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Manufacturing Strategy & Operations: Reflections on Key Current Issues: Challenges and Associated Human Resource Implications

Lorraine McGrath

Technological University Dublin

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Renato Passaro, Antonio Thomas
(Editors)

Supply Chain Management: Perspectives, Issues and Cases



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Manufacturing strategy & operations: Reflections on key current issues, challenges and associated human resource implications

Lorraine McGrath¹

This chapter evaluates the current issues and challenges in defining a company's manufacturing strategy and its production operations in consideration of the contemporary shift to low cost manufacturing locations. Competitive priorities of cost, quality, delivery and flexibility are reviewed. The structural and infrastructure elements of a manufacturing strategy are outlined. Mitigating risks in a global arena are reviewed. Collaborative efforts, including the cultural and personality issues of being human are included in the discussion of managing diversity in such a highly competitive and challenging enterprise resource planning environment.

1 Introduction

As an integral part of the supply chain, manufacturing plays a vital strategic role in modern businesses, as an increasingly competitive weapon not only to help them to achieve competitive advantage, but also for their basic survival. Although customer demands are many, they still tend to be prioritised into price (cost), quality (fit for purpose and aesthetics), delivery (fast and on-time) and flexibility (agile and ability to customise).

¹ National Institute for Transport and Logistics, Dublin Institute of Technology.

Therefore, a business' competitive strategy will impact on (and will be influenced by) its manufacturing strategy, where "business strategy" is defined as being "a cohesive entity of programmes, projects and policies that concentrate corporate resources to enable an organization to establish, sustain and enhance its competitiveness and capabilities for self-renewal" (Park, 2007: p.73). Consequently, it is necessary for companies to develop and evolve their manufacturing strategies in tandem with their overall business strategies to ensure they meet their objectives of having the three "rights", per Table 1, whether they are individual local domestic businesses or very large global organisations.

- *Right product*: with the required levels of functional and aesthetic quality standards.
- *Right time*: with increasingly shorter lead-time and with reliable deliveries in the quantities needed.
- *Right Cost*: with acceptable profit for all involved in the supply chain.

Table 1 The three "rights"

As shown in Table 2, Hayes and Wheelwright (1984) outlined ten elements of manufacturing strategy:

- Structure*
- *Capacity*: Capacity flexibility, shift patterns, temporary subcontracting policies.
 - *Facilities*: Size, capacity, location and focus on manufacturing resources.
 - *Production equipment*: Degree of automation, technology choices, configuration of equipment into lines, cells etc.
 - *Vertical integration*: Strategic make versus buy, supplier policies, extent of dependence on suppliers.
- Infrastructure*
- *Human resource policies*: Recruitment, training and development, culture and management style.
 - *Quality systems*: Quality assurance and quality control policies and practice.
 - *Production planning/materials control*: Production and order, material control system.
 - *New product development processes*: Design for manufacture guidelines, introduction stages, organisational aspects.

- *Performance measurement*: Financial and non-financial performance management and linkages to recognition and reward systems.
- *Organisation*: Structure, accountabilities and responsibilities.

Table 2 Ten elements of manufacturing strategy

Traditionally, manufacturing strategy focussed on the “structural” elements. Long term sustainable success also requires a solid “infrastructure” and attention to local personnel, political and cultural issues. One way to address these issues is to form partnerships or strategic alliances with a company already operating in the low-cost location, if the company favours outsourcing its manufacturing and/or logistics activities, as many do now.

Other options include establishing its own operations in the low cost country, presumably with the majority of employees being local. A third option is to sub-contract its requirements from an independent supplier. All three options involve substantial risk to their supply chains, and a need to recognise the importance of dealing with diverse cultures in multifunctional cross-matrix arenas.

2 Added value

Skinner (1974) outlined an effective operations strategy in terms of “added value” to customers. Specifically, value is added through the competitive priority or priorities that are selected to support a given strategy. Skinner initially identified four basic competitive priorities, which translate into characteristics that are used to describe various processes by which a company can add value to the products it provides.

A fifth competitive priority – service – was added by Sandra Vandermerwe (1993). These five competitive priorities are outlined in Table 3.

- *Cost*: Historically these were typically commodity-like (e.g. flour, petroleum, sugar). However, with the advent of rapid consumer information regarding competitive price information in contemporary times, almost all items are influenced by the cost priority.
- *Quality*: This is now a market “qualifier” which means that customers expect functional or aesthetic quality standards as a “given”, and not related to price. While customers may compromise price for perceived “brand” advantages, they still expect basic functional and/or aesthetic quality as a basic requirement irrespective of price.
- *Delivery*: The company’s ability to provide consistent and fast delivery. This is now a market “qualifier” which means that customers expect short (sometimes immediate) lead-times coupled with quantity completeness, especially in areas where there are

available alternative suppliers. Access to such immediate information regarding availability is now often available instantly via the internet.

- *Flexibility*: This relates to how the company's processes are designed resulting in its ability to offer customers a wide variety of products and to respond to rapidly changing product life cycles. Another dimension of flexibility refers to the company's ability to customise its products to meet specific requirements of individual customers – often referred to as “mass customisation”.
- *Service*: As a result of reducing product life cycles, product service is now associated with “value-added” service which can vary to include ease of set-up or installation, technical support, bundled functionality and associated prices, and many other innovative “values”.

Table 3 Five basic competitive priorities

3 Effects of global changes

Currently, with the advent of electronic communications, information technology at end users' fingertips via the internet and the enormous changes which have taken place in the global economic structure (mainly regarding the reductions of traditional trade barriers), local domestic businesses find themselves competing with global organisations. Manufacturing competitiveness has shifted geographically from the west to the east.

While this brings opportunities for western companies to expand into these new and densely populated markets, it also brings enormous challenges relating to vastly different cultural and logistics issues. In China, for example, 30 years ago Zhenzhen was just a small fishing town of less than 80,000 people but now has a population of more than 12 million and manufactures products for the full range of electronic devices, fashion garments and accessories, and much more, for sales to the western world as well as to their own local and fast-growing domestic market.

4 Outsourcing

Outsourcing, defined by Chase *et al.* (2004: p.372), as an “act of moving some of a firm's internal activities and decision responsibilities to outside providers” offers companies an opportunity to pursue cost advantages by concentrating manufacturing and operations in these low-labour cost countries.

4.1 Outsourcing decision framework

The typical elements of the outsourcing decision where the motivators, benefits, risks and other factors are typically encountered in such decisions (Kremic *et al.* 2006) are outlined Figure 1.

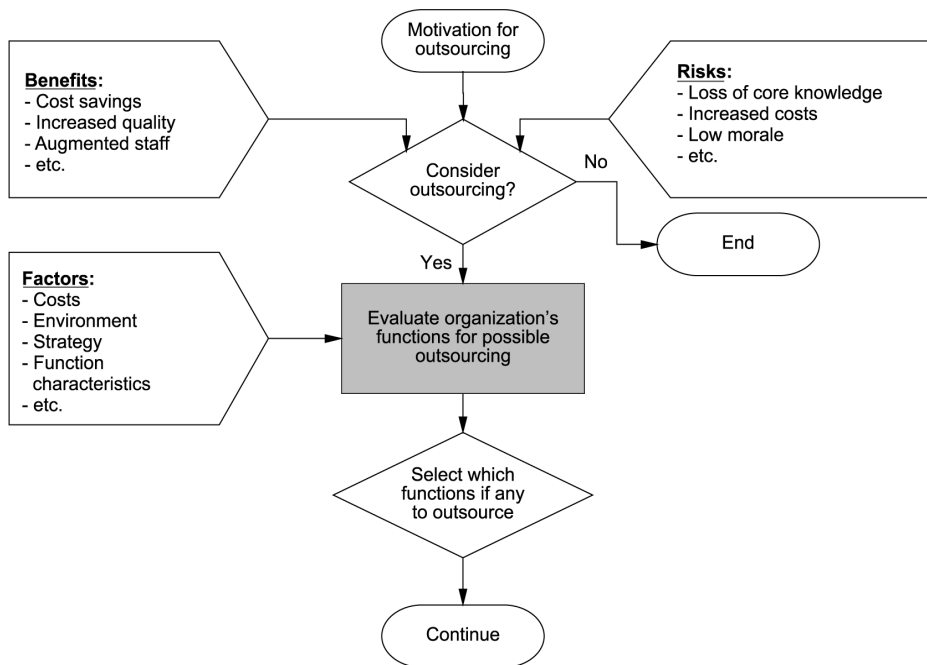


Figure 1 Outsourcing decision framework (Kremic *et al.*, 2006)

While there can be many reasons why firms consider outsourcing, the main driver is to lower cost. Customers, as competition intensifies with easy information access and multiple players in low-cost (currently mainly in the east), including the expanding roles of (third party logistic providers (3PLs), and indeed fourth party logistics providers (4PLs), evaluate their options and alternatives various companies can offer them. If they are not satisfied with the current products or services they can easily switch to others with an ease unknown in the past.

Achieving the 3 “rights” (as shown in Table 4) is increasingly difficult when the company’s manufacturing operations are dispersed across the globe. There are numerous risks associated with outsourcing, each as potential negative impact on customer service.

Kremic *et al.* (2006) list some of the more common risks as shown in Table 4.

- | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Unrealized savings or hidden costs• Less flexibility• Poor contract or poor selection of partner• Loss of knowledge/skills• Loss of control/core competence• Power shift to supplier• Supplier problems (poor performance or bad relations, opportunistic behaviour, etc.)• Losing customers, opportunities, or reputation• Uncertainty/changing environment• Poor morale/employee issues |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 4 Common risks in outsourcing (Kremic *et al.*, 2006)

Manufacturing strategy cannot be formed in a vacuum; it affects and is affected by many organizational groups inside and outside the company itself because of the interrelationships involved within its own divisions firstly and secondly with its competitors, customers, suppliers and other parties such as 3PL's. Working together and consistently on overall objectives are the keys to success in these interactions.

5 Low cost manufacturing locations

Transferring manufacturing operations to low cost economies can lead to cultural, language and geographic difficulties while customers expect the same level of service and availability after such transfers as before, whether they are to the company's owned facilities, joint ventures or to independent outsourced "suppliers". If operational flexibility is reduced after such manufacturing transfers then the ability to respond to customers' needs will be diminished.

Mainly due to the distances involved and the pressures felt to ensure product availability, many companies resort to maintaining high inventories of the "low-cost manufactured" product at various points in the supply chain, perhaps in distribution centres or 3PL hubs, or they may maintain multiple sources through quota and/or parallel sourcing. Monitoring and regulating these suppliers can be difficult, time con-

suming and fraught with risk resulting in additional product “cost”. Therefore, there is significant uncertainty about the expected savings generated by such strategic decisions in the first place.

While initial cost-saving benefits might be achieved, levels of satisfaction with quality, delivery, lead-time and production innovation may be “wanting”. A recent survey concluded that “companies that are able to size, time and prioritize demand opportunities; cultivate and protect future demand in high-growth geographies and build agile and flexible operational capabilities, will have the best chance for long-term success” (Accenture, 2012: p.6) .

6 Mitigating risk

Risks can be divided into three types: risks inherent in any project, general risks that would be present in most outsourcing projects and specific risks that would confront the specific organisation, people, resources and providers involved (Greaver, 1999). From a single organisation view (Miller, 1992) distinguished five generic strategies companies undertake in order to mitigate risk, four of which can be adapted to supply chain contexts as described in Table 5.

- *Avoidance*: Dropping specific products/geographical markets/supplier and/or customer organisations.
- *Control*: Vertical integration. Increased stockpiling and the use of buffer inventory. Maintaining excess capacity in productions, storage, handling and/or transport. Imposing contractual obligations on suppliers.
- *Co-operation*: Joint efforts to improve supply chain visibility and understanding. Joint efforts to share risk-related information. Joint efforts to prepare supply chain continuity plans.
- *Flexibility*: Postponement. Multiple sourcing. Localised sourcing.

Table 5 Generic strategies to mitigate risk

With new technologies available nowadays regarding immediate and transparent data information, companies endeavouring to mitigate the risks associated with their geographically distant manufacturing operations, may become less struggled. Flows of product, information and money can be smooth if they are in a system that helps business process, such as enterprise resource planning (ERP).

Russell and Taylor (2009) demonstrate how organizational data flows and the inter-activities involved, and suggest that even across the globe the time involved may actually be just a second, as visually showed in Figure 2.

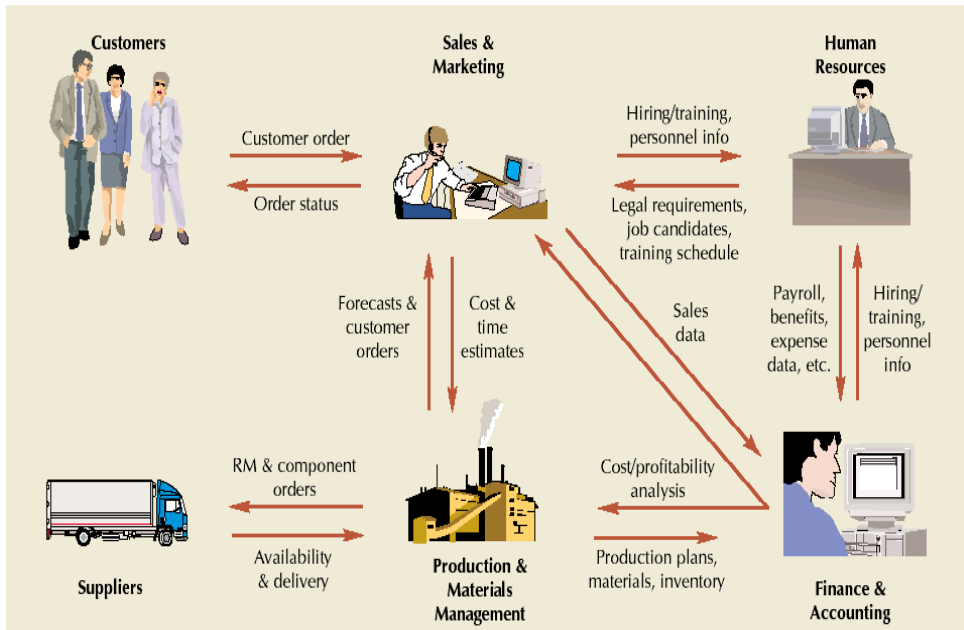


Figure 2 Along the supply chain (Russell, Taylor, 2009)

The global sourcing risk has to be highly collaboratively managed within the sourcing network. A close relationship between parties based on trust, transparency of information and cooperation will lead to more collaborative activities. Enhancing collaboration between buyer and suppliers can significantly help mitigate risk.

Agility is critical in terms of the global sourcing process since it reduces companies' response time to supply disruptions. However, companies can only facilitate agility if upstream and downstream partners are similarly agile. The agility of the local company and its upstream partners must be sufficient to implement an overall agile strategy to mitigate risk.

7 Risk management culture

A fundamental prerequisite to achieving risk mitigation in global sourcing is to create a risk management culture in business. Creating a risk management culture across the business can only succeed if it is led from the boardroom.

In other words there has to be a conscious focus on monitoring and managing the risk profile of the business – particularly the impact that supply chain decisions have on that profile. To this end the establishment of a supply chain continuity plan and the creation of a business-wide awareness of the issues are vital (Christopher *et al* 2011).

Sustainable competitive advantage is managed through strategic assets. Manufacturing strategy is a strategic asset linked to organisation culture which needs to be fostered within an open and learning environment so that continuous and competitive advantage may be sustained through an on-going holistic systems approach. A systems approach is dependent on team-work.

The role of the human resource (HR) function is not only to hire and foster suitable technical “manufacturing” personnel, but also to hire and foster the other necessary human attributes for successful team performance. On-going systems-approach teams may be cross functional matrices within a company’s own functional or geographic divisions, or across global out-sourced functional or geographic contributors to the supply chain.

Collaborative product forecasting is essential to achieve the combination of the three “rights” in a global manufacturing environment in order to maintain or increase product quality, reduce product lead-times and reduce overall product cost because achieving one or two of the three “rights” is unacceptable either to the company or its customers. Collaborative problem-solving is essential to sustain a functioning manufacturing supply chain both internally (owned resources) and externally (with out-sourced associates).

8 Collaborative global team-working

Successful team working, in a collaborative sense, is dependent on selecting the right team members and then to establish and maintain strong relationships with them (Fawcett *et al.* 2004). Such relationships are characterized by high levels of trust, coordination, and interdependence (Monczka *et al.*, 1998).

Cultural differences have been found to be the single most important stumbling block in establishing trust in global supply chain relationships (Smagalla, 2004). China, currently the most popular area of low-cost manufacturing for western companies, is classed as a high-context country, where relationships are all important. The US, for example, on the other hand, is classed as a low-context country, where business comes before relationships. Culture is difficult to define, but it can be viewed as the “collective programming of the mind” (Hofstede, 1991: p.6) and comprises everything people have, think and actually do.

While successful team-working obviously requires the team members to provide the technical and functional expertise required to sustain competitive advantage, it also requires the team members to complement each other’s personality traits to actually “work”. Meredith Belbin (2010) proposed and later concluded that an effective team has 8 (later 9) key roles that effect how the team is managed and how it carries out its work. These roles are described in Table 8.

Some roles are compatible and may be more easily filled by the same person. Some are less compatible and may be done by people with the same behavioural clusters.

- *Plant*: a creative, imaginative, unorthodox team member who solves problems.
- *Resource investigator*: the networker for the group.
- *Chairman/co-ordinator*: is concerned for fairness and equity across team members.
- *Shaper*: a dynamic team member that loves a challenge and thrives on pressure.
- *Monitor-evaluator*: a sober, strategic and discerning member, who tries to see all options and judge accurately.
- *Team worker*: is concerned to ensure that interpersonal relationships within the team are maintained.
- *Company worker/implementer*: a practical thinker who can create systems and processes that will produce what the team wants.
- *Completer finisher*: the detail person within the team.
- *Specialist*: single minded, self-starting, dedicated, provides unique or rare expertise or skills.

Table 6 The nine team roles

Comparisons may be drawn between Belbin's behavioural team roles and personality types, such as the Enneagram (Baron, Wagele, 1994) model. Belbin's roles represent tasks and functions in the self-management of the team's activities.

The Enneagram model, outlined in Table 7, teaches that early in life we learn to feel safe and to cope with our family situations and personal circumstances by developing a personal strategy based on our natural talents and abilities.

- *Perfectionists* are realistic, conscientious and principled. They strive to live up to their high ideals.
- *Helpers* are warm, concerned, nurturing and sensitive to other people's needs. *Achievers* are energetic, optimistic, self-assured and goal-oriented.
- *Romantics* have sensitive feelings and are warm and perceptive.
- *Observers* have a need for knowledge and are introverted, curious, analytical and insightful.

- *Questioners* are responsible, trustworthy and value loyalty to family, friends, groups and causes. Their personalities range broadly from reserved and timid to outspoken and confrontational.
- *Adventurers* are energetic, lively and optimistic. They want to contribute to the world.
- *Asserters* are direct, self-reliant, self-confident and protective.
- *Peacemakers* are receptive, good-natured and supportive. They seek union with others and the world around them.

Table 7 Nine basic personality types

The Enneagram, which is heavily influenced by perceptual position at any time, explains why we behave the way we do. It points to specific directions for individual growth. It is an important tool for improving relationships. By working with the Enneagram, people develop a deeper understanding of others and learn alternatives to our own patterns of behaviour and learn to see situations from a broader point of view.

9 Conclusions

The human aspects of all this result in appreciating the need to firstly develop a manufacturing strategy that will create and sustain competitive advantage in a global arena utilising low cost manufacturing locations, educate and respect the team members in cultural dimensions and ensure that the “right” psychological and personality motivators are present to ensure that actual and demonstrated human behaviours achieve positive results.

An organisation with a well-aligned and implemented manufacturing strategy demonstrates a group/team oriented organisation structure and culture with coordinated decision making, decentralized authority, speedy problem solving, and proactive opportunistic reactions to market fluctuations – in itself a competitive advantage.

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Renato Passaro, Antonio Thomas (Editors)

Supply Chain Management: Perspectives, Issues and Cases

It is quite complicated to monitor the developments that have been taking place in recent years in management studies and, in particular, in Supply Chain Management (SCM). Based on this premise, the volume contains contributions that highlight some basic issues of the recent international debate on SCM, which has gained the attention of several scholars, for a deeper understanding of its theoretical implications and to improve the methods and scope of empirical research. Accordingly, the book presents a large number of papers relating to SCM as well as the Logistics and Transport Services industry, written by academics, managers, entrepreneurs, practitioners and other experts.

The volume, therefore, includes papers by Authors with different background, research and professional expertise. Hence, this reflects both the wide scope and complexity of SCM, and the variety of perspectives from which processes and strategies are analysed and interpreted.

This volume is structured into three sections, which represent three different points of view on issues, constraints and actors, revolving around SCM and Logistics and Transport Services industry.

Renato Passaro is Full Professor of Business Economics at the Faculty of Engineering of the University of Naples Parthenope. His research interests include Entrepreneurship and Small business economics, Supply chain management, Business Logistics at firm and inter-firm level, Competition and collaboration among firms.

Antonio Thomas is Aggregate Professor of Business Economics at the Faculty of Engineering of the University of Naples Parthenope. His current main fields of scientific interest are Entrepreneurship, Intangibles resources, Small and Medium Enterprises Development and Transport Firm Management.

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