

THE EFFECT OF MANUFACTURING FLEXIBILITY ON EXPORT PERFORMANCE IN CHINA

Gabriel O Ogunmokun

US University of the Virgin Islands

Ling-ye Li (Esther)

Lingnan University of Hong Kong

Abstract

Although in the current global dynamic environment, organizations looking for sustainable growth in their performance need to be flexible in their operations, very few empirical studies have examined the effect of manufacturing flexibility on export performance. This paper presents the result of a study that was designed to identify if flexibility in manufacturing will be related to export performance of the companies in mainland China.

INTRODUCTION

In this current dynamic and uncertain environment many writers (Barry, 2009; Hugill, 2008; Jones, 2007; Verdu-Jover et.al, 2006) are claiming that flexibility is the key to future successful business performance. According to the literature (Cook and Morgan, 1986; Harvey, 1987; Storper and Scott, 1988; Noori, 1990; Goldhar, Jelinek, and Schlie, 1991) flexibility in terms of the adoption of more flexible machines and labor within firms may arise due to changes in the environment.

While Piore and Sabel (1984) described flexibility as the firm's ability to respond to fluctuations in market demand and to adopt new products quickly to a "flexible specialization strategy"; Cook (1987) described this ability as "flexible integration". Noori (1990) developed the notion of "economies of integration" which stemmed from a firm's characteristics of scale and scope. Firms with flexible integration or economies of integration according to Noori (1990) possess the greatest flexibility along the volume, variety and value dimensions. With flexible manufacturing systems, Noori (1990) argued that the existence of machines that could perform several functions, or variations of a given function according to product configuration, allowed firms to exploit economies of scope across a range of product types while, in principle, aggregate production volumes remained quite high. The versatility of flexible machines or technologies could according to Goldhar, Jelinek, and Schlie, (1991) reduce the fixed costs associated with the production of each individual product, thereby lowering the average cost of production.

Although, Awward (2011) found that tactical flexibility can have an influence on the competitive advantage of a firm, and Goldhar, Jelinek, and Schlie (1991) suggested that the use of flexible machines could be capital saving in the long run, as they were reprogrammable and hence adaptable to product changes, very few empirical studies have examined the effect of manufacturing flexibility on export performance. This study was designed to identify if flexibility in manufacturing will be related to the export performance of companies in mainland China.

METHODOLOGY

Based on the level of export earnings made by different city states in the People's Republic of China, exporting firms from the following three city states were selected and used in this study: Beijing (representing the north), Shanghai (representing the east), and Guangdong (representing the south). These three city states served as the sampling base for this study. Using the membership directories of manufacturers a systematic random sample of 100 was drawn for each of the three cities, and each sampling unit was contacted by mail beforehand to solicit their cooperation in participating in this study. Out of the total 300 exporters randomly selected 280 firms indicated their willingness to participate in this study. A copy of the survey instrument was provided via personal delivery to each of the 280 exporting firms that indicated their willingness to participate in the study.

Out of the 280 exporting firms that were asked to complete the questionnaire, a final total of 111 exporting firms fully completed the questionnaires resulting in a response rate of 39.6 per cent. The response rate is comparable to the rates reported in other studies involving exporting firms (e.g. Moini 1995; Burton and Schlegelmilch 1987). Since the questionnaire for this study involves both specific issues regarding export marketing and exporting in general, the selection of knowledgeable respondents according to John, (1984) must be a key consideration in the data collection process. The authors therefore felt that the most appropriate person to complete the questionnaire in the companies selected should be the export manager or the marketing manager. However, in very small firms where there is no export or marketing manager, the director or general manager was asked to complete the questionnaire.

Of the total 111 exporting firms used in the sample, 34 per cent were involved in manufacturing final consumer goods, while about 57 per cent of the firms were engaged in manufacturing final industrial products and the remaining 9 per cent of the firms were manufacturing other things such as component parts. Using firms that were engaged in manufacturing final industrial products as well those engaged in manufacturing non-industrial products is an indication that firms in this study represented a broad spectrum of exporting firms in China. However, although the achieved sample is not generally representative of the total set of firms in China, the findings are at least suggestive of the marketing mix control practiced by the exporters in the population from which the sample was drawn.

The majority (96.4 per cent) of the respondents were in senior/middle level management positions. Only 3.6 per cent of respondents described themselves as junior managers in their firms. Given that nearly all the respondents used in this study were in middle/senior management positions they should have a reasonable knowledge regarding the export practices of their firms. Most (80 per cent) of the respondents had college or university qualifications. On the whole, the exporting firms used for this study consisted of small, medium, and large sized exporting firms. For example, the majority (86 per cent) of the respondents employed more than 99 full time employees. Only 13.5 per cent of the respondents employed less than 100 employees. More than a third (37.8 per cent) of the respondents employed 1,000 full time employees or more.

The rationale of the inclusion of small, medium, and large sized firms in this study is that according to Aaby and Slater, (1989) there is little agreement in the literature regarding the impact of organizational size on either export propensity or export success. According to the literature, although large sized firms tend to have more financial and human resources for export, firm size is not a barrier to export success for small firms.

Instrument Used for Data Collection

The primary data collection for this study commenced with a series of informal personal interviews with business managers and executives in P.R.C. who are familiar with the exporting activities of their firms. For these informal interviews, open-ended questions were used to gain free and uninhibited responses from the interviewees about the export practices of their firms. The information collected from this first step, combined with secondary data obtained from a literature review, provided the basis for the development of a structured questionnaire used for this study. This was followed by the translation of the original English questionnaire into its Chinese version. To avoid the problem of an overly literal word-for-word type of translation, the Chinese questionnaire was forwarded for comment to several academic researchers who are familiar with not only the international marketing literature, but also the business environment in mainland China. The feedback obtained from these researchers was used to improve the questionnaire before pre-testing.

Twenty exporting firms in China were used for pre-testing the questionnaire through personal interviews. Some of the respondents used in pre-testing the questionnaire completed it in Hong Kong because the pre-testing was scheduled to coincide with the time they were attending a course in Hong Kong. During the pre-test, respondents were asked to complete the questionnaire and indicate any difficulties they experienced and to offer suggestions for improvement. This second step ensured that ambiguity and confusion was minimized.

The final structured questionnaire was delivered personally to each firm and later collected. Each firm was asked to provide information on one successful product export venture and one unsuccessful product export venture initiated not more than three years ago. This method of asking respondents to choose one successful case and one unsuccessful case within a specific period of time was used in a study by Madsen, (1989) and utilized for this study because the approach is useful for comparative purposes. Another reason for using this approach according to Madsen, (1989) is the desire to exclude ad hoc export activities from the study.

In the literature, other researchers that used this method (i.e. asking respondents to pick one successful case and one unsuccessful case) in previous export performance studies include: Cavusgil and Zou, 1994; Kleinschmidt, 1988; Madsen, 1989; Li and Ogunmokun, 2001). This approach is appropriate because, according to Matthyssens and Pauwels (1996), comparison between complete success and complete failure is a valuable analysis as it serves to highlight the distinctive characteristics in differentiating export success and failures. This approach is also a popular method used in the new product development research studies (see e.g. Brown and Eisenhardt, 1995 for an overview; Cooper, 1979; Mishra et al., 1996, Montoya-Weiss et al., 1994; Parry and Song, 1994; Song and Parry, 1997). Furthermore, since both successful and unsuccessful export ventures will be selected by the same firm and looked after by the same respondent owner/manager, much control over contextual variables such as firm and personal characteristics could be attained (Matthyssens and Pauwels, 1996).

In order to determine whether the characteristics of the respondents differ from those of “non-respondents”, a sample of 50 non-respondents was contacted by phone to obtain the structural characteristics of their firms and reasons for their refusal to complete this survey. This procedure generated 32 responses. Eighteen firms out the 32 firms explained that they could not participate in this survey because either (1) they had stopped exporting, or (2) they had not started exporting activities. None of the respondents reported difficulty in understanding the instrument as a factor for not completing the questionnaire. Furthermore, the analysis of data (at the five per cent significance level) showed that the characteristics of non-respondents concerning firm size, total company sales turnover, international experience, number and type of export markets did not differ significantly from those of respondents.

Aaker and Mascarenhas (1984) described strategic flexibility as the ability of the organization to adapt to substantial, uncertain, and fast occurring environmental changes. Kickert (1985) defined flexibility as a meta-control aimed at increasing control capacity as a reaction to uncertain future environmental development. Eppink (1978a) interpreted flexibility as a characteristic of an organization that made it less vulnerable to, or better able to respond successfully to, unforeseen environmental change. All these definitions of flexibility by Aaker and Mascarenhas (1984), Kickert, (1985), and Eppink, (1978a) tend to suggest that strategic flexibility is rooted in the ability of an organization to adapt very quickly to environmental changes.

The list of statements used to measure the flexibility of a firm to change its manufacturing process appropriately in response to environment changes were adopted from Bearden, Igram and Laforge (1995), Noori (1990), Paik (1991), and Young et. al (1992). A five-point scale was employed for asking respondents to rate their firms level of flexibility in adapting to their manufacturing process to environmental changes when their product export venture was successful versus when it was not successful on a 5-point scale (1=very inflexible, 5=very flexible).

RESEARCH FINDINGS

Manufacturing Flexibility

There is significant difference between successful and unsuccessful export ventures with respect to the firm’s flexibility in adapting their manufacturing in the area of physical distribution (see table 1) to the environment. For example, the claim by respondents that their firms were very flexible in adapting the following aspects of their manufacturing to changes in the environment were cited more frequently when export ventures were successful than when they were unsuccessful

- Tracking inventory;
- Replenishing stock;
- Assuming carrying costs;
- Speeding up container movement;
- Offering higher service levels; and
- Sharing data with suppliers or distributors.

Table 1 Manufacturing Flexibility

Manufacturing Flexibility	Number of firms that claimed to have flexibility in the following physical distribution areas when export ventures were successful		Number of firms that claimed to have flexibility in the following physical distribution areas when export ventures were unsuccessful		Chi-square Sig. Level
	N = 111	%	N = 111	%	
<i>Flexibility of the organization (in response to environmental changes) to provide quick responses in physical distribution activities:</i>					
The organization was very flexible in providing quick responses in tracking inventory and sales.	54	48.6	25	22.5	.001
The organization was very flexible in providing quick responses in replenishing stock.	55	49.5	28	25.2	.001
The organization was very flexible in providing quick responses in assuming carrying costs.	48	43.2	25	22.5	.005
The organization was very flexible in providing quick responses in speeding up container movement.	46	41.4	22	19.8	.001
The organization was very flexible in providing quick responses in offering higher levels of service.	77	69.4	38	34.2	.000
The organization was very flexible in providing quick responses in sharing data with suppliers or distributors.	58	52.3	26	23.4	.001

(Note: Chi-square test with D.F. = 1 was used for the above analysis.)

For example, when export ventures were successful the majority (69.4 per cent) of the firms claimed to have flexibility in offering high levels of service in their physical distribution activities in response to environmental changes compared to just a third (34.2 per cent) of the firms that made such a claim when export ventures were unsuccessful. Whereas about a half of the firms claimed to have flexibility in sharing data with suppliers/distributors, in tracking inventory and sales, and in replenishing stock in response to environmental changes when export ventures were successful, only about a quarter of the firms made such a claim when export ventures were unsuccessful. These findings tend to support Bello and Gilliland's (1997) studies, which showed that flexibility has a significant positive effect on export channel performance.

SUMMARY AND CONCLUSION

Concerning manufacturing the claim by respondents that their firms were very flexible in adapting the following aspects of their manufacturing to changes in the environment were cited more frequently when export ventures were successful than when they were unsuccessful: Tracking inventory; Replenishing stock; Assuming carrying costs; Speeding up container movement; Offering higher service levels; and Sharing data with suppliers or distributors.

These findings tend to support that manufacturing flexibility is related to export performance. The major implication of the findings of this study is that organizations that are not flexible in their manufacturing may be hindering the performance of their export ventures that is necessary for sustaining the survival of their operations. However, because this study used a small sample (N=111 exporting companies), more intensive studies are required to investigate further the validity of the findings of this exploratory study.

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