QUICK SCAN YOUR WAY TO SUPPLY CHAIN IMPROVEMENT

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INTRODUCTION

Many companies are coming under pressure from customers to improve responsiveness and reduce lead times, whilst at the same time needing to improve financial performance through more effective use of working capital. The key is through improving the effectiveness of the whole supply chain from suppliersall the way through internal manufacturing to delivery to customers. An approach has been developed to undertake a 'Quick Scan'* (QS) of the supply chain for a particular business unit and highlight quantified opportunities for improving the quality, cost, service and cycle time of the supply chain.

THE NEED FOR A 'QUICK SCAN' APPROACH

In order to improve supply chain performance within the UK automotive industry, a three year project, funded by the Engineering and Physical Sciences Research Council (EPSRC), has been established between LucasVarity, Computer Sciences Corporation and the Logistics Systems Dynamics Group at Cardiff University. Entitled 'Supply Chain 2001', the aim of the project is to develop a route map to enable a company to move from an existing functional, differentiated supply chain to a process-orientated seamless supply chain. Supply chains are **not** homogeneous, therefore one supply chain solution will not fix all. This means that in order for a company to identify 'where' to focus its improvement efforts for maximum impact on the bottom line, it needs to analyse its existing processes and assess the maturity of existing practices.

Many companies recognise the benefits of using a team which includes members 'external' to the company to evaluate the performance of a business as it often provides an objective viewpoint. The 'Supply Chain 2001' steering committee identified the need for a methodology and associated tools that would enable an external team to analyse the key business processes within a site and across the interfaces of its supply chain over a short time frame. Therefore, a 'Quick Scan' procedure has been developed in order to promote supply chain improvements. What is more, the building blocks developed as a result of Quick Scans of individual businesses can be extended to suppliers and customers in order to understand and document total supply chains.

DEVELOPMENT OF A QUICK SCAN PROCEDURE

Within the context of 'Supply Chain 2001', the QS procedure has been developed by Cardiff University in conjunction with LucasVarity and Computer Sciences Corporation representatives on the 'Supply Chain 2001' steering committee as a diagnostic tool to allow a QS team to perform a health check of a business's supply chain. This is based on previous work undertaken jointly by LucasVarity and Computer Sciences Corporation to reduce levels of working capital within LucasVarity. The QS builds on knowledge obtained by Cardiff University during involvement with LucasVarity and Computer Sciences Corporation task forces and utilising and integrating previous industry experiences.

The aim of the QS is to understand and document the supply chain and its associated material, information, cash and resource flows and to identify and recommend quick hit (not quick fix) improvement opportunities and longer-term strategic action plans. To satisfy the time requirement, the QS procedure has been designed to be completed within a two week period, of which only three days has to be spent on site. This is an important pre-requisite so as to:

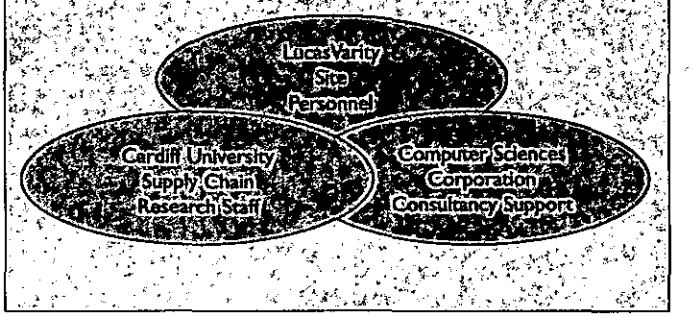
1 minimise resources and time allocation of the site's personnel who are busy with operational duties

2 ensure a rapid build-up of the supply chain 'jigsaw'.

The key to the approach is a multi-disciplinary team, split according to the three elements of the QS outlined below. The ideal QS team developed as a research prototype for use in 'Supply Chain 2001' is shown in Figure 1. This emphasises the importance of gaining commitment and 'buy-in' from the site through membership of the team.

FIGURE 1.

THE COMPOSITION OF THE QUICK SCAN TEAM - RESEARCH PROTOTYPE



THE THREE ELEMENTS OF THE QUICK SCAN

The QS procedure uses three data collection techniques; questionnaire analysis, process-mapping and semi-structured interviews.

The questionnaires have a number of purposes. The preliminary questionnaire is used to gain an initial knowledge of the site being analysed including information such as key customers, suppliers, production volumes, product variants and company structure. Secondly, a Human Resources questionnaire is used to capture a staff profile and related issues. Further questionnaires issued at the customer and supplier interfaces are used to gain perceptions of relationships with external customers and suppliers while questionnaires issued to each internal process area are used to gain perceptions of key personnel in the site on their own performance, the performance of their preceding and following process areas and the performance of support services, such as maintenance and Human Resources.

The aim of the process mapping phase is to map the flows in the company's internal supply chain and across the interfaces with customers and suppliers. Extensive use is made of existing data available on the site, relating to quality, capacity and production issues. Material flows are mapped using software tools and non-value added activities identified together with opportunities for simplification through re-designing or re-evaluating aspects of the material flow, as recommended by Parnaby (1993) [1].

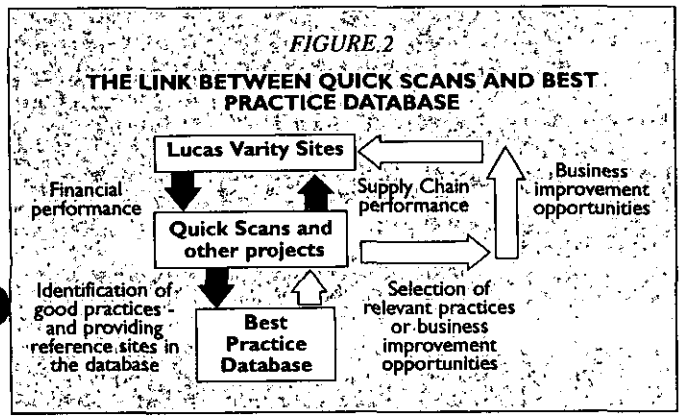
* The term 'Quick Scan' has been coined by a LSDG partner, Eindhoven University of Technology to describe their logistics diagnostic method used by post graduate students within companies. See http://www.tue.nl.ivo/ibs/ for further details.

These two data collection techniques are supplemented by the third, the semi-structured interviews. These are conducted with key personnel in all departments in order to collect information relating to the key business processes and support processes, and most importantly, the links between processes and departments. Key financial and supply chain data is collected and used to relate the use of particular practices to performance. Together, these three data sources enable information to be triangulated.

TRIANGULATION OF DATA

Having collected the data, the team convene to undertake 'brainstorming' sessions. The aim of these sessions is to *correlate the findings from all three data sources, identify gaps* in the data and inconsistencies, thereby leading to further data collection. Rigorous analysis of the information allows key problem areas and issues to be highlighted. The result of the triangulation of data is a clear assessment of the current status of the company and its supply chain together with the maturity of its practices and processes and ability to meet current and future customer needs. Access to best practice databases at this stage can reveal opportunities for change, which can then be quantified using simulation tools and flagged for discussion and debate with members of the management team.

Figure 2 shows how the QS team can tap into a LucasVarity best practice database, also developed by the Cardiff Research Team and utilise the information to drive business improvement as a result of the QS. The best practice database has a cause and effect structure which enables actions to be identified for minimising unwanted effects on the business. At this stage, improvement actions are also prioritised according to impact on the bottom line and split into short-term 'quick hits' and longer-term recommendations for strategic changes. Hence the goal of using the QS and database is to identify, capture, adopt and implement practices that have a significant effect on the supply chain.



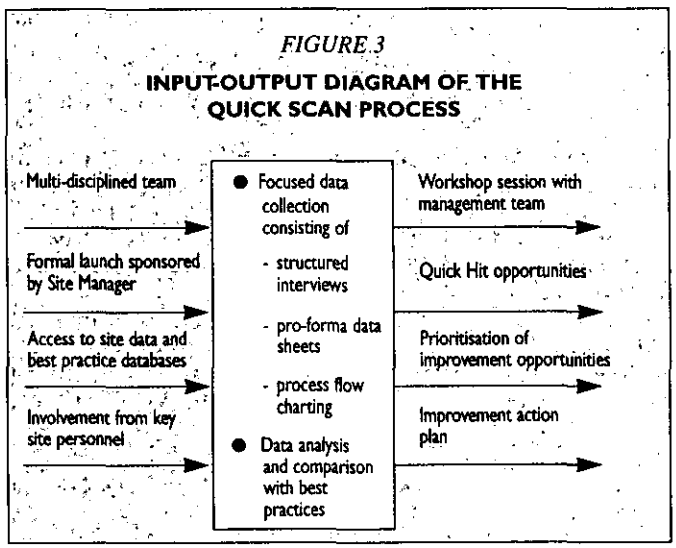
THE QUICK SCAN TEAM IN ACTION

Applying the QS procedure in practice follows a structured approach. The first step in the QS procedure is a formal launch presentation to the site management team sponsored by the Business General Manager. This sets the foundation for the data collection period and has the following objectives:

- To outline the role of the QS, its objectives and deliverables
- To identify one or two key personnel to support the team during 'on-site' periods
- To agree on days for data collection and times for short interviews
- To agree a date and time for the final QS presentation and feedback from site
- To agree on product(s) to follow during the process mapping phase
- To issue questionnaires and data requirements
- To tour the site.

Following the formal launch, a focused data collection exercise, including collection of the completed questionnaires, is carried out during the agreed times over a two day period in the first week. This is followed by three days of data analysis, brainstorming and gap analysis. The second week starts with a further day of data collection to fill in the information gaps, which is followed by three days of data analysis and preparation of a presentation and final report containing the recommendations for improvement actions identified by the QS team. At the end of the second week, a final presentation and workshop session with the management team ensures that the findings are fed back to the site and feedback gained on the results and recommendations.

Figure 3 shows an input-output diagram of the Quick Scan process. This summarises the approach, where the principle deliverable from the process is a workshop session to discuss findings.



HOW THE QUICK SCAN CAN PROMOTE SUPPLY CHAIN IMPROVEMENT

The QS looks at the TOTAL business process that includes people, relationships and communications as well as procedures, processes, products and information flows. In this way it is a catalyst for supply chain improvement by focusing on the quality, cost, service and cycle time of the supply chain. Application of the QS procedure to LucasVarity businesses has provided them with a third party review of their business processes and supply chain. It has achieved this by:

- identifying bottlenecks/problems
- identifying the true causes of the problems
- assessing the maturity of the site in terms of a comparison of its practices with 'better' practices
- identifying why the site is not performing as well as it could be and the processes on which to focus future improvement efforts.
- identifying quick hit improvement opportunities coupled with longer-term strategic action plans

As a result, the QS procedure has helped business units within LucasVarity to identify plans of improvement actions to enable them to manage their supply chains more effectively. For example, opportunities have been identified for sites to:

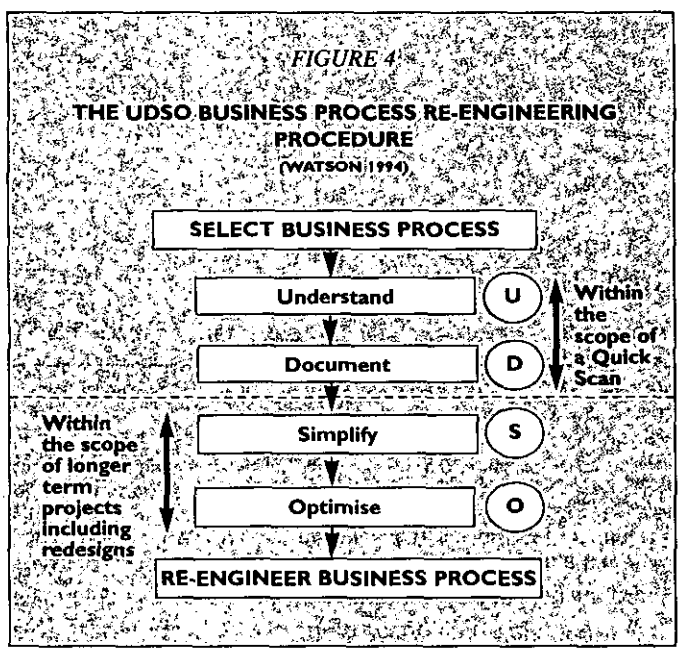
- increase production capacity by reducing scrap levels and improving product identification
- focus on material cost reduction rather than stock reduction for maximum financial impact
- set up gateways for controlling material flows and improving stock accuracy and customer service requirements
- change inbound and outbound logistics arrangements in order to reduce time and cost.

However, particular benefits have been achieved when the output from the QS is integrated into the business change projects planning process.

Within a re-engineering programme, the QS has its scope confined to the first two stages identified by Watson (1994) [2] as 'Understand' and 'Document', as shown in Figure 4. These are the key stages that identify the focus areas for further change programmes, which lead to the 'Simplify' and 'Optimise' phases of a re-engineering programme. A typical example of this in the automotive industry is the modelling and simulation of a distribution network leading on to re-engineering of a supply chain infrastructure (Disney et al., 1997) [3].

With time, the application of the Quick Scan procedure to LucasVarity sites will have a more pronounced effect. As more Quick Scans are undertaken, the Quick Scan team are identifying opportunities for sites to share 'better' practices. This, in turn, is helping to promote dissemination across sites and between divisions within LucasVarity, thus the Quick Scan approach is proving to be a powerful tool for promoting business improvement and improving company performance. Ultimately, the QS should be an ongoing assessment that businesses can learn to do themselves as they continually eliminate waste and establish a lean supply chain. However, there are opportunities for obtaining an even greater impact on supply chain performance by extending the use of the QS into suppliers and customers as part of the drive towards achievement of a seamless supply chain.

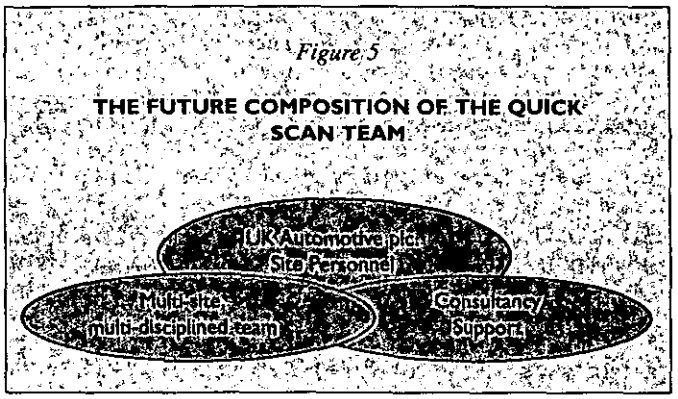
FIGURE 4



FUTURE APPLICATIONS OF THE QUICK SCAN PROCEDURE

The Quick Scan procedure has been developed and tested as part of 'Supply Chain 2001' within LucasVarity sites. As such, it is helping to differentiate generic supply chain groups and the different enablers for success. However, its use is not limited to the lifetime of the project. In order for the QS procedure to be used in UK Automotive plc. by UK Automotive plc, it is recommended that a multi-site, multi-disciplined team is used to replace the Cardiff University team. This would ensure that an 'external' viewpoint, which has made the QS process a success, is maintained. Figure 5 shows the future composition of the Quick Scan team, which retains a site project owner and the involvement of a consultant, in order to provide an unbiased viewpoint and/or facilitation role. However, the most significant benefit would be gained if a multi-site team were to tour a number of sites performing Quick Scans. Ultimately, the team could consist of members from different echelons in a supply chain and in this way, the dissemination of 'best practice' information between sites would be encouraged and exploited to promote supply chain improvement across the whole of UK Automotive plc.

Figure 5



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REFERENCES

[1] Parnaby, J., "Business Process Systems Engineering" *Proceedings of Business Processing Re-engineering Conference,* London, 24 November, (Chairman's Address) 1993.

[2] Watson, G.H., "Business Systems Engineering: Managing Breakthrough Changes for Productivity and Profit", *John Wiley and Sons, Inc.* 1994.

[3] Disney, S.D., Childerhouse, P. and Naim, M.M., 1997, 'Development of Supply Chain Structures in the Automotive Aftermarket', *Proceedings of the Logistics Research Network Conference,* Huddersfield, 16 September 1997.

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