Don't wait! Innovate!

Innovation management in fiber based packaging

By Dr. Veronica Schey and Kristi Magllara

Mankind has always been forced to innovate simply through the pressure to adapt to the environment. Innovation has been instrumental for the survival and development of mankind. Innovation is part of the necessary adaptation requirements that Darwin describes in "The origin of species". For companies, this means that environments and structures must be created in a way that they enable innovation.

Why should I care about innovation & product development?

The biggest inventions have typically emerged from situations of scarcity, imminent immediate danger to survival, or in disruptive situations (e.g. mastery of fire, agriculture or handwriting). For companies, however, the target is business stability and growth so that innovation can take place within the settings of "normal" business operations. While this seems contradictory, it is important for companies to provide the right environment, culture and processes to drive innovation. This article will provide an aid as to how innovation can be fostered within the settings of a company.

For the purpose of this article we will define innovation as the "identification & development of all sorts of ideas that will lead to new business and/or increase profitability by value-adding features and/or services".

Innovation can be seen in many different aspects as depicted in Figure 1. Equally important to product innovation are the other types of innovations, such as process innovation, organizational innovation, business model innovation and so forth. This paper will focus on product innovation from the perspective of the fiber-based packaging industry, not considering other packaging materials such as plastics, glass or plate.

Types of Innovation

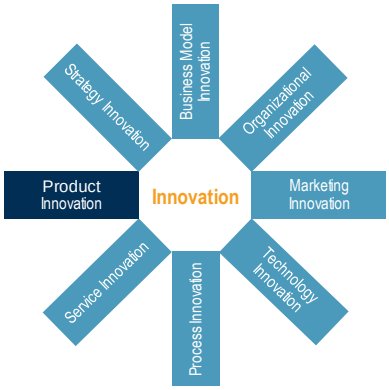


Figure 1: Different aspects of innovation

Why is it important to work on innovation? Is "innovate or die" still valid? Despite overall growth in the packaging industry, innovation management is crucial to improve profit margins and to sustainably stay in business. It is key to:

- **Enhance sales volume** by serving unmet customer demands (thus expanding the product portfolio)
- **Increase contribution margin** by providing value-adding features (thus improving the existing product portfolio)
- Stay in business in the long-run – **today´s innovations will be tomorrow´s commodities**. To keep pace with the market, companies need to innovate.

Innovation is a result of the need to prepare for the future and sometimes the need for immediate and short-term survival. The benefits are typically mutual both for producers and customers. Innovative products will lead to benefits on the customer side. While a manufacturer can charge a premium for a new feature, the customer might benefit from lower total cost of ownership (e.g. lightweight packaging leading to savings in transportation).

Furthermore, a report from Bain[1] found out that highly innovative companies are better at retaining employees. These companies have a higher attractiveness to employees than companies that lack innovation culture. The need for innovation has already reached the industry, as the topic "Product development & innovation" is one of the top three priorities within the pulp and paper industry, having become increasingly important in recent years (see Figure 2 and 3).

[1] Bain & Company: Taking the measure of your innovation performance, 2013

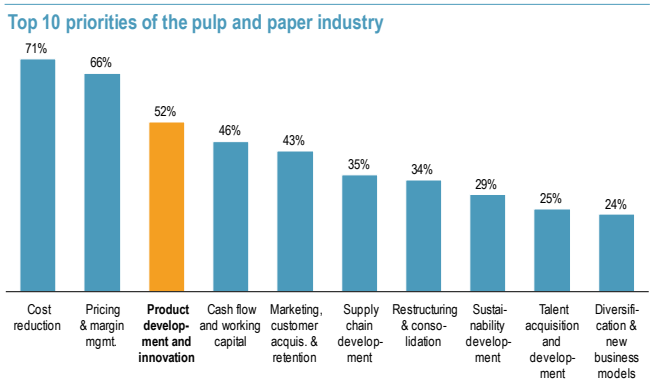


Figure 2: Ranking of priorities in the pulp and paper industry2

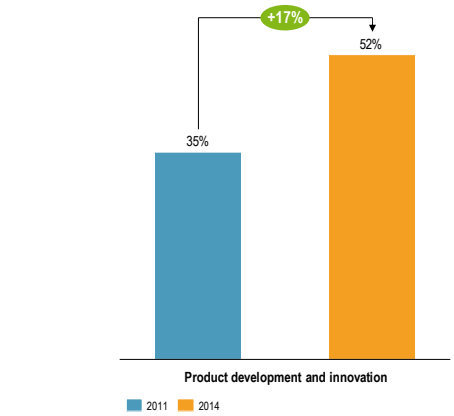


Figure 3: Growing importance of product development and innovation[3]

What factors are driving innovation and therefore impacting the innovation process?

There are six main drivers of innovation that provide the pre-requisites and the need for change (see Figure 4).

- Companies aim for **higher (financial) returns** through product enhancements and value-adding functionalities
- **Customer requirements** from companies in fast-moving consumer goods (FMCG) are drivers. FMCG companies continuously conduct market studies and try to position new products to satisfy changing customer behaviors to maintain market shares. These requirements are then passed through the supply chain and become drivers of innovation "upstream". Requirements typically can be new products and/or adaptive changes, e.g. packaging as branding, traceability or security features. This push through the supply chain requires process collaboration and insight on customer feedback.
- **Environment & sustainability** represents an increasingly important driver. This topic comprises current environment & sustainability trends such as reducing CO2 footprint, bio-based solutions (e.g. biodegradable materials) or recy-cling.
- **Technology** is another driver triggering innovation. The rapid rate of technological development has yielded a whole new generation of intelligent machines and robots that are autonomous and able to communicate with each other. In the Industry 4.0 concept, the whole value chain will be digitalized and connected by smart objects and products, thus leading to automatic and real-time actions and responses between them.
- **Politics** can unleash innovation potential by establishing – intended or unintended – new regulatory frameworks. There is usually a close connection with security and envi-ronment agencies, pushing companies to fulfill certain standards and/or requirements.
- The ever-changing **sociological trends** such as urbaniza-tion, migration, or increase in single-households can change demand patterns and create the need for different product solutions, such as smaller or easy-to-carry pack-aging units.

[2] StepChange Survey for RISI European Pulp and Paper Outlook Conference 2014

[3] StepChange Survey for RISI European Pulp and Paper Outlook Conference 2014

DRIVERS	ASPECTS
Higher returns (volume & profit)	• Unmet market demands • Product enhancements • Value-adding features
Customers requirements	• FMCG req's (e.g. packaging as branding) • Food quality & traceability (e.g. food waste) • More features and functionalities
Environment & Sustainability	• CO2 • Recycling • Bio based materials
Technology	• Industry 4.0 • Big data • Collaboration
Politics	• New laws and regulations • Standards and norms • Environment, safety, security
Sociology	• Globalization & urbanization • Individualization • Single-household

Figure 4: Drivers of innovation within fiber based packaging industry

What are exemplary innovations and how can they be structured?

In the exemplary innovation matrix of a packaging company (see Figure 5) sample innovation projects are shown. They can be classified in three main types – "same but cheaper", "new features" and "new material".

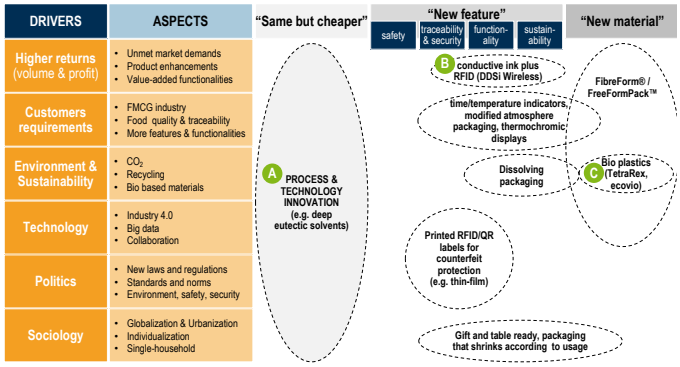


Figure 5: Exemplary innovation matrix from a packaging company point of view

- **"Same but cheaper":** The aim is to manufacture existing products at lower costs, which is achieved by process and/or technology innovations and not necessarily by product innovation

Innovation	Benefit
A. **Deep eutectic solvents** – producing pulp at low temperature and at atmospheric pressure. Using DES (deep eutectic solvents), any type of biomass could be dissolved into lignin, cellulose and hemicellulose.	• Lower production costs by producing pulp with less energy and emissions

Figure 4: Example – "Same but cheaper"

- **"New features":** The aim is to create a product that is providing new features, e.g. safety functionalities, traceability & security or sustainability functionalities

Innovation	Benefit
B. **Conductive ink plus RFID (DDSi Wireless)** – this smart pharmaceutical blister pack concept uses a conductive ink and conventional components to give real-time patient adherence monitoring	• More volume sold by providing user-friendliness and health security

Figure 7: Example – "New features"

- **"New material":** the aim is to research for new base materials that can be used for packaging purposes.

Innovation	Benefit
C. **Bio plastics** – e.g. ecovio, compostable polymers with bio-based content	• More volume sold by providing sustainability feature (biodegradable)

Figure 8: Example – "New materials"

The barriers of innovation: What is hindering companies to successfully launch new products on a regular basis?

A lot of ideas and innovations are generated by companies but get stuck in **regulatory bottlenecks**. Especially innovations around food packaging face several legislative hurdles.

Even after an innovation has been approved, it might not find its way to the market immediately due to the **higher sales price/higher production costs**, as e.g. in the case of bio-based packaging material. The main determinant for the advanced bio-based packaging material market is the price gap between traditional fossil-based materials and bio-based materials. So, it might need a process or technology innovation to reduce production costs. As soon as the sales price is at a comparable level, the product could hit the mass markets. Another way to achieve lower initial production costs would be government subsidies, to scale demand and by that leverage economies-of-scale.

While the barriers mentioned above cannot effectively be influenced, the following can and should be actively managed:

- A barrier to innovation might be the **lack of an effective and efficient R&D infrastructure** (funding, universities, agencies …) or the **high investment costs** and the risk of low pay-back. Without the option of collaboration with external parties such as universities or research centers, innovation projects might become too expensive or the required intellectual and physical resources may not be available.
- Probably the biggest barrier is the **lack of innovation management** in terms of a structured approach and the lack of having innovation as an integral part of company strategy or embedded in the company culture. Financially successful companies might become complacent and not consistently continue to invest in innovation.

So how can an innovation management framework be structured to overcome barriers and help foster innovation?

Innovation management consists of the following seven elements (see Figure 9):

1. Innovation targets & portfolio
2. Ideation
3. Stage-gate process
4. Culture & organization
5. Performance management & metrics
6. Supporting tools
7. Intellectual property

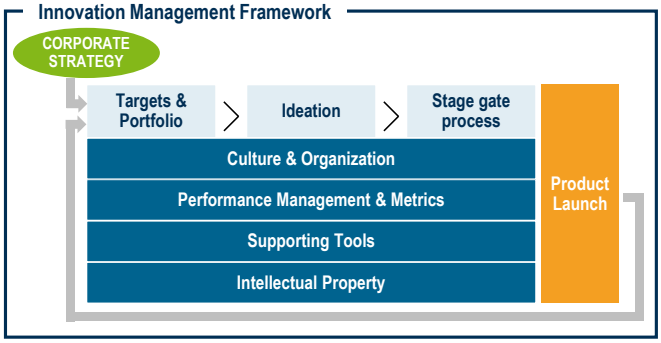


Figure 9: Simplified Innovation Management Framework

1. First, the **innovation targets & innovation portfolio** have to be determined. Based on the existing product portfolio and the strategic outlook regarding new market potentials, a company has to define its innovation targets, thus creating an innovation-vision. The targets have to indicate where a company wants to set its focus on, e.g. developing new bio-degradable materials or providing counterfeit protection functionalities.
2. Once the areas and scope of the desired innovation efforts (target & portfolio) are defined, the next phase, the **ideation** phase, can start. The aim of the ideation phase is to capture as many ideas as possible (e.g. for counterfeit protection possibilities) by different means of creativity techniques such as mimicry, brainstorming etc. Additional sources can consist of:
   - Market research
   - Customer feedback and/or claims
   - Employees
   - External resources (universities, research centers, experts, …)
   - Social networks
3. After the ideation phase, all potential projects have to follow a **stage-gate process**. The stage-gate process (see Figure 10) is intended to standardize and accelerate the innovation process and enhance the quality and effectiveness by ensuring that all the efforts are aligned with the original innovation targets & portfolio. The stage-gate process serves as an innovation funnel that should quickly discard ideas determined non-feasible according to pre-defined criteria. It is common that a majority of new ideas are failures and never make it to market entry. The principle of the stage gate approach is to spend time and efforts on developing ideas that will be successful rather than spending too many efforts on projects that will be unsuccessful. The stage-gate process is completed when

an idea or a project reaches production maturity and is ready for market launch. So how does the process work?

Illustrated stage-gate process

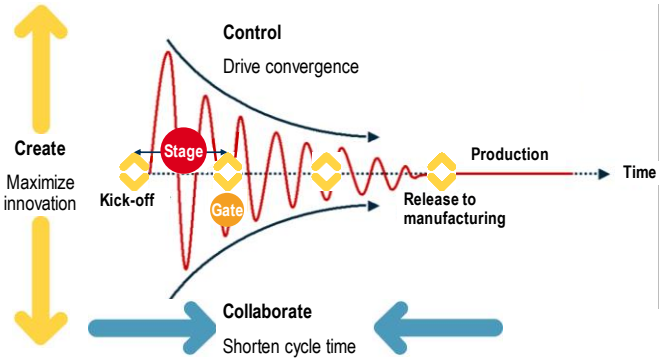


Figure 10: Illustrated stage-gate process

First, you have to define all your main stages of the innovation process, from the initial high-level idea to the detailed product design and agree on the prioritization criteria. Then, after each stage, there will be a "gate" serving as a checkpoint (yes/no) whether the idea is allowed to proceed to the next stage or is stopped. The target is not to send ideas back for re-work, but rather discard projects in favor of those that seem more promising. The gate-process is defined so that all ideas are reviewed based on a checklist with defined criteria.

Stage-gate process

Stage	Gate
1. Idea • High-level ideas from all sources • Assessment based on main criteria	✓ Strategic fit ✓ "must-have" criteria ✓ Prioritization criteria
2. Concept • Market assessment • Product value-add • Requirements & technical feasibility	✓ Market attractiveness ✓ Product feasibility ✓ requirements
3. Business case I • Market analysis • Financial analysis • Profitability analysis	✓ ROI
4. Design & Development • Detailed design & drawings • Technical requirements • Project costs	✓ Verify design with concept ✓ Production costs (ROI)
	✓ Post-mortem analysis
5. Customer validation • Design vs. customer/market requirements • Feedback loop	✓ Verify with market & customer requirements
6. Business case II • Profitability analysis	✓ ROI ✓ Post mortem analysis

Figure 11: StepChange adapted stage-gate process

After the last stage "Business case II" the final go/no-go decision is made. In case of confirmation, the new product is launched. While it seems simple, there are additional areas for consideration in order to implement a successful innovation management.

4. A company needs the right **culture & organization** that helps driving innovation. This starts with – as in many other areas such as continuous improvement programs – with top management commitment and involvement. Without the communicated urgency from the top of the organization, employees may not take the innovation process seriously. In addition to management commitment and involvement, an innovation culture should embrace the following elements:
   - Applying innovation tools (brainstorming, stage-gate model, etc.)
   - Providing room for outside-the-box thinking
   - No premature judgements and no sole focus on financials when evaluating new ideas
   - Celebrating success AND accepting and analyzing failures ("every new insight is an insight")
   - Providing required resources (time & material)
   - Trial & error
   - Innovation training
   - Recruiting for innovators

   Without those set of cultural rules, no sustainable and successful innovation process can be developed.

5. The performance of the innovation process has to be supported by **metrics** that cover the whole "value-chain" of innovations, starting from ideation to innovation marketing. These metrics are crucial for monitoring a company´s innovation performance, its effectivity and

efficiency. According to a Harvard Business Review[4] a company can classify its key metrics as follows:

- **Inputs:** invested money, employee time spent on innovation projects, total number of ideas that are generated internally each month or sourced from customers, suppliers, and other outsiders, etc.
- **Throughputs:** number and quality of ideas that enter the different stages of the innovation process, the time per stage/gate, value of ideas, etc.
- **Outputs:** number of innovations that reach the product launch phase, percentage of revenue derived from new products and services, the margin gains that are attributable to innovation, etc.
- **Leadership:** percentage of executive time that gets devoted to mentoring innovation projects, employee feedback regarding support of innovation management by leadership, etc.
- **Competence:** innovation trainings conducted, percentage of employees who have been trained as business innovators, etc.

6. In some cases it might make sense to use **supporting tools,** like innovation incubators, for example. Those incubators or accelerators are appropriate for exploring open-ended, vague, unclear or undefined ideas that are associated with long-term innovation timelines.

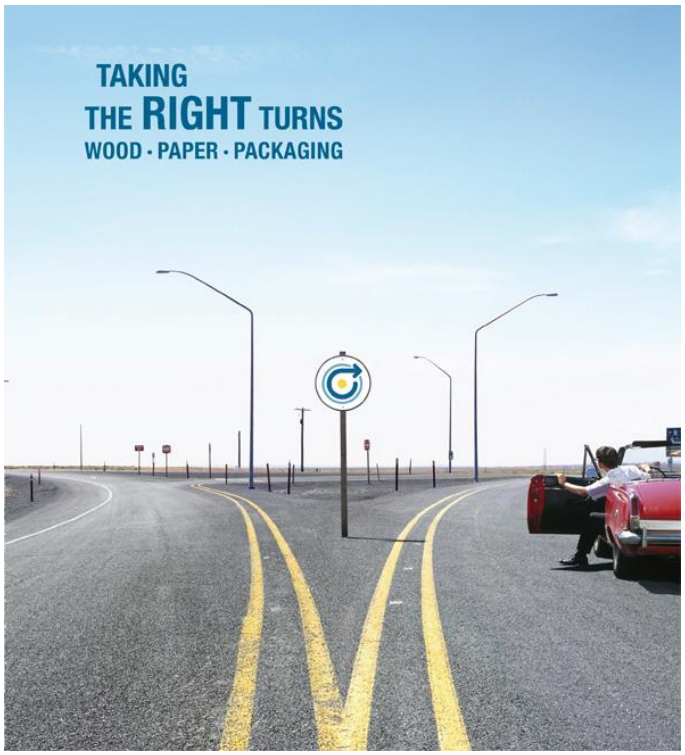
7. Last but not least, all developed **intellectual property** has to be taken care of and protected, e.g. by patents. Additionally some companies are further leveraging their intellectual property by allowing others to use its patents in "good faith", as Tesla, for example. In this way they are able to build new markets rather than protecting them.

You still wait? – Don´t wait, innovate!

Don´t wait to innovate. Innovation will increase sales and profitability and in the long run will be crucial for staying in business. Furthermore by having a functioning innovation culture in place, companies can attract and retain more talent. The prevailing drivers like customer requirements, environment or sociological trends are not to be seen as threats but rather to be used to foster and spur the innovation process. The whole idea generation process has to be supported by a sound innovation management framework, that covers the whole process from corporate strategy over ideation to product launch and that is embedded in the company culture. At the start a company has to agree on its innovation targets and to define where to put the focus on. All ideas generated have to follow a stage-gate process where unsuccessful projects are stopped at an early stage according to predefined criteria. The stage-gate process ends when the project is finally launched in the market. Equally important to the stage-gate process is to create an open innovation culture, that provides room for outside-the-box thinking, enough resources and ensures that success and failures are celebrated. In the end, to see the overall performance of all innovation efforts, a company needs to keep track of the main metrics. Implementing such an innovation management framework will ensure that innovation is fostered, innovative talent is bred and kept and that a company will be able to innovate to win. There is no time to wait – innovate!

"They always say time changes things, but you actually have to change them yourself."
(A. Warhol)

[4] Refer to "The 5 Requirements of a Truly Innovative Company", April 2015



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With an international team of industry experts StepChange can hit the ground running. StepChange provides innovative and yet pragmatic solutions, placing an emphasis on delivering measurable business results.

For further inquiries and comments regarding this Point of View please contact us at *leapfrog@stepchange.com*.

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