A decade of competitive priorities within manufacturing SMEs: a longitudinal study from 2000 to 2017

Dr Eustathios Sainidis
Dr Andrew Robson
Newcastle Business School
Northumbria University

Topic: A longitudinal study on competitive priorities within manufacturing SMEs: 2000-2017.
Conference theme: Business creation, early stage development and business closure.
Aim: The paper aims at evaluating the competitive priorities of UK-based manufacturing SMEs over two decades 2000-2017.
Methodology: A longitudinal study based on a mixed methods research approach covering two decades from 2000 until 2017. The mixed data consists of two sets of quantitative data and one set of qualitative data, primary data covering the timeline from 2000 until 2017.
Contribution: The study suggests a shift in the competitive priorities of manufacturing SMEs from delivery performance and quality in the early years of 2000s to productivity, efficiency and process flexibility in the second part of 2010s. Pivotal in the change of strategic direction is the 2008-09 Great Recession which acted a structural break in the SMEs business environment.
Practical implications: The study offers an insight to manufacturing SME managers on the change of direction of their competitive environment and acts as a call for repositioning their competitive priorities.
Policy implications: The study draws upon the successive UK government industrial strategies since 2000 and compares these to the practices of manufacturing SMEs.
Keywords: SMEs, manufacturing priorities, longitudinal study, mixed-methods research.
Paper classification: Research paper.

Introduction

The manufacturing sector makes a substantial contribution to the global economy both in terms of economic output and employment opportunities. Manufacturing firms in the United Kingdom employ 2.6 million people, contribute 10% to the nation's gross value added (GVA) and account for 44% of its exports (EEF, 2017). Since the Global Recession of 2008-09 investment in rebalancing the UK economy has become a priority for successive British governments. Consequently, a number of government-led industrial strategies between 2010 to 2017 have resulted in the country regaining its position as the 9th largest contributor to the global output of manufactured goods (Rhodes, 2016). An important factor in the success of the industrial strategies and supplementing polices has been the rebalancing of key manufacturing priorities by businesses and supporting public policy bodies.

The present paper presents a longitudinal study based on a mixed methods data set aiming to review the changes of manufacturing priorities within the SMEs sector. The geographical focus of the study is the United Kingdom. A review of the extant literature on manufacturing priorities and how these are positioned within the SMEs sector provides the theoretical background of the study. The study is of particular interest to academics, manufacturing practitioners and industrial policy bodies.

The results of the study indicate a clear shift in the competitive priorities of manufacturing SMEs. The shift in the change of strategic focus is in the areas of efficiency and productivity accompanied with a greater level of product range and manufacturing process flexibility. Delivery performance and quality management have become threshold competences in the post-Great recession business environment for SMEs.

Literature Review

Manufacturing strategy includes management decisions and actions at functional level and reflects and supports the overall business strategy of the organisation. Manufacturing and operations literature differentiates between process and content of manufacturing strategy. Manufacturing strategy process refers to the formulation and implementation of the manufacturing strategy whereas manufacturing strategy content to the strategic decisions and actions of the organisation (Acur *et al.,* 2003*).* The present paper has an interest in the manufacturing content and in particular competitive priorities applicable to manufacturing SMEs. Manufacturing competitive priorities are a set of strategic objectives the manufacturing function is expected to meet in order to support the overarching SME business strategy (Tarigan, 2005; Sarmiento *et al.,* 2008). Within the literature, the list of manufacturing competitive priorities has expanded considerably over the years into a number of customer-driven criteria including: delivery performance (dependability), product quality, product design, manufacturing flexibility, manufacturing cost, innovation, but also corporate measures such as return on investment, risk, organisational learning and financial viability.

The majority of the literature is primarily drawn upon studies on large organisations. There is absence of studies on the strategic manufacturing considerations within the SME arena (O'Regan *et al.,* 2006). Although the body of literature on SMEs has grown considerably, there are still very few studies on how manufacturing SMEs view and develop their competitive priorities, decisions and related issues, making it very difficult for researchers to identify accepted theoretical constructs. The aim of the paper is to explore this literature gap and by benefiting from primary data spanning across the two decades of 2000s and 2010s to identify realignment of the strategic direction within the manufacturing SMEs sector.

Reviewing the state of the literature on competitive priorities a number of influential studies have shaped current academic and practitioner thinking. Lagace and Bourgault (2001) surveyed 229 SMEs aiming to evaluate the effectiveness of government initiatives on improving manufacturing practices. Their study confirms that SMEs place considerable emphasis on the competitive priorities of quality, manufacturing flexibility and employee involvement. On the other hand, the same SMEs place relatively limited emphasis on the manufacturing decisions of product development, manufacturing set-up time, maintenance management, cellular layout, relationships with suppliers, stock management and product simplification. The same study by Lagace and Bourgault (2001) also concludes on government initiatives which should reflect the manufacturing competitive priorities and decisions of individual SMEs in order to be successful, instead of taking a generic approach to SMEs.

Further empirical research illustrates that although a large number of SMEs are heavily investing in manufacturing process technology and quality systems (e.g. ISO certification), these investments do not bring immediate organisational and performance improvements (Swamidass, 1995). Further studies also question the benefits of isolated and opportunistic implementation of world-class manufacturing systems such as JIT and TQM (Ferdows and De Mayer, 1990; Bartezzaghi and Spina, 1998; Boyer, 1998). These strategic manufacturing improvement systems, programs and decisions lead to real gains only if they are in line with

the SME's corporate strategic orientations (Gilgeous and Gilgeous, 1999; Raymond and Croteau, 2009).

SMEs use innovation in product and service as a model for growth (Storey, 1994; Beaver and Prince, 2002). However, O'Regan *et al.* (2006) found that UK-based SMEs have internal difficulties in converting R&D investment into innovative products. The same authors suggested that high-growth SMEs tend to place greater emphasis on their sales and marketing strategy rather than their manufacturing process aiming to compete on price and customer service. Hogg (2003) points to the importance SMEs place on being flexible to customer demands. More recent research however suggests that UK-based SMEs do not complete on price anymore, instead they see quality and customer service as their value activities (MacBryde *et al.*, 2013). A cautious conclusion may be made that manufacturing flexibility is becoming a major strategic consideration for SMEs, however, so far no empirical evidence supports this claim. Rundh (2011) also adds that product flexibility is a requirement in export driven SMEs.

Study Design and methods of data analysis

The study presented in this paper aims to respond to calls for further use of qualitative data and in particular the lack of mixed methods within the SMEs and manufacturing management literature (Boyer and Swink, 2008; Barratt *et al.*, 2011). Stemming from a relativist ontological stance and influenced by the philosophical position of pragmatism, the study makes use of the advantages of mixed methods to explore the complex nature of manufacturing SMEs over the two-decade timeframe the longitudinal study covers.

Barratt *et al.* (2011) review of research methods applied within the manufacturing and operations management literature suggest a strong bias towards positivistic, quantitative-based research within the discipline, although the number of qualitative-based research studies has slowly increased since the late 1990s. The majority of studies in eth discipline are inductive (theory building), with deductive (theory testing) studies making for just below a fifth of the total published papers in reputable academic journals.

Likewise, a small number of SMEs and manufacturing management research has applied a mixed methods approach. To note a few, the most notable is the work by Badri *et al*. (2000), SIOM (2009), Kitching *et al*. (2009b) and MacBryde *et al*. (2013). Mixed methods approach offer the advantages of collecting rich data in the form of both qualitative and quantitative, analysis and interpretation (Creswell and Plano Clark, 2011). Moreover, the application of a parallel mixed analysis (Tashakkori and Teddlie, 1998) seeks to utilise triangulation and counter for any limitation of utilising a single method of data collection and analysis approach, thereby providing a greater insight into the longitudinal study presented here.

A common data collection instrument was used across the longitudinal study in the form of a questionnaire. The questionnaire was designed to reflect the current state of the academic literature at the two time-points of the longitudinal study to allow for comparisons between theory and practice and further exploration of the UK-based manufacturing SME sector. The two time-points of the longitudinal study are the years of 2000 when the first survey was completed and 2017 when the second survey and follow up interviews took place. The 2000 survey was a postal survey with a response rate of 22.7% whereas the 2017 survey was an online survey with a response rate of 4.3%. The different response rates indicate the limitations of modern survey-based data collection techniques where senior managers of SMEs and other

organisations receive a very high number of survey demands resulting in a reluctance to participate in all research activities.

The research was subject to ethical approval by the author's University. Implementation of appropriate protocols capturing guaranteeing confidentiality, anonymity and data storage followed. Piloting of the data collection instrument (survey/interview questionnaire) ensured the instrument accounted for clarity of terminology, wording and instruction, further assessing completion time and ease of understanding.

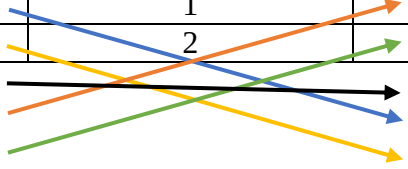
The quantitative and qualitative data sets where subject to the mixed method analysis techniques. In particular the parallel mixed analysis method incorporating both quantitative and qualitative data was employed as described by Caracelli and Greene (1993) and Tashakkori and Teddlie (1998). The quantitative analysis involved the application of descriptive statistics percentage frequency distributions and paired t-test assessments of the various priority area scales presented in the survey instrument, alongside a correlation analysis to assess association between the Global Recession which acted at an economic structural break on manufacturing management practices of the SMEs sector. For each of the tests and associations presented, reporting of levels of significance is at the standard 5%, 1% or 0.1% levels. This afforded a sector overview, if not necessarily generalizable given sample size, the findings have arguably some level of transferability. The sample size and associated numbers of MSMEs within associated sub-sectors prohibit meaningful tests for differences in experience, and as such, represent a study limitation albeit perhaps not unexpected for a sector noted for low study participation (Dennis, 2003). In line with the mixed methods and parallel analysis research approaches enriching of the quantitative findings by the quality and volume of the qualitative data generated by the in-depth survey follow-up interviews involved "*nesting*" of the two data sets (Yin, 2006). The qualitative data was subject to template analysis (King, 2004) a method used in other business and management research (Waring and Wainwright, 2008). By implementing the parallel mixed analysis method appropriate relationships and synthesis between the two components of analysis well-supported conclusions are developed (Onwuegbuzie and Johnson, 2006; Yin, 2006).

Findings and Discussion

The study has the aim to identify changes in the competitive priorities of manufacturing SMEs using a UK-based sample. The paper builds on established SMEs and manufacturing priorities theoretical paradigms and points to evidence of the Great Recession acting as a micro-economic structural break.

The longitudinal data shows evidence of strategic shift from 2000 to 2017. Manufacturing SMEs in the early years of 2000s were highly concerned with delivery speed and quality followed by manufacturing flexibility, cost, product range, and technology being at the bottom of their competitive priority list. Table 1 lists the two sets of competitive priorities and how these have changed for the manufacturing SMEs sector over the course of almost two decades between 2000 and 2017. The results reveal a complete shift in what manufacturing SMEs perceive as their key strategic issues. The response is the homogenous across the sampled SMEs regardless of size, production type (batch, job, continuous) or location within the UK.

2000 competitive priorities	importance	2017 competitive priorities
delivery performance	1	cost
quality	2	product range



manufacturing flexibility	3	manufacturing flexibility
cost	4	delivery performance
product range	5	quality

Table 1. Comparison of SME competitive priorities over the time-period: 2000-2017.

The follow-up interview data revealed a number of causes for the shift of strategic focus. The underlying factors of the strong focus on cost reduction, efficiencies and productivity are price inflation of raw materials, energy bills and the remuneration of essential, skilled employees. The weaker sterling pound since the Great Recession (2008-09) and Brexit referendum (2016) have put inflationary pressures on the UK industrial sector.

The Great Recession had a profound impact in the cost base of SMEs and the manufacturing sector in particular. Three in four of the SMEs participating in the survey reported here have experienced significant cost increases, primarily relating to energy, transportation and materials. The management of energy has emerged as a core strategic consideration, given the large above-inflation increases in both electricity and industrial gas (DECC, 2012). To realise these achievements, the participating SMEs report on the essential role that needs to be played by senior management through employee motivation and changes to the culture within their organisations.

The importance attached to delivery performance has clearly declined for SMEs in the today's business environment from being at the top of the list in 2000 to a low priority in 2017. This is line with the historical review of the relevant literature, which presents a similar picture. (Swamidass and Newell, 1987; Ward *et al*., 1995, Acur *et al*., 2003, Grössler and Grübner, 2006). The trend towards high levels of delivery performance becoming a threshold competitive advantage is further reinforced by the proportion of UK manufacturers exhibiting improvements since the millennium (DTI, 2008).

Smaller batch size orders and more frequent deliveries described above have led in increases in transport costs, and need for need for competent manufacturing flexibility and greater product range. This also puts pressure economies of scale. Migration towards vertical integration, consideration of the supply chain and the pursuit of resources efficiencies have been the principal outcomes for the SMEs in this particular study, as indicated by various interviewees.

Concluding remarks

A number of contributions emerge from the study presented in this paper. First, it contributes to the limited number of longitudinal studies in the SMEs literature. The study has a particular focus on manufacturing SMEs with a geographical focus on the UK, the literature in this area is scarce. The paper's research question is driven by the critical strategic considerations faced by manufacturing managers within the British SMEs arena as a result of the turbulence the Great Recession and Brexit have developed in the business environment. As such the study offers empirical and conceptual value to this contemporary academic field. At the same time, its employment of a mixed methods research design responds to the recent call by Boyer and Swink (2008) and Barratt *et al.* (2011) for further qualitative-based and mixed methods research angles to be applied within the subject of SMEs and manufacturing management.

The analysis and subsequent discussion of the primary data collected for this study confirms a realignment of the manufacturing priories of delivery performance, cost, quality and flexibility within the UK SMEs sector due to industry and market changes since the Great Recession. Increasing market pressures for product customisation, increase in product range and shorter life cycles complemented with short and more frequent product orders have led SME managers to promote product and manufacturing process innovations within their SMEs. Moreover, inflationary pressures on energy and supply costs are directing manufacturing SMEs towards green manufacturing practices and in-house-manufacture.

References

Acur N, Gertsen F, Sun H, and Frick J (2003). The formalisation of manufacturing strategy and its influence on the relationships between competitive objectives, improvement goals, and action plans. *International Journal of Operations and Production Management.* Vol. 23 (10), pp.1114-1141.

Ahmad A and Schroeder R (2002). Dimensions of competitive priorities: are they clear, communicated and consistent. *Journal of Applied Business Research.* Vol. 18 (1), pp. 77-86.

Badri M, Davis D, and Davis D (2000). Operations strategy: environmental uncertainly and performance: a path analytic model of industries in developing countries. *Omega.* Vol. 28 (2), pp. 155-173.

Barratt M, Choi T, Li M (2011). Qualitative case studies in operations management: trends, research outcomes, and future research applications. *Journal of Operations Management. Vol*. 29 (4), pp. 329-342.

Bartezzaghi E and Spina G (1998). Italian assembly industry: challenges and responses to globalisation and innovation. *In: International Manufacturing Strategies, edited by Lindgerg P et al.* UK: Kluwer Academic Publishers.

Beaver G and Prince C (2002). Innovation, entrepreneurship and competitive advantage in the entrepreneurial venture. *Journal of Small Business and Enterprise Development.* Vol. 9 (1), pp. 28-37.

Boyer K (1998). Longitudinal linkages between intended and realised operations strategies. *International Journal of Operations and Production Management.* Vol. 18 (4), pp. 356-373.

Boyer K and Swink M (2008). Empirical elephants - why multiple methods are essential to quality research in operations and supply chain management. *Journal of Operations Management.* Vol. 26 (3), pp. 337-348.

Caracelli V and Greene J (1993). Data analysis strategies for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis.* Vol. 15 (2), pp. 195-207.

Creswell J and Plano Clark V (2011). *Designing and Conducting Mixed Methods Research.* 2nd edition. Sage.

DECC (2012). *Quarterly Statistical Publication Containing Tables, Charts and Commentary Covering Energy Prices to Domestic and Industrial Consumers for all the Major Fuels.* Available from:

Dennis W (2003). Raising response rate in mail surveys of small business owners: results of an experiment. *Journal of Small Business Management.* Vol. 41 (3), pp. 278-295.

DTI (2008). *The Government's Manufacturing Strategy.*

EEF (2017). *2017/18 UK Manufacturing Factcard.*

Ferdows K and De Mayer A (1990). Influence of manufacturing improvement programs on performance. *International Journal of Operations and Production Management.* Vol. 10 (2), pp. 120-131.

Gilgeous V and Gilgeous M (1999). A Framework for manufacturing excellence. *Integrated Manufacturing Systems.* Vol. 10 (1), pp. 33-44.

Grössler A and Grübner A (2006). An empirical model of the relationships between manufacturing capabilities. *International Journal of Operations and Production Management.* Vol. 26 (5), pp.458-485.

Hogg G (2003). Consumer changes, in Hart S (eds), *Marketing Changes.* Thomson.

http://www.decc.gov.uk/publications/Default.aspx?term=energy%20prices&tags=&urn=&frommdate=&todate=&alpha=#result

King N (2004). Using templates in the thematic analysis of text, in: Cassell C and Symon G (Eds). *Essential Guide to Qualitative Methods in Organisational Research.* Sage.

Kitching J, Smallbone D and Xhenethi M (2009). Have UK Small Enterprises been Victims of the 'Credit Crunch'? *XXIII RENT Conference.* Budapest, 19-20 November.

Lagace D and Bourgault M (2001). *Linking manufacturing improvement programs to the competitive priorities of Canadian SMEs.* Technovation. Vol. 23 No. 8. pp. 705-715.

MacBryde J, Paton S and Clegg B (2013). Understanding high-value manufacturing in Scottish SMEs. *International Journal of Operations & Production Management.* Vol. 33 (11/12), pp. 1579-1598.

O'Regan N, Ghobadian A and Gallear D (2006). In search of drivers of high growth in manufacturing SMEs. *Technovation.* Vol. 26 (1), pp. 30-41.

Onwuegbuzie A and Johnson B (2006). The validity issue in mixed research. *Research in the Schools.* Vol. 13 (1), pp. 48-63.

Raymond L and Croteau A-M (2009). Manufacturing strategy and business strategy in medium-sized enterprises: performance effects of strategic alignment. *IEEE Transactions on Engineering Management.* Vol. 45 (2), pp. 192-202.

Rhodes C (2016). *Manufacturing: International Comparisons.* Briefing Paper Number 05809, 18 August 2016. House of Commons Library.

Rundh B (2011). Linking flexibility and entrepreneurship to the performances of SMEs in export markets. *Journal of Manufacturing Technology Management.* Vol. 22 (3), pp. 330-347.

Sarmiento R, Knowles G and Byrne M (2008). Strategic consensus on manufacturing competitive priorities – A new methodology and proposals for research. *Journal of Manufacturing Technology Management.* Vol. 19 (7), pp. 830-843.

Sarmiento R, Knowles G and Byrne M (2008). Strategic consensus on manufacturing competitive priorities – A new methodology and proposals for research. *Journal of Manufacturing Technology Management.* Vol. 19 (7), pp. 830-843.

SIOM (2009). *Manufacturing in Scotland.* University of Strathclyde Glasgow: January.

Storey D (1994). *Understanding the Small Business Sector.* Routledge.

Swamidass P (1995). *Technology on the Factory Floor II.* Washington: The Manufacturing Institute.

Swamidass P and Newell W (1987). Manufacturing strategy, environmental uncertainty and performance: a path analytic model. *Management Science.* Vol. 33 (4), pp.509-524.

Swink M and Way H (1995). Manufacturing strategy. Propositions, current research, renewed directions. *International Journal of Operations and Production Management.* Vol. 15 (7), pp.4-26.

Tarigan R (2005). An evaluation of the relationship between alignment of strategic priorities and manufacturing performance. *International Journal of Management.* Vol. 22 (4), pp. 586-597.

Tashakkori A and Teddlie (1998). *Mixed Methodology – Combining Qualitative and Quantitative Approaches.* Sage.

Ward P, Duray R, Keong Leong K and Sum Chee-Chuong (1995). Business environment, operations strategy, and performance: an empirical study of Singapore manufacturers. *Journal of Operations Management.* Vol. 13 (2), pp.99-115.

Waring T and Wainwright D (2008). Issues and challenges in the use of template analysis: two comparative case studies from the field. *The Electronic Journal of Business Research Methods.* Vol. 6 (1), pp. 85-94.

Yin R K (2006). Mixed methods research: Are the methods genuinely integrated or merely parallel? *Research in the Schools*. Vol. 13 (1), pp. 41-47.