



Strategic change in the forest industry towards the biorefining business



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ABSTRACT

The aim of the study was to explore the current forest industry's change features, necessary resources and management for the biorefining business in Scandinavia and North America. A total of 23 representatives from the forest, bioenergy and bioproducts sectors participated in themed interviews in the last round of a three-phase Delphi study. In both Scandinavian and North American forest industries, a conservative organizational culture and lack of financial resources create barriers to change. The role of the forest industry in the forest biorefinery consortium is largely seen to be that of a biomass provider. The scope of change depends on context-specific features, such as biorefinery location and raw material availability. Operating a commercial-scale biorefinery facility requires both new managerial and operational-level skills. Readiness for change needs to be embedded in the organizational culture – and the key to attaining this is open-minded organizational management. It is believed that there are innovative personnel in forest industry companies, yet the current culture does not encourage such people to submit their ideas. Success in the biorefinery business cannot be achieved without collaboration. However, sharing of profits among partners in the consortium will be challenging.

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1. Introduction

Many different driving forces are shaping developments in the forest industry,² and these have consequences for its continuity. Some of the most prominent forces are largely negative (e.g. industry structure and the maturity of some product markets) and can only be addressed by changes within the industry itself [1,2].

Better corporate performance depends on understanding how industries evolve. Companies can improve their performance by adapting their investments to follow industry trends rather than fighting against them [3]. Several frameworks have

been developed in order to understand the structural changes shaping the industries. For instance, changes within the industries and sectors can be analyzed in terms of the S-curve [4,5] and the closely related Product Life Cycle and Industry Life Cycle [6–10]. These concepts suggest that industries start out small in their development stage and then go through a period of rapid growth, culminating in a period of “shakeout”. The last two stages are a period of slow or even zero growth – the maturity stage – and then a final stage of decline.

In some respects, the forest industry is facing challenges that have already been seen in other manufacturing sectors. In developed regions, the industry has significant capital assets and large domestic markets, but production costs are relatively high and markets are growing quite slowly or even declining [1]. Therefore, in many regions the forest industry has long been characterized as a mature [11] industry with production-oriented [12,13], low-cost strategies [14–16]. In contrast, markets in emerging economies are growing rapidly and production costs are generally lower, with the result that many new investments are directed towards these countries,

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² In this study, “forest industry” is understood to include pulp, paper, paperboard and wood products industries. The latter includes saw-milling, plywood, chipboard, fiberboard and construction products industries.

further increasing their competitiveness. The result of this is overcapacity in many emerging economies and a generally negative outlook for prices and profitability, both globally and particularly in many developed countries [1].

Although the S-curve framework is dynamic, and it focuses on how industries evolve over time, it does not consider how companies move across product generations (i.e. across S-curves). Industry leaders may become trapped in a kind of self-fulfilling logic of maturity if they take action based on an oversimplified S-curve. In the event that they believe an industry has reached the “mature” phase of the S-curve, they may wrongly assume that it is beyond innovation [3]. Styles and Goddard [17] suggest that firms falling into the maturity trap do so because they are competing in an industry where many firms are pursuing the same strategy (i.e. “being better at the same game”). Moreover, McGahan [3] warns of the “maturity mindset,” which can leave many managers complacent and slow to respond to new competition.

It is obvious that no business can survive over the long term if it cannot reinvent itself [18,19]. Yet maturity does not imply a lack of opportunity, nor does it mean a lack of innovation: many mature industries have been transformed by new technologies and new strategies [20]. However, the management of organizational change tends to be random, reactive and ad hoc with a high failure rate in change programs [21–23]. Accordingly, it has been said that, “Human nature being what it is, fundamental change is often resisted mightily by the people it most affects: those in trenches of the business [18].” One of the interviewees in this study describes the need for change in the forest industry:

I would say it's clear that we know it's going to change. I would say it's not so clear what we need to do to get there. I think the way I would look at it, the key decision-makers in the forest industry are saying, OK, we know we have to be ready to change the business model. But they're not quite sure how it's supposed to go yet and so I think nobody is — well, very few anyway are — blind, have put blinders on and are just kind of continuing business as usual, so I think the strategies are being almost constructed to have a lot of flexibility in them. (Forest sector representative, U.S.)

A need to innovate and redefine business models is particularly urgent in the mature pulp and paper industry, with its frequent mill closures and profitability problems [24–27]. The emerging bio-based economy (bioeconomy) is a promising sector with notable potential for the future and many business opportunities [28]. Biomass-based energy (bioenergy) and products (bioproducts) play an important role in society's transition towards a greener and more bio-based economy in general, and they offer opportunities for the global forest industry in the long run [1,2]. In particular, integrating biorefineries in the pulp and paper industry seems to hold great future potential [29]. In the present research, a forest biorefinery is defined as a multi-product factory that integrates biomass conversion processes and equipment in order to produce a variety of bioproducts like fuels, fibers, and chemicals from wood-based biomass [30–32]. The development of forest-based biorefineries may imply a fundamental structural change in the traditional forest-based industries, but so far our understanding of these potential changes is limited [33]. Chambost et al. [29] state that forest

biorefinery implementation presents prominent challenges for firms, related to key technological, economical, financial, cultural, and operational risks, and most importantly, enterprise transformation.

This study is based on data from the final round of a three-phase Delphi study concerning the diffusion (development and implementation) of forest biorefineries in Scandinavia and North America. The results of the first two rounds were reported in previous papers [2,34]. In the two previous research rounds, many statements by respondents indicated the rather passive role of the forest cluster and a lack of change management, implying that more proactive attitude and independent vision from forest sector companies would be necessary for entering a new business. The previous rounds also indicated that the forest industry should evaluate the business environment and its strategies from a new perspective. Therefore, the previous research rounds clearly revealed that as emerging biorefining economies continue to evolve, there is a need for realistic estimates regarding the forest industry's change resources [2,34].

The main aim of this study was to explore the current forest industry's change features, needed resources and management towards the biorefining business in Scandinavia and North America. The research explores the forest industry's move across product generations and recognizes related challenges, particularly in management.

Change management approaches, specifically the change kaleidoscope of contextual change [21], were used as a framework for analyzing the forest industry's change features in regard to the biorefining business. The aim was not only to explore the change process and related change management capabilities within the forest industry, but also to evaluate the actual new skills and know-how that are needed when developing and operating a commercial-scale forest biorefinery facility.

2. Analyzing industrial change: contextual and change features

2.1. Strategic change features

Balogun and Hope Hailey [21] emphasize that due to the complexity of change tasks, successful change requires the development of a context-sensitive approach. In other words, the design and management of any change process should be dependent on the specific situation of each organization [23,35,36]. Consequently, organizational change cannot be separated from organizational strategy, or vice versa [37,38].

Balogun and Hope Hailey [21] present a framework, the *change kaleidoscope*, which can be used to help achieve successful change. The contextual features in the change kaleidoscope do not carry equal weight across all organizations. This is why the framework is named after a kaleidoscope, as features are constantly shifting in relation to the organization being analyzed. The kaleidoscope can also change over time in response to change interventions, thus offering a tool for non-static change management. Even though in each change situation the configuration of contextual features is unique, certain questions remain constant in any change context. These questions include the amount of *time* available for change (see also [23,39]), the *scope* of the change required [40,41], the *degree of diversity* within an organization [18,37],

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