Statistical analysis of the development of Algerian family-owned SMEs: Application of the independence test

BERRAH Kafia*
Laboratory in Management and Quantitative Techniques (RMTQ)
University of Bejaia, Algeria
kafia.berrah@univ-bejaia.dz

submitted:30/04/2026 Accepted:20/05/2026 published:30/06/2026

Abstract:

This article aims to identify the phenomenon of family-owned SME development in the Algerian context by analysing the factors that influence their development. This study was based on a cross-tabulation analysis (using the independence test). We utilised primarily primary data collected from a sample of Algerian family-owned SMEs.

Our results show that a number of variables significantly affect the development of the family businesses studied. This contribution will help to guide discussions on a more appropriate set of strategies to promote the development of family businesses, which are the essential drivers of economic growth in Algeria.

Keywords: family-SMEs, manager, growth, crossover table, chi-square test, Algeria.

JEL Classification Codes: C1,C2,L2,L25

---

correspondent author *

Introduction:

Through their investments and the total wage bill they represent, SMEs play an important role in many countries in driving economic and social dynamism and development, through the creation of wealth and employment. According to the Organisation for Economic Co-operation and Development (OECD, 2005) : 'SMEs play a vital role in promoting sustainable economic growth and job creation, whilst contributing to the social, cultural and environmental capital of nations'. As such, the development of this type of enterprise is seen as a prerequisite for the success of an economy.

In recent years, Algeria has embarked on a wide-ranging programme to promote small and medium-sized enterprises (SMEs), which has led to a significant boom in private family-run SMEs. These form a vital part of the economic fabric: they are the most common type of business and a key driver of job creation (Ministry of Industry and, Mining;, 2024).

The aim of this study is to examine the factors that may influence the growth of family-owned SMEs in the Algerian context. Through a study conducted on a sample of family-owned SMEs in the agri-food sector of the province of Bejaia, we have sought to identify the factors that explain the growth of these businesses.

The research question that defines the scope of our study is as follows: Which variables have a significant influence on the development of family SMEs in Bejaia ?

The study is therefore divided into two parts. The first part is devoted to a review of the literature on the phenomenon under study, whilst the second part focuses on the analysis of the results (using the independence test) based on a sample of family-run agri-food SMEs, with a view to identifying the factors driving their growth.

Firstly. Literature review and theoretical framework of the study

Although business growth is a long-standing issue, having been the subject of numerous theoretical works such as those by (Penrose, 1959) and (Bienayme, 1973), the debate on the subject remains as relevant as ever.

One can thus identify differences in the theoretical understanding of the phenomenon, the indicators used, the specification of methodologies, and the examination of the factors explaining business growth.

Indeed, business growth is a phenomenon that has attracted the interest of many researchers and has been the subject of numerous studies on indicators used to measure business growth, such as profit, assets, fixed assets, value added, employment and sales. These indicators are the subject of debate regarding their comparability, on the one hand, and their significance, on the other. The choice of an indicator may also depend on the broader objective of the research.

At the same time, (Gibb & Davies, 1990) pointed out that several studies which have sought to understand the phenomenon of firm growth can be classified into different approaches: the neoclassical economic approach, the Penrosian approach to growth, the firm life-cycle development approach, the resource-based approach and the ecological approach…

And each approach classifies the various factors in different ways (Gibb & Davies, 1990). For example, some studies have linked growth to the characteristics of the manager (Woywode & Lessat, 2001), to their education and type of training, as well as to their experience and skills, whilst studies have focused on the personal objectives of the owner-manager (Kolvereid, 1992); (Julien, 2000); (OECD , 2002)

We then come to approaches related to organisational development, which are primarily theoretical and seek to explain growth using various models of developmental stages (Mitra & Pingali , 1999). Studies focusing on resource management include, amongst others, work on the impact of resource availability (Julien, 2000) ; (Mustar, 2001) and the influence of operational and strategic planning on business growth (Julien, 2000) ; other studies, falling under approaches related to the business environment, focus on the constraints and problems associated with growth for a particular sector or examine the impact of industry structure on the growth of SMEs (Calvo & Lorenzo, 2001); (Woywode & Lessat, 2001).

From an empirical perspective, (Kolvereid, 1992) conclude that studies incorporating multiple theoretical approaches are necessary to understand the causes of growth. Furthermore, (Wiklund , Patzelt, & Shepher, 2009) highlight the limitations of approaches that focus on the impact of a single variable and demonstrate that a combined approach provides a better explanation of growth.

(Janssen, 2011) highlighted the clear overlaps between these approaches, noting that focusing on a single factor or using a single approach may limit our understanding of the phenomenon of growth.

Consequently, this research will draw on various elements of these approaches in order to gain a better understanding of the phenomenon of business growth.

Furthermore, business growth is a multifactorial phenomenon in that it results from a combination of factors: personal, organisational, and environmental, social, political and macroeconomic elements. Numerous authors have developed various explanatory models to highlight these factors in explaining business growth (Tarillon, 2014).

In our study, we focused on (Tarillon, 2014) integrative causal model, which comprises three categories of factors:

- firstly, factors linked to the entrepreneur's personal characteristics, which are, moreover, considered central to understanding growth (Lasch, 2005).
- Secondly, factors linked to the characteristics of the firm will also be important in explaining growth.
- Thirdly, factors linked to the characteristics of the firm's economic environment. This choice is dictated mainly by pragmatic considerations relating to our work.

Secondly. Research methodology

To carry out this study, we conducted a questionnaire survey of family-run SMEs in the agri-food sector in the province of Bejaia. The selection of the surveyed firms was based on a non-probability convenience sampling method. We chose to test the explanatory factors of growth using the independence test, applying the theoretical approach of (Tarillon, 2014)causal model across three categories: characteristics related to the entrepreneur, characteristics related to the firm, and those related to its environment.

The measurement tool used to collect the data was a questionnaire survey. This questionnaire comprises several questions of various types, which enable us to identify all the information relating to the growth factors of the family businesses in our sample.

We opted for the non-probability random sampling method. This choice was primarily due to the fact that the sample was selected in such a way as to reduce both the costs and the time required for the survey. The data was then analysed using SPSS software.

With regard to the variables used in our study, the growth of family businesses constitutes the dependent variable. The factors cited in the literature, which appear to be relevant to our study, constitute the explanatory variables.

-The dependent variable : we have chosen to analyse the growth of family businesses using the workforce indicator, measured by the relative change in employment over a five-year period (the most commonly used index in the literature).

-The explanatory variables used : The choice of explanatory variables is based, on the one hand, on the literature review highlighted in previous studies, and, on the other hand, on the information available in the field of research. We present here the list of our explanatory variables: gender, pull and push motivation, the age of the firm, the type of financing, market size, and the degree of competition.

The data were analysed using SPSS software. To test our variables, we made extensive use of the chi-square test for cross-tabulation analysis at a 5% significance level, which enables us to examine the relationship between the study variables.

Thirdly. Analysis and discussion of the results

In the following, we will examine the cross-tabulation statistics for the various variables in pairs, between the dependent variable and each of the independent variables in our study. We used the chi-square test to analyse the cross-tabulations at a significance level of 5%. The aim of these analyses is to provide an overview of the various relationships between the dependent variable and the independent variables in our study.

The table below provides the main results from the SPSS software analysis. It details the variables in our study and the significance (p-value) associated with the chi-squared test.

Table 1: the results of the application

Variables	Chi-squared
Gender	Probability = 0,239
Age of the entrepreneur	Probability = 0,907
Level of education	Probability = 0,562
Experience	Probability = 0,039*
Family origin	Probability = 0,018*
Pull motivations	Probability = 0,03*
Push motivations	Probability = 0,000*
Age of the firm	Probability = 0,004*
Legal form	Probability = 0,842
Bank loan	Probability = 0,024*
Public programs	Probability = 0,011*
National market	Probability = 0,002*
International market	Probability = 0,036*
Intensity of competition	Probability = 0,019*

Note: *indicates a significant variable at the 5% threshold.

Source: Results from the application

Firstly, one of the key findings from our results is that male entrepreneurs account for the largest proportion of growing family businesses, at 56.9%.

The chi-square test (p-value = 0.239) suggests that there is no causal relationship between the entrepreneur's gender and the growth of family businesses.

As for the age of the entrepreneur, 20.8% of growing family businesses are run by managers aged between 30 and 40.

The chi-square result indicates that the age of the owner-manager is not necessarily linked to the growth of the family business (Probability = 0.907).

Entrepreneurs with a secondary school education account for the highest proportion of growing businesses, at 29.2%.

The chi-squared test (p-value = 0.562) indicates that there is no causal relationship between the two variables.

As for entrepreneurial expertise, growth is higher among groups of individuals with prior professional experience, sector-specific experience or entrepreneurial experience, at a rate of 55.6%.

The chi-square probability is 0.039; this result allows us to conclude that there is a causal relationship between the two variables.

With regard to the family entrepreneurial network, 37.5% of growing family businesses are run by entrepreneurs who come from entrepreneurial families.

This is indicated by the fact that the chi-squared test result is significant (chi-squared: p = 0.018). This means that there is a causal relationship between the two variables.

In terms of motivations, 55.6% of growing family businesses are owned by entrepreneurs with 'pull' motivations. The chi-square test shows that the two variables are dependent.

With regard to company size, we find that growth is more common among small family businesses (SFBs), at a rate of 31.9%. For this variable, the chi-square test is not significant; therefore, company size does not influence its growth trajectory.

Furthermore, the growth variable is significantly correlated with the age of the business; the result of the regression analysis (p-value = 0.04) indicates that the age of the business is linked to the growth of the family business.

As for the legal form, the chi-squared test was not significant (probability = 0.842). This result suggests that there is no causal relationship between the two variables.

With regard to the source of funding, more than half (52.8%) of family businesses that experienced growth drew on their own funds when setting up their business. And 34.7% of growing businesses took out bank loans.

The chi-square test is significant (probability = 0.024), indicating that there is a dependent relationship between business growth and financing through bank loans. As for businesses that received public aid, 27.8% of them are currently growing. The Chi-square result is significantly linked to the growth of the family business (Chi-square: probability = 0.011).

In terms of market reach, 43.1% of family businesses experiencing growth sell their products on the domestic market. The chi-square probability is 0.02, which suggests that there is a significant relationship between the domestic market and business growth.

Finally, with regard to the intensity of competition, 52.8% of firms that perceive competition to be intense are experiencing growth. The chi-square test is significant (probability = 0.019). This result leads us to conclude that the two variables are dependent.

Conclusion

The results of our study reveal that the following factors—the entrepreneurial family network, the owner-manager's expertise, motivations for starting the business, the age of the firm, bank loan financing, the domestic market and market intensity—significantly influence the growth of the family businesses in our sample.

Our findings are supported by some previous research (Boukar, 2009), which highlight that development prospects are greater within a firm characterised by these factors.

The implications of our research concern both entrepreneurs and public decision-makers. Our findings will enable entrepreneurs to gain a better understanding of the factors affecting their development and to access useful information that can contribute to better management of their businesses.

These findings may also assist public authorities in defining a development strategy for family-owned SMEs. This strategy focuses on a clear definition of the development factors that these businesses must address. Furthermore, these decision-makers will gain new insights to better guide and coordinate the actions of the various stakeholders involved in promoting family-owned SMEs, with a view to creating greater synergy amongst them.

Références

1. Bienayme, A. (1973). La croissance des entreprises, analyse dynamique des fonctions de la firme. . Bordas.

2. Boukar, H. (2009). Les facteurs de contingence de la croissance des micro et petites entreprises camerounaises. Journal of Management Sciences, 3(237), 75-83.

3. Calvo, J., & Lorenzo, M. (2001). Une caractérisation des entreprises manufacturières espagnoles à forte croissance : 1994-1998. International SME Review, 14(3), 45-66.

4. Gibb , A., & Davies, L. (1990). In Pursuit of Frameworks for the Development of Growth Models of the Small Busines. International Small Business Journal, 9(1), 15-31.

5. Janssen, F. (2002). Les déterminants de la croissance des P.M.E. : analyse théorique et étude empirique auprès d'un échantillon d'entreprises belges. Doctoral thesis, • Frank Janssen (2002) : « Les déterminants de la croissance des P.M.E. : analyse théorique et étud Jean Moulin University, Lyon 3, France.

6. Janssen, F. (2005). La conceptualisation de la croissance: L'emploi et le chiffre d'affaires sont-ils des représentations interchangeables d'un même phénomène? Management 2000, 22(6), 267- 291.

7. Janssen, F. (2011). La croissance de l'entreprise une obligation pour les PME. Bruxelles: Boeck.

8. Julien, P.-A. (2000). Les PME à forte croissance : Les facteurs explicatifs. IXe International Conference in Strategic Management. Montpellier.

9. Kolvereid, L. (1992). Growth aspirations among Norwegian entrepreneurs. Journal of Business Venturing, 209-222.

10. Lasch, F. (2005). Les déterminants de la survie et de la croissance des start-up TIC . Journal of French Management, (2), 37–56.

11. Ministry of Industry and, Mining;. (2024). SME Statistical Information Bulletins. Algerie.

12. Mitra , R., & Pingali , V. (1999). Analysis of growth stages in small firms: a case study of automobile ancillaries in India. Journal of Small Business Management, 37(3)., 62-75.

13. Mustar, P. (2001). Diversité et unité des entreprises à forte croissance du secteur manufacturier en France. International Journal of SMEs, 14(4)., 66–89.

14. NEGRE, C. (1988). la croissance de l'entreprise . French Journal,No 234., 21–25.

15. OECD. (2002). Les PME à forte croissance et l'emploi . OECD, Paris. Récupéré sur http://www.oecd.org/dataoecd/18/29/2493085.pdf.

16. OECD. (2005). Perspectives de l'OCDE sur les PME et l'entrepreneuriat. OECD.

17. Penrose, E. (1959). Facteurs, conditions et mécanismes de la croissance de l'entreprise. Paris: Hommes et Techniques.

18. Tarillon, C. (2014). Les représentations des dirigeants en matière de croissance et de gouvernance à l'origine des trajectoires des start-up. Doctoral thesis in Management Sciences, University of Grenoble, French. .

19. Weinzimmer, L., Nystrom , P., & Freema, S. (1998). Measuring organizational growth: issues, consequences and guidelines. Journal of Management Studies, 24(2)., 235-262.

20. Wiklund , J., Patzelt, H., & Shepher, D. (2009). Building an integrative model of small business growth. Small Business Economics, 32(4)., 351-374.

21. Woywode, M., & Lessat, V. (2001). Les facteurs de succès des entreprises à croissance rapide en Allemagne. International SME Review, 14(4)., 17-43.