006; Byrne, 2006; Brown, 2006). So, the nomological validity of the theoretical model was examined through the Chi-square test, which compared the results obtained between the theoretical model and the measurement model. Such results indicate that the differences between both models are not significant which can offer an explanation of the relationships observed among the latent constructs (Anderson & Gerbing, 1988; Hatcher, 1994). See Table 9.

**Table 9.** Structural equation modeling results from the theoretical model.

Hypotheses	Path	Standardized path coefficients	Robust t-Value
H1. Higher level of STR higher level of OBM at ITSZMG; . The model has significant positive effect.	STR→OBM	0.789***	24.429
H2. Higher level of TEC higher level of OBM at ITSZMG; . The model has significant positive effect.	TEC→OBM	0.866***	33.887
H3. Higher level of BMG higher level of OBM at ITSZMG; . The model has significant positive effect.	BMG→OBM	0.750***	56.457
H4. Higher level of NWE higher level of OBM at ITSZMG; . The model has significant positive effect.	NWE→OBM	0.733***	34.876
H5. Higher level of OIO higher level of OBM at ITSZMG; . The model has significant positive effect.	OIO→OBM	0.876***	45.987

Results: (S-BX<sup>2</sup> with df = 270) = 81.201; p < 0.000; NFI = 0.820; NNFI = 0.844; CFI = 0.823; RMSEA = 0.060.

Note: \*\*\* = p < 0.01

Conclusion: The model has significant positive effect among the Factors

Source: Own.

## Discussion

We emphasize the value of this study because is the result of an extensive literature review to obtain the main OBM variables contrasted with the experience of the specialists at ITSMZG, through AHP and Delphi's Panel. It is quite clear at the ITSMZG, that the concepts have not been enough disseminated, understood and applied in the field of the OBM. This represents a great chance for the ITSMZG, because is necessary the actions planning and execution to increase the rest of 18 variables (see Table 7, factor loading values  $\geq 0.6$  and  $\leq 0.8$ ) in order to improve the conceptual OBM. According the results of our empirical OBM model, we recommend for the ITSMZS, the next actions:

-For strategy (STR) factor, is necessary that the firm in strategy OBM (SOBM) variable, firstly defines with accurate the kind of design to use, for instance: efficiency-centric open business model; user-centric open business model; crowd-based innovation strategies; collaborative open business model; open platform business model or other; this is because each different design brings different actions plans, saving time and resources. For strategy on intellectual property rights (SIPR), although there is a level of awareness about this, is not reflected in real actions to create, generate and protect the IPR. For the firm, is highly recommended, defines the main motivation for registration and how to make business with IPR.

-For technology (TEC) factor, we have that one main feature of OBM is to see for internal and external resources and capabilities to create, share, buy and/or sell technology. In this sense for technology based on market (TEM) will require some kind of technology based on policies (TECP), onto the firm to chek out the opportunities and make it happen.

-For open business management OBM factor, as we've seen, we believe that the Osterwalder & Pigneur (2010) model is enough to adapt it and apply it with its most important variable blocks: MKS.Market segmentation; CRM.Customer relationship management; PTF.Platform-Channels; VPR.Value proposition ; RIPR.Revenues per IPR ; KYR.Key resources;; KYA.Key activities; PTS.Partenrship; CST.Cost structure. Some of these elements would be more por less strategic according the level of relationships with resources and capabilities of third parties (partners) as a main feature of the OBM process.

-For new entrepreneurs (NWE) factor, also we found out a low level of awareness to use it, but it represents the main product of the OBM and here, it has been divided in: intellectual property rights (IPR) pretty related with strategy intellectual property rights (SIPR) and the lean start-up (LST), as the best indicator of how the OBM is able to create new enterprises by means of spin-offs, start-ups, etc.

-For open innovation orientation (OIO) factor through the orientation business management (ORBM) we determine the factor where the firm decides the mode of OBM is going to be applied it's the heart of the planning block and involves the connection of how the knowledge is going to be used for the development and how is going to be integrated in the OBM. To make it happen, is necessary regulations involved in form of governance to control all the process.

-Also, it's highly recommended the design of several key performance indicators for each one of the factors such as performance of: strategy (PSTR), technology (PTEC), business model management (PBMG), new entrepreneurs (PNWE) and finally, open innovation orientation (OIO) to measure and feedback all the process and take the better decisions for improvement of each factor.

-Finally, for further studies of this empirical OBM is important to determine also, the most important indicators in the model, suggesting a linear regression analysis to find out the correlations between the factors and variables and analyze, how they are interacting in the model.

-For most generalized model, we suggest to replicate this empirical OBM in other similar industry of the area, just like: the biopharmaceutical sector or the automobile sector to establish a general empirical model for OBM.

## **Conclusion**

This study concluded answering all the specific questions (SQ1, SQ2, SQ3) and the general question (GQ), with a proposition of a conceptual OBM framework (see Appendix 1), with 5 factors: STR (3 variables/14 indicators), TEC (3 variables/24 indicators), BMG (10 variables/76 indicators), NWE (3 variables /7 indicators) and OIO (3 variables/18 indicators) (See Scheme 1). The model has significant positive effect in our pose hypotheses, mainly in 4/24 variables (see Table 7 factor loading values  $\geq 0.8$ ): SIPR, MKS, VPR and ORBM. This proposition is product

for the academic vision (literature review) and the consulting of specialists experience at ITSMZG, through the analytic hierarchy process (AHP).

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**Appendix 1**

Final Questionnaire

Factor	Variable	Indicator	Author(s)	
(1) BMG	(1) MKS	1.-Your OBM determines the real needs of its consumers, classifying them on: mass market	Osterwalder & Pigneur, (2010)	
		2.-Your OBM determines the real needs of its consumers, classifying them on: niche market		
		3.-Your OBM determines the real needs of its consumers, classifying them on: segmented		
		4.-Your OBM determines the real needs of its consumers, classifying them on: diversified		
		5.-Your OBM determines the real needs of its consumers, classifying them on: multisided platforms-markets		
		6.-Your OBM is only focused an makes surveillance on your current market		OECD (2008); Chesbrough (2006)
		7.-Your OBM only makes surveillance for discovering and developing new markets		
		8.-Your OBM only makes surveillance for licensing other Firm's Market		
	(2) VPR	9.- Your OBM offers VP through newness	Osterwalder & Pigneur, (2010)	
		10.-Your OBM offers VP through performance		
		11.- Your OBM offers VP through customization		
		12.- Your OBM offers VP through, design		
		13.- Your OBM offers VP through brand		
		14.- Your OBM offers VP through price		
		15.- Your OBM offers VP through cost reduction		
		16.- Your OBM offers VP through risk reduction		
		17.- Your OBM offers VP through accesibility,		
		18.- Your OBM offers VP through convenience/usability		
		19.-Your OBM lead the VP based on User Innovation (Create Value) as a tool of Open Innovation (Capture Value)		Von Hippel (2005); Chesbrough (2006); Van der Borgh et al. (2012)
	(3) CRM	20.-Your OBM uses CRM motivated for: customer acquisition	Osterwalder & Pigneur, (2010); OECD (2008)	
		21.-Your OBM uses CRM motivated for: customer retention		
		22.-Your OBM usesCRM motivated for: boosting sales (upselling)		
		23.-Your OBM is seeking to deliver requirements to your consumers by: personal assistance		
		24. Your OBM is seeking to deliver requirements to your consumers by: dedicated personal assistance		
		25.-Your OBM is seeking to deliver requirements to your consumers by: self service		
		26.-Your OBM is seeking to deliver requirements to your consumers by: automated service		
		27.-Your OBM is seeking to deliver requirements to your consumers by: communities		
		28.-Your OBM is seeking to deliver requirements to your consumers by: co-creation		Rayna & Styriukova (2014); Osterwalder & Pigneur, (2010)
		29.-Your OBM is seeking to be connected with its users more by partners media than own media		Osterwalder & Pigneur, (2010)
	(4) PTF	30.- Your OBM seeking to be very closed to the delivery of the services to your costumers by own channels	Osterwalder & Pigneur, (2010); OECD (2008)	
		31.-Your OBM is raising enough awareness among customers about a company's products and services?		
		32.-Your OBM is helping customers evaluate a company's value proposition?		
		33.-Your OBM is allowing customers to purchase specific products and services?		
		34.-Your OBM is delivering a Value Proposition to customers?		
		35.-Yopur OBM is providing post-purchase customer support?		
	36.-Your OBM is always seeking the update to connect to the platform in hardware,			

		software and access rules.	
		37.- Your OBM seeking to be very closed to the delivery of the services to your costumers by partner channels	
(5) RIPR		38.-Your OBM applies revenue stream of IPR by mean of: financial assets licensing and/or building a Intellectual Capital Portfolio to exploitation	
		39.-Your OBM applies revenue stream of IPR by mean of: usage fee	
		40.-Your OBM applies revenue stream of IPR by mean of: subscription fees	
		41.-Your OBM applies revenue stream of IPR by mean of: lending/renting/leasing	
		42.-Your OBM applies revenue stream of IPR by mean of: licensing	
		43.-Your OBM applies revenue stream of IPR by mean of: brokerage fee	
		44.-Your OBM applies revenue stream of IPR by mean of: advertising	
		45.-Your OBM applies revenue stream of IP by mean of trade secrets	
		46.-Your OBM to facilitate the revenue stream makes patent pools	OECD (2008)
		47.-Your OBM to facilitate the revenue stream makes cross-licensing	
(6) KYR		48.-Your OBM uses, more of the partnerships than yours, the : physical key resources (buildings, labs, sites, network etc.)	Osterwalder & Pigneur, (2010)
		49.-Your OBM uses, more of the partnerships than yours, the : intellectual key resources (relationships, databases, information systems, etc.)	
		50.-Your OBM uses, more of the partnerships than yours, the :human key resources (its personnel)	
		51.- Your OBM uses, more of the partnerships than yours, the :financial key resources	Gassman (2006); Asakawa et al. (2010)
		52.-Your OBM considers the rapid shift of industry and technology borders, to pose new business models	
	53.-Your OBM considers the knowledge as a factor of competitive advantage.		
	54.-Your OBM considers that a more interdisciplinary cross boarder research more partnership for innovation		
(7) KYA		55.-Your OBM uses, more of the partnerships than yours, the : production key activities	Osterwalder & Pigneur, (2010)
		56.- Your OBM uses, more of the partnerships than yours, the :problem solving key activities	
		57.- Your OBM uses, more of the partnerships than yours, the :: platform network key activities	
		58.- Your OBM uses, more of the partnerships than yours, the :R&D located under cluster and networks innovation systems with geographical proximity because the spillovers often occur by this.	OECD (2008); Bathelt et al. (2004); Enkel et al.(2009); Whelan, et al. (2010 ); Gassmann et al.(2010)
		59.-Your OBM making activities for a great awareness to invest in own R&D because the importance of absorptive capacity	Cohen & Levinthal, (1990); OECD (2008)
		60.- Your OBM making activities for R&D investments in other countries, because is more the available the pool of scientist, clusters and academic institutes, than the near to markets and production facilities	Schwaag (2006); INSEAD et al. (2006); Thursby & Thursby (2006)
		61.-Your OBM attracting technology sourcing mainly, in locating the R&D activities outside the home country, and the geographic dispersion a means of knowledge creation rather than knowledge diffusion	Kuemmerle (1997); Dunning & Narula (1995);
		62.-Your OBM attracting the share of codified information and co-ordination of activities among different parties because is easier for innovations that can be pursued independently (autonomus innovation).	Chesbrough & Teece (2002)
		63.-Your OBM making activities to have benefits only realized in conjunction with complementary innovations,.Your product lifecycle is long. Less attractive	
	(8) CST		64.-Your OBM minimizes your cost through: cost-driven
		65.-Your OBM minimizes your cost through: value-driven	
		66.-Your OBM minimizes your cost through: fixed costs	
		67.-Your OBM minimizes your cost through: variable costs,	
		68.-Your OBM minimizes your cost through: economies of scale	



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	(9) PTS	69.-Your OBM minimizes your cost through:, economies of scope	(2012)	
		70.-Your OBM seeking partners to support: optimization and economy of scale global industries results, powerful standards and dominant designs. (Globalisation)	Osterwalder & Pigneur, (2010); OECD (2008); Gassman (2006)	
		71.-Your OBM seeking partners to support: reduction of risk and uncertainty, and acquisition of particular resources and activities	OECD (2008b); Osterwalder & Pigneur, (2010);	
		72.-Your OBM seeking partners to support: new developments in and around their industry owing is based on an industry characterized by rather short technology life cycles	Cook (2005); Gassman et al. (2010);	
		73.- Your OBM seeking external partners (suppliers, customers, universities, etc.) even in a cross countries, in an innovation ecosystem.	Etzkowitz & Leydesdorff, (1995); OECD (2008); Miller et al. (2016); Beckman et al. (2004);	
		74.-Your OBM seeking the relation amongst: University-Industry-Government (the triple helix) because the collaborative innovation activities stimulates innovation; even more you're considering the social aspect (quadruple helix) benefits		
	75.-Your OBM seeking use venturing to find external partners for commercialising innovations that are not used internally (divestment, spin-out, spin-off)			
	(10) POBM	76.-YourOBM takes decisions about the measure of remarkable improvement and performance of the OBM	Parmenter (2010); Lichtenthaler (2015); Chien-Tzu & Wan Fen (2014)	
	(2) STR	(11) SOBM	77.-Your OBM is designed on Efficiency-Centric Open Business Model ; hence you pose Market-Based Innovation Strategies)	Saebi & Foss (2013); Hopkins et al. (2011)
			78.-Your OBM is designed on User-Centric Open Business Model; hence you pose Crowd-Based Innovation Strategies	
79.-Your OBM is designed on Collaborative Open Business Model; hence you pose Collaborative Innovation Strategies.				
80.-Your OBM is designed on Open Platform Business Model; hence you pose Network-Based Innovation Strategies				
(12) SIPR		81.-Your strategy to do IPR protection registration is due: preventing copy	Cohen et al. (2002); Asakawa et al. (2010)	
		82.-Your strategy to do IPR protection registration is due: preventing other companies from patenting (e.g. prevent blocking)		
		83.-Your strategy to do IPR registration is due: prevent lawsuits		
		84.-Your strategy to do a IPR protection registration is due: to use for negotiations		
		85.- Your strategy to do a IPR registration is due: the enhance of reputation		
		86.- Your strategy to do a IPRregistration is due: to generate licensing revenue		
		87.- Your strategy to do IPR protection registration is due: to measure the performance		
(13) PSTR		88.- Your strategy to do IPR protection registration is due: to get competitive advantage	Rohrbeck,et al. (2009.)	
		89.-Your strategy to protect your IPR is based entirely by the industrial trade secrecy	OECD (2008)	
(3) TEC	(14) TECM	90.-You take decisions about the measure of remarkable improvement and performance of the STR	Parmenter (2010); Lichtenthaler (2015); Chien-Tzu & Wan Fen (2014)	
		91.-Your OBM is implementing internal technology for your current market	Chesbrough (2006); Lichtenthaler & Holger 2009.	
		92.-Your OBM is implementing internal technology for the new markets		
		93.-Your OBM is implementing internal technology for other Firm's market		
		94.-Your OBM is implementing internal/external venture handling technology to your current market		
		95.-Your OBM is implementing internal/external venture handling technology to the new markets		
		96.-Your OBM is implementing internal/external venture handling technology to the other Firm's Market		
		97.-Your OBM is implementing external technology insourcing to your current market		
		98.-Your OBM is implementing external technology insourcing to the new markets		
		99.-Your OBM is implementing external technology insourcing to the other Firm's		

		market	Chesbrough,& Kardon –Crowter, (2006)
		100.-Your OBM is implementing external technology for your current market	
		101.-Your OBM is implementing external technology for the new markets	
		102.-Your OBM is implementing external technology for other Firm´s market	
	(15) TECP	103.-Your OBM is on permanent looking for external technology to bring to the company	
		104.-Your OBM is on permanent surveillance for IPR of other technologies	
		105.-Your OBM is implementing technology opportunistically	
		106.-Your OBM is implementing technology in formal and systematic way.	
		107.-Your OBM is implementing alternative technologies	
		108.-Your OBM is implementing technologies with enough incentives	
		109.-Your OBM is implementing technologies to address an incremental product improvement	
		110.-Your OBM is implementing more proven technologies than new ones	
		111.-Your OBM is implementing more proven technologies more than trying to develop entirely new	
		112.-Your OBM is implementing external technologies because they represent more benefits	
113.-Your OBM is implementing internal technologies because they represent more benefits			
(16) PTEC	114.-Your OBM takes decisions about the measure of remarkable improvement and performance of the TEC	Parmenter (2010); Lichtenthaler (2015); Chien-Tzu & Wan Fen (2014)	
(4) NWE	(17) IPR	115.-Your OBM produce a remarkable number of registration of new patents in the last year	Chesbrough (2003 (OECD, 2008)
		116.- Your OBM a remarkable number of registration of new trademarks in the last year	
		117.- Your OBM a remarkable number of registration of new copyrights in the last year	
	(18) LST	118.-Your OBM has got <i>spin in</i> as: an investment in technology <i>start-ups</i> (e.g. university <i>spin off's</i> )	OECD (2008); Trimi Berbegal-Mirabent (2012)
		119.-Your OBM has got <i>spin out</i> as: divesting internally developed technologies relates to the <i>inside-out</i> aspect of open innovation	
		120.-Your OBM has got <i>spin off</i> as: the company no longer maintains a stake in the project/company.	
(19) PNWE	121.-Your OBM takes decisions about the measure of remarkable improvement and performance of the NEW	Parmenter (2010); Lichtenthaler (2015); Chien-Tzu & Wan Fen (2014)	
(5) OIO	(20) ORBM	122.-Your OBM is oriented more in knowledge exploration for innovation	Chien-Tzu & Wan Fen (2014)
		123.-Your OBM is oriented more in knowledge exploitation for innovation	
		124.-Your OBM in open innovation mode is based on: purchase of technology	
		125.-Your OBM in open innovation mode is based on: joint venturing and alliances	
		126.-Your OBM in open innovation mode is based on: joint development	
		127.-Your OBM in open innovation mode is based on: contract R&D	
		128.-Your OBM in open innovation mode is based on: licensing	
		129.-Your OBM in open innovation mode is based on: collaborations with universities	
		130.-Your OBM in open innovation mode is based on: equity in university spin off's	
		131.-Your OBM in open innovation mode is based on: equity in venture capital investment funds	
	132.-Your OBM in open innovation mode is based on: purchase of technology		
	(21) GOV	133.-You take decisions about the measure of remarkable improvement and performance of the GOV	EIRMA (2003); OECD(2008)
		134.-Your OBM recognizes the need to have written rules to exchange the information in the innovation ecosystem	
135.-Your OBM participates in the election of central governance system			
	136.-Your OBM participates in the development of operating procedures, that include	Deloitte (2015);	

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		standards for collecting, storing, and sharing data	
		137.-The practice of your OBM marketing policies is according the expectations, perceptions and evaluations of the society	Svensson, G., Wood, G. (2008).
		138.-The practice of your OBM marketing policies is on permanent surveillance to match with expectations, perceptions and evaluations of the society	
(22) POIO		139.-Your OBM takes decisions about the measure of remarkable improvement and performance of the GOV	Parmenter (2010); Lichtenthaler (2015); Chien-Tzu & Wan Fen (2014)

**Source:** Several authors with own adaption.

**Note:** BMG. Business management;MKS.Market segmentation; VPR. Value proposition ; CRM.Customer relationship management; PTF.Platform-Channels.; RIPR.Revenues per IPR; KR.Key resources; KA.Key activities; PTS. Partnership.; CST.Cost structure; PBMG. Performance BMG; STR. Strategy;SOBM.Strategy on OBM; SIPR.Strategy on IPR; PSTR. Performance STR; TEC. Technology; TECM.Technology based on market;TECP. Technology based on politics of the firm; PTEC. Performance TEC; NWE.New entrepreneurship; IPR.Intellectual property rights; LST.-Lean start-up; PNWE. Performance NWE; OIO. Open Innovation Orientation; ORBM.Orientation of OBM; GOV.Governance; POIO. Performance OIO.

## Appendix 2

### Glossary

Abbreviation	Meaning
AHP	Analytic hierarchy process
BM	Business Model
BMG	Business management
CRM	Customer Relationship Management
CST	Cost structure
GQ	General question
GOV	Governance
IT	Information Technologies
IPR	Intellectual property rights
ITSMZG	The information technologies sector of metropolitan zone of Guadalajara
KYA	Key activities
KYR	Key resources
LST	Lean start-up
MKS	Market segmentation
NEW	New entrepreneurship
OBM	Open Business Model
OIN	Open innovation
OIO	Open innovation orientation
ORBM	Orientation of OBM
PBMG	Performance of BMG
PNWE	Performance of NEW
POIO	Performance of OIO
PSTR	Performance of STR
PTF	Platform-Channels
PTS	Partnership
RIPR	Revenues per IPR
SEM	Structural equations modeling
SIPR	Strategy on IPR
SOBM	Strategy on OBM
SQn	Specific question (number)
STR	Strategy
TEC	Technology
TECM	Technology based on market
TECP	Tecnology based on policies of the firm
VPR	Value proposition

**Source:** Own.