Path to Success -
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Owen Keates
Dr Yvonne Walus
MOTHERWELL BRIDGE
Motherwell Information Services
New Zealand
owen.keates@motherwell.co.nz
yvonne.walus@motherwell.co.nz

Abstract

The objective of this paper is to demonstrate the final and often absent phase of any optimisation project, namely, the Transformation. It is not enough to be discontented with the present. It is not enough to want to change. There has to be a path to the future, a way for change to succeed.

The paper will cover the following topics:

- Best practice for managing the supply chain
- Sales & Operations Planning
- Market focus
- Key Performance Measurement
- Change Management

1 Introduction - What is a Supply Chain?

A supply chain comprises all the resources (raw materials, people, machines, processes) involved in manufacturing and supplying the product to the customers. This includes inventory policies, procurement options, sales proposals and distribution planning. In order to optimise a supply chain, one needs to consider its costs and constraints with respect to storage, manufacture and transport.

It stands to reason that a supply chain can be found at any stage of a complex manufacturing process. A mill that cuts tree logs into planks can be seen as a manufacturer (its supplier is the forest and its customer is the yard that stores the planks). But further down the manufacturing process, we encounter the treatment plant that obtains the planks from the yard and anti-sap stains them and subsequently sends them to a warehouse. In this way, we encounter customers who are also manufacturers and suppliers. Thus, an extended supply chain is defined, where we consider the

supplier's supplier as well as the customer's customer. Collaboration between the enterprises within the supply chain leads to better global optimisation of the business.

2 The challenge – case study

2.1 Background

A New Zealand forestry enterprise owns forests which it cuts down to provide wood logs and pulp to various domestic and international customers. Its suppliers are its own harvesting department, and – at times – rival companies. Its clients are overseas markets, NZ housing industry, pulping mills and rival companies.

The enterprise is a primary manufacturer that has to deal with the unpredictable nature of harvesting on the source side, and the varying demand on the client side. It is supply-driven, in other words, it has little control over which trees are ready for felling and when.

2.2 Life cycle of a project

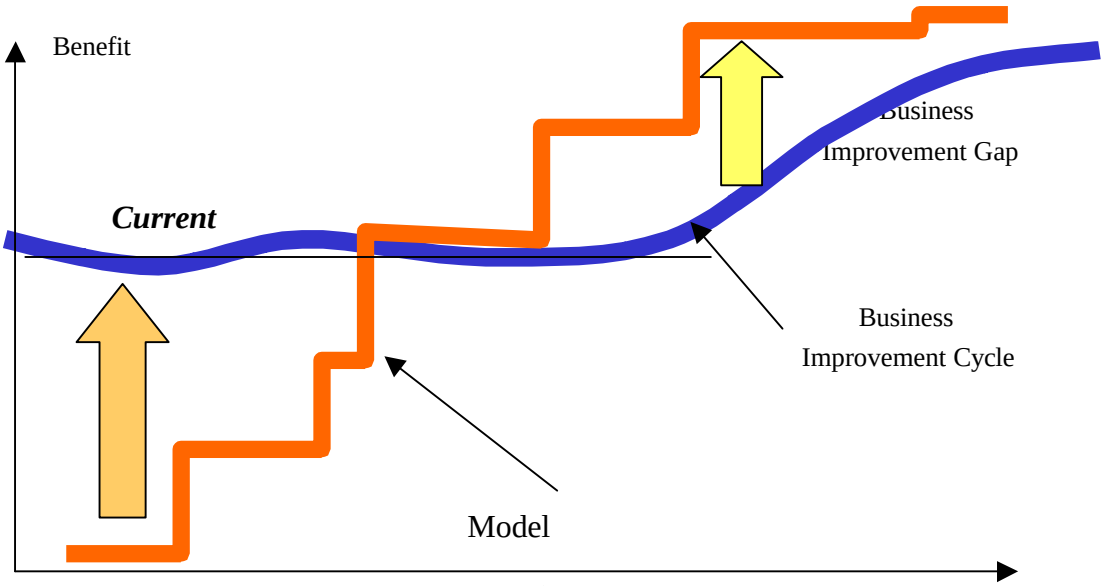

Figure 1

2.3 Potential pitfalls of real-life projects

Our objective is to add value to the enterprise, i.e., to maximise profitability. Typically, this involves a combination of cutting costs, increasing sales and improving business processes.

In an ideal world, this objective can be achieved with any linear programming tool capable of handling massive volumes of data. In the business world, however, we deal with business realities, deadlines, inaccessibility of data, customer resistance to change

and technology, lack of communication, etc. This is why, in Figure 1, we see the gap in business improvement and why it takes time for the mathematically superior model to start adding value to the business.

Nowadays, it is not sufficient to optimise an enterprise. One must also ensure that the new way of working will be adopted by the business. This paper demonstrates how to implement the operations research “numeric” solution by the correct managing of change that results from business process re-engineering.

2.4 Best practice for managing the supply chain

Over the past three years, many businesses have implemented advanced planning and optimisation systems. Some implementations have been stunning successes with huge returns on the investments, others, whose technical solutions where quite similar, have struggled to get the full potential from the systems, due to a variety of business problems including: poor business data, lack of alignment with business drivers, conflicting performance measurements and generally resistance to change. Over the past three years, a best practice methodology has evolved, a methodology which guides businesses through the implementation of the advanced planning and optimisation systems. This paper highlights key areas of the best practice methodology.

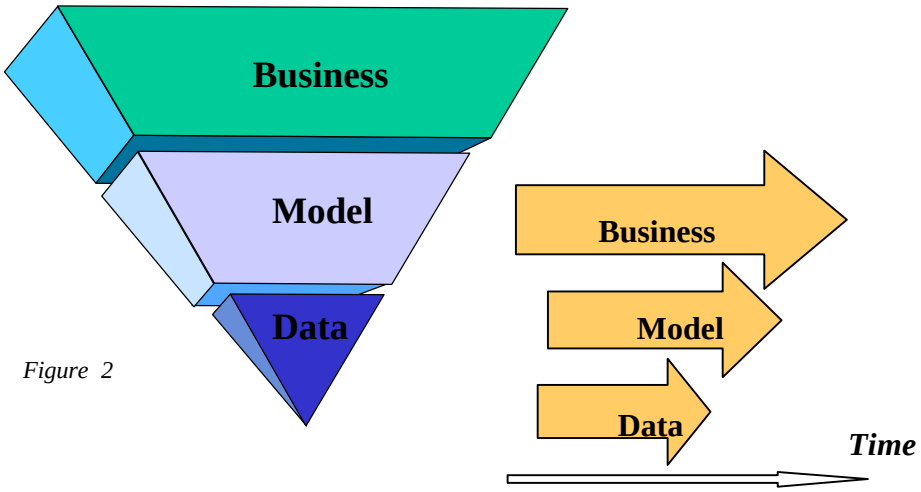

Figure 2

Figure 2 summaries the approach used in the best practice methodology. It illustrates the importance of the business processes and how they must be closely examined and developed; the process starting even before the data collection and model building. The traditional approach would be illustrated by the pyramid in figure 2 being inverted, a high level of focus on data, less on model building and even less on business processes. In terms of timeline, the traditional approach had modelling following data collection with business processes being a late add on at the end.

While data is of course absolutely critical and the success of the advanced planning and optimisation systems is totally dependant on accurate data, the position we take in this paper is that this is a given. With accurate data, it is possible to build a sophisticated model that can be solved to determine the optimum conditions for the business.

Constraints can be adjusted and various “what if ” analyses and scenarios run to examine various business options. This is all great technology and with huge business potential, but unless the business understand the advanced planning and optimisation systems, how the process works, believe the result and use the result there will never be any benefit, any optimisation, any returns.

The best practice methodology recognises that while technology is the enabler, supply chain management has become a strategic imperative for business, business must adapt itself to achieve supply chain excellence.

With regard to inventing itself to achieve supply chain excellence, a business examines the following areas in detail:

- Supply chain directly impacts profit
  - ✓ The process must be taken seriously by senior management
- Key element of business drivers
  - ✓ The business drivers need to be revisited, supply chain must be included
- Owned by executive management
  - ✓ Supply chain does not belong in the Information Technology or Financial departments, it belongs alongside Production and the other functions and is owned by a senior manager
- KPI’s monitor supply chain
  - ✓ Compliance to plan is key, beware of traditional efficiency measures!!
- DIFOTIS lead indicator
  - ✓ The product delivered in full, on time, in specification is the major issue
- High visibility, high participation
  - ✓ Supply chain management involves the whole business, performance and issues must be highly visible.

2.5 Sales & Operations Planning

In a business striving for supply chain excellence, the process is largely driven by the sales and operations planning process. This is where supply and demand comes together. The process is owned by the most senior manager, normally the chief executive officer or chief operating officer. Issues examined include:

- Consolidation of an enterprise wide S&OP process
- Focus on data accuracy
- Continuous improvement processes

2.6 Change management

Resistance to change is inevitable. Hence, every optimisation or business process-reengineering project must ensure that the change is managed properly. This involves overcoming pre-set attitudes as well as ensuring that the new systems are implemented.

Making the change happen relies on the people. They must believe in the new paradigm and agree to monitor new performance measures. As in every team, we need champions to take the initiative, lead by example and offer support; and followers. Some people will initially resist the change, but will convert to being followers once they see benefit they change. They need coaching and encouragement, but in the end they might convert others and become the change's biggest champions. Resistors will remain outwardly opposed to change and will insist on doing things their way. Strong leadership and coaching is required to ensure they don't become a stumbling block. Saboteurs are those who will agree to support the change but remain unconvinced at heart. Their attitude may be dangerous to the success of the project and part of the change management process is to seek these people out and convert them.

The only constant in today's business environment is change. We must strive to coach our customers to be adaptable.

3 What the future holds

3.1 Minimising waste

As the world and New Zealand in particular embrace their "green" image and strive for conservation of the environment, business optimisation may reach new heights. Instead of simply maximising profits, we might look towards minimising waste. Returning to our forestry example, we might want to cut the log not in a way that yields the most planks, nor in a way that provides most money, but in a way that best satisfies the demand and thus saves trees on a global scale.

From a mathematical point of view, this would change the simple linear problem into a multi-objective linear problem, with the two objectives at times directly disproportional. This would challenge most of the LP tools on the market today and lend itself to methods like visual integration of goal functions.[i]

3.2 Innovative cost cutting

Cost cutting can be achieved through:

1. More effective manufacturing processes and optimised distribution
2. Limiting bureaucracy
3. Total Quality Management

4. Making suppliers part of the team to improve the cycle time, decrease the costs and increase quality
5. Integrated supply: focussing on the overall impact of supplier relations on the enterprise's operational effectiveness
6. Outsourcing of logistics

3.3 Conclusion

Advanced planning and optimisation systems have revolutionised the way businesses manage their supply chains. Rising customer expectations, globalisation and free trade opportunities are placing huge demands on businesses. Supply chain management has become a strategic imperative. Technology is the enabler, but the changes required of the business to ensure success must not be underestimated. Supply Chain management provides the opportunity to make suppliers as well as customers part of the team, in a unique win-win-win relationship. In the end, education and process improvement supported by change management will help businesses realise the full potential.

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References

[1] *VISINT, A Multiple Objective Linear Programming Tool*, M Rudolph, YE Walus, CSIR Information Services 1992;

[2] "An Interactive Programming Method for Solving the Multiple Criteria Problem", S Zionists, J Wallenius, Management Science, Vol.22, No.6, February 1976;

[2] Motherwell senior consultants, various project documentation.

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[i] One way of handling multiple objectives within the LP environment is the algorithm proposed by PJ Koeronen and J Laakso (EJOR 24 (1986), 277-287, an interactive multi-objective LP solution method where the decision maker guides the process by specifying reference goals at every interaction, and helps determine the step size graphically.