Repositioning the business of sustainable manufacturing

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Abstract
The current contextual reference of sustainable manufacturing has typically been influenced by contemporary and academic literature to a point where a myopic view could be said to exist, that places the concept of sustainability outside that of commercial operating principles. Furthermore, recent decisions concerning supply integration and commissioning are typically being based around issues such as short term risk mitigation, and early steps towards developing protocols focused on corporate social responsibility introduce further pressure into businesses, that could lead to a significant hiatus in operating efficiency. Recent research has indicated that in many cases, supply networks are fragmented and lack the connectivity that ultimately precludes true sustainability and competitiveness. This paper provides a brief comparison between current theory and actual practices in sustainable business, and illustrates a model of sustainability that places the customer at the core.

Keywords
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Repositioning the Business of Sustainable Manufacturing

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The current contextual reference of sustainable manufacturing has typically been influenced by contemporary and academic literature to a point where a myopic view could be said to exist, that places the concept of sustainability outside that of commercial operating principles. Furthermore, recent decisions concerning supply integration and commissioning are typically being based around issues such as short term risk mitigation, and early steps towards developing protocols focused on corporate social responsibility introduce further pressure into businesses, that could lead to a significant hiatus in operating efficiency.

Recent research has indicated that in many cases, supply networks are fragmented and lack the connectivity that ultimately precludes true sustainability and competitiveness. This paper provides a brief comparison between current theory and actual practices in sustainable business, and illustrates a model of sustainability that places the customer at the core.

Key Words - Sustainability, Supply Chain, Supply Networks, End-to-end Integration, Quality Triangle, Australian Business

1.0 Introduction

The concept of sustainability has experienced meteoric growth in the consciousness of business in the last few years. In common with many of the management principles (or fads) of the last twenty years, there appears to be limited work focused around integrating the principles of sustainability into the extended enterprise (i.e. the total supply chain or supply network of an organisation). Full, end-to-end integration represents a significant challenge to any organisation, especially within the context of operational efficiency and indeed globalised supply. However, unless the concept of sustainability can be incorporated fully and meaningfully into the supply network of an organisation, a limited if not regressive effect can be expected.

This paper discusses the development of a framework for integrating the concept of sustainability into a strategic quality management framework (the Quality Triangle), and with it a comparison between current theories and practices of sustainability within business.
The paper concludes, rather controversially, by suggesting that without the integration of sustainable protocols throughout the entire supply network, then some sustainable policies could have a negative effect on the business concerned.

2.0 Background

Initial field research conducted in 2011, focused on Australian Business (Styger 2011), and later augmented by further research in 2012, provided indicators that there was no single concept of sustainability in industry. This finding supports the work of Bonevac (2010) and Herremans (2002) who claim that there are in the region of 300 definitions of sustainability and suggest that sustainability is, at best, an abstract concept.

Brown et al (1987), noted that frameworks of sustainability typically lack important key elements and this is supported by Bakshi and Fiksel (2003) consider sustainability from a systems point of view. The significant literature around this subject, typically indicates that there is a fragmentation in the conceptual construct of sustainability, that does not assist in developing meaningful protocols and business improvement systems. Indeed, it may be argued that the concept of sustainable has been so distorted by much of industry, and in many respects supported by academia, that there is now division and conflict regarding the actual focus of sustainability and its impact within organisational thinking and identity. This in turn leads to an irrelevance within the concept of sustainability and, importantly, the removal of operational principles from many sustainable frameworks.

3.0 A Snap Shot of Perception of Sustainability

Within the context of the Australian research, a number of key indicators were highlighted as a product of the research, these may be summarised as:

- There was a general feeling within the study groups that sustainability was either a “half baked” concept or “overdone”, with little real impact being noticed within the organisation
- There is a significant disconnect between organisations and their suppliers in terms of recognised standards and protocols of sustainability. What does exist is typically isolated and often owned within single organisations and not always shared across the entire supply network
- Short-term, cost driven, initiatives typically dominate corporate thinking, leaving sustainability as “a nice thing to have”, “some time in the future”
- Sustainability is confused with environmental thinking and is typically resigned to areas such as ISO 90014 and not holistically embedded within the management systems of most businesses

4.0 The Development of a Datum for Incorporating Sustainable Concepts into Management Principles

The research had illustrated that there was not a datum for sustainability with many businesses. In an attempt to develop a datum point for incorporating sustainable concepts into management systems, it became apparent that it was necessary to consider sustainability from a holistic business or manufacturing sense. In order to achieve a holistic view of sustainability a protocol was necessary to link sustainability to business drivers.
Initially, it was considered that the Quality Triangle offered sufficient linkage opportunities, however, in its initial version, the Quality Triangle was too simple to add any real value or diagnostic possibility to the concept of sustainability (see Figure 1.).

![The Quality Triangle](image)

**Figure 1. The Quality Triangle**

The Quality Triangle was initially developed as a simple explanatory aid to describe the basic principles of Total Quality Management and condense the fundamental principles of good business operations into a simple conceptual reference.

Overtime, the model became a standard teaching and consulting tool, however, as it became embedded into programs, it became apparent that, although the Quality Triangle was undoubtably conceptually robust, and when used correctly effective, it was often misused and open to misinterpretation. The misinterpretation was typically caused by the lack of formal recorded rules available to users, and no accumulative knowledge of how to use the model, within the user base. The solution appeared to be to develop a set of basic rules consisting of the order of analysis. These rules were:

1. Begin by defining the customer first
2. Develop operational cost down strategies
3. Develop customer value up strategies
4. Balance risk and reward between cost reduction and customer value strategies
5. Continue (always) the basic analysis

**5.0 Development of the Datum**

It was thought that users would gain a richer data set by applying the basic rules to the Quality Triangle, however, this was not always the case. It was discovered that the basic rules set still enabled a level of ambiguity and therefore confusion. As such, the model was extended to include more focused questions with a view to removing latent ambiguity (see Figure 2).
6.0 The Incorporation of Sustainable Principles and the Breakthrough within the Context of Supply Chain Integration

It became apparent that the core principles of modern quality management had the potential to provide a protocol for a sustainable business culture, however, the fundamental ethos of sustainability needed to be embedded within the model. As such, Carters and Rogers (2008) principles (i.e. sustainability should consists of a combination of social, fiscal and environmental considerations) were combined with those being developed around the Quality Triangle.

The work of Carters and Rogers has become a focal point for sustainability theorists. The work is typically robust in its concept, however, it became apparent that within the context of business integration (i.e. the supply chain or supply network of a company), that concepts around, cultural integration, communication and strategic intent were lacking. Put simply, for sustainability to be effective within a supply network, all parties need to agree on the overall parameters of the scope of sustainability. Effectively, supply networks need to develop an “end-to-end” consensus concerning sustainability, if meaningful integration is to become manifest (see Figure 3).
7.0 End-to-end Supply Network Integration - The Achilles Heal of Meaningful Sustainability Programs

The original Australian research in 2011 had identified significant gaps in end-to-end integration and connectivity within supply networks. As such, it may be argued that any meaningful attempt by one organisation to achieve a “gold standard for sustainability”, is likely to be restricted by elements of the total supply network that the organisation belongs to, if there is no end-to-end integration of that supply network.

The research had shown that, typically, many focal companies (or OEM’s) had devolved or “role shifted” supply management responsibility into lower tiers of supply. This finding is
inline with the work of Emberson et al (2006). For example it is not uncommon for first and second tier suppliers to take on supply responsibility from the focal company for the rest of the focal companies network. Focal companies typically conduct these policies to reduce risk and costs in their own operations. However, in so doing, they also lose sight of the entire supply network and as such, increase risk in areas such as continuity of supply, quality and brand equity and, in the case of sustainability, the ability to share their vision and requirements of sustainability with the entire network. This in turn places significant risk in areas such as corporate social responsibility (CSR), and raises the probability of catastrophic events potentially being caused by rouge suppliers interpreting, unethically, the focal companies mandate of sustainability.

The overriding concept is that, as a byproduct of role shifting, tier 1 and tier 2 suppliers block the view and indeed the message of the focal company to the entire supply network and typically “translate” a message best suited to themselves (see Figure 4). At the same time, lower levels of supply have the belief set that they are performing a task in accordance with the focal companies mandate, but are in fact performing within the direction of lower levels of supply (see Figure 5).

![Figure 4. The Concept of Role Shifting in the Context of Visibility (Over the Horizon) within a Supply Chain](image-url)
As such, if consensus of a framework or protocol is missing within a supply network, and end-to-end integration does not occur as it should do, a potentially catastrophic event can result.

8.0 Redefining the Business of Sustainability

Issues such as CSR, ethics and governance are relatively new to the boardrooms of many businesses and indeed the classrooms of many business schools. It may be argued that the function of sustainability is to drive an equitable outcome for all stakeholders within the extended enterprise and effectively provide a robust interface between the boardroom vision for CSR and the operational manifestation of CSR.

For this outcome to be achieved, sustainability principles must be embedded into the core principles of the focal company and all of its suppliers and stakeholders. This requires clear communication of intent and the tools and measure to monitor and improve its impact on the business. This may be achieved initially via a proven standardised diagnostics and later refined in a single management system for the entire supply network.

9.0 Conclusions

There is little doubt that the principles of sustainability within business represent the right thing to do. However, there emerges a rich paradox insofar as those organisations embarking on sustainable strategies (for all of the right reasons), might actually be facing an unsustainable future, because their strategies might not have the end-to-end integration to enable a fundamental step change in operational improvement. As such, it might be argued that further risk is being introduced into often fragile supply networks, via a corporate desire to be sustainable.

Post the first wave of the Global Financial Crisis, internal and external supply networks are not what they used to be, and contain significant risk. However, the first step in offsetting...
supply risk, might be for organisations to define what sustainability really means to their operation and that answer can only be derived from the customer.

The concept of a quality management system at the centre of the principles of sustainability offers a fundamental framework for the “total business”, but only if a consensus can be reached by every player in the supply network (i.e. end-to-end integration).

Recommendations for Further Work

The recommendations for further work include:

- Investigate the level and depth of sustainability strategies within businesses
- Investigate how sustainability strategies are being cascaded down into supply networks
- Develop measures of the impact of sustainability on a supply network

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References


