
Editorial

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This special issue started quite a while back with the recognition that many companies today are good in either day-to-day performance, with an increasing number maturing in Continuous Improvement, or in radical innovation (with an increasing number able to transfer lessons learnt to next innovation projects). However, rarely one finds a company that successfully combines these three key functions to achieve and sustain high performance in all three. However, it is this author's firm belief that successful companies of tomorrow are the ones that excel in terms of *today's* operational performance, continuously try to do so ever better, to also succeed in *tomorrow's* market place, and prepare for the *day after tomorrow* at the same time. In other words, one of the things that will distinguish successful companies of tomorrow from the less successful ones is their capability to align, or even integrate, day-to-day operations, incremental change (continuous improvement, organisational learning) and radical innovation. This will require companies to invent, adopt and implement radically new processes, in particular learning (and unlearning) processes; ways of organising and managing so-called continuous product and process innovation; forms of collaboration, both within the firm and increasingly so with other companies; and technologies supporting information and communication processes.

There are huge bodies of literature on the organisation and management of operations, and the management of radical innovation and change, including product innovation and organisational change (e.g. Business Process Reengineering). Also the body of literature on incremental innovation, especially continuous improvement, has grown rapidly since Imai's seminal publication on kaizen [1]. In contrast, however, at the time this special issue was kicked off, there were hardly any publications presenting good practice or theory, either conceptual or instrumental, on the organisation, 'instrumentation' (technology) and/or management of the relationships and interaction between these three functions. Unfortunately, this situation has not changed much since. The need to address this had been dropped (see e.g. [2]), but management and even descriptive theories on the issue are still scarce and ever more in demand.

So, it was thought to be a good idea to invite articles on the subject. Both theoretical papers and contributions based on empirical research papers were welcome and it was hoped that the special issue would turn out to be a blend of different perspectives, paradigms and levels of aggregation. The present special edition of the IJTM is the final result of this, and it is interesting indeed to see how the focus, level of analysis, and 'ambition' (descriptive vs. prescriptive) of the seven articles vary. This means that obviously this issue does not come even near to presenting a comprehensive 'grand' theory about the successful organisation, 'instrumentation' and management of the relationships between operations, incremental change and radical innovation. Yet, there

are some interesting lines, which will be presented and discussed after the next, brief summaries of the contributions to this IJTM special.

The first article, by Jens Riis (Aalborg University), is about the role of manufacturing strategy and vision in the management of the alignment and orchestration of different improvement activities. The article starts with the notion that: 'Short-term and long-term initiatives are different in nature; yet they are mutually interrelated and need to be combined'. This is quite appropriate and actually hits the nail on the head. The question is how a portfolio of different, in terms of content and scope (local, functional, cross-functional, interdepartmental) but interrelated initiatives can be managed effectively for short-term and long-term success. According to the author, manufacturing vision is one of the ways of supporting this, providing the basis for triggering new improvement initiatives, stopping existing ones, and orchestrating the portfolio of ongoing improvement and innovation activities. An industrial case example is used to demonstrate the efforts of the company involved to cope with these challenges. Based on more than ten case studies, the paper offers a range of descriptive and normative propositions, as postulates for further research, which, essentially describe the managerial problem related to the dynamic interaction between various improvement and innovation initiatives. A very powerful co-ordination, alignment, integration mechanism is a well formulated, communicated, deployed, shared vision on today's and tomorrow's manufacturing. Achieving such a vision, however, is not trivial and the paper demonstrates three challenges associated with this:

- Integration, of different elements and perspectives of a production system.
- Collaborative development with a high degree of participation.
- Inclusion of innovative aspects.

The second article, by Jan-Willem Stoelhorst (Twente University) explores the nature of competition under conditions of technological change. The central question addressed in the paper is: how can firms manage technological discontinuities? Drawing on lessons from the semiconductor industry, the author develops a model to help established firms manage the transition to a newly emerging technological regime. As the critical success factors change from stage to stage, from technological competencies, through organisational capabilities, via strategic manoeuvring, to complementary assets, management has to shift its focal attention from the portfolio of technologies, through that of applications and designs, via alliances, to products and linkages. Stoelhorst clearly shows that technological change is a continuous process of radical innovation and incremental change succeeding each other, while at the same time, continuity must be ensured. His overview of the changes taking place in the top-ten US semiconductor companies between 1995 and 1975, and the top-ten international rankings between 1972 and 1994 clearly shows that very few firms are capable of managing these transitions successfully.

There are strong links between the contributions by Stoelhorst and Neil Jones (University of Western Ontario), who also takes a long-term perspective, focuses in the electronics industry, and the question why some companies are more successful, in the long run, than other companies are. The basis of this contribution is in the commonly accepted observation that non-incremental technological change is difficult for incumbent firms, because they tend to bias their choices towards maintaining the existing technology for too long. They must identify numerous potentially relevant technologies and consider

their usefulness at different levels in a technological system, predict their future potential, and then fund and develop new superior technologies before new entrants do. Jones demonstrates that incumbents can, surprisingly, accomplish these formidable tasks and identifies some of the reasons why. In so doing, the paper hits the *managerial* core of this issue, namely: how can incumbent firms overcome the barriers to innovation that are due to the conditions that make their operations so successful? Major factors involved include:

- The development, refinement and application of abstract ‘meta’ knowledge to guide the selection of technological possibilities.
- The adoption of organisational practices that overcome biasing forces in technological choice. This would include the separation (!) of operational from development groups.
- The extensive use of formal procedures to compare, test and learn to improve different system alternatives.

Whereas Stoelhorst and Jones focus on technology and product development on a fairly high level of aggregation, Spina *et al.* and Corso, respectively, take a more detailed view. Gianluca Spina, Roberto Verganti and Giulio Zotteri (Politecnico di Milano) present and illustrate a contingent model of co-design relationships. They identify four different approaches to co-design, which differ in terms of the type of knowledge transferred from the supplier to the customer and the degree of interaction between the partners. Furthermore, they show that there is not ‘one best way’. Rather, the appropriate choice depends on the uncertainty of the design task and the relational capabilities of the partners. A key *managerial* lesson to be learnt from this paper is that co-design relationships must be managed “... dynamically: the success of a given co-design project depends on previous experiences, which are an intrinsic characteristic of [the] relationship ...”. In other words, co-design is not a given, static process, but involves learning options between projects and even within projects.

Mariano Corso (University of Pisa) digs much deeper into the latter point. The title of his article ‘From product development to continuous product innovation: mapping the routes of corporate knowledge’ accurately reflects the need for companies to reconsider the management of their product innovation activities. Many companies still approach product innovation as a series of essentially unrelated, one-off projects, with a strong focus on the new product development phase. However, they should increasingly consider and manage product innovation as a continuous process of knowledge creation, embodiment and transfer that occurs with the contribution of a large part of the organisation and is extended to all phases of the product life cycle. The article proposes and illustrates a model to support companies assessing their own ability and sharing experience concerning knowledge management in product innovation. That is, the management of the continuous and cross-functional process of knowledge creation, transfer and integration both within and outside the boundaries of the firm. The paper provides an extensive overview of managerial levers, mechanisms that managers can use to foster learning and knowledge management in continuous product innovation. The levers proposed and illustrated with reference to twelve case studies, range from strategy, via process definition, organisational integration mechanism and HRM policies, project and performance management, to design and more general information and

communication technologies. However, in spite of the wealth of vehicles enhancing learning and knowledge management, this 'does not ensure ... that people are able and willing to use them in a [Continuous Product Innovation] perspective', and the paper calls for further research on this topic.

According to Terry Sloan and Paul Hyland (University of Western Sydney) and Ron Beckett (Hawker de Havilland), sustainable competitive advantage depends increasingly on the learning capabilities of companies and their employees. This would require new, innovative training methods and programs. The article examines strategies Hawker de Havilland has put in place to enable them to maintain their competitive position by creating a learning organisation. An important part of that has been that the company has entered into an alliance with a tertiary education provider, which enabled them to grasp various benefits simultaneously:

- Ensure that staff who successfully complete educational programs are rewarded with an accredited certificate or even a university-level Masters degree.
- Becoming a learning organisation.
- Becoming an example to other companies of a manufacturer that is seeking to become a leader in its field by redefining not only how they do business but also what business they are in.

Sloan *et al.* clearly show not only how a firm relationship between an industrial company and a university may be beneficial for the company in terms of them being supported to gradually move towards becoming a learning organisation. They also suggest how other companies may benefit from such a relationship, either directly, through active participation, or indirectly, by following the example set by leading companies.

The final contribution to this issue was submitted by Jan de Leede, Jan Kees Looise and Ben Alders (Twente University). The title of their article is a very accurate description of its content and indeed its contribution to this issue: 'Innovation, improvement and operations: an exploration of the management of alignment'. The paper is based on two studies, a survey among 267 firms and three case studies, and explores the role of structural and social-dynamic (power, trust) mechanisms to enhance the improvement of company performance through the alignment of operations, improvement and innovation. With alignment the authors mean some middle-position between complete separation ('throw-over-the-wall' relationships) and total integration (which would be at the expense of the efficiency of functional departments). This seems trivial, but it is not, and the authors unambiguously show how companies could achieve and make best use of this middle-position. In terms of organisational structures, their main finding is that neither functional separation nor pure product-based groupings are very effective forms to contribute to improvement and innovation. Most high-performance companies represented in their sample had hybrid forms, with size determining whether cross-functional teamwork or more informal mechanisms are more efficient. 'Superimposed' on structure is alignment as a human activity, which is, consequently, subject to interaction between people, a perceived rather than objective reality, and therefore also a dynamic process, rather than a steady state of fit or misfit.

The set of papers in this issue is small, and its variety high, in terms of field focus, theoretical background and contribution, methodology, and level of analysis. They also differ in 'ambition'. Some of the authors pursue increased descriptive knowledge about the interaction between operations, incremental change and radical innovation while

others go one step further and aim at developing normative guidelines for managers to cope with this challenge. Therefore, this issue does not provide any definitive answer. At the same time, however, the sample provides sufficient evidence for some tentative conclusions.

- It is worthwhile putting explicit effort into the organisation, 'instrumentation' and management of the interaction between operations, change and innovation. One way or another, most articles show that alignment does lead to improved and sustained performance.
- Alignment is a process, rather than a state of affairs.
- The relationships between operations, change and innovation are relationships between different kinds of people, different perspectives, different time horizons, ...
- There are various different mechanisms to enhance the alignment: strategy, organisational structure and culture, management systems, technology.
- There is no single best way. Alignment requires a situation-specific and at the same time dynamic configuration of strategy, structure and culture, systems and technology. Some of the papers clearly illustrate the influential role of factors such as company size and situation, and industrial stage of technological development, and how changes in these factors necessitate changes also in the way the interaction is approached.
- In the network society, alignment is not just an intra-firm activity; it involves cross-firm collaboration.

For all these and other reasons, alignment is not a state-of-affairs but first of all a dynamic, ongoing learning process. Prevailing practices may need to be unlearned, and new practices developed and instilled in the organisation and indeed in relationships with other firms. The challenge that companies are facing is essentially a balancing act, between organisation and 'laissez-faire', short-term and long-term issues, top-down direction and bottom-up 'emergent' development, formal and informal, dictate and dialogue.

References

- 1 Imai, M. (1986) *Kaizen. The Key to Japan's Competitive Success*, Random House, New York.
- 2 Tushman, M.L. and O'Reilly, C.A. (1996) 'Ambidextrous organizations: managing evolutionary and revolutionary change', *California Management Review*, Vol. 38, No. 4.