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SMEs' Export Propensity in North-Africa: A Fuzzy c-means Cluster Analysis

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SMEs' Export Propensity in North-Africa: A Fuzzy *c*-means Cluster Analysis

Abstract

Purpose: This paper analyses the determinants of Small and Medium Enterprises' (SMEs) propensity to export using data from a North African country, namely; Algeria. Drawing on the extended Resource-based View, the study examines the role of firms' resources and capabilities in explaining the probability to export.

Design/methodology/approach: The study employs the nascent fuzzy *c*-means clustering technique to analyse a sample of 208 Algerian SMEs. The sample included both established and potential exporters operating across various sectors. A combination of online and face-to-face methods was used to collect the data.

Findings: While a preliminary analysis established the existence of five clusters exhibiting different levels of resources and capabilities, further discernment of these clusters has shown significant variances in relation to export propensity. In short, clusters exhibiting combinations that include higher levels of export-oriented managerial resources showed greater export propensity, whereas clusters lacking such assets were less likely to display high export propensity, despite superior capabilities in marketing and innovation.

Practical implications: The findings provide a more comprehensive insight on the critical resources shaping SMEs' internationalisation in the North-African context. The paper holds important implications for export promotion policy in this area.

Originality/value: The study makes a twofold contribution. First, the use of the fuzzy *c*-means clustering technique to capture the joint influence of discrete resources and capabilities on SMEs' export propensity constitutes a methodological contribution. Second, being the first study bringing evidence on SMEs' internationalisation from the largest country in the African continent, in terms of landmass, constitutes an important contextual contribution.

Key Words: Algeria, Export propensity, Cluster Analysis, Resources and Capabilities, SMEs.

Paper Type: Research paper

Introduction

Small business internationalisation has received an increasing attention in the international entrepreneurship literature (Terjesen et al., 2016). Particularly, the resource-factors influencing the internationalisation of small and medium sized enterprises (SMEs) have been the focus of numerous past studies (Brush et al., 2002; Dhanaraj and Beamish, 2003; Beleska-Spasova et al., 2012; Díez-Vial and Fernández-Olmos, 2013; Conti et al., 2014; Denicolai et al., 2014; Pickernell et al., 2016). Identifying such resources is considered crucial for the development and improvement of the so-called export promotion programmes, as these are typically designed to act as a resource supplement for SMEs (as evidenced in Shamsuddoha et al., 2009; Leonidou et al., 2011, Haddoud et al., 2017 and Wang et al., 2017).

Contrastingly, such a surge in the empirical literature is less evident with respect to SMEs evolving in developing regions (Matanda et al., 2016; Cahen et al., 2016; Bianchi et al., 2017; Paul et al., 2017). Despite their increasing participation in the international business arena, related research on African SMEs remains scarce (Boso et al., 2016; Misati et al., 2017). As a consequence, policy makers and export promotion organisations in this part of the world have often relied on findings obtained from advanced countries' datasets. Arguably, the relevance of such findings to the African context is yet to be determined (Boso et al., 2012; Robson and Freel, 2008; Bianchi et al., 2017). This is mainly due to the fact that African SMEs are affected by unique factors emanating from context-specific institutional and environmental pressures (Boso et al., 2016). It is acknowledged that different contexts would lead to different internationalisation behaviours (Andersson and Floren, 2008).

Against this, the current study examines the role of discrete resources and capabilities in increasing SMEs' propensity to export, within the Algerian context. Algeria is an increasingly important player in the global world, enjoying a strategic geographical position bridging Africa, Europe and the Middle-East. Being in such a location makes the export potential of Algerian SMEs considerable and likely to be an important driver of the regional development. Despite a few studies examining the Algerian context in various management-related disciplines (Mellahi and Frynas, 2013; Branine et al., 2008; Ramdani et al., 2014), in the internationalisation literature, this study represents the first study providing evidence from this country, hence providing an important contextual contribution. In Ibeh et al.'s (2012) recent review on the African internationalisation, only two studies looking at North African

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Journal of Small Business and Enterprise Development

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3 reduce this imbalance, as the long term growth of the economy will depend on the
4 Government's ability to boost its non-oil foreign trade (IMF, 2011; World Bank, 2014).

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6 Conscious of such role, the Algerian Government has increased its commitment
7 through extensive investments on a range of export promotion programmes in order to
8 increase the number of exporting SMEs (Algerie Press Service, 2016). Nonetheless, despite
9 these efforts, the total number exporters remains minimal. The latest estimations evaluate
10 their number as not exceeding 520 companies (The Algerian Chamber of Commerce
11 Database, 2016). It is believed that this lack of effectiveness could be primarily attributed to
12 the lack of relevance and inefficient targeting of promotion programmes. Thus, identifying
13 the relevant resources driving SMEs' to successfully enter export markets would be a good
14 step forward in increasing the efficiency of the government export promotion organisation
15 through effective targeting (Haddoud *et al.*, 2017). This makes Algeria a suitable focus for
16 this study.
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26 **Firm resources and internationalisation**

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28 The shift in the internationalisation literature from the gradual approach, which considers
29 firms' foreign operations as an incremental process conditioned by perceived psychic
30 distance (Johanson and Vahlne, 1977), to the international entrepreneurship approach, which
31 argues that firms' internationalisation is conditioned by their resource stock, has emphasised
32 more than ever before the role of firms' assets in driving international activities (Brush *et al.*,
33 2002). Recent literature provided evidence that barriers preventing SMEs from entering
34 foreign markets are generally due to the lack of both internal and external resources (Neupert
35 *et al.*, 2006; Tesfom and Lutz, 2006; Villar *et al.*, 2014; Brouthers *et al.*, 2015). Thus, a key
36 difference between domestic and international SMEs resides in their resource availability
37 (Brush *et al.*, 2002). Drawing on the extended resource-based view (RBV) (Lavie, 2006),
38 which argues that firms' competitive advantage is driven by both internal and external
39 resource bundles, the export literature has been developing successful theoretical models to
40 explain SMEs' internationalisation behaviour (Beleska-Spasova *et al.*, 2012; Boehe, 2013;
41 Kembro *et al.*, 2014; Hinterhuber, 2013; Spring and Araujo, 2014).
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51 In an international context, the export literature has broadly clustered the resource
52 factors into assets related to the owner/manager's, the organisation and the business networks
53 (Brush *et al.*, 2002; Beleska-Spasova *et al.*, 2012). In this study, the resource bundles have
54 been divided into firms' managerial resources, relational resources, marketing capabilities
55 and innovative capabilities. This classification considers the distinction between a resource
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(what the firm has) and a capability (what the firm does) (Kaleka, 2002). The categorisation is also partly adapted from Beleska-Spasova *et al.*'s (2012) classification of firms' resource driving export performance. This categorisation is comprehensive and includes both internal and external resource bundles. This study argues that the availability of such resource bundles influence SMEs' decision to enter export markets (Bloodgood *et al.*, 1996).

In an SME context, the owner/manager plays a central role in influencing firms' internationalisation (Miesenbock, 1988). The export literature has dedicated significant attention to study the managerial resources as precursors to export behaviour (Sousa *et al.*, 2008). Such attention could be explained by the influence of psychic distance on firms' internationalisation, as argued by the Uppsala School (Johanson and Vahlne, 1977). According to this perspective, SMEs' internationalisation is influenced by the decision maker's experience and knowledge towards export market. Hence, factors such as the lack of foreign knowledge could prevent firms from entering international markets (Fillis, 2002). Similarly, internal capabilities are considered as important determinants of export behaviour (Ibeh, 2003). Innovative and marketing capabilities are frequently cited amongst the factors leading firms to enter foreign markets (Dhanaraj and Beamish, 2003; Ibeh, 2003; Serra *et al.*, 2012). Such capabilities would allow SMEs to develop international competitive advantages which would encourage them to enter international markets.

Finally, firms' internationalisation is also considerably affected by tangible and intangible resources that are obtained through collaborative activities with peer-firms (Wright *et al.*, 2007). Inter-firms' alliances are often the synonym of resource and capability development (Boehe, 2013). By definition, network resources refer to the external resources owned by peer firms and which can be accessed through cooperation (Gulati, 2007). Based on the network approach of internationalisation (Coviello and Munro, 1997), SMEs are able to enter foreign markets through their networks. Such networks constitute the means to overcome the liability of foreignness that prevent SMEs from entering export markets. The following reviews the resource determinants of SMEs' export propensity in further details.

Export-oriented managerial resources

The recognition and the influence of an export stimulus are closely related to the management's knowledge, attitudes and motivation toward internationalisation (Reid, 1981). The export literature has commonly included the manager's knowledge and experience as resource antecedents of export propensity. In both developing and developed countries, the manager's lack of information and knowledge about exporting and export markets was found

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3 to be among the most significant factors stopping resource-constrained firms from embarking
4 on export activities (Pinho and Martins, 2010; Shih and Wickramaesekera, 2011; Al-Hyari *et*
5 *al.*, 2012). The lack of knowledge increases the uncertainties characterising the turbulent
6 export markets (Pinho and Martins, 2010; Al-Hyari *et al.*, 2012; Uner *et al.*, 2013). Reliable
7 and updated information is essential to assist managers' decision-making tasks in export
8 markets. Export knowledge gives the decision maker more flexibility and allows them to
9 have a quicker understanding of export problems and react more effectively (Nemkova *et al.*,
10 2012). Equally, internationally experienced management teams are more likely to benefit
11 from more strategic partners and are quicker in obtaining foreign sales (Reuber and Fischer,
12 1997). Evidence from developing countries such as Nigeria revealed that having a past
13 foreign business experience positively influenced decision makers to go abroad and hence
14 increase their propensity to export (Ibeh, 2003).
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24 *Innovative capabilities*

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26 Several studies found a significant and positive association between innovation, technology
27 intensity and the propensity to export (Reid, 1982; Nassimbeni, 2001; Dhanaraj and Beamish,
28 2003; Ibeh, 2003; Van Beveren and Vandebussche, 2010; Serra *et al.*, 2012). Innovative
29 capabilities constitutes a competitive advantage, which can make the difference in
30 international markets and enhance the export potential (Nassimbeni, 2001; Roper and Love,
31 2002; Ibeh, 2003; Serra *et al.*, 2012). Innovative capabilities allow SMEs to develop new
32 products at a reduced cost that would enable them to compete internationally (Pickernell *et*
33 *al.*, 2010). The quality, uniqueness and adaptability of the product to international markets
34 are seen as important factors for exporting. Yang *et al.* (2004) confirmed that innovative
35 activities (through R&D variables) positively influence the SMEs' export propensity.
36 Similarly, Van Beveren and Vandebussche (2010) suggested that both product and process
37 innovation increase firms' export propensity.
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48 *Marketing capabilities*

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50 Based on the RBV, marketing capabilities utilised during the marketing mix processes could
51 be rare, valuable, non-substitutable, and inimitable, and are likely to provide firms with an
52 international competitive advantage that can enhance their internationalisation (Vorhies and
53 Morgan, 2005; Morgan *et al.*, 2012). Marketing capabilities constitute a source of cost-
54 efficiency and branding advantages which would enhance firms' competitiveness in
55 international markets (Zou *et al.*, 2003). However, empirical studies on export entry have
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3 underestimated the importance of the firms' competencies (Ibeh, 2003). A few studies
4 revealed that marketing competencies including informational (Reid, 1984), pricing (Tzokas
5 *et al.*, 2000), and advertising capabilities (Serra *et al.*, 2012) were amongst the determinants
6 of firms' export propensity. In fact, firms focusing on strategic export pricing are more
7 stimulated to enter export markets due to the opportunities of increasing the profit margin
8 through foreign sales (Tzokas *et al.*, 2000). Similarly, firms with strong advertising
9 capabilities (locally) are more likely to enter export markets through unsolicited foreign
10 orders.
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18 *Relational resources*

19 According to Lavie (2006), relational resources are the set of resources emerging from the
20 SMEs' relationships and collaboration with peer firms and business partners. Local
21 collaboration reflects the degree of cooperation between the firm and the surrounding local
22 businesses. In this respect, several studies have confirmed the positive link between local
23 collaboration and export propensity (Elis and Pecotish, 2001; Nassimbeni, 2001; Nemkova *et*
24 *al.*, 2012; Boehe, 2013; Gashi *et al.*, 2014). Firms' decision and attitude to exporting are
25 often influenced by other local firms' export activities and strategies (Karlsson *et al.*, 2014).
26 Firms can benefit greatly from valuable exchange of information which would in turn
27 positively influence the decision maker's attitude toward exporting (Wiedersheim-Paul *et al.*,
28 1978). In a qualitative study, Elis and Pecotish (2001) found that four out of five interviewed
29 firms acknowledged that local networks considerably influenced their decision to start export
30 activities. Likewise, memberships in industry associations affect firms' export propensity by
31 increasing their local reachability (Boehe, 2013).
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42 Overall, the empirical export literature confirms the importance of SMEs' resource
43 bundles in enhancing export entry. In particular, it can be acknowledged that resources
44 related to the decision makers' (managerial resources) and to the SMEs' external network
45 (relational resources), as well as both innovative and marketing capabilities, are likely to
46 enhance SMEs' export entry. Thus employing a comprehensive approach, this study
47 examines the influence of four distinct categories of firms' resources on their likelihood to
48 become exporters (export propensity). In so doing, the study adopts a novel fuzzy *c*-means
49 cluster analysis approach and seeks to identify the joint influence of such factors in increasing
50 SMEs' export propensity. Therefore, since no existing empirical evidence has explicitly
51 tested such combinations, the authors abstain from generating hypotheses. The identification
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of these combinations will be data driven through the fuzzy *c*-means clustering technique. In fact, the use of hypotheses is atypical with cluster analysis (McDermott *et al.*, 2013).

Methods

The study surveyed Algerian non-exporting (with an export potential) and exporting manufacturing SMEs. Here, SMEs are defined as firms employing less than 500 employees (Dhanaraj and Beamish, 2003; Wilkinson and Brouthers, 2006; Rutihinda, 2008). This threshold is generally adopted to distinguish firms that are likely to have the potential to enter export (Haddoud *et al.*, 2017). The sampling frame for this study was gathered using databases provided by ALGEX, the main export promotion organisation in Algeria, as well as the Algerian Chamber of Commerce (Nancy *et al.*, 2009). In these databases, both established and potential exporters are listed. It is worth noting that, to enhance its relevance, the present study mainly focuses on non-exporters with an export potential. To increase the response rate the researchers used a mix of online, postal and face to face (mainly in trade fairs) techniques to distribute the questionnaires. The survey targetted the owner/manager or the export manager (if existing) as these constitute the most relevant source of information (Sousa *et al.*, 2008).

The study returned 277 responses, from which 208 had complete data and were able to be included in the factor analysis employed in this study. This is considered as highly representative as according to recent statistics, the number of exporters in Algeria does not go beyond 520 companies (The Algerian Chamber of Commerce Database, 2016). Similarly, the number of potential exporters throughout the whole country accounts for approximately 1200 firms (LaTribune, 2015). To test for non-response bias, the study followed Armstrong and Overton's (1977) extrapolation method using the t-test technique in SPSS to compare the means of 30 late respondents (representing non-respondents) with 30 early respondents using a randomly selected 15 items (Kalafsky, 2004; Kaleka, 2012; Ketkar *et al.*, 2012). The difference between all the considered items was statistically non-significant, which leads to the conclusion that no major non-response bias exists in the sample. The sample characteristics in terms of firm's size, firm's age and firm's export status, are presented in Table 1. In summary, the majority of SMEs employed less than 250 employees¹ and were operating for less than 50 years. The sample approximately included 63% of potential exporters and 37% of established exporters.

¹ A t-test comparing means across all variables revealed no significant differences between SMEs employing less than 250 and SMEs with 250-500 employees.

Table 1:
Samples' Characteristics

Characteristics	Percentages (%)
Firms' Size	
Less than 10	16.2
10 – 50	28.5
51 – 250	32.1
251 - 500	21.3
Firms' Age	
Less than 2 Years	7.9
2 - 10 Years	22.7
11 - 25 Years	37.2
26 -50 Years	20.2
Over 50 Years	6.1
Firms' Export Status	
Non-Exporters	63
Exporters	37

Measurement

Export propensity

Existing research on exporting has investigated the factors that influence whether a firm exports or not, this is known as the propensity to export (Javalgi *et al.*, 2000; Obben and Magagula, 2003; Orser *et al.*, 2010; Densil, 2011; Serra *et al.*, 2012; Boehe, 2013). Export propensity is widely used to capture the probability to export. The premise behind this instrument is that factors which are significantly higher in exporters than in non-exporters would constitute indicators of the elements needed to motivate and enable non-exporters to begin exporting (Atuahene-Gima, 1995). Hence, following the abovementioned studies, this study measures export propensity using a dummy variable where exporters are coded 1 and non-exporters are coded 0. A company would be qualified as exporter if the latter has exported within the last five years (see Appendix A for further details on research instruments).

SMEs' resources and capabilities

Following previous categorisations, the study included the following resources and capabilities: marketing capabilities, relational resources, export-oriented managerial resources and innovative capabilities. The export literature considers the entrepreneur's capital as a valuable resource that can enhance SMEs' internationalisation (Lafuente *et al.*, 2015). In this vein, managerial resources refer to the set attributes associated to the firms' decision maker(s). In this study, these attributes comprised the managers' export knowledge and international experience as managerial resource attributes affecting firms' export propensity. The inclusion of such resource factors was based on Reid's (1981) early suggestion that the management's knowledge and experience play a significant role in encouraging the decision maker to start exporting. According to Stoian and Rialp (2010), these factors are amongst the most studied managerial attributes in the export literature. Appendix A shows the measures used to assess these attributes.

Relational resources refer to the set of external resources obtained through collaboration with peer firms (Welch *et al.*, 1998; Lavie, 2006). Relational resources were measured through assessing the relationship quality firms have with peer firms. Here, the premise is that long-term and high quality relationships will likely lead to cooperation and collaboration which would then give firms access to additional external resources. This was confirmed by Pinho and de Sá (2013) through an empirical study where the relationship quality led to commitment and cooperation. Measuring relationship quality was done using Lages *et al.*'s (2005) RELQUAL (relationship quality) measure. This measure could be utilised to assess the relationship quality between different parties. It includes four dimensions namely; the amount of information sharing, communication quality, long-term orientation and satisfaction with relationship. According to Lages *et al.* (2005), information sharing and intensive communication amongst firms would lead to long-term goal and risk sharing behaviours, which would eventually lead to higher performance. Such collaborative behaviours would allow the firm to access valuable resources (Stoian *et al.*, 2016) that are likely to enhance international competitiveness (Wilkinson *et al.*, 2000).

Marketing capabilities included pricing, informational and advertising capabilities. To measure pricing capabilities, the study used items tested in several previous studies (Zou *et al.*, 2003; Vorhies and Morgan, 2005; Morgan *et al.*, 2009; Morgan *et al.*, 2012). The items covered the abilities of the company in communicating prices, responding to customers' needs and offering competitive deals. As for advertising capabilities, these were measured

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3 using items adapted from Zou *et al.*'s (2003) and Morgan *et al.*'s (2012) studies. These items
4 assess the ability of the firm on developing effective promotional activities. As for
5 informational capabilities, these were assessed using items adapted from previous studies
6 (Kaleka, 2002; Morgan *et al.*, 2006; Leonidou *et al.*, 2011). These items evaluate the firms'
7 capability in gathering market information, identifying potential customers and monitoring
8 competition. Details about the measurement used to assess these dimensions are included in
9 Appendix A. Here, the respondents were asked to rate their firm's export marketing
10 capabilities compared to their major competitors in terms of pricing, information gathering
11 and advertising competencies. The items were measured on a five-point Likert scale ranging
12 from "much worse than competitors" to "much better than competitors" (Morgan *et al.*,
13 2012).

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21 Lastly, innovative capabilities included R&D related activities and innovation outputs
22 (Kim and Hemmert, 2016). To measure this, the study used a perception based scale
23 measuring the R&D activities, the number of patents owned by the firm alongside the extent
24 to which firms are adopting both process and product innovations (Knight, 2001; Pla-Barber
25 and Alegre, 2007; Leonidou *et al.*, 2011). The proposed items are developed from Leonidou
26 *et al.*'s (2001) study; these are measured on a five-point Likert scale ranging from "strongly
27 disagree" to "strongly agree". All items are presented in Appendix A.

28 29 30 31 32 33 34 35 *Exploratory factor analysis*

36 To validate the proposed categorisation, an exploratory factor analysis (EFA) was conducted.
37 The EFA was applied following principal component factor analysis with Varimax rotation
38 (McDermott *et al.*, 2012). The Kaiser-Meyer-Olkin value was .89, exceeding the
39 recommended value of .6 (Kaiser, 1970) while the Bartlett's Test of Sphericity was
40 significant at 0.1%, hence supporting the factorability of the correlation matrix (Pallant,
41 2013). Based on the Scree plot, four components have emerged from the principal
42 components analysis, labelled as Marketing Capabilities, Relational Resources, Managerial
43 Resources, and Innovative Capabilities (see Appendix B). These accounted for 60.33% of the
44 total variances.

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51 The Cronbach's Alpha for these factors was as follow: Managerial resources
52 ($\alpha=0.90$); Relational resources ($\alpha=0.92$); Marketing capabilities ($\alpha=0.94$); Innovative
53 capabilities ($\alpha=0.81$). Appendix B shows the factors' loadings. The dropped items due to low
54 loadings are highlighted in appendix A. In short, the obtained categorisation is to some
55 extent in line with previous ones yet with a few differences. For example, while Brush *et al.*

(2002) added financial resources (in terms of debt, equity and profitability), Beleska-Spasova *et al.* (2012), considered knowledge-based resources as a separate construct. The study omits financial resources due to the sensitive nature of such data amongst Algerian firms. Researchers in Algeria have no access to firm-level data, whereas the few objective data available are difficult to verify (Ramdani *et al.*, 2014). Nonetheless, based on growing empirical evidence, the present study included marketing capabilities as a driver to export propensity.

Analysis

Cluster analysis of the resource-factors

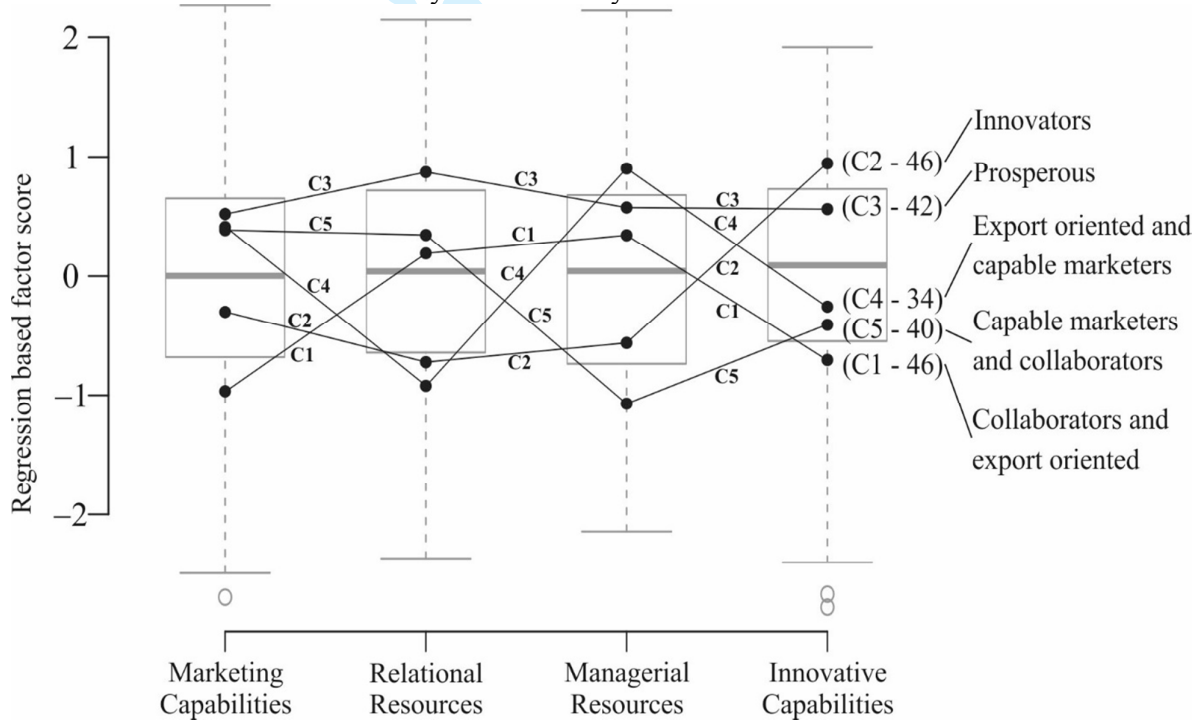
This section undertakes a series of cluster analyses of the established four factors, describing determinants of export propensity for the considered 208 firms, across Algeria. The nascent fuzzy *c*-means technique (Bezdek, 1980; 1981) is employed in this study, a development of *k*-means (MacQueen, 1967; Kanungo *et al.*, 2002), which allows objects to have degrees of association (membership) to individual clusters. This separation in what happens when employing fuzzy clustering and ‘crisp’ non-fuzzy clustering is pertinent in this analysis. Given the clustering is prevalent on the factor scores from factor analysis, which are each over continuous scales exhibiting themselves grades of opinion on certain factor based terms, when clustering the resultant cluster membership should be encompassing of this grades of opinion (McDermott *et al.*, 2013), hence preferment to fuzzy clustering.

Fuzzy clustering is particularly relevant when investigating firms’ resources. Companies are more likely to display varied combinations of resource levels, and therefore, the fuzzy cluster analysis is performed on the assumption that each SME will be associated, to varying degrees, with different resource-based clusters. In this regard, cluster solutions were provisionally investigated with three, up to six clusters, with theoretical defence arguments, as well as granularity of cluster case membership suggesting the five cluster solution was appropriate for the analysis here (Andrews and Beynon, 2010; 2017, McDermott *et al.*, 2013).

With the five-cluster solution established, constituent cluster factor means were found by grouping respondents to clusters based on majority association and taking the means of their values, for each cluster, over the different factors. Comparison of these constituent cluster factor means enables us to evaluate the ability of the clustering process to discern types of respondent, see Figure 1.

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Figure 1.
Five cluster solution based on fuzzy c-means analysis



In Figure 1, the individual cluster factor means are shown as points, with those associated with the same cluster joined by solid lines. Box plots are included, which show the spread of the factor values amongst the 208 respondents across each factor. These graphical and statistical findings allow us to consider the typologies of companies within each cluster, from Figure 1, next described:

- The first cluster (C1) includes 46 companies that exhibit high relational and export-related managerial resources. As for the remaining two capabilities, the companies within this cluster show the lowest levels in each of these. Therefore, the study labels this cluster as “Collaborators and export oriented”.
- The second cluster (C2) includes 46 firms that are characterised by high innovative capabilities yet score relatively low in the remaining resource factors. Hence, the study refers to these as “Innovators”.
- The third cluster (C3) comprises 42 firms which exhibit relatively high levels across all resources and capabilities. These are labelled as “Prosperous”.
- The fourth cluster (C4) includes 34 firms that are distinguished with relatively high levels of export-related managerial resources and marketing capabilities. The study labels these firms as “Export oriented and capable marketers”.
- The fifth cluster (C5) has 40 firms which exhibit high level of marketing capabilities and relational resources. These are called “Capable marketers and collaborators”.

With the five-cluster solution briefly described, in terms of typologies of the clusters, the study now considers the relationships between these clusters and export propensity.

Analysis of export propensity

This next section further considers the cluster analysis undertaken, in terms of the five cluster solutions established, using fuzzy *c*-means clustering. Beyond an understanding of the actual established clusters, in terms of the prescribed typologies of firms presented in respect to individual clusters, how these clusters of companies compare against export propensity is next considered.

This is an important issue when considering clustering cases. That is, the clustering attained must be interpreted and validated, to ensure that it is theoretically and practically meaningful (Frayley and Raftery, 1998). This meaningfulness (validation) should take both the consideration of qualitative arguments (Frayley and Raftery, 1998), as well as based on statistical analysis (Ketchen and Shook, 1996). Both the qualitative and statistical considerations of validation are considered here in respect to export propensity, not used in the clustering process, associated with the considered companies.

As in the elucidation of the factors used to cluster the firms, here both statistical and graphical elucidation of export propensity and the five-cluster solutions found using fuzzy *c*-means, see Figure 2. Since the export propensity is described by each SME in terms of a binary variable (0-1), the statistical elucidation is based on Chi-squared test and the graphical

elucidation is based on the percentages of SMEs in each cluster which stated they had or had not propensity to export. The results show a statistical difference between firms' export propensity across the different clusters ($X^2(4, N = 208) = 56.292, p = 0.000 < .05$).

Figure 2.
Bar chart based breakdown of respondents in each cluster based on export propensity (including a statistical pairwise comparisons of clusters)

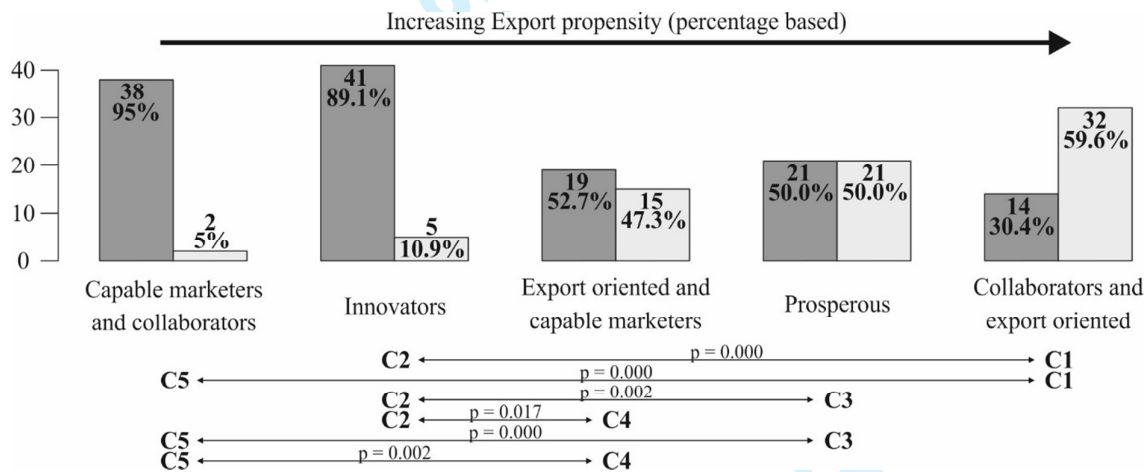


Figure 2 (bar chart, top part), graphically shows the variations in the cluster associations of respondents (based on majority association), to export propensity formulated on the percentage in each cluster which reported they were (light grey shaded bars) or were not (dark grey shaded bars) exporters.

Moving left to right in terms of increasing export propensity, and noting the interpretations of the clusters C1 to C5 given previously (C1 - Collaborators and export oriented, C2 - Innovators, C3 - Prosperous, C4 - Export oriented and capable marketers and C5 - Capable marketers and collaborators), the cluster with the highest proportion of exporters is the "Collaborators and export oriented" with 59.6%. This is followed by the

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3 “Prosperous” cluster with 50% and the “Export oriented and capable marketers” with 47.3%.
4 In contrast, the clusters with the least proportion of export propensity are the “Capable
5 marketers and collaborators” with only 5% of SMEs suggesting export propensity and the
6 “Innovators” with 10.9% of exporters.
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10 In statistic terms, Figure 2 (horizontal line, bottom part) graphically elucidates the
11 cluster to cluster comparisons of different export propensity levels. Moreover, using pairwise
12 comparisons, including Bonferroni p-value adjustment (see Beasley and Schumacker, 1995),
13 the lines and pairs of cluster labels shown – identify those pairs of clusters which are
14 statistically different in export propensity terms at the 5% significance level (see *p* values also
15 shown – non-statistically different pairs of clusters are not shown). Inspection of these lines
16 illustrates a clear divide between two groups of clusters, namely low export propensity C2,
17 C5, and high export propensity C1, C3 and C4. These results are next discussed.
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23 Discussion

24 The fuzzy clustering analysis established five resource clusters. These clusters distinguished
25 the SMEs in relation to the levels of their resources and capabilities. The clusters comprised
26 of firms with high export-oriented managerial and relational resources (Collaborators and
27 export oriented - C1), high innovative capabilities (Innovators - C2), high levels of resources
28 and capabilities across the four sets (Prosperous - C3), high export-oriented managerial
29 resources and marketing capabilities (Export oriented and capable marketers - C4), and lastly
30 high marketing capabilities and relational resources (Capable marketers and collaborators -
31 C5).
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38 More importantly, the study identified that these clusters differ significantly in terms of
39 export propensity. The pairwise comparison has outlined clear differences between clusters
40 involving managerial resources and the ones missing such assets. Therefore, the possession
41 of certain resources and capabilities was found to lead to higher propensity to export.
42 Overall, it was established that clusters possessing high export-oriented managerial resources
43 (Export oriented, Export oriented and capable marketers, and Prosperous) were highly likely
44 to include a high proportion of exporting SMEs. Alternatively, with a low level of export-
45 oriented managerial resources, SMEs with assets comprising marketing and innovative
46 capabilities are more likely to include a high proportion of non-exporters. As for relational
47 resources, these would only increase the share of exporters when coupled with additional
48 resources and capabilities. SMEs possessing high relational resources and marketing
49 capabilities had a low proportion of non-exporters, whereas SMEs with high relational
50 resources and export-oriented managerial assets comprised a high proportion of exporters.
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3 In considering the findings above, it is suggested that SMEs possessing higher levels of
4 export-oriented managerial resources and relational resources are more likely to export. This
5 goes in line with the extant literature. Managers equipped with relevant export knowledge
6 and experience, and characterised by a positive perception towards exporting are likely to
7 overcome uncertainties associated to international markets (Casillas *et al.*, 2015). The
8 influence of the managerial attributes on SMEs' export propensity reflects the Uppsala
9 approach to firms' internationalisation where the latter depends highly on the decision
10 maker's knowledge and attitudes towards international activities (underlined by the psychic
11 distance concept) (Johanson and Vahlne, 1977).
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18 Regarding the influence of relational resources, early claims have acknowledged the
19 importance of such resources (mainly through information exchange) in driving SMEs to
20 enter export markets, a phenomenon known as contagion transmission (Wiedersheim-Paul *et*
21 *al.*, 1978). The firm's decision to export is a process often considerably influenced by other
22 peer firms. This is particularly relevant in highly collectivist societies such as the Algerian
23 one (Ramdani *et al.*, 2014). The export decision becomes the resultant of a process of
24 knowledge and experience sharing amongst firms (Bonaccorsi, 1992). Furthermore, an access
25 to such relational resources may also be synonymous of reduced sunk costs (Yi and Wang,
26 2012) and increased reachability (Boehe, 2013).
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33 However, it is important to note that in the present study, such a positive role was
34 conditioned by joint the presence of export oriented managerial and relational resources. In
35 fact, in accordance with the extended RBV, it could be argued relational resources per se
36 would not be sufficient to achieve a competitive advantage. This is due to the fact that such
37 shared resources are generally lacking uniqueness, which, according to the RBV principle, is
38 an important requirement to achieve a competitive advantage (Barney, 1991; Dhanaraj and
39 Beamish, 2003; Kaleka, 2012). This could be offset by managers' unique expertise,
40 experience and knowledge.
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46 Contrastingly, the study reveals that marketing and innovative capabilities are unlikely
47 to enhance SMEs' export propensity. Such findings are not consistent with previous studies
48 reporting a significant and positive influence of innovative capabilities (Nassimbeni, 2001;
49 Dhanaraj and Beamish, 2003; Ibeh, 2003; Serra *et al.*, 2012) and marketing capabilities
50 (Tzokas *et al.*, 2000; Serra *et al.*, 2012) on export propensity. This could be explained by the
51 fact that, in an export context, R&D activities are likely to engender additional costs, which
52 would then negatively impact the capital assigned to exporting and subsequently prevent the
53 firm from going international (Rodriguez and Rodriguez, 2005). This is particularly relevant
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3 to the context in which this study took place. Exported products from African regions may
4 not necessarily need advanced technology and innovative capabilities to be competitive
5 (Alvarez, 2004). Algerian non-oil exports mainly constitute of agricultural and food-related
6 products (such as fruits and vegetables) which would not require advanced technologies
7 (ALGEX, 2014). It could therefore be argued that costs engendered by these processes are
8 highly likely to discourage African SME managers from venturing into foreign markets,
9 especially when such advanced technology may not be necessary given the nature of the
10 exported products. A similar explication could be given to the negative role of marketing
11 capabilities. Developing such competencies is a costly process, which could offset its benefit
12 (Morgan *et al.*, 2012). However, the findings also revealed that when these capabilities are
13 coupled with export-oriented managerial resources, SMEs' probability to enter export
14 markets tends to increase. The pairwise comparison suggested significantly greater export
15 propensity amongst clusters involving high levels of managerial resources, alongside these
16 capabilities (C3 and C4 in comparison with C2 and C5). This is in accordance with the extant
17 literature. Evidence shows that export oriented managers are dedicated to allocate sufficient
18 resources to export activities (Sousa *et al.*, 2008), and hence, even when such capabilities
19 involve extra costs, these will not be at the expense of exporting budget. Export oriented
20 managers see exporting as opportunities to exploit (McNaughton and Pellegrino, 2015),
21 rather than costs to mitigate.
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35 In summary, it could be concluded that the possession of a combination of resource-
36 factors is more likely to lead to export entry than single factors. In fact, none of the factors
37 can be considered as a critical success factor. The possession of competencies such as
38 marketing and technology, and the access to relational resources, will not necessarily lead to
39 export entry unless combined with high managerial resources.
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45 **Conclusions**

46 The findings from the fuzzy *c*-means cluster based analysis emphasised the interplay of
47 various types of firms' resources and capabilities and their role in enhancing SMEs'
48 propensity to export. Such findings contribute to the RBV theory by demonstrating that, in a
49 North-African context, the possession of resources and capabilities such as innovative and
50 marketing factors are not necessarily drivers of SMEs' export propensity. The fuzzy *c*-means
51 clustering has highlighted that these should be complemented by decision makers that are
52 export oriented who have the relevant attributes in terms of export knowledge and
53 experience. Contrary to the common understanding emerging from the export literature,
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3 marketing (Vorhies and Morgan, 2005; Morgan *et al.*, 2012) and innovative abilities
4 (Nassimbeni, 2001; Dhanaraj and Beamish, 2003; Serra *et al.*, 2012) per se could have an
5 inverse influence on export propensity due to various costs related to their development and
6 acquisition, it is only when complemented by export-oriented managerial factors that these
7 could enhance internationalisation. Furthermore, the findings have increased understanding
8 regarding the role of relational resources in SMEs' internationalisation. It was found that
9 such resources should not be considered as core resources driving SMEs' propensity to
10 export, as due to their shared nature, such resources may lose their uniqueness and hence
11 would not necessarily lead to a competitive advantage. Instead, relational resources should
12 be seen as complementary assets that, with the presence of core resources and capabilities,
13 are likely to enhance SMEs' internationalisation.

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21 This study holds several important implications to export promotion organisations
22 (EPOs) operating in North Africa. EPOs can benefit from such findings in targeting their
23 programmes which are known to be resource enhancers (Leonidou *et al.*, 2011). Targeting the
24 relevant resources would be crucial in increasing the effectiveness of such programmes.
25 Following the taxonomy provided here, EPOs will be able to improve their assistance.
26 Programmes dedicated to develop innovative and marketing capabilities, such as marketing
27 training programmes and technology upgrade schemes, should be carefully targeted in
28 accordance with the firm's financial abilities and the nature of the exported products. Due to
29 their costs, developing marketing and innovative capabilities may not necessarily lead to
30 international market entry and can instead have a negative influence on export propensity.
31 More importantly, when offered, programmes designed to increase such capabilities should
32 be complemented with informational sessions and workshops on exporting activities. These
33 programmes are likely to enhance the decision makers' foreign knowledge and raise their
34 awareness and attitudes toward exporting opportunities. This will motivate them to pursue
35 exporting operations despite the engendered costs. Furthermore, EPOs should not
36 underestimate the role of relational resources in supplementing the aforementioned assets.
37 Although not critical, these could help enhancing export likelihood. It is therefore suggested
38 that North African EPOs should encourage and facilitate collaborative strategies amongst
39 peer firms at the domestic level.

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53 In terms of limitations, the study acknowledges the following. First, while the study
54 seeks to include a comprehensive list of resources and capabilities bundles, this list is not
55 exhaustive. Future research may include additional factors that could act as drivers to SMEs'
56 export entry. Second, given the scarce number of Algerian existing and potential exporters,
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the study includes SMEs from various manufacturing sectors. However, it is recognised that firms in different sectors may be affected by different factors and hence, the study calls for sectoral studies that may uncover such differences. Third, while it is believed that the present special issue on African entrepreneurship will advance our knowledge on SMEs' operating in this region, the authors still call for further empirical evidence from the North-African region. The current and continuous drop in oil prices stresses the imperative need to assist policy makers in this part of Africa through advanced knowledge on SMEs' international involvement.

From a methodological perspective, future thinking should also be considered in terms of identifying novel techniques to employ in this analysis, for example the fuzzy clustering undertaken here (itself can be further developed – such as imposing thresholds on membership to clusters for a case to be considered associated with a cluster). Within this form of analysis, there is also the potential to connect the clustering with other variables (control variables) in concomitant regression level analysis, something to consider in future research with understanding of pertinent control variables.

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Appendix A: Breakdown of Survey Questions

Constructs
Innovative Capabilities
<i>Firm's Technology and Innovation</i>
measured on five-point scale: 1= strongly disagree, 5=strongly agree
source: Adapted from Leonidou <i>et al.</i> (2011)
<i>Technology</i>
Our firm possesses unique products
Our firm possesses proprietary technical knowledge ^a
Our firm spends considerable amounts of money on R&D
Our firm possesses modern production technology and equipment ^a
Our firm possesses sufficient production capacity
<i>Innovation</i>
Our firm is constantly adopting innovative marketing techniques
Our firm is constantly sensing trends and competitors' movements
Our firm is constantly adopting new methods in the production process
Our firm is constantly developing new products
Export Oriented Managerial Resources
<i>Decision Maker's export knowledge and experience</i>
measured on five-point scale: 1= strongly disagree, 5=strongly agree
source: Adapted form Leonidou <i>et al.</i> (2011)
<i>Intellectual foreign knowledge</i>
We have extensive knowledge of foreign market demand
We have extensive knowledge of export regulations and paperwork
We have extensive knowledge of overseas shipping and transportation practices

We have extensive knowledge of foreign business practices
Foreign experience
 We have extensive overseas experience (lived/worked abroad)

Relational Resources

Relationships quality with local businesses
 measured on five-point scale: 1= strongly disagree, 5=strongly agree
 Source : Adapted from Lages *et al.* (2005) ; Ural (2009)

Information sharing

These firms frequently discuss strategic issues with us
 These firms openly share with us confidential information about foreign markets
 These firms rarely talk with us about their business strategy^{r,a}

Communication

Our firm has a continuous interaction with other firms during implementation of our business strategy
 The strategy's objectives are communicated clearly to these firms
 Team members from both sides openly communicate while implementing business strategies
 There is extensive formal and informal communication during implementation of our business strategy

Long term orientation

We believe that, over the long run, our relationship with these firms will be beneficial
 Maintaining a long-term relationship with these firms is crucial to us
 We focus on long-term goals in this relationship
 We are willing to make sacrifices to help these firms from time to time

Satisfaction with relationship

Our association with these firms has been a highly successful
 These firms leaves a lot to be desired from an overall performance standpoint^{r,a}
 Overall, the results of our relationship with these firms fell far short of expectations^f

Marketing Capabilities

Firm's informational capabilities
 easured on five-point scale: 1= much worse than competitors, 5=much better than competitors
 source: Adapted form Kaleka (2012)

Capturing important market information
 Identifying prospective customers
 Acquiring market related information^a
 Making contacts
 Monitoring competitive products

Firm's pricing capabilities

measured on five-point scale: 1= much worse than competitors, 5=much better than competitors
 source: Adapted form Morgan *et al* (2012)

Doing an effective job of pricing the products
 Using our pricing skills to respond quickly to changes in customer needs
 Communicating pricing structures and levels to customers
 Being creative in "bundling" pricing deals

Firm's advertising capabilities

measured on five-point scale: 1= much worse than competitors, 5=much better than competitors
 source: Adapted from Morgan *et al* (2012)

Developing effective advertising and promotion programmes
 Advertising and promotion creativity
 Skillfully using marketing communications
 Effectively managing marketing communications programmes

Export Outcome

Export Propensity
 measured using a dummy variable
 source: Serra *et al.* (2012)

Does your company export or has exported in the last five years? (Yes/No)

^r Reversed item

^aDropped item

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Appendix B: Exploratory Factor Analysis

Rotated Component Matrix^a				
	Component			
	1	2	3	4
Skilfully using marketing communications	.829	.193		
Advertising and promotion creativity	.823	.131		.108
Developing effective advertising and promotion programmes	.818	.103		.151
Effectively managing marketing communications programmes	.817	.188		
Making contacts	.785	.209	.132	.106
Identifying prospective customers	.771		.180	
Being creative in "bundling" pricing deals	.751	.125		
Monitoring competitive products	.750	.165		.170
Using our pricing skills to respond quickly to changes in customer needs	.735	.102		.139
Doing an effective job of pricing the products	.725			.192
Capturing important market information	.708	.114		
Communicating pricing structures and levels to customers	.648			.186
Our association with these firms has been a highly successful	.198	.800		.106
Maintaining a long-term relationship with these firms is crucial to us	.111	.796		
We focus on long-term goals in this relationship		.794		
We believe that, over the long run, our relationship with these firms will be beneficial		.787		
There is extensive formal and informal communication during implementation of our business strategy	.118	.751	.107	.118
The strategy's objectives are communicated clearly to these firms		.738		.165
Our firm has a continuous interaction with other firms during implementation of our business strategy	.164	.726	.110	
Team members from both sides openly communicate while implementing business strategies	.134	.719		.156
Overall, the results of our relationship with these firms fell far short of expectations		.697	.174	
We are willing to make sacrifices to help these firms from time to time		.687	.140	
These firms frequently discuss strategic issues with us	.197	.611	.118	
These firms openly share with us confidential information about foreign markets	.146	.587	.122	
We have extensive knowledge of overseas shipping and transportation practices		.168	.860	.100
We have extensive knowledge of foreign business practices			.846	
We have extensive knowledge of export regulations and paperwork	.184	.238	.814	.145
We have extensive overseas experience (lived/worked abroad)		.178	.803	
We have extensive knowledge of foreign market demand	.130	.225	.746	.189
Our firm is constantly adopting new methods in the production process	.109			.771
Our firm is constantly adopting innovative marketing techniques	.163			.744
Our firm is constantly sensing trends and competitors' movements	.158	.112		.700
Our firm possesses unique products			.134	.676
Our firm spends considerable amounts of money on R&D	.183		.163	.653
Our firm possesses sufficient production capacity	.211	.152		.628
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 5 iterations.				