



## Data Article

# Dataset for the study of the relationships among business model innovation, open innovation, agility, and export performance



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## ABSTRACT

The data comes from research analyzing the effect of business model innovation on firms' export performance and, also, the role of organizational agility and open innovation as antecedents of business model innovation. The population in this study was comprised by 1518 Spanish exporting manufacturing companies, and the final valid sample included 196 companies. To collect the data, a telephone survey was conducted using a questionnaire designed based on the literature review. PLS was used to assess the reliability and validity of the measures and to test the structural model. The results showed that the measures meet the general criteria commonly accepted by the literature, which makes them suitable for conducting replication studies. Moreover, the data can be used to go further in the study of the relationships between business model innovation and export performance and to clarify the determinants of business model innovation by considering the different dimensions of that variable, to examine some group-specific effects and to test whether some characteristics of the firms in the sample may moderate the relationships between the variables mentioned above. Since business model innovation is crucial in today's turbulent markets, a better understanding of its antecedents and its impact on firms' export performance can help guide managers in their decisions.

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## Specifications Table

Subject	Management Technology and Innovation
Specific subject area	Relationship between business model innovation and export performance and the role of open innovation and firms' agility as antecedents of business model innovation
Type of data	Table, Figure Raw, Analyzed, Filtered
Data collection	A survey was carried out to collect data. A specialized company contacted the companies that comprises the population of the research by telephone, 1,518 Spanish exporting manufacturing companies taken from the SABI database (Iberian Balance Sheet Analysis System). Valid answers were obtained from 196 companies. Respondents were export managers or foreign trade managers. The questionnaire used to collect data was designed based on previous research. The validity and reliability of the measures were verified.
Data source location	City/Town/Region: Southeastern Spain Country: Spain
Data accessibility	Repository name: Mendeley Data Data identification number: Pinera Salmeron, Jose; Sanz Valle, Raquel (2024), "Business model innovation, organizational agility, open innovation and export performance", Mendeley Data, V1, doi: <a href="https://doi.org/10.17632/vz39y8mj4b.2">10.17632/vz39y8mj4b.2</a> Direct URL to data: <a href="https://data.mendeley.com/datasets/vz39y8mj4b/2">https://data.mendeley.com/datasets/vz39y8mj4b/2</a> Instructions for accessing these data: Download "Dataset BML.csv" file from the Mendeley repository to access the raw data and use the "Questionnaire BML.docx" for more details on the questions followed in the survey.

## 1. Value of the Data

- The data are valuable because of the rigorous process followed for their collection. The sample is representative of the population, the variables were measured by using scales validated in previous research, and the tests conducted to verify the reliability and validity of the scales demonstrated that they are appropriate.
- The database allows researchers to study business model innovation, its antecedents, and its effect on export performance more deeply by considering the three dimensions of business model innovation (value offering, value architecture and revenue model) separately. This helps identify which specific changes in the firm's business model can be fostered by organizational agility and open innovation, and which of these changes have a greater impact on the firm's success in its export markets.
- The database includes additional variables, such as the firm's age, size, export experience, export breadth, and whether it is a family or a non-family firm. These variables can be used to partition the data and estimate group-specific effects (for example, between family and non-family firms) or to test the moderating effects of some firm's characteristics on the proposed relationships.
- The data and scales provided can also be used to replicate the study in other regions. The products the companies sell in foreign markets vary depending on their country of origin, so new studies could be particularly useful to understand the effect of business model innovation on export performance. Replicating the study with samples comprised of larger firms could also enrich the conclusions about the relationships proposed.
- Managers could benefit from the results of the studies by using the dataset provided. First, they can achieve a better understanding of how organizational agility (operational and marketing agility) or adopting an open innovation approach can foster business model innovation. Second, findings from new studies using the database can guide managers in the de-

cision of which specific changes to make in their business model to improve their export performance.

- Finally, the dataset can be used for learning purposes in different courses on the PLS-SEM methodology, to demonstrate how to test the measurement and structural models.

## 2. Background

The database was generated to test the impact of business model innovation on export performance and to examine the role of open innovation and organizational agility as antecedents of business model innovation. Fig. 1 shows the model that was examined. Following [1] suggestions, the above-mentioned concepts, and the relationships between them are described below.

Business model innovation, which is conceptualized as implementing significant changes in the key elements of a firm's business model, is increasingly considered as crucial driver of firm performance. Some studies have proved this, but they have focused on firm performance in the domestic's market. Studies examining the impact of business model innovation on firm success in international markets are very scarce, although business model innovation is considered essential for exporting firms [2]. The variable that usually captures success in international markets is export performance, which is the dependent variable in our model. Moreover, the literature has recently expressed the need for further research on the antecedents of business model innovation [3], highlighting organizational agility and open innovation as ways of addressing traditional barriers to business model innovation [4]. Open innovation is based on collaboration with actors outside the company to accelerate innovative results, and organizational agility is a dynamic capability that enables the firm to detect changes in its environment and respond to them quickly. The questions in the survey explore these variables, and the empirical study based on the dataset clarifies the relationships between them and business model innovation, which have been highlighted in the literature but not empirically tested. In summary, the model under consideration is meaningful and relevant.

## 3. Data Description

This article provides a dataset in a similar format to [5,6]. Data were collected between May and June 2020 through a phone survey based on a questionnaire designed for that purpose. This

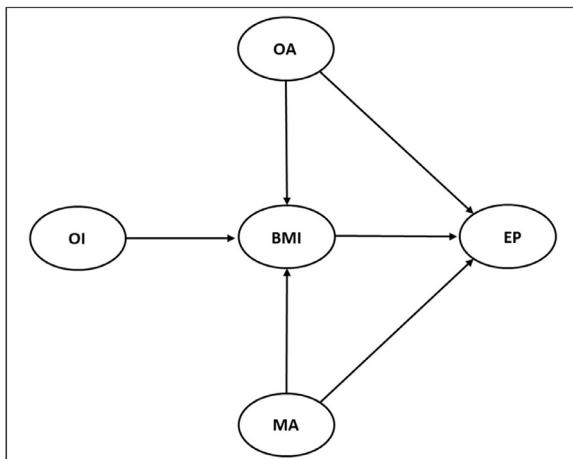
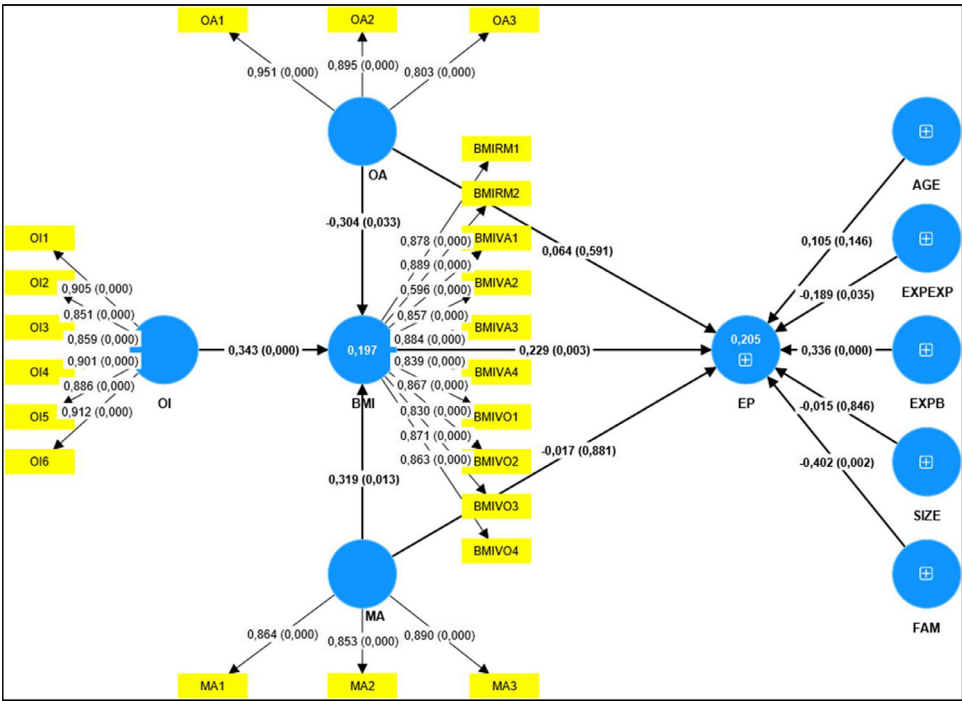


Fig. 1. Research model.

**Table 1**  
Items related to firms' characteristics.

Variables	Questions/Descriptions	Coding
AGE	How many years has your company been operating?	
EXPEXP	How many years has your company been exporting?	
EXPB	How many countries does your company sell to?	
SIZE	How many employees are there in your company?	
FAM	Is your company family-owned (It is considered family-owned if more than 50% of the capital is in the hands of one family.?)	
	• Yes	1
	• No	2



**Fig. 2.** Structural model results.

questionnaire included questions related to the main variables of the study and others related to the general characteristics of the sample. Table 1 shows the wording of the general characteristics questions. As can be seen, they include four continuous variables, firms' age (AGE), export experience (EXPEXP), export breadth (EXPB), and firms' size (SIZE), and one dichotomous variable to measure whether the firms is a family or a non-family firm (FAM). 7-Likert scales were used to measure the main variables of the model. Table 2 shows this information. Open innovation was measured with the six-items scale developed by Hung and Chou [7]. Two types of organizational agility were measured, operational (OA) and market (MA) agility, using two three-items scales based on [8]. Business model innovation (BMI) was measured following [9]. They developed a multi-item scale that includes the three domains that business model innovation is usually considered to comprise: value offering innovation, value architecture innovation, and revenue model innovation. Finally, export performance (EP) was measured with a scale of 5 items adapted from [10].

**Table 2**  
Item wordings multi-items scales.

Variables	Questions/Descriptions	Scales based on	Coding
OI	<b>Open innovation</b> To what extent do you agree with the following statements about your company?	[7]	
OI1	To improve our activity, we regularly look for ideas outside the company		(1-7) Likert
OI2	We often acquire technology or technological know-how (patents, licenses, etc.)		(1-7) Likert
OI3	We often collaborate with external agents in our innovation projects (customers, suppliers, competitors, research centers...)		(1-7) Likert
OI4	We sometimes sell technology or technological know-how (patents, licences, etc.) developed by our company		(1-7) Likert
OI5	We often collaborate in innovation projects of other companies and institutions		(1-7) Likert
OI6	We share our technological know-how with external agents		(1-7) Likert
A	<b>Organizational agility: Operational and market agility</b> Please indicate to what extent you agree with the following statements about your company:	[8]	
	<b>Operational agility</b>		
OA1	We can quickly adjust the level of production to variations in demand.		(1-7) Likert
OA2	When supplier supply failures occur, we are able to make the necessary adjustments so that we are affected as little as possible.		(1-7) Likert
OA3	We can respond quickly to urgent orders or special requests from customers: they rely on our responsiveness.		(1-7) Likert
	<b>Market agility</b>		
MA1	We are able to take swift action in response to market changes.		(1-7) Likert
MA2	We continually seek new ways to better serve the market.		(1-7) Likert
MA3	We see changes in the market as a source of opportunities.		(1-7) Likert
BMI	<b>Business model innovation</b> Please indicate to what extent your company has made changes in the following areas in the last 3 years:	[9]	
	<b>Business model innovation: Value offering innovation</b>		
BMIVO1	Your target audience		(1-7) Likert
BMIVO2	The company's main product or service		(1-7) Likert
BMIVO3	Your market strategy		(1-7) Likert
BMIVO4	The value proposition it makes to its customers		(1-7) Likert
	<b>Business model innovation: Value architecture innovation</b>		
BMIVA1	The main distribution channel		(1-7) Likert
BMIVA2	The internal areas the company considers most strategic		(1-7) Likert
BMIVA3	The type of resources and competencies the company invests most in		(1-7) Likert
BMIVA4	The role its customers, suppliers and other stakeholders play in the company		(1-7) Likert
	<b>Business model innovation: Revenue model</b>		
BMIRM1	The company's main sources of revenue		(1-7) Likert
BMIRM2	The company's cost structure		(1-7) Likert
EP	<b>Export performance</b> Concerning to your sales abroad, please assess the evolution of the following indicators over the last 3 years:	[10]	
EP1	Foreign sales volume		(1-7) Likert
EP2	Weight of foreign sales in total company sales		(1-7) Likert
EP3	Profitability of foreign sales		(1-7) Likert
EP4	Number of countries to which the company sells		(1-7) Likert
EP5	Extent to which the company achieves its sales targets abroad		(1-7) Likert

**Table 3**  
Descriptive statistics of the firms' characteristics variables.

Variables	Questions/Descriptions	Mean	St. Dev.	Skewness (st. error)	Kurtosis (st. error)
AGE	How many years has your company been operating?	32	20.154	2.418	10.692
EXPEXP	How many years has your company been exporting?	21	11.474	0.772	0.708
EXPB	How many countries does your company sells to?	9	12.450	3.699	18.575
SIZE	How many employees are there in your company?	40	20.154	2.418	10.692
		<b>Frequency</b>	<b>Percentage</b>	<b>Skewness (st. error)</b>	<b>Kurtosis (st. error)</b>
FAM	Is your company family-owned (It is considered family-owned if more than 50% of the capital is in the hands of one family)?			0.532	-1.735
	Yes	123	63%		
	No	73	37%		

**Table 4**  
Descriptive statistics of multi-items scales.

Variables	Mean	St. Dev.	Skewness (st. error)	Kurtosis (st. error)
OI				
OI1	4.649	1.244	-1.317	2.078
OI2	4.480	1.264	-0.734	0.896
OI3	4.633	1.273	-1.242	1.666
OI4	4.622	1.306	-1,199	1.401
OI5	4.546	1.368	-1.249	1.198
OI6	4.490	1.391	-1.178	0.980
A				
OA1	5.077	0.958	-0.049	-0.080
OA2	4.964	1.037	0.183	-0.226
OA3	5.189	0.931	-0.080	-0.501
MA1	5.036	0.966	-0.106	0.158
MA2	5.214	1.042	-0.031	-0.118
MA3	4.969	1.020	-0.085	-0.003
BMI				
BMIVO1	4.867	1.461	-1.171	1.141
BMIVO2	4.872	1.277	-1.017	1.242
BMIVO3	4.990	1.225	-1.139	1.703
BMIVO4	4.964	1.243	-1.346	2.616
BMIVA1	5.163	1.188	-1,037	2.221
BMIVA2	5.005	1.323	-1.289	1.826
BMIVA3	4.990	1.317	-1.210	1.703
BMIVA4	4.934	1.290	-1.270	1.986
BMIRM1	5.046	1.353	-1.218	1.861
BMIRM2	4.923	1.301	-1.229	1.672
EP				
EP1	5.062	1.095	-0.459	-0.057
EP2	4.872	1.124	0.059	-0.587
EP3	5.066	1.035	-0.023	-0.575
EP4	5.133	1.108	-0.311	-0.384
EP5	5.143	1.064	-0.186	-0.665

A specialized company carried out the data collection, following the authors' instructions. They contacted the 1518 Spanish exporting manufacturing companies that comprised the population. The respondents were the export managers or, failing that, foreign trade managers, operations managers, or the company CEO. A total of 203 questionnaires were obtained, but 3 were discarded because the companies indicated that they had not exported during the study period, and 4 were removed due to invalid response patterns. Therefore, the final sample of this

**Table 5**

Measurement model assessment results for multi-items scales.

Variables	Loading	Composite reliability (CR)	Average variance extracted (AVE)	Rho_a	Cronbach's $\alpha$
OI		<b>0.956</b>	<b>0.785</b>	<b>0.947</b>	<b>0.945</b>
OI1	0.905				
OI2	0.851				
OI3	0.859				
OI4	0.901				
OI5	0.886				
OI6	0.905				
A		<b>0.913</b>	<b>0.780</b>	<b>1.007</b>	<b>0.881</b>
AO					
OA1	0.951				
OA2	0.896				
OA3	0.795				
AM		<b>0.902</b>	<b>0.755</b>	<b>0.881</b>	<b>0.755</b>
MA1	0.864				
MA2	0.851				
MA3	0.892				
BMI		<b>0.960</b>	<b>0.708</b>	<b>0.963</b>	<b>0.953</b>
BMIVO1	0.867				
BMIVO2	0.830				
BMIVO3	0.871				
BMIVO4	0.863				
BMIVA1	0.597				
BMIVA2	0.857				
BMIVA3	0.884				
BMIVA4	0.839				
BMIRM1	0.878				
BMIRM2	0.889				
EP		<b>0.938</b>	<b>0.753</b>	<b>0.923</b>	<b>0.918</b>
EP1	0.855				
EP2	0.856				
EP3	0.853				
EP4	0.866				
EP5	0.906				

database is made up of 196 industrial exporting companies, which represents a response rate of 12.9%. Tables 3 and 4 include the descriptive statistics (frequency, percentage, skewness, and kurtosis) obtained with s SmartPLS v 3.3.6 software. The average age of the companies in the sample is 32 years, all are SMEs, and more than 60% are family-owned. Their export experience is varied, with an average of 21 years of exporting. The average number of countries to which companies export is 9. A series of analyses was carried out to examine the sample's representativeness. No significant differences between the sample and the population regarding firm's size, profitability, and industry were found.

The partial least squares (PLS) technique was selected to assess the measurement model and test the structural model. SmartPLS v 3.3.6 was used. Given the reflective nature of the scales, a type A modelling was used. Reliability and validity tests were applied to the measurement model. The results are shown in Tables 5 and 6, following the structure proposed by [1]. Table 5 shows the loadings, composite reliability (CR), average variance extracted (AVE), the Dijkstra-Henseler test (Rho\_a), and the Cronbach's alpha. Table 6 presents the Heterotrait-Monotrait Ratio (HTMT), Fornell-Larcker correlations, and the square-root AVE. For all the variables considered, the scales meet the general criteria commonly accepted by the literature, which guarantees reliability and validity [11,12].

After verifying the adequacy of the measurement model, the structural model was tested. Fig. 2 shows the results. They are fully analyzed in [13].

**Table 6**

HTMT criterion, correlations, and square-root AVE.

Variables	OI	OA	MA	BMI	EP
OI	<b>0.886</b>	0.072	0.111	0.402	0.382
OA	-0.045	<b>0.883</b>	0.915	0.102	0.086
MA	0.108	0.756	<b>0.869</b>	0.137	0.085
BMI	0.390	-0.077	0.126	<b>0.841</b>	0.232
EP	0.355	0.057	0.068	0.213	<b>0.868</b>

#### 4. Experimental Design, Materials and Methods

The research began with an exhaustive review of previous theoretical and empirical studies to gain a better understanding of business model innovation and its drivers and impact on company export performance. Based on this revision, a model was proposed that reflects the gaps detected (Fig. 1).

After this, the population and sampling strategy was established. Since the dependent variable is export performance, the sample is comprised of exporting companies, specifically, manufacturing exporting firms from southeastern Spain. The companies in this region are quite similar in size, activity sector, exporting characteristics, and target markets. They are characterized by their strong export orientation. A significant number of these companies compete in the agri-food sector, and their main exporting market is Europe.

Next, based on scales applied in previous research, a questionnaire was designed, and data were collected. Then, as explained before, the measurement model was assessed, and the structural model was tested using SmartPLS v 3.3.6.

#### Limitations

The proposed dataset presents some limitations. Future research must keep in mind that the data are cross-sectional, which does not provide a clear understanding of the causal relationships among the variables. In addition, there was only one respondent to each survey, which can lead to biases. Furthermore, it is important to highlight that the sample came from a specific geographical area, southeastern Spain, which influences both their sectorial composition and foreign markets where they sell their products. Specifically, a significant number of companies belong to the agri-food sector, and the European Union is their main exporting market. This characterization should be considered in the conclusions of any future studies.

#### Ethics Statement

The authors comply with the ethical procedures of the University of Murcia. All the respondents were voluntary, and thoroughly informed of the scope of the research. The authors offered the respondents to have a report on the main conclusions of the study.

#### Data Availability

[Business model innovation, organizational agility, open innovation and export performance \(Original data\)](#) (Mendeley Data).

#### CRedit Author Statement

**José Piñera-Salmerón:** Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft; **Raquel Sanz-Valle:** Conceptualization, Methodology, Data curation, Writing – review & editing, Supervision.



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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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