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# Assessing the Role of Strategic Choice on Organizational Performance by Jacquemin–Berry Entropy Index

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**Abstract:** This paper investigates effects of strategic choice on organizational performance for Romanian family-owned Small and Medium sized Enterprises (SMEs). Using adapted Jacquemin–Berry entropy index for both product and international diversification and using a regression model, our study discusses family involvement as a moderating factor for organizational performance assessment. We discovered that there are multiple interactions between strategic choice and organizational performance while family involvement fails to have a significant role in moderating these interactions.

**Keywords:** entropy index; organizational performance; family involvement; strategic choice

## 1. Introduction

The role of strategic choice in terms of diversification [1] on organizational performance has been extensively researched in the literature [2–5]. However, despite being the subject of many empirical studies, it requires additional empirical tests [6] due to the diversity of results [7] and lack of consensus [6–8].

This paper focuses on Small and Medium sized Enterprises (SMEs) and their increasingly more international strategies [9], seeking to use concepts from various scientific disciplines such as econophysics and finance [10–13], in a similar way with other authors [14,15], to assess organizational performance [16] in connection with diversification as a strategic choice employed by entrepreneurs.

A number of studies argue on the necessity to further investigate not only the diversification–performance relationship but also its moderating factors [17–19]. In line with this, our study aims to analyse the relationship between strategic choice in terms of diversification and organizational performance in a specific context, in our case Romanian SMEs operating in the garments and fabrics industry, while considering a moderating factor, family involvement. By including the family involvement, we seek to assess if the impact of this moderating factor affects strategic choice and eventually organizational performance in family-owned SMEs.

Various scholars argue that family involvement may significantly influence strategic decisions of entrepreneurs [3,7,20–23] toward product diversification [24,25]. Still, there is little knowledge on whether the organizational performance due to diversification varies specifically due to family involvement in SMEs [26,27].

The interest in family involvement is justified by the increasing number and importance of family-owned SMEs in terms of GDP contribution or job creation [28], since such entities are common in the European Union (EU) [29–31]. Specificity of family-owned SMEs such as family members' active involvement in management [7], potential problems due to the conflicts of interest between family

members [32,33] provides an interesting setting to explore the relationship between strategic choice and organizational performance [34].

The context of our study is the Romanian garments and fabrics industry, which is interesting in this case due to constant internationalization strategies implemented by SMEs [35], their role in operating on other markets [35] and their impact on performance [36], in spite of problems determined by quality of resources [37]. Another reason is that in this industry there are many family-owned SMEs.

According to our empirical study, the results show a linear relationship between product diversification and organizational performance and an inverted U-shaped relationship between international diversification and organizational performance. Moreover, family involvement seems to negatively influence organizational performance, our findings showing that family SMEs underperform non-family SMEs when engaging in diversification.

## 2. Theoretical Background and Hypotheses

Scholars have extensively focused on the relationship between product diversification, international diversification and organizational performance considered separately [6,38,39]. However, more studies begin to analyse the effects of both approaches, also [7,40–42].

SMEs choosing diversification as a strategic choice may have better results due to positive effects like achieving synergies or gaining economies of scope. As such, both product and international diversification have a positive impact on organizational performance [43,44]. In spite of these benefits, pursuing simultaneously both types of diversification might also lead to a decrease in performance because product or international diversification may require greater coordination [43] due to differences on local conditions [44].

The proponents of less diversification argue that SMEs have fewer resources than larger companies, so are not best suited for it [45] since it is more difficult to gain economies of scale or experience market-related problems [46,47].

On the other hand, SMEs' organizational flexibility or innovation focus allow them to better develop new products and access new markets [48], aligning their owners' interests with those of the business [48].

### 2.1. Product Diversification and Organizational Performance

Even though product diversification-organizational performance relationship has a dedicated stream of research, a general consensus regarding the theoretical and empirical lacks [2,6,49] with both linear [6,50,51] and inverted-U relationships [6,52–54].

We choose for our paper the linear approach, which states that the level of diversification is linearly and positively related to organizational performance because SMEs are better to exploit market advantages and capitalize on their increased flexibility.

As such, our first hypothesis is:

**Hypothesis 1 (H1).** *In SMEs, product diversification-organizational performance relationship has a linear shape.*

### 2.2. International Diversification and Organizational Performance

In the literature, international diversification as a strategic choice regards expansion across the borders of countries into different markets [55,56]. Since Romania is a member of the European Union, international diversification comes as a natural choice for many entrepreneurs willing to access better markets in terms of prices or number of customers. This is the case for the fabrics and garments industry, which has to cope with fierce competition of low-quality cheap prices from Chinese products. On the other hand, many SMEs use *lohn* as a production system, meaning they manufacture for European retailers.

Level of international diversification is given by the number of different abroad markets in which it operates [7]. For SMEs, the benefits of international diversification include achieving economies of

scale, using location-specific advantages [56], better use of their capabilities [57], accessing markets that are not easily accessible in their originating country [58] or gaining competitive advantages [55].

However, international diversification brings additional threats for SMEs since international diversification may require gaining access and integrating different resources and capabilities [57] while facing an increase in coordination costs [7], which may overshadow economies of scale [59,60].

Again, a consensus on the nature of the relationship between international diversification and organizational performance was not achieved [38,55]. The empirical studies found out a wide array of results, from no relationship [42,61], a positive linear [62,63] and negative linear [64], an inverted U-shaped [55,57,65,66] or an S-shaped [38,58] relationship between the two variables. These conflicting results can be explained by diverse performance measures adopted, and methodological settings [67–69]. In this study, we decided to investigate the inverted U-shape because it is the most common and also fits our opinion of the nature of relationship. According to the U-shaped relationship, the results are visible up to a point where the costs of coordinating various organizational branches exceeds the benefits [55,66,70–72].

As such, our second hypothesis is:

**Hypothesis 2 (H2).** *In SMEs, international diversification-organizational performance relationship has an inverted U-shape.*

### 2.3. Role of Family Involvement on Product Diversification-Organizational Performance Relationship

Although research on family businesses is comprehensive [31,73–75], the moderating role of family involvement in the diversification-organizational performance relationship is controversial [7]. Some scholars argue that family-controlled enterprises tend to be more diversified than non-family ones to reduce financial risks associated with wealth concentration [76], while others strongly oppose [24,26,77], arguing that family businesses engage less in diversification because it threatens familiar socio-emotional wealth, or the specialized assets required represents risks for family control [24]. These conflicting views imply explanations of the phenomenon based on different theoretical approaches and invoke conflicting narratives regarding its antecedents and performance implications [78].

As such, we assume that:

**Hypothesis 3 (H3).** *For SMEs, family involvement positively influences the relationship between product diversification and organizational performance.*

### 2.4. Role of Family Involvement on International Diversification-Performance Relationship

In the literature, there are conflicting theoretical and empirical findings regarding actual effects of international expansion on family business [79]. Some scholars [24] suggest that family enterprises internationalize less than non-family SMEs due to management's desire to retain familial control and ensure socio-emotional wealth [24], avoid international operations due to the costs and complexity associated with managing geographically dispersed operations [80] or due to the lack of professional managers with specialized international skills [78].

Others, [81–83] on the contrary, argue that, due to their access to capital, international orientation for family-owned SMEs is comparable to non-family businesses with similar features or demonstrated the positive effects of family involvement on internationalization [82,84]. Consequently, the impact of family involvement on the international diversification-organizational performance is controversial.

As such, we assume that:

**Hypothesis 4 (H4).** *Family involvement positively influences international diversification-organizational performance relationship.*

### 3. Methods

#### 3.1. Sample and Data Collection

We test the theoretical model by using a sample of Romanian SMEs operating in the fabrics and garments industry. Data concerning the model variables have been extracted from companies' reports available at the Romanian Finance Ministry over a five-year time period (2011–2016).

The initial selection of SMEs was based on 4 criteria:

- (a) *all selected companies have to operate in fabrics and garments as their main activity (at least 50% of their turnover).*
- (b) *all selected companies have to be SMEs.* We consider EU recommendation 2003/361, classifying companies as medium-sized, small and micro (see Table 1).
- (c) *localization.* We wanted to cover all of Romania's development regions (South-East, South, South-West, West, Bucharest-Ilfov, North-East, North-West and Center).
- (d) *family involvement,* where it was the case. To ensure this, two criteria had to be met: the managing entrepreneur has to be a member of the family which owns the company and the entrepreneur and other family members have to own more than 50% of the business in terms of social capital.
- (e) *exports.* To be eligible for the sample, the company has to export its products. We do not set up a limit for exports.

**Table 1.** SMEs classification.

Company Category	Staff Headcount	Turnover
Medium-sized	<250	≤€50 m
Small	<50	≤€10 m
Micro	<10	≤€2 m

Questionnaires were administered to 108 SMEs. In the end, we had 58 valid questionnaires, resulting in a 53.7 response rate. The sample structure is shown in Table 2.

**Table 2.** Sample structure.

Characteristics	Share in the Sample	%
Localization (Development Region)	South-East	12.07%
	South	8.62%
	South-West	1.72%
	West	20.69%
	Bucharest-Ilfov	31.03%
	North-East	5.17%
	North-West	1.72%
	Center	18.97%
SME size (no. employees)	Micro (<10)	31.03%
	Small (10–49)	39.66%
	Medium (50–249)	29.31%
SME age (years from establishment)	Less than 5 years old	24.14%
	5–10 years old	34.48%
	10–15 years old	25.86%
	More than 15 years old	15.52%

### 3.2. Variables

#### 3.2.1. Dependent Variable

In our study, dependent variable was *Organizational performance*. While previous studies have considered diverse measures for it, usually accounting-based and market-based measures [6], we choose a measure of financial performance [7,39,40,85], namely return on sales (RoS) [4,6,47], due to availability and capacity to serve our purpose.

#### 3.2.2. Control Variables

We considered three control variables: *Size*, *Age* and *Localization*. While the first two are common control variables, *Localization* addresses the geographical distribution of SMEs in terms of development regions. Romania has 8 development regions (see Table 2) and we wish to investigate whether the location of headquarters influences results.

#### 3.2.3. Dependent Variables

We considered two explanatory variables, *Product diversification* and *International diversification*.

In order to measure *Product diversification*, we used the Jacquemin–Berry entropy index [86], a well-documented measure for diversification studies. As such, the entropy index takes into consideration two elements of diversification [87]: the number of segments in which a SME operates and the relative importance of each of the segments in the total sales of that SME [7].

According to Palepu [87], the Jacquemin–Berry entropy measure is based on three elements: (1) the number of product segments in which the business operates; (2) the distribution of the business's total sales across the segments; and (3) the degree of relatedness among the various product segments. What distinguishes the Jacquemin–Berry entropy index from other diversification indices is its ability to consider the third element [87]. Because of this, the entropy measure overcomes the limitation of the earlier diversification indices.

For *Product diversification*, the entropy measure of diversification was defined as:

If  $y_j$  are total sales of an SME in a segment  $j$ ,  $j = 1, \dots, m$ ,

Then,

$$\sum y_j = Y \text{ represents the total sales of SME} \quad (1)$$

and

$$p_j = (y_j/Y) \text{ represent the quota of the sales in a segment } j \quad (2)$$

Thus,

$$\text{Product diversification} = \sum_{j=1}^m p_j \ln (1/p_j) \quad (3)$$

As such, the entropy index is null when the SME recorded no product diversification and is equal to  $\ln n$  in case its sales are equally distributed among  $n$  segments.

Using a similar theoretical rationale, *International diversification* was measured by using the same entropy index. As such,

$$\text{International diversification} = \sum_{j=1}^m p_i \ln (1/p_j) \quad (4)$$

where  $m$  represents the number of international markets in which the SME operates and  $p_j$  is the share of its international segment in SME total sales.

This measure takes into account both the number of international markets in which a SME operates and the relative importance of each international market over total sales. The entropy index is null when the SME has no international diversification and is equal to  $\ln n$  in case its sales are equally distributed among  $n$  international markets. Jacquemin–Berry entropy index is extensively used in similar studies [7,88,89].

Finally, in our study moderator variables was considered *Family involvement*. In this case, we encountered some methodological problems since there is a lack of consensus in the literature on the level of ownership that constitutes family influence [90]. Hence, we decided to consider a rather restrictive approach by mixing two criteria: the managing entrepreneur has to be a member of the family which owns the company, which is in line with other studies [7,90] and the entrepreneur and other family members have to own more than 50% of the business, which is well above restrictions from other studies [7,91].

## 4. Analysis and Results

### 4.1. Testing the Variables

First, we tested variables' normality of distributions and examined the skewness and kurtosis. For the hypotheses testing, a fixed-effects panel data regression model was used (see Table 3).

**Table 3.** Correlation coefficients between variables.

1. <i>Organizational performance: RoS</i>	1										
2. <i>Size of SME</i>	0.217 *	1									
3. <i>Age of SME</i>	0.094 *	0.342 *	1								
4. <i>Localization</i>	0.061	−0.066	−0.106	1							
5. <i>Product diversification</i>	0.008	0.104 *	0.013	−0.006	1						
6. <i>Product diversification squared</i>	−0.000	0.034	−0.004	0.000	0.954	1					
7. <i>International diversification</i>	0.250	0.290	0.149	−0.131	0.227	0.211	1				
8. <i>International diversification squared</i>	0.202	0.256	0.131 *	−0.103 *	0.195 *	0.187 *	0.962 *	1			
9. <i>Family involvement</i>	0.093 *	−0.132 *	0.088 *	0.192 *	−0.080 *	−0.088 *	−0.055	−0.067 *	1		
10. <i>Product diversification × Family involvement</i>	0.033	−0.097 *	0.038	0.062 *	0.317 *	0.284 *	0.102 *	0.076 *	0.809 *	1	
11. <i>International diversification × Family involvement</i>	0.087 *	−0.042	0.112 *	0.009	0.099 *	0.067	0.352 *	0.337 *	0.754 *	0.718 *	1

Note: \* Denotes 10 per cent significant correlations.

Variance inflation factors (VIF) and a linear dependency test were used to test for collinearity [92]. Since none of the VIF scores exceed 10, the commonly accepted threshold for indicating a potential problem, these results confirm that multicollinearity is not a problem for the model.

### 4.2. Testing the Hypothesis

First, we tested the control variables and the results show that SMEs' *Size* and *Localization* are positively and significantly related to *Organizational performance*, while *Age* does not influence it. (See Table 4).

**Table 4.** Influence of SMEs' size, age and localization on organizational performance.

Variables	
<i>Size of SME</i>	1.26 ***
<i>Age of SME</i>	0.02
<i>Localization</i>	0.73 *
$\sigma_v$	0.096
$\sigma_\varepsilon$	0.216
P	0.166
Wald $\chi^2$	32.89
Prob > $\chi^2$	0.000
N	58

Note:  $p = p$ -value; \*  $p < 0.10$ ; \*\*\*  $p < 0.001$ ; N = 58.

Then, we further introduced strategic choice represented by *Product diversification* and *International diversification* as well as the moderator variable, *Family involvement* (See Table 5).

**Table 5.** Influence of strategic choice on organizational performance, moderated by family involvement.

Variables	
Size of SME	1.01 ***
Age of SME	−0.01
Localization	0.79 *
<i>Product diversification</i>	2.25
<i>Product diversification squared</i>	2.49
<i>International diversification</i>	4.55 ***
<i>International diversification squared</i>	−7.12 **
<i>Family involvement</i>	2.21 **
$\sigma_v$	0.182
$\sigma_\varepsilon$	0.383
P	0.219
Wald $\chi^2$	83.98
Prob > $\chi^2$	0.000
N	58

Note:  $p = p$ -value ; \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.001$ ; N = 58.

Our first hypothesis was that of H1. *In SMEs, product diversification-organizational performance relationship has a linear shape.* The results show a positive and significant relationship between *Product diversification* and *Organizational performance*; however, *Product diversification squared* has a negative and insignificant influence on *Organizational performance*. As such, the first hypothesis is confirmed, there is a linear relationship between *Product diversification* and *Organisational performance*. This is in line with other similar studies [7,93].

The second hypothesis was that of H2. *In SMEs, international diversification-organizational performance relationship has an inverted U-shape.* Regarding *International diversification*, the results show a positive and significant relationship between it and *Organizational performance*, and a negative and significant relationship between *International diversification squared* and *Organizational performance*. These results confirmed the second hypothesis, as well.

*Family involvement* is positively and significantly related to *Organizational performance*, indicating that SMEs characterized by family involvement are able to perform better than SMEs with no family involvement (See Table 6).

**Table 6.** Differences in organizational performance for family and non-family SMEs.

	Total	Family SME	Non-Family SME	t-Test	Sig.
RoS	2.569	3.693	1.598	−2.324	**
<i>Product diversification</i>	0.283	0.275	0.273	1.944	**
<i>International diversification</i>	0.526	0.323	0.313	1.282	
Number of observations	58	26	32		

Note: Standard deviations in parentheses. \*\*  $p < 0.05$ .

Finally, at the end we added the interaction between variables (See Table 7).

**Table 7.** Influence of strategic choice on organizational performance, moderated by family involvement, with interaction between variables.

Variables	
Size of SME	0.79 **
Age of SME	−0.01
Localization	0.53 *
Product diversification	9.42 *
Product diversification squared	−6.35
International diversification	8.94 ***
International diversification squared	−7.74 **
Family involvement	3.53 ***
<i>Product diversification × Family involvement</i>	−8.33 **
<i>International diversification × Family involvement</i>	−1.09 ***
$\sigma_v$	0.621
$\sigma_\varepsilon$	0.928
P	0.332
Wald $\chi^2$	117.21
Prob > $\chi^2$	0.000
N	58

Note:  $p = p$ -value; \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.001$ ;  $N = 58$ .

Once we introduced the interactions between variables, we tested the last 2 hypotheses.

The third one stated that H3. *For SMEs, family involvement positively influences the relationship between product diversification and organizational performance.* The results showed that *Family involvement* negatively moderates *Organizational performance* on both *Product diversification* and *International diversification*. In fact, the interaction between *Product diversification* and *Family involvement* exerts a negative and statistically significant influence on *Organizational performance*. Hence, this hypothesis is rejected.

Finally, the last hypothesis was H4. *Family involvement positively influences international diversification-organizational performance relationship.* In this case, also, the interaction between *International diversification* and *Family involvement* exerts a negative and statistically significant influence on *Organizational performance*. As such, this hypothesis is rejected, also.

## 5. Discussion and Conclusions

Our study found out a linear relationship between product diversification and performance, in line with similar studies [6,7]. In our opinion, since many SMEs operating in this specific industry have specific assets, this is a rather natural conclusion. Diversification may allow the entrepreneur to exploit these resources that would otherwise prove less effective.

Regarding the effect of international diversification on organizational performance, our study confirms the theoretical assumption discovering an inverted U-shaped relationship. This result is consistent with most management literature on the topic [7,55] and suggests that early efforts to diversify internationally are often positive as they can produce economies of scale.

An interesting conclusion is that family involvement has a significant negative moderating effect on organizational performance, contradicting with results of other studies on the topic [26,94]. In our opinion, reluctance to diversify for family-owned SMEs is motivated by the desire to reduce uncertainties and risks associated with diversification and willingness to protect the socio-emotional benefits of family members. Other scholars argue that this leads family-owned SMEs to minimize HR investments, which is an essential asset for successful diversification [7].

This study contributes to both management theory and practice in several ways.

First, it makes a contribution to entropy literature in terms of using specific entropy index—in our case the Jacquemin–Berry index—to analyse the relationship between strategic choice and organizational performance. Simultaneously, it contributes to the family business literature on strategic choice in family SMEs in terms of diversification pathways [24,25].

Secondly, by providing empirical evidence we extend diversification-organizational performance research by testing it in an unexplored context, and by assessing the role of an interesting moderating factor, family involvement.

Finally, from a pragmatic perspective, we provide useful suggestions for entrepreneurs concerning how to run their business in terms of diversification choices and what are the most appropriate ways to do it.

Despite these contributions, the study has some limitations. First, the results are limited to manufacturing SMEs in a specific context, Romania, and a very specific industry, fabrics and garments. Secondly, the small sample size and the focus on SMEs may reduce generalizability of the results. Thirdly, accessibility in terms of data limitations was a problem. This led us to use only one organizational performance indicator—Return on Sales—instead of several. It also determined that our panel only cover a five-year time period.

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