

FACULTY OF BUSINESS AND ECONOMICS

AN AUSTRALIAN QUICK RESPONSE SUPPLY CHAIN MODEL

Marcia Perry, Amrik S. Sohal & Richard Laney

Working Paper 43/02 December 2002



This paper is a work in progress. Material in the paper cannot be used without permission of the author.

DEPARTMENT OF MANAGEMENT

AN AUSTRALIAN QUICK RESPONSE SUPPLY CHAIN MODEL

INTRODUCTION

This paper presents an evolving model of effective Quick Response practices in the domestic Australian Textiles, Clothing and Footwear (TCF) industry supply chain, developed from a study of companies participating in a government program. The companies included some major department store retailers and their supply chains for particular products. The authors adhere to Quick Response definitions that incorporate not only speed-to-market but pipeline and process waste reduction, increased inventory turns, information sharing and partnerships (Perry, 1997, pp. 33-37). These activities have been demonstrated to be jointly associated with competitive benefits (Perry, 1997, pp. 198-202).

The preliminary model (see Figure 1) was developed as an outcome of a number of research processes that have been documented elsewhere (see Perry, Sohal & Rumpf, 1999). It was tested in the TCF industry and modified, resulting in a second model (see Figure 2) that was later tested in industry in 2001, leading to the third model of the responsive supply chain for the new millennium (see Figure 5). This paper will describe the industry testing processes that led to the final model and discuss variations between the models.

The second and third models display conceptual frameworks. The components of model two are further explained in other publications (see Perry, Sohal & Rumpf, 1999). Both models reflect the important finding that strategically-oriented extended supply chain partnerships, confirmed by Hughes, Ralf & Michels (1998, p. 99) remain a vital aspect of Quick Response competitiveness. However, some major TCF industry changes were occurring between 1997 and 2001, including greatly increased globalisation and overseas outsourcing, the impact of the information economy, the explosion of Electronic Commerce (EC) and greater demands by retailers for Point-Of-Sale (POS)-driven orders to support fast product turnaround with reduced lead-time. These changes are reflected in the third permutation of the model. The model-testing processes involved some open-ended questions asked of TCF industry leaders (see Perry, 1997, pp. 84-104 for a detailed explanation of the methodology).

THE PRELIMINARY MODEL

The preliminary model was complex, containing most of the major features of competitive Quick Response that had emerged from the research activities on a single page. It was desirable to show the main details of the preliminary model to the industry leaders in spite of the complexity, because the details displayed were the outcomes of the research conducted, and warranted industry-based discussion. It was evident that the preliminary model needed to be simplified, perhaps to a conceptual framework, with explanatory sub-layers, in order for it to be easily understood by other readers and in order for its application in industry. Feedback from industry leaders was considered to be essential for the desired simplification and for validation or refinement of the concepts presented.

Figure 1 displays the types of practices that were required along the supply chain and by the manufacturers in order for products to be available on the shelf or peg for the consumer. Practices that were common to all companies in the chain were shown above and below the supply chain. Included in the model were the practices of the development of supply chain partnerships, Quick Response organisation, Quick Response-related information, implementation of 'information transference technology' and the outcome of timely delivery to supply chain customers and end consumers.

Manufacturing-specific practices were placed beneath the boxes depicting the manufacturer and suppliers. Examples of Quick-Response-enabling practices were listed under the two headings of Advanced Manufacturing Technologies and Best Practice. However, it needs to be stated that most of the companies were still geared towards mass production with Quick Response products representing a small percentage of production. The work of Batchelor & Croom (1999, pp. 275-280) is relevant in this instance. They raise the issue of mass customisation for customer responsiveness and examine some of its implementation difficulties. The preliminary model also included four key manufacturing performance outcomes considered,

from a review of academic literature, to be associated with Quick Response competitiveness. These were deliveries by the due date, sales revenue, amount of business conducted with customer and inventory turnover. Following a survey of manufacturing practices and competitive Quick Response performance (documented in Perry & Sohal, 1999, pp. 297-302) and the administration of the Spearman correlation coefficient test to practices and the performance a number of associations were found. The associations confirmed the viewpoints of academics Blackburn (1991) and Lowson (1995) that particular manufacturing practices were associated with competitive Quick Response performance.

Figure 1: Preliminary Model, Prior to Testing, of Essential Practices for Quick Response



In order to validate the Quick Response model, seven TCF industry leaders were interviewed. They comprised: a Business Victoria Quick Response Pilot Program Officer; a managing director in knitwear; a supply chain manager in apparel; an EDI and later, EC retail manager; an industry consultant for the TCF industry; a Quick Response manager and later, Supply Team leader; and a manager/owner in footwear. There was unanimous support amongst the industry leaders interviewed for a model of effective Quick Response practices for the TCF industry. There was also agreement that there was a need for a 'big picture' model that included the supply chain, the essential practices and the likely beneficial outcomes. Furthermore, there was general agreement that additional layers were required which detailed key Quick Response practices in both manufacturing and retailing. Each person interviewed added valid contributions to the model from their particular perspective.

THE 1997 MODEL

The adjusted model (see Figure 2) was multi layered (see Perry, 1997, pp. 236-261 for details of the subsequent layers which describe the components of the displayed model). It had been greatly simplified in that the top layer (displayed in Figure 2) presents a conceptual synopsis of the key elements of effective Quick Response. As in the preliminary model, a key feature was a responsive supply chain partnership with a strategic focus on the requirements of the end consumer. In this model three drivers of the responsive supply chain partnership had been identified. These were information sharing, strategic planning and a set of supportive in-house practices. The partners would constantly share relevant information in face-to face meetings and other means to ensure that their in-house systems and practices could respond to the demands of frequent deliveries to replenish stock sold in the store.

Figure 2: Effective Quick Response Supply Chain Practices, 1997, Model 2



Quick Response activities were associated with a number of beneficial outcomes for supply chain companies, the most lucrative of which concerned sales revenue, lowered inventory and associated costs, increased business and, for the retailer, fewer markdowns in the store. These beneficial outcomes are displayed in Figure 3.





It was clear that the second model was in fact very similar to the preliminary model taken to the industry leaders, but simplified greatly conceptually and with some important modifications. Electronic communication of forecast data had become a required practice at the retail-manufacturer end of the supply chain. Facsimiles and telephone calls could suffice upstream in the short term. In fact, in the Quick Response pilot program group, even EDI between the retailer and the manufacturer was not always used. However, most of the companies were in the process of improving and fine-tuning their EDI systems.

THE 2001 MODEL

The third model reflected the changing reality of supply-chain relationships in the twenty-first century. According to the industry leaders, the structure of the supply chains had become generally more complex, as discussed by Lauer, (2000, pp. 366-375). This complexity reflected adjustments made to accommodate key drivers external to the firm, namely the information economy and globalisation. The impact of increased global competition was viewed as being all-pervasive throughout the TCF industry. Facilitated by the Australian government's policy of continued reduction in industry protection, the import share of the domestic demand for all TCF industry clothing more than doubled over the decade 1990 to 2000, from 17 percent to 41 percent (see Figure 4).





The clothing industry was the most affected by imports, followed by footwear, with textiles being the least affected. The number of TCF companies had further diminished, with many of the remaining companies making radical changes to stay competitive. Local TCF-product retailers were feeling the pressure of global competition and were focussing on driving costs and risks down. The number of their overseas suppliers was steadily increasing, particularly in basic products such as underwear, casual clothing and hosiery.

In the local arena some retailers had become clearly directive, insisting on suppliers adopting prescribed EC practices and adhering to strict on-time/in-full delivery standards for POS-driven orders. It was also apparent that EC systems tended to be segmented, as discussed by van Hoek (2001, pp. 21-28) generally diminishing towards the upstream end of the pipeline. In some chains the EDI systems set up prior to 1997 were still being used. It was evident too that supply chains had undergone radical restructuring, with some manufacturers replacing local suppliers with overseas providers and with the remnants of former supply chains forming new chains with various mixes of local and overseas suppliers. Chains within chains were not unusual features, with the manufacturer-come-design-house as an example, outsourcing all the supply and manufacturing activities, sometimes over several continents. There was a clear trend for suppliers to the domestic market to focus on high value-added local-demand products that could compete with imports. The evolution of the information economy had had clear impact on the Australian TCF industry, providing a potential means of control over emerging global supply chains. Communication with overseas supply chain partners was a challenge, calling for high levels of use of secure Extranet Gateways, EC transaction platforms, CAD/CAM design and specification transfer, email, facsimiles and the telephone. There was a need for new organisational paradigms to cater for the increasingly complex supply chain.

Figure 5: The Effective Quick Response Supply Chain, 2001, Model 3



ENVIRONMENTAL DRIVERS

The close-knit retail-to-upstream supplier partnerships that had been set up through the government workshop and assistance program had been eroded somewhat through the retreat of the retailers back to their traditional power-based role of term and standard setting for suppliers. This stance was understandable in the light of global EC competition affecting retailers, bringing the urgent need to streamline EC transactions and continually monitor supplier adherence to strict delivery and quality standards in order to stay competitive. Hence the supply chain environment had changed from a nurtured one under the wing of the Victorian government Quick Response program to a less favourable globally competitive environment, dominated by the information economy and retail requirements. In this environment, initiation of supply chain partnership activity had mostly fallen to the direct supplier of product to the retailer.

CONCLUSION

In the ten-year period over which the authors have observed supply chain developments in the Australian TCF industry, there have been substantial developments reflecting both internal pressures and external influences, including government policy, globalisation, information technology and Electronic Commerce. The Australian TCF Quick Response supply chain of the new millenium is more focussed on high value-added, more customised products, working smarter with local or overseas partners. The supplier to the retailer, be it manufacturer or design house, is on the watch for the most advantageous supply chain partners, either local or overseas, and is operating in a more fluid supply chain partnership environment than existed previously. Companies have been rapidly harnessing EC and information technology in order to meet exacting retail delivery requirements, speed up transactions and drive costs down to beat competitors. They have become better informed about the market and the stayers of the Australian TCF industry have repositioned themselves in globally-oriented supply chains.

REFERENCES

- Batchelor, J & Croom, S. (1999) 'Developing customer responsive supply chains and the issues to be addressed in the new product introduction process' in Muffato, M. & Pawar, K. S. (eds.) *Logistics in the Information Age*, SGEditoriali, Padua, pp. 275-280.
- Blackburn, D. (1991) Time-Based Competition: The Next Battleground in American Manufacturing, *The Business One /APICS Series in Production Management*, Vol. 11, No. 3, pp. 43-51.
- Hughes, J., Ralf, M. & Michels, B. (1998), Transform Your Supply Chain, Thomson Business Press, pp. 95-114.
- Lauer, T. (2000) 'Side effects of mandatory EDI order processing in the automotive supply chain', *Business Process Management Journal*, Vol. 6, No. 5, pp. 366-375.
- Lowson, B. (1995) 'A rent in the fabric: adoption of Quick Response strategies in our industry', Conference Paper, Textile Institute 76th International Conference in Turkey, pp. 1-17.
- Perry, M. (1997) Effective Quick Response Practices in the Australian Textiles, Clothing and Footwear Industry, Unpublished PhD Thesis, Department of Management, Faculty of Business and Economics Monash University.
- Perry, M. and Sohal, A. (1999) 'Supply chain activities for improved customer responsivenesss', in Muffato, M. & Pawar, K. S. (eds.) *Logistics in the Information Age*, SGEditoriali, Padua, pp. 297-302.
- Perry, M., Sohal, A. & Rumpf, P. (1999) 'Quick Response supply chain alliances in the Australian textiles, clothing and footwear industry', *International Journal of Production Economics* 62, pp. 119-132.
- van Hoek, R. (2001) 'E-Supply chains vitually non-existing', Supply Chain Management: An International Journal, Vol. 6, No. 1, pp. 21-28.
- Wind, J. Y. & Main, J. (1998) *Driving Change: How the Best Companies are Preparing for the 21st Century*, Kogan Page, pp. 193-209.
- Youssef, M. A. (ed) (1992) 'Agile manufacturing: a necessary condition for competing in global markets', *Industrial Engineering*, December, pp. 18-19.