

Integration of Life Cycle Thinking within Research & Development: A case study of five New Zealand companies

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Introduction and Methodology

This paper summarizes results of research into the Design for Environment activities at five New Zealand companies participating in the Life Cycle Management (LCM) Project led by Landcare Research. The LCM Project has been introduced by Coelho et al. [1] elsewhere in these proceedings.

This paper reports the findings from phase one of the research (undertaken mostly in May-July 2009). Data were collected for this phase of research by conducting semi structured interviews with company personnel, undertaking site visits, and through a review of company literature. Phase two of the research will focus on re-investigating the current status of companies towards the end of the LCM research programme in late 2010.

Summary of Research Findings

After visiting the companies and sorting and grouping the findings, six generic themes were identified as relevant with respect to the successful integration of Life Cycle Thinking and LCM within each company's product R&D activities:

- Culture and Organisation
- Market and Marketing Communication
- Business Capability and Processes
- Life Cycle Knowledge and Inventory Data
- Supply Chain Factors
- Technical Factors

The participant companies are at varying levels of understanding regarding how to integrate LCM within their product development activity. There are also different drivers behind each company's desire to develop an internal programme of LCM activity and between the relevant enablers and barriers. Overall, key findings include:

Dominant enablers to integrate LCM with R&D activity are:

- A company culture, or parent company culture, that includes sustainability values.
- A senior management attitude that is progressive, enthusiastic and engaged with LCM or environmental issues.
- A company expectation that LCM will deliver financial benefits in the short and long term.
- Market demand or customer interest in sustainability are less important drivers for LCM than a company culture and brand that includes sustainability values.
- The presence of existing systematic business processes in other areas may act as enablers to implement other initiatives such as LCM. In particular, close relationships exist with lean manufacturing initiatives responsible, chemical care initiatives and environmental monitoring/reporting.

Key barriers to the integration of LCM with R&D activity include:

- Omission of environmental issues in formal design and procurement processes and documentation prevents environmental decision making. For several companies this was

viewed as a critical step to further LCM implementation within new product development activity.

- Lack of knowledge regarding the environmental performance and profile of the existing product life cycle prevents LCM decision making due to lack of clarity regarding the ‘right’ issues to address.
- In some cases lack of market demand and customer interest regarding environmental issues was perceived as a barrier to including environmental within company R&D activity, although this was often tempered with recognition that business foresight is required regarding global sustainability trends.
- Omission of environmental issues from marketing materials can be perceived by stakeholders (internally and externally) as a lack of company commitment to the principal of environmental sustainability.
- Lack of knowledge regarding the environmental performance of the supply chain and the inability of companies to influence existing suppliers’ environmental performance, or change their supply chain. Environmental performance of the supply chain is viewed as a critical factor to implement LCM principles.

Conclusions

In summary, the research findings underline the nature of R&D as a key enabling function for change within companies, and also identified the challenges of transferring design solutions into operational activities. Integration of LCM with a company R&D team’s collective mindset is thus a critical enabler for wider LCM implementation. The involvement of strategic management and their exposure to the key business LCM issues is also a key factor in driving LCM implementation.

It is also clear that several participants are seeking a ‘joined up approach’ to developing their LCM frameworks, which enables holistic LCM decision making during new product development to be more closely related to, and influenced by, issues and relationships between all relevant stakeholders including: customers, market/marketing, supply chain, operations/manufacture, financial performance and end of life product stewardship.

The majority of companies within the LCM project had little or no formal structure at the start of their product developmental process which would drive the development of more sustainable products and services. One aspect that may be a potential issue for some companies in the project was that formally adding environmental issues into their product development processes requires a greater level of structured R&D process and documentation than currently exists. During the process of conducting our research and the subsequent LCM Design for Environment workshop there was evidence of some improvements to R&D processes being created and implemented which would improve this situation.

One key finding across all companies was that in the absence of a previously completed life cycle product study, all the companies held various assumptions and perceptions about the nature of the life cycle environmental performance of their products. For example, transport was uniformly viewed as a critical environmental factor. This was not linked to any quantitative information or understanding, but originated from the companies’ perceptions regarding the environmental significance of transport, or a perceived market concern regarding transport impacts and the potential risk for this to become a trade barrier. In addition, for some companies ‘natural’ ingredients were seen as implicitly ‘sustainable’, without any quantified environmental comparison with non-renewable or synthetic ingredients having been conducted. The companies reported comments such as: “We don’t know which the most significant environmental issue to focus on is” and, “We’d like to know which material is the ‘better’ environmental one”. This lack of detailed life cycle knowledge in all areas was a commonly cited motivation for the companies to join the LCM project. The life cycle studies which will be completed during the LCM programme [1] should provide participant companies with greater clarity on what the key areas for product orientated environmental improvement should be, and deliver a significant input to their overall environmental strategy.

References

[1] Coelho, C., Hume, A., & McLaren S.J. “The role of life cycle assessment as a tool in life cycle management – a case study of NZ companies” Proceedings of the LCMANZ / NZLCM Centre: Life Cycle Assessment and Footprinting Conference. Wellington, New Zealand, March 24-25 2010.