

An Illustration of Lessons for Forest Sector Researchers and Managers from Current New Product Development Research

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Abstract

Forest sector innovation researchers suggest that the academy does not do an adequate job of transferring research findings to forest industry managers. While the forest sector-oriented research community has drastically increased the output of innovation-focused research in recent years, it has not necessarily been effective in transferring new findings in a form easily digested by forest sector managers. In addition, there has been virtually no effort to transfer the knowledge from the general innovation literature. With this shortcoming in mind, we reviewed all of the articles published during 2009 in the *Journal of Product Innovation Management*. We chose to limit our summary to articles focusing on the process of new product development in a setting relevant to the forest sector. We outline the results of six of the 43 articles published in 2009 and illustrate the insights available to industry managers and academic researchers from existing work outside the forest sector.

Introduction

Innovation and new product development are undeniably hot topics in society as well as industry. The growing success of manufacturers in developing countries and the inability of manufacturers in the developed world to compete based on costs have driven an increased focus on innovation throughout the workplace and a special emphasis is often placed on one type of innovative activity, new product development (NPD). Numerous authors emphasize the importance of innovation to the continuing success of any company (Andrew et al. 2009, Bullard and West 2002).

The look to innovation as a source of competitive advantage is also evident in the global forest products industry (Hansen 2010). Unfortunately, the industry appears to lag others when it comes to the sophistication of its approach to innovation and NPD. In fact, the forest sector is often generally described as having a commodity mentality and lacking the systems and culture necessary for innovation (Hansen et al. 2007, Stendahl et al. 2007). For example, research shows that, overall, the forest industry does not tend to have a systematic approach to NPD (Hansen 2006). In addition, new products from the industry often result from attempts to utilize readily available raw materials rather than specific demands from the marketplace (Bull and Ferguson 2006) suggesting a lack of market orientation in the industry, a characteristic that positively impacts firm performance via innovation (Kirca et al. 2005).

Current forest industry-focused research suggests that the hype surrounding innovation and NPD fails to match on-the-ground practices (Hansen 2006, Stendahl 2009). Assum-

ing this is true, there are many reasons that could explain the lack of implementation. One significant reason may be a woefully inadequate transfer of knowledge to industry managers. For example, Stendahl (2009) states that although consultants commonly advise that Nordic wood companies should increase their rate of innovation and NPD, there is little from the consulting or academic communities that provides concrete paths to reaching that trajectory. Similarly, in a synthesis of forest sector innovation research, Hansen et al. (2006) suggest that,

“...even though innovation literature includes conflicting findings, existing knowledge can be used as a basis for approaching innovation as a systematic, enterprise-wide process. It is important for practitioners that research findings be broken down into concepts, tools, and rules to follow for easier practical application. There is a clear need

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Journal of Forest Products Business Research
Volume 7, Article No. 4

for further interpretation of current findings and identification of implications for industry practice as well as research exploring new territory.”

With a goal of providing an illustration of the type of information that is available from current research findings, we summarize the findings of six articles published during 2009 in the *Journal of Product Innovation Management* covering the NPD process. The *Journal of Product Innovation Management* is generally recognized as the top journal in the field of innovation. The journal “advances management practice by offering both theoretical structures and practical techniques” regarding product innovation (JPIM 2010). We do this with the intention of accomplishing the following objectives:

1. Illustrate insights available from current research that are of relevance to forest sector companies.
2. Identify key actions companies can take based on these insights to improve their NPD processes.
3. Identify research opportunities for forest industry researchers.

Methods

We conducted an extended and iterative exploration of articles published by the *Journal of Product Innovation Management* (JPIM) in order to identify a set of articles with which to create our summary. As an initial step we considered all articles from 2007-2009. The two authors separately read the abstract of each article and considered which articles were appropriate to include in the summary and which were not. This process made it clear that inclusion of three years of articles was infeasible given our summary approach. More importantly, the process informed development of a set of criteria we would eventually use to select articles. We concluded that our industry target was large forest industry companies and that articles should be what we judged to be especially relevant to the B2B sector. We also decided to exclude articles that were not empirical or were specifically focused on services, final consumers, or the high-tech sector. While we recognize that exclusion of these categories may also exclude important insights, our goal was to narrow the field to a small set of articles that could provide an insightful and

manageable summary that most effectively illustrated the opportunity to the reader. Table 1 summarizes the categories of all the articles reviewed.

Based on our initial experience we chose to isolate our search to articles published in 2009. Each author carefully read the abstract and skimmed the text of each of the 43 articles published in 2009. Our article selection process was performed in two steps. Throughout this process, if the authors were in disagreement, a negotiation ensued resulting in eventual compromise and agreement. First, based on the criteria outlined above we excluded 17 articles from further consideration. The remaining articles were carefully considered by each author and after several iterations placed into a number of categories representing the innovation process: NPD Process, Management Process, Project Teams, Leadership, and Project Review (Table 1).

Given our summary approach, 26 articles were considered to be too extensive. Accordingly, we chose to focus on only one of the categories outlined in Table 1, the NPD Process. This allowed us to succinctly illustrate the useful findings that are available from a small sample of the academic literature for use by forest sector researchers and forest industry managers. The six articles used in this illustration are outlined in Table 2.

It is important to note that since our results are based on six articles published in one journal in 2009, we in no way are making an attempt to paint a holistic picture of appropriate NPD process practices. Rather, we treat this as an opportunity to outline the type of valuable information and insights that are available from the general literature. While we focus on the NPD process in this article, the same approach could be used for other areas of interest associated with innovation management. The article seeks to demonstrate that there are a number of useful and practical, managerial and research insights that an exercise such as this can provide to an industry that generally struggles to implement a systematic approach to new product development. While this article is, by design, limited in scope it is hoped that it provides incentive and impetus to researchers and industry to grasp the opportunity that exists.

Our consideration of the six articles began with each author conducting an additional deep reading of each, identifying findings we each found to be especially relevant to large forest industry companies. Careful consideration of the identified findings lead us to develop a set of four categories that we felt adequately reflect the areas of focus covered in the articles. Again, selection of these categories was a cooperative/negotiated process. The four categories are:

¹By selecting JPIM we were not attempting to create a representative sample of the current literature. As pointed out by one anonymous reviewer, other important innovation-related journals may have quite different areas of focus.

Table 1. Classification of articles.

| | NPD Process | Management Process | Project Teams | Leadership | Project Review | Excluded |
|-------------------------------|------------------------|-------------------------------|--------------------------|-------------------|---------------------------|-----------------|
| Number of articles | 6 | 10 | 7 | 1 | 2 | 17 |

- Organizational structure
- NPD strategy
- Designing the NPD process

- NPD competencies
- The following results and discussion section is structured utilizing these four categories.

Table 2. NPD Process articles selected and summarized.

| Article | General Topic |
|---|--|
| <p>PERSPECTIVE: Trends and Drivers of Success in NPD Practices: Results of the 2003 PDMA Best Practices Study</p> <p>Gloria Barczak, Abbie Griffin, Kenneth B. Kahn</p> | <p><i>Barczak et al.</i>'s (2009) work is primarily focused on members of the Product Development and Management Association which means that results are clearly biased towards "above average" product developers. Still, even within this group of firms, NPD remains a risky business with only one successful new product for every seven NPD projects. They compare top performers, with respect to sales and profits derived from new products, versus other companies ("best" versus "rest"). The authors suggest that, "The best are indeed different from the rest, and much can be learned from their practices."</p> |
| <p>Adaptation and Organizational Connectedness in Corporate Radical Innovation Programs</p> <p>Donna Kelley</p> | <p><i>Kelley</i> (2009) explores how radical innovation can best be accomplished in mature companies. Opinions on this topic range significantly. Some advocate for near complete separation between the existing company and the unit working to develop a radical innovation (e.g., O'Reilly and Tushman 2004). However, Kelley (2009) finds that connection to the existing organization is important for success.</p> |
| <p>Formal Rules in Product Development: Sensemaking of Structured Approaches</p> <p>John K. Christiansen, Claus J. Varnes</p> | <p><i>Christiansen and Varnes</i> (2009) investigate how structured NPD processes are interpreted in practice by industry managers and find that there is a high level of sensemaking (interpretation) when it comes to the rules governing NPD processes. They find that companies with very similar rules often have different implementation practices because of the interpretation of company managers.</p> |
| <p>The Impact of NPD Strategy, Product Strategy, and NPD Processes on Perceived Cycle Time</p> <p>Mark E. Parry, Michael Song, Petra C. de Weerd-Nederhof, Klaasjan Visscher</p> | <p><i>Parry et al.</i> (2009) examine the impact on cycle time, as perceived by managers, of NPD strategy, NPD environment, and NPD processes. They find that managers are more satisfied with perceived cycle times when they have developed a formal NPD strategy, created a positive climate for innovation, and created cross-functional teams.</p> |
| <p>Where Do Good Innovation Ideas Come From? Exploring the Influence of Network Connectivity on Innovation Idea Quality</p> <p>Jennie Björk, Mats Magnusson</p> | <p><i>Björk and Magnusson</i> (2009) explore the connection between connectivity within a social network and the quality of innovation ideas created by both individuals and groups. Generally, they find that connectivity has a positive impact on the quality of ideas. However, group processes are found to be quite complex and they are unable to fully explain the connection between group connectivity and idea quality.</p> |
| <p>Management Control and Strategic Renewal in the Front End of Innovation</p> <p>Jarno Poskela, Miia Martinsuo</p> | <p><i>Poskela and Martinsuo</i> (2009) investigate the front end of innovation and test the use of management control, process formalization, and rewards on strategic renewal. They find that control by managers is important for strategic renewal, but formalization of processes and offering rewards are not.</p> |

Results and Discussion

As with any aspect of business, managers play a significant role in the success or failure of NPD efforts. Meanwhile, researchers offer a vital support role in developing understanding of those areas that will improve the competitive advantage and effectiveness of a business. Of particular note is the NPD content and areas covered by the Product Development and Management Association study (Barczak et al. 2009). The results of the study cover each of the categories outlined above and can easily be used by forest industry companies to compare practices in their own firms with leading NPD companies. For example, past research (Hansen et al. 2007) suggests that few companies in the forest sector have a new product strategy, yet this is something that nearly all of the “best” companies possess. Generally, the findings show that the “best” companies take a structured approach to NPD providing support to managers and teams, giving them the necessary NPD tools to succeed.

The following text provides insights and advice from the six articles about each of the above mentioned categories related to the NPD process for both researchers and managers, both of whom have a responsibility to improve forest sector innovation.

Organizational Structure

Despite a large body of research attempting to determine the ideal organizational structure to facilitate successful NPD, researchers continue to fail in the endeavor. This is again illustrated in the articles selected for this manuscript. For example, Barczak et al. (2009) state that despite a concerted effort in their benchmarking study, that they were unable to,

“differentiate between organizational structures used by the best and those used by the rest. Furthermore, the lack of consistency or even a general tendency for a particular organizational form even within different levels of project innovativeness is baffling, with some results just not making sense.”

Kelley (2009) concludes that with respect to radical innovation there is no one ideal structure. She also highlights that, “It may therefore be more important to develop feedback mechanisms and to maintain sufficient flexibility to change and adapt rather than to get it right at the outset.” This advice presumably applies to organizational structure as well as other elements of the NPD process.

An area that crosses two categories is that of employee connectedness, which has been shown to impact idea generation (Björk and Magnusson 2009). Ensuring that an organization is appropriately structured so as to optimize employee connectedness is important but also complicated.

Insights for researchers: While results around ideal organizational structure from the studied articles are, at best, vague, it would nevertheless be useful to replicate Barczak et al.’s (2009) benchmarking study in the forest industry to identify and evaluate patterns in industry.

The studies highlight the need for organizational con-

nectedness. Research that aims to gain insight on the current level of connectedness and its impact on NPD would provide the industry with useful insights.

Insights for managers: While it is difficult to gain direct and practical organizational insights regarding organizational structure from these articles that could be immediately implemented, findings do highlight the need for developing an understanding of the organizational structure that is in place, including that concerning employee connectedness.

NPD Strategy

According to Parry et al. (2009), the benefit of NPD strategy is that it provides criteria for project prioritization and resource allocation, which reduces conflict and the time needed for decisions. Nearly three-quarters of firms in Barczak et al.’s (2009) study have a new product strategy and 55% have a well-defined and structured process for portfolio management. It is suggested that companies are tending to focus on current product line maintenance and less on expanding into new areas. This could be partially due to the fact that managers from firms with narrow product lines are more likely to perceive NPD cycle times as satisfactory (Parry et al. 2009). Over 85% of the “best” firms have a new product strategy that guides NPD efforts whereas only 69% of the “rest” have such a strategy (Barczak et al. 2009). The “best” firms tend to have a strategy of being first to market (49.5%) whereas only 26.3% of the “rest” pursue this strategy.

Insights for researchers: The findings of these studies point clearly to the benefits of having a new product strategy. These outcomes provide directives that researchers could develop into clear, digestible information for the forest industry. It also highlights the benefit that replicating Barczak et al.’s (2009) benchmarking work in the forest industry could provide. Doing this would provide researchers with a clear understanding of where the forest industry is placed in this regard. From this work it would prioritize further research work and be better placed to appropriately pitch advice and directives to practitioners.

Insights for managers: This work clearly identifies for managers the benefits of having a new product strategy. It indicates the need for managers to develop an understanding of new product strategies and integrating the process into their business.

Designing the NPD Process

Modern NPD processes are typically set up based on a number of stages and gates or decision points where go, no-go decisions are made. For example, Barczak et al. (2009) use the following stages in their research: idea generation, idea screen, business analysis, development, test & validation, and commercialization. Formal NPD processes (those using stages, gates, and formal rules) are the norm among the advanced firms in the Barczak et al. (2009) study. The companies are generally moving from second-generation to third-generation NPD processes indicating enhanced sophistication of their NPD efforts. Despite this fact, idea management is a significant weakness for firms in the study. Overall, companies still do not manage idea generation well and they often are not strategic in the ideas that they choose to pursue. Less

than half of companies actively record and archive potentially useful ideas and only about 65% of generated ideas are recorded (Barczak et al. 2009).

Structured approaches to NPD can be classified based on their exhaustiveness and elaborateness. Christiansen and Varnes (2009) investigate how the many rules that govern the NPD process are interpreted and used by managers, referring to a process called sensemaking. While managers agreed that rules are important, they felt the need to adjust the rules depending on the task at hand. It is seen as very important that rules be flexible and adaptable. More experienced managers tend to interpret rules differently and are more likely to adapt them to a given situation. Because of sensemaking by managers, companies with very similar official rules differ considerably with respect to levels of elaborateness and exhaustiveness.

There is considerable discussion in the literature regarding how the process for radical innovation should be different from more routine innovation efforts. In some cases companies separate radical innovation endeavors and essentially run them outside the parent organization (Christiansen and Varnes 2009). However, the work of Kelley (2009) shows that over time the approach to radical innovation can undergo significant change with respect to strategies, structures, and processes. In addition, her findings suggest that radical innovation efforts move toward greater connectedness with the parent firm. Companies in the study generally move toward a portfolio perspective with attention given to the overall innovation portfolio rather than focusing on individual, high-risk projects. Kelley (2009) emphasizes that strategy can be adapted to changing conditions and learning yet maintain clarity as it evolves.

According to Barczak et al. (2009), leadership of NPD is structured a myriad of ways within responding firms with the most common being a part-time project leader. This leads the authors to conclude that NPD leadership is somewhat neglected. In fact, they show that managers support innovation adequately only 60% of the time.

Barczak et al. (2009) find that the “best” firms tend to have a variety of rewards for NPD teams such as profit sharing, compensation time, and project completion celebrations. Other findings suggest that extrinsic rewards may lead to risk averse behavior, so creating a situation with high expectations and a strong risk of failure should be driven by curiosity and intrinsic motivation (Poskela and Martinsuo 2009).

Poskela and Martinsuo (2009), citing Cooper and Kleinschmidt (1987) and Kleinschmidt et al. (2005), define strategic renewal as the ability of the front end to create an opportunity for new market entries and NPD activities. They find that management activities designed to assure success in the front end of innovation are positively associated with strategic renewal as are intrinsic task motivation and market and technology uncertainty. Having highly specified procedures and outcome-based rewards in the front end is not found to be related to strategic renewal.

Insights for researchers: The outcomes from the work by Barczak et al. (2009) further highlight the need and usefulness of a benchmarking study specific to the forest industry. The work by both Christiansen and Varnes (2009) and

that by Kelley (2009) highlight the need for flexibility and adaptability. Researchers could work to better understand how well the forest industry works in this regard as well as immediately producing some easy to understand information on the topic.

The output from the articles also provides advisory material for researchers to communicate in the areas of managerial support of innovation, reward structures, and strategic renewal. All three areas could be further investigated specifically in the forest industry.

Insights for managers: Managers would no doubt benefit from some of the research in these papers being described in a digestible form. Areas of insight for managers from these papers are:

- The benefit of implementing formal NPD processes;
- The benefit of flexible management styles;
- The need to appropriately support the NPD process; and
- The importance of creating reward structures for NPD teams.

Managers could cooperate with researchers to facilitate adoption of these practices in their businesses.

NPD Competencies

Despite the findings that no single system of organization is most appropriate, researchers are consistent in their belief that employees with competencies in the use of NPD tools are important to NPD success. Kelley (2009) shows that radical innovation efforts tend to move toward increased use of process tools like those used in less radical innovation efforts. In addition, those processes need to be flexible and adaptable. Her findings suggest that organizations are more comfortable with tools that are more familiar. With this in mind, they must be flexible if they are to be used for incremental NPD and radical innovation. A competency for radical innovation is something that can be built over time and it is an evolutionary process (Kelly 2009). “Perhaps greater consideration of both adaptability and organization connectedness in developing radical innovation programs could ensure the activity stays in operation long enough to demonstrate its value (Kelley 2009).”

Teams in the “best” companies more often use NPD tools, especially tools designed for developing a qualitative understanding of potential customers (Barczak et al. 2009). These teams are also more open to using new tools – meaning that they tend to be more innovative than their “rest” counterparts. However, less than half of firms conduct a number of team training activities, leading the authors to conclude that team and management development are key areas for NPD improvement (Barczak et al. 2009). Only about one-third of teams are collocated and team support tools are not widely utilized, likely resulting in communication difficulties (Barczak et al. 2009).

Individuals who have a larger network are more likely to create high-quality ideas for innovation. Higher levels of connectivity allow the individual to acquire more information and knowledge. The dynamic is somewhat different with respect to the connectivity of groups within a company. There are diminishing returns suggesting an ideal level of connectivity.

However, the general principle is that higher connectivity results in higher-quality ideas (Björk and Magnusson 2009). Accordingly, managers should facilitate employee interaction both within and outside company borders.

Insights for researchers: The findings of the papers provide clear indication of the benefits that NPD tools provide. They highlight the need for the research community to understand the extent of the use of NPD tools in the forest

industry and to provide them with easy to understand information on the suite of tools available and possible benefits. The research community could also usefully further the understanding of connectivity between employees by producing easy to understand information on the topic.

Insights for managers: Managers should make sure that they are aware of the available NPD tools and the pros and cons of each. With this they are in a position to judge

Table 3. Recommendations for researchers and companies.

| Category | Key action for researchers | Key action for companies |
|---------------------------|--|--|
| Overarching | <p>Replicate the PDMA Best Practices Study for the forest industry to benchmark their positioning</p> <p>Create template/profile of a “best” company that can be used by members of the industry to use with their organizations. More specifically, provide working examples of product development strategies</p> <p>Analyze the PDMA studies and identify those areas that would be useful for researchers to create industry specific advice on, for example, ‘How to create a product development strategy’</p> | <p>Analyze the PDMA benchmarking study and pursue strategies and tactics characteristic of “best” companies. For example, if one does not exist, create a product development strategy</p> <p>If there are elements of studies that are not clear to the practitioner, communicate with researchers so they can develop it into an easy to understand format</p> |
| Organizational Structure | <p>Develop an understanding of how the forest industry interprets and applies management processes to the NPD process</p> <p>Identify how the forest industry currently manages employee connectedness</p> | <p>Encourage networking and connectivity by employees, both within the company and outside the company</p> |
| NPD strategy | <p>Develop a greater understanding of how process tools for developing radical innovation projects are used by different sectors of the forest industry</p> <p>Once an understanding is developed around the use and understanding of new product strategies in the forestry industry (via the replicated PDMA study), researchers can develop appropriately pitched briefs on product strategies to guide firms</p> | <p>Develop a better understanding of NPD strategy, create a strategy and integrate it into company policy</p> <p>Include radical innovation as part of overall innovation strategy and carefully consider the best way to organize for radical innovation.</p> <p>Strive to link process, strategy, and structure when designing innovation programs and assure feedback to allow constant adaptation.</p> |
| Designing the NPD process | <p>Identify where radical innovation is happening in the forest products industry and how it is organized.</p> <p>Develop an understanding of how the style of sensemaking influences decision making in forest industry projects</p> <p>Develop an understanding of what impacts NPD cycle time in the forest products industry</p> <p>Better understand front end management of innovation in the forest industry.</p> <p>Disseminate easy to understand knowledge on the NPD process to the forest industry</p> | <p>Seek to understand innovation management and NPD. In the areas where the company has no background or understanding of “best” strategies, seek outside assistance from researchers</p> <p>If nonexistent, develop strategies, rules, and policies for NPD. If these exist, carefully evaluate whether the practice of NPD follows existing strategies, rules, and policies and adapt appropriately.</p> <p>Seek intrinsic motivators for employees and fuel employee curiosity to encourage innovation</p> <p>Develop an understanding of how ideas are managed in the company and seek a strategic approach to those ideas that are chosen to pursue</p> |
| NPD Competencies | <p>Develop an understanding of which NPD tools are used where in the forest industry</p> <p>Create easy to understand information on NPD tools for the forest industry</p> | <p>Develop an understanding of NPD tools relevant to the workplace. Seek to implement as appropriate</p> <p>Develop a connected workplace</p> |

what NPD tools should be used in which situation. Managers should also maintain a deep understanding of the level of connectedness in their organization, and work to optimize opportunities for employee connectivity.

Conclusions

Using the NPD process as an example, this illustration highlights the gap between the amount and sophistication of knowledge available generally and the lack of information readily available that is tailored for the context of the forest industry. Although current research is beginning to create a more refined picture of NPD practices in the forest products industry, there is still much that is unknown. This lack of information and what appears to be a NPD gap between the forest products industry and other industries presents a threat to the industry's long-term competitiveness. This illustration highlights the opportunities available to take advantage of existing work to learn from and implement robust NPD approaches. A true synthesis or possibly a meta-analysis of relevant work on NPD would allow a prioritized set of research activities to be established that capitalizes on existing research and develops proposals for targeted research specific to the forest industry.

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