This is the author's version of a work that was published in the following source:

Mateu, Jose M. and March-Chorda, Isidre. **Searching for better business models assessment methods.** Management Decision. Vol. 54 Iss 10 pp. 2433 - 2446

ABSTRACT:

Purpose.- The aim of this paper is to provide a more useful business models assessment method than the traditional intuitive one. The paper also compares both methods, in order to display what does the intuitive assessment method really assess.

Design/methodology/approach.- An experimental approach allows us to generate a set of business models, in order to assess them and to compare the assessments in a quantitative manner.

Findings.- Our work proposes a scale for ex-ante business models assessment consisting on eight indicators. This provides an *ex-ante* assessment that takes into consideration a wider range of factors than the traditional intuitive assessment. The comparison between both methods shows which factors are intuitively taken into account and which are not.

Research limitations/implications.- Our research contributes to expand the business model creation framework.

Practical implications.- A more accurate assessment will show the most promising business models, that will result in higher chances of success of new business ventures.

Social implications.- As companies and entrepreneurs hardly have the possibility to implement more than one business model, to choose the best option becomes essential. This election could mark the threshold between success and failure, between wealth creation and destruction.

Originality/Value.- Little research has been conducted in a field that might be really fruitful, the field of business model *ex-ante* assessment. Our work faces the challenge using an experimental methodology that allows to broaden the range of situations to study.

KEYWORDS:

Innovation; Business model; Business model innovation; Business model assessment; Intuitive assessment

ARTICLE CLASSIFICATION:

Research paper

1. Introduction

New business models explain the success of a great number of internationally well known companies. These successes go beyond companies' limits, producing a generation of new markets (Dew *et al.* 2011), leading to the creation of new industries (Teece 2010), or both. We believe business model innovation can do this because, in fact, this has already happened in some markets and industries. "Business Model Innovations have reshaped entire industries and redistributed billions of dollars of value". ((Johnson *et al.* 2008), page 52).

Expectations are even greater: "... a company has at least as much value to gain from developing an innovative new business model as from developing an innovative new technology". ((Chesbrough 2010), page 356). Business model then becomes an essential part of the strategy followed by the company in order to reach sustainable competitive advantage. (Casadesus-Masanell and Enric Ricart 2010), and the ability to generate new business models, to choose the best ones and implement them in a new or old organization becomes a real dynamic capability (Teece *et al.* 1997).

Despite the benefits that can be achieved from business model innovation, and the expectations around it, little research has been conducted in order to improve business model generation methods, and even less research has been conducted to define a method to choose the most promising business models from among the previously generated models. As the new or old company hardly has the possibility to implement more than one business model, this choice is essential.

The first objective of our work points out the gap in the business model evaluation field, defining a scale for *ex-ante* business models assessment. This scale takes into account a comprehensive set of decision criteria.

This scale is then used to go forward to a second objective, meaning, the analysis of the factors that are present in the, too often, purely intuitive assessment of business models. We try here to describe this kind of assessment, finding what criteria have a weight in it and what criteria are overlooked in it.

To go forward in these kind of subjects has not only a descriptive utility, but also a prescriptive one. It may help as a prescriptive guide for practitioners, giving recommendations to improve their cognitive processes and their procedures for decision making in the business models arena.

The rest of this paper is organised as follows. We include next a short literature review on the business model evaluation field. It is short because of the lack of referents in the field. Among these few referents we highlight David J. Teece's contributions (Teece 2010), that we take as a base for our scale, that is then presented. We go then to the empirical part of this communication paper that begins with the presentation of the experimental methodology and continues with the research results. This work finishes with some concluding remarks and comments about the limitations of this study and possible future developments.

2. Business model *ex-ante* assessment literature review

The usefulness of a business model can be seen *ex-post*, when it has been implemented and the consequences of this implementation have been uncovered. We can then determine if the business model implemented by the company has been successful or not, according to the profits obtained by the company or similar performance measures.

Ex-post assessment methods have two evident methodological limitations. First, they can only be applied to really well-implemented business models. As a consequence, we will never have an ex-post assessment of non-implemented business models. On the other hand, ex-post assessment can only be obtained years after the implementation itself, when the implications of the so-called implementation have already happened and been registered.

In any case, what we are interested in is in assessment methods that are able to assess theoretical business models before implementing them (*ex-ante* methods) or, in other words, assessment methods that we can use in order to choose the most promising business models.

Few authors have proposed ex-ante assessment methods until now. Amit and Zott propose an ex-ante assessment method consisting on four indicators that measure model efficiency, complementarities, lock-in (barriers to supply change for the customer) and novelty (Amit and Zott 2001). Their initials are combined to form the acronym NICE.

Brettel et al. compare two of the Amit and Zott business models indicators (efficiency and novelty) with the performance in a sample of 234 technology intensive small and medium companies. These authors find a positive correlation between both indicators and company performance. This performance is measured in terms of profitability and growth (Brettel *et al.* 2012). Performance measurement is based on the interviewee perspective, and is related to the last three-years period. The study found out a positive relationship between both indicators and performance measures.

David J. Teece proposes a set of questions that may be useful as a point of departure when assessing *ex-ante provisional* business models (Teece 2010). His list is more comprehensive than Amit and Zott's one, and includes in its summary the following items:

- How does the product or service bring utility to the consumer? How is it likely to be used? Are all the necessary complements available?
- What do customers really value and how will the firm value proposal satisfy their needs? How much may the customer pay for receiving this value?
- How large is the market? Is the product/service honed to support a mass market?
- Are there alternative offers in the market? How is our offer in comparison to theirs?
- Has the business model got the contractual structures required for executing value-creating activities?
- What will be the cost of providing the product/service? How will these costs behave as volume and other factors change?

- What is the nature of the appropriability regime? How can imitators be held at bay?

The answers to these questions are transferred into practice throughout business model *ex-ante* assessment, which is an estimate of its potential. In order to make these questions manageable it is necessary to make them specific and objective too, and also to define the range of possible values in the scale.

3. Definition of a scale for business models *ex-ante* assessment

In order to turn the previous set of questions into a manageable scale it is necessary to define the range of possible answers. We have chosen a five-point Likert scale in order to achieve this.

The following presentation of each question includes the question itself but also other relevant information to help in the assessment, such as the description of the extremes of the scale (business models rated with 1 and 5), as well as examples of well-known models and their ratings.

We show below the details for each of the questions included in the scale, and after this, some comments regarding its usefulness and nature.

3.1. Value creation condition (Indicator 1)

The first indicator of our ex-ante assessment scale tries to quantify the value that the value proposition of the business model will bring to the targeted customer.

How will the product or service bring utility to the consumer? How is it likely to be used? Are all the necessary complements available?

The adult spectators of the Cirque du Soleil, for instance, leave the tent excited and shocked by what they have seen. But value creation is not only related to excellence. Many Southwest and Ryanair passengers are also excited to be able to travel frequently thanks to the cheap prices of these airlines.

Other value propositions are not able to provoke their customers in the same way, but they also generate important savings and satisfactory products for them. We can think about companies like Dell, IKEA or McDonald's, for example.

In the lower extreme we find business models that are not able to stimulate the customers to whom they are targeting to. An example to illustrate this idea can be VoicePod, a device designed for digital recording and for sending voice messages as an attachment in e-mails. Another example of temporary and quite insignificant value contribution are gastronomic trends, those restaurants that obtain customers because of the novelty but are not able to transform these customers into loyal ones.

So, the first question of the assessment questionnaire is this one:

1.- How would the value proposition bring utility to the customer? To what extent?

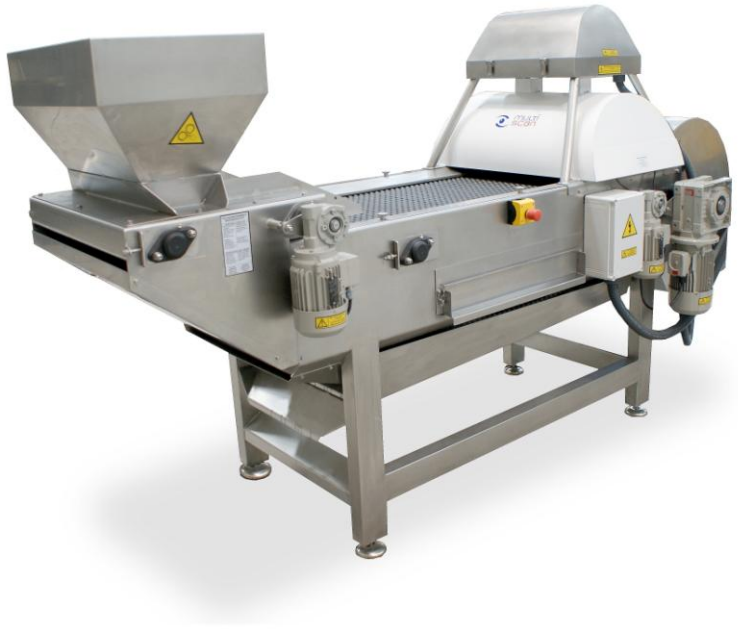
The new Business Model wouldn't add value or differentiation compared to existing options				The new Business Model would add important advantages for the potential customer, either huge savings in effort and money or real and exciting benefits
←1	**2**	**3**	**4**	**5→**
	A new fashion restaurant	Dell	IKEA, McDonald's	Southwest, Cirque du Soleil

3.2. Complete value proposition condition (Indicator 2)

Many of the business models do not need to implement important adaptations. When IBM introduced the possibility to hire their computers it did not require complementary technologies or services to do so. It was only a question of money to finance the new scheme.

A different case is the product offered by the Spanish company Multiscan Technologies. Other entrepreneurs saw the opportunity of using an artificial vision for quality control of agricultural products but the software, the hardware and the scanner they offered did not constitute a complete product. Multiscan Technologies' staff were able to add partners to the project in order to add a hopper, a conveyor belt and some mechanical blowers in a complete solution.

Figure 1.- Product offered by Multiscan Technologies



The worst case is when the product requires adaptations in the regulatory system, which are completely out of the company's scope, or when it requires the collaboration of organizations that are not open to innovations.

So, the second question of the assessment questionnaire is this one:

2.- Are all the necessary complements already available? If not, can we obtain those complements or develop them conveniently and at a reasonable price?

The new Business Model requires legal development which for the entrepreneur is out of reach				The new Business Model includes a complete solution and doesn't require any change, or the required changes are really understandable by the potential customers
←1	2	3	4	5→
	The BM requires expensive changes for both the entrepreneur and the customer	The BM requires technological changes that the entrepreneur does not control	The BM requires technological changes but these are available to the entrepreneur	

3.3. The sufficient size of the market condition (Indicator 3)

Southwest's vision was not to steal customers from its competitors but to expand the air transport market by attracting passengers from other means of transport, such as people who travel by car, by bus or by train. The market of coffee drinkers is also numerous (Nespresso). In any case, the size of the market should not only be estimated by its number of potential customers, but also by their wallet share which our business model is able to catch. Repetitive purchasing can change the attractiveness of a market. It would be the case of Nespresso and, in general, the case of markets that can be approached by *razor and blades* business models. Repetitive purchasing could be the unique driver for personnel service markets. The target of the gyms chain Curves are women. Its prices are cheap but, relaying on the loyalty of their customers, it has built a profitable business. Throughout monthly fees, they can sum up a great amount of money.

Then, the third question of the assessment questionnaire is this one:

3.- How large is the market in terms of both customer volume and purchasing power?

The market is very small (only local, with very few customers, very few purchases by each customer and/or in small amounts)				There is a massive market, with a huge volume of potential customers that spend a lot of money in this kind of products or services
←1	**2**	**3**	**4**	**5→**
	Limited markets with a low level of repetitive purchases	Markets with numerous customers but with small purchases or a low level of repetitive purchases	Not massive but attractive market because of repetitive or big purchases	

3.4. The access to the potential customer condition (Indicator 4)

Many customers thanked IBM for the possibility of renting computers. Orders grew significantly.

Changes in Southwest's model involved its internal procedures and, at most, its suppliers and partners. Customers were not affected by these changes. They only perceived benefits. Although, it is true that Easyjet's customers took longer than it was expected to buy the cheap tickets offered by the company. In any case, inconveniences for the customers like remote airports or less legroom, did not discourage the purchase of tickets by low-cost airlines' customers.

Multilateral platform models (such as Google Adwords) are not always so intuitive, and this requires a special effort in order to guide customers.

The beginning phase was more difficult for the Valencian company ABC Eutelcom. Its remote teaching system used Satellite Internet to broadcast interactive live classes. Customers needed to complement their computers with a satellite card and a dish antenna. This fact discouraged potential customers, even those that found a great value in the system's performance.

Another example is Customer Relationship Management Systems (CRM Systems). Their adoption has found a strong resistance from their potential users (companies' sales department staff). It has only been possible after significant investment both in terms of time and money for explanations and incentives made by the companies' management staff.

So, the forth question of the assessment questionnaire is this one:

4.- How difficult will it be to explain the benefits of the value proposition to the potential customers?

The new Business Model entails a radical change in the way in which customers do things. The value for them is not obvious				The new Business Model value for the customer is obvious and doesn't require any kind of explanation, additional costs or effort
←1	**2**	**3**	**4**	**5→**
Remote teaching system by ABC Eutelcom	CRM systems	Multilateral platforms as Google Adwords	Southwest	IBM renting scheme

3.5. Predisposition to make efforts condition (Indicator 5)

Southwest's customers are not worried about the price, as it is much lower than the value they perceive. Starbucks' customers are also ready to pay its prices, although they are not cheap at all. They are small in comparison to their customers total budget.

IKEA customers must make a higher level of effort. Prices are also low, but they must be ready to make more effort when carrying out physical activities (taking and assembling furniture at home).

Low predisposition to make additional efforts can be also found in industrial companies. The investment required to buy a solution as the one provided by Multiscan Technologies is important, and can delay the purchase decision. This low predisposition to change equipment can be encouraged when the customer has recently changed. An example is Cretaprint, a company from Castellón (Spain) which provides inkjet printers designed for ceramic products. Its technology improves its predecessors, but their potential customers have recently changed to these predecessor technologies and need time to recover from this previous investment.

Offering Internet services for free has become very popular. This makes difficult to take profits from *freemium* business models (information and media services are good examples).

So, the fifth question of the assessment questionnaire is this one:

5.- Would the potential customers be ready to pay the price and make the effort the new business model requires?

Potential customers are very reluctant to pay for the kind of services the new business model offers, or they are not ready to make the necessary effort				Potential customers will be ready to pay and make the effort the business model demands
←1	**2**	**3**	**4**	**5→**
Usually free services on the Internet	New solutions for industrial companies that have invested huge amounts of money on previous technology	Offers that imply a huge investment (Multiscan)	Customers must make relevant efforts (IKEA)	Limited efforts and slow prices (Southwest, Starbucks)

3.6. Affordable costs condition (Indicator 6)

Multilateral platform models, like Google Adwords, delegate most part of the work on customers. So, their marginal costs are close to zero. On the other size of the scale we find personnel services, where economies of scales play a very small role. Let's think about a barber shop. More customers will allow to share premises renting costs and to get a better price from suppliers for shampoo and other products

too, but staff cost is not going to decrease significantly. The time required to smarten up two customers is twice as long as the time required to smart up only one customer.

Nevertheless, women's gyms, as Curves, would probably obtain more economies of scale than men's gyms. Women prefer less demanding sport activities in terms of space and fitness equipment.

Economies of scale can also be important in other services. For instance, we can think in Cirque du Soleil. The tent can be widen to accommodate more customers. The main cost (staff wages) remains the same.

So, the sixth question of the assessment questionnaire is this one:

6.- Will it be costly for us to offer the value proposition?, or, on the contrary, will it give us an attractive margin?

The new Business Model doesn't include mechanisms that reduce the unit costs (like economies of scale) or network effects that can function as a growth engine				The new Business Model includes mechanisms, like economies of scale or network effects, that reduce the costs, give attractive margins and can function as a growth engine
←1	**2**	**3**	**4**	**5→**
Services with a high component of personal attention	Economies of scale but only available at corporative level or similar (Starbucks)	Economies of scale on distribution or manufacturing (Dell)	Strong economies of scale or self service in key tasks (Cirque du Soleil, IKEA)	Very reduced costs because of its high digitalisation and total self-service (Google Adwords)

3.7. Superiority over competitors condition (Indicator 7)

Cirque du Soleil faced wick competitors. Adult customers of these competitors went to their tents in order to satisfy children's demands but did not come out satisfied at all.

On the other extreme we find the irruption of new competitors in mature and highly competitive markets, especially when the new entrant has not got a clear competitive advantage.

The market where Dell did its entrance was dominated by powerful global competitors (Compaq, HP), local competitors (Inves in Spain), as well as by handcraft assemblers. There was also a dense network of distributors. Dell may be considered as an intermediate case, because of the competitive advantage given by its new business model and its strengths, comparable to those of its competitors.

So, the seventh question of the assessment questionnaire is this one:

7.- Are there many alternative value propositions competing for the same customers? How valuable are those alternative options? How strong are those competitors?

There are several strong competitors whose Business Models are similar or better than ours.				There are few and weak competitors and our Business Model is clearly superior than theirs
←1	**2**	**3**	**4**	**5→**
The market is mature and has numerous and strong competitors	The market is mature and there are competitors who are stronger than us, although we show a relative differentiation (Starbucks)	The market is mature, there are strong competitors, and we show a markedly relative differentiation (Dell)	We can compete with a definitely relative superiority (IKEA)	The competition doesn't exist or it is very weak (Cirque du Soleil)

3.8. Entry barriers existence condition (Indicator 8)

Google Adwords' initial strength was the superiority of Google as a search engine. As far as this superiority as been tempered, Adwords' competitors are gaining advantage. In any case, network effects hinder competitors' progress, because these competitors don't have Google's size.

The strongest entry barriers are patents and other legal tools for avoiding illegal copying. Regrettably, these tools are not really useful in business model protection against copying. They can protect specific elements of the business models, but not the business model itself.

Business models that must be placed on the left side of the scale are more common, because of their easy replication and their difficult protection against copying. Only marketing tools, like building a branch, can be used in these cases for protection against copying. This is, generally, a weak form of protection.

So, finally, the eighth question of the assessment questionnaire is this one:

8.- Does the new Business Model provide a mechanism to hold the imitators at bay?

The new Business Model can't be protected from copying, and there is no mechanism to discourage competitors from replicating the model				The new Business Model has legal protection mechanisms (patents for core elements or others), or requires resources and capabilities which are hard to obtain for competitors
←1	**2**	**3**	**4**	**5→**
The new BM is very easy to replicate	The new BM is very easy to replicate and can only be protected by marketing tools (Starbucks)	The new BM is hard to replicate because it requires an important volume of investment (Dell)	The new BM is protected by network effects or similar mechanisms that help the first mover (Google Adwords)	Legal protection (patents).

4. Research methodology

4.1. Experimentation in business model innovation field

The majority of research methodologies try to analyze real social phenomena, in order to deduct or infer knowledge. Thus, they study situations that happened in the past or are happening now. These situations, whatever they are, cannot be changed according to researchers requirements. These methodologies compel researchers to be simple observers of the past and the present times. They make more difficult the process of obtaining knowledge about phenomena and change as time goes by.

When what we are trying to understand is not the reality, but how reality shapes our future, our attitude needs to be more *interpretiviste*. To know about a specific situation is not enough. We need a wider range of situations. If they are not real, they should at least be possible. This is the contribution of the experimental methodologies.

Scientific experiment gives the opportunity to choose and fix certain parameters, in order to avoid the influence of the above mentioned parameters. This allows the opportunity to observe a greater number of cases. The result is that, using experimentation, we can study things that would be difficult to study with other methodologies.

Experimentation has been used very little in our field, but this is changing recently. In any case, there is an increasing trend to use this methodology, and quite a few research works use it (Ward *et al.* 2004, Girotra *et al.* 2010, Yong *et al.* 2014).

In the specific field of business model innovation, Eppler, Hoffman and Bresciani experiment applying creativity to different conceptual tools in order to generate new business models, and also to compare the results of the collaborative work with each tool (Eppler *et al.* 2011).

They specifically compare three business model generation procedures: a standard method (combining physical objects with sketching), a method specifically conceived for business model generation (based on the Osterwalder and Pigneur's business model canvas (Osterwalder and Pigneur 2010)) and the simple use of a *powerpoint* presentation (as a control condition).

Under their experimentation, groups of experienced managers worked with each procedure for two hours, in search of new business models in the daily newspaper industry. The research compares creativity, collaboration and willingness to adopt the business model that is being generated, all of them measured throughout the participants' perceptions. Findings display significant differences between groups (and procedures).

4.2. Our experimental approach

We organized seven experiments between February and June 2014. These experiments were organized as training workshops, in conjunction with different entities (a university, several professional

organizations and a European Business Innovation Centre). They involved the participation of 77 people (between five and 23 per experiment), with a wide range of professional experience (between zero and 37 years, with an average of 13.6).

Each workshop began with a four-hour class of theoretical and practical training on the subject (business model concept, business model innovation, business model generation methods), and ended with the experiment itself.

The experiment began with the organization of the teams, in which participants with similar levels of experience were grouped together in teams of two to five participants. Experienced teams selected the sector in which they worked whereas teams with no experienced members worked in the 'food delivery industry'. This sector was chosen because its traditional business model is quite intuitive, even for people with little or no experience at all.

Once the teams had been organized, the experiment continued, following this schedule:

- Generation of business models, working into teams (45 minutes)
- Selection of the best model from those generated by the team, preparing the presentation and selecting spokespeople (10 minutes)
- Presentation of each team's best model to the rest of the participants in the experiment (5 minutes per team)
- Presentation of the assessment scale by the authors and filling in of assessment templates by the participants (15 minutes)

Thus, 20 teams were organized (2 to 5 per experiment) that presented 20 different models. Each participant individually assessed each model presented in the course of his or her experiment. Thus, 270 valid assessments were obtained (each participant assessed an average of 3.5 models). Each assessment included intuitive assessment as well as our eight indicators for scale assessment.

Intuitive assessment was carried out before the presentation of our eight indicators scale. For it, the following template was included at the beginning of the assessment questionnaire:

0.- Please grade with 1, 2, 3, 4 or 5 each business model expectations, in terms of possibilities of success, rounding to the chosen number.

The new Business Model would be a total failure				The new Business Model would be a huge success
←1	**2**	**3**	**4**	**5→**

4.3. Data analysis

To compare intuitive assessment basing ourselves on our eight indicators scale assessment we analyze to what extent the first one can be approached with a linear combination of the second's eight

indicators. So, essentially, a multiple linear regression analysis is the appropriate analysis tool. We have got 270 complete observations for analysis. The sample is large enough for using this technique.

Multiple linear regression analysis delivers a constant (B_0) and a set of coefficients or weights (eight B_j, in our case) that approach the observed value of a variable (intuitive assessment in our case) with a linear combination of a set of other variables (the eight indicators of our assessment scale, in our case). If $Ind0_i$ is the observed value (intuitive assessment) and $\underline{Ind0}_i$ is the approach given by the linear combination, the statistic model is as follows:

$$Ind0_i = \underline{Ind0}_i + e_i$$

...where:

$$\underline{Ind0} = B_0 + \sum_{j=1}^{8} (B_j * Indj)$$

In this model, Ind_j are the observed values of the explicative variables (value given by evaluators to the eight indicators of our scale). Constant (B_0) and coefficients or weights (eight B_j) are obtained by minimizing the error (e_i).

In theory, B_j shows the weight we must give to each of the eight indicators in order to obtain the best approach for intuitive assessment. In practice, these weights show the importance that the average evaluator implicitly attaches to each of the eight factors measured by the scale, when he or she performs an intuitive assessment.

5. Results

5.1. Correlation analysis between intuitive assessment and assessment made throughout our eight indicators scale.

Peter M. Senge finds the command of 'mental models' as one of the five disciplines to build learning organizations. These kinds of abilities help organizations to improve their collective goals (Senge 1990). Our work helps to understand the mental model people use for intuitively assessing business models. Our view is that this understanding can improve decision making in this field.

Essentially, the statistic model proposed above allows us to describe people's intuitive assessment behaviour through a set of value drivers.

Table 1 shows a summary of the above mentioned model and regression analysis parameters.

Table 1.- Regression statistics and ANOVA parameters.

R	R^2	Adjusted R^2	Standard error
0.64	0.41	0.39	0.86

	Square sum	Df	Medium square	F	Significance
Regression	126.92	8	15.87	21.61	**0.00**
Residual	182.83	249	0.73		
Total	309.75	257			

Analysis is significant at a significance level of 99%. A 41% of the variance is explained with the model.

Table 2 shows coefficients and goodness of fit statistics.

Table 2.- Regression coefficients

	Non standardized coefficients		Standardized coefficients		
	B	**Standard error**	**Beta**	**T**	**Sign.**
Constant	-0.17	0.27	0.00	-0.62	0.54
Ind. 1	0.35	0.06	0.33	6.14	**0.00**
Ind. 2	0.05	0.05	0.06	1.04	0.30
Ind. 3	0.27	0.06	0.26	4.56	**0.00**
Ind. 4	0.11	0.06	0.11	1.96	0.05
Ind. 5	0.10	0.05	0.11	1.94	0.05
Ind. 6	0.02	0.05	0.02	0.43	0.67
Ind. 7	0.09	0.05	0.10	1.91	0.06
Ind. 8	0.05	0.06	0.05	0.96	0.34

All weights (coefficients) are positive. We will use standardized coefficients, which are independent from the rest of coefficients.

Indicators with higher weights are 1 and 3, with values of 0.33 and 0.26 respectively. Correlation between intuitive assessment and both indicators results significant at a significant level of 99%. The weight for the rest of the indicators is less than 12%.

Let's remember what exactly do indicators 1 and 3 measure:

- Indicator 1: How would the value proposition bring utility to the customer? To what extent? (Value creation condition).
- Indicator 3: How large is the market in terms of both customer volume and purchasing power? (The sufficient size of the market condition).

It is clear that value creation ability as well as the size of the market are relevant factors for business model success, but, is it reasonable to give almost 60% of the weight to these two factors when we choose a business model? Similarly, pay attention to coefficient 6 (having or not having mechanisms up to leverage margin). To what extent should it only receive less than 2% of the total weight?

A practical implication we can draw is that intuitive assessment underrates important factors that had to be regarded when choosing the business model. Think for instance in Indicator 6, which has already been mentioned above, or Indicator 2, weighted with a 6%. When Multiscan Technologies, mentioned in paragraph 3.2, launched its computer vision system for quality control of agricultural foodstuff, there were many start-up companies trying to enter that market. Most of them failed. The most significant difference was not the size of the market, that was the same for all of them, neither how they planned to add value to the customers. The most important difference between Multiscan Technologies business model and its competitors' ones was the ability for assembling a complete solution.

Another implication we can draw is a consequence of the explanations above. It consists in the need to use a more sophisticated scale than a simple intuitive one or, at least, a more complete one. Our eight indicators scale presented here can be a first approach in this direction.

Even if decision makers prefer to follow their instinct, as it is usual between managers, we may suggest completing their instinctive assessment by paying attention to some relevant aspects that are not considered in this kind of assessment.

In any case, a more complete assessment (based on a higher number of criteria) will add more information wealth and this can mean the difference between success and failure.

To find a better weight distribution can lead us to a more accurate business model assessment. This is another interesting research line, but it exceeds the goal of this study.

6. Conclusions

This work has tried to open new paths in a field that shows evident lacks, business model assessment. In order to do this, we have developed an eight-indicators scale that helps decision makers to take more factors into consideration.

Our scale has also been useful to analyze the nature of the intuitive assessment of business models, a method whose use is widespread despite its evident limitations. In fact, even venture capitalists, who could be defined as rational decision-makers, seem to behave as intuitive decision

makers (Zacharakis and Shepherd 2001). In this direction, our work converges and complements other recent attempts to rationalize the choice of most promising start-ups in which to invest by venture capitalist (Afful-Dadzie and Afful-Dadzie 2016), providing a useful tool for assessing the start-up's business model itself.

On the other hand, our research confirms the correlation between intuitive assessment and the assessment performed by our eight indicators scale. Two of the eight indicators have a remarkable weight in the intuitive assessment statistic model. They imply 'value for the customers of the business model', and 'the size of the business model potential market'.

Other factors are in fact relevant for the success of the business model, but an intuitive assessment pays very little attention to them.

These conclusions encourage the use of more complete assessment methods for taking decisions in a field that is extremely relevant, the business model innovation one.

7. Limitations and possible future developments

We understand that this work may stimulate the academic community in a field whose importance is as evident as its current lacks. So, it would be useful to complement this research developing more and better business models assessment tools, as well as contrasting these tools and analysing requirements and other recommendations for their further application. It would be useful, for instance, to know the robustness of the scales against contingent factors related to the evaluators (i.e. their experience), the company, the industry...

Contrasting *ex-ante* methods with *ex-post* methods, would present methodological difficulties and may dramatically increase common knowledge in the field. We see in this research line a clear opportunity for moving this issue to the next level.

On the other hand, our study can be framed under the model proposed by Calvalcante, Kesting and Ulhoi (Cavalcante *et al.* 2011). These authors proposed four types of business model change: creation, extension, revision and termination. We add a nuance for the creation and revision types. It is the ability to generate alternative business models, choosing the most promising by our scale. This perspective can widen the opportunities for building a more comprehensive business model creation framework.

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