



INNOVATION MANAGEMENT

TRAINING HANDBOOK

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Target Groups:	<ul style="list-style-type: none">o Small and medium-sized enterpriseso Regional public authoritieso Researchers within higher education institutions and research institutes
Training date and venue:	February, 2018 - to be discussed

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GLOSSARY

REFERENCES

PART I.

- Introduction – the aim and expected results of this training course

The objective of the training in innovation management is to teach the participants how to deal with the issues in bridging the gap between research, innovation and business creation. The trainings aim to enhance the innovation management capacity of SMEs and to equip the participants with tools to start or manage product, process or business model innovation in their enterprises. The main objective of the trainings is to provide relevant know-how in innovation management to increase competitiveness and innovation capabilities.

Based on the Territorial Analysis of SE-Europe, the Danube Macro-Region has challenges to overcome in relation to the following difficulties: a) significant gaps in the relationship between R&D and market participants b) lack of ability to implement the knowledge-based and technology-intensive innovative activities in the SE-European regions c) modest flow of information and knowledge between region and d) lack of knowledge and internationalization of SME's.

SMEs contribution to the economic development is attributed to its innovative ability. Their ability to exploit new technologies, and to respond quickly to changing market needs, gives SMEs a pivotal role in the success of the any economy. SMEs are more creative than Large Enterprises because of the indomitable spirit of the entrepreneur and creativity. SMEs are more adaptable to evolving trends; tend to create smaller, more practical systems because of their limited people power.

Innovation will help SMEs in improving performance, growth efficiency, productivity, quality, competitive positioning and market share. Further, smart innovation helps in reducing the cost of product that an organization bring to market thus enhance the reach and prospects of the product along with best message for buyers. Innovation can result in a lower cost product, lower cost promotion and more sales.

After this training, the participants will be able to overview the main trend, challenges of the innovation process and get effective and efficient methods, techniques tips in their hands to manage the innovation process successfully in the future to bridge the gap between R&D, innovation and business creation. In the course of the training the participants sharing the best practices and experiences related to this area to each other and draw the main lessons learnt from this courses, which all participant can take into practice.

The expected results of the training:

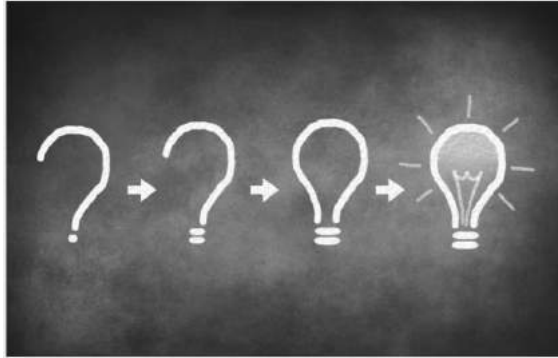
After participating on the trainings, the participants will be able to:

- ❖ Understand the conceptual framework of innovation management



- ❖ Play a vital role in knowledge exchange
- ❖ Contribute to establish a common pool of resources through networking and alliance building
- ❖ Develop future strategies to implement a capacity building and handling the innovation management tools and techniques to foster their innovation activities

"Innovation" comes from the Latin word "innovare" and stands for renewal. From an economic point of view, innovation is something new that brings benefits for an organization or / and for society." (<http://www.lead-innovation.com/english-blog/definition-innovation-management>)



- Learn the definition of innovation, understand what does innovation mean to business

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Sources:

- Oslo Manual: THE MEASUREMENT OF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES PROPOSED GUIDELINES FOR COLLECTING AND INTERPRETING TECHNOLOGICAL INNOVATION DATA <http://www.oecd.org/science/inno/2367580.pdf>
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- Types and models of innovation

Innovation is at the heart of economic change. In Schumpeter's words, "radical" innovations shape big changes in the world, whereas "incremental" innovations fill in the process of change continuously. Schumpeter proposed a list of various types of innovations:

- ❖ introduction of a new product or a qualitative change in an existing product;
- ❖ process innovation new to an industry;
- ❖ the opening of a new market;
- ❖ development of new sources of supply for raw materials or other inputs;
- ❖ changes in industrial organisation.

In the age of digital transformation, organizations are faced with the need to innovate more and innovate quickly.

Firms innovate to defend their competitive position as well as to seek competitive advantage. A firm may take a reactive approach and innovate to prevent losing market share to an innovative competitor. Or it may take a proactive approach to gain a strategic market position relative to its competitors, for example by developing and then trying to enforce higher technical standards for the products it produces

Specialized literature provides a number of classifications for innovation types; they vary depending on criteria such as sources (e.g. manufacturer or end-user innovation) purpose, achievement (e.g. internal or external innovation), impact on society/economy and the measurable progress.

In Geoffrey A. Moore's book, "Dealing with Darwin: How Great Companies Innovate at Every Phase of Their Evolution", innovation is considered in the context of the category life cycle, with category being the product or service term used by customers that distinguish what it is they are buying. In this context, Moore defines innovation types consisting of:

- Disruptive;
- Application;
- Product;
- Platform;
- Line-extension;
- Enhancement;
- Marketing;
- Experiential;
- Value-engineering;
- Integration;
- Process;
- Value-migration;
- Organic; and
- Acquisition.

The Oslo Manual, developed jointly by Eurostat and the Organization for Economic Co-operation and Development (OECD) provides a framework to enable innovation measurement. The manual proposes innovation types of:

- Product (good or service);
- Process;
- Marketing methods; and
- New organizational method in business practices, workplace organization or external relations.

In a approach that considers change impact or scope, common types are:

- **Incremental innovation;**

In an era where businesses are required to constantly reinvent themselves, incremental innovation helps them thrive by constantly improving current products, services, processes or methods

- **Radical (or breakthrough) innovation;**

A breakthrough innovation refers to technological advancements that can boost the level of a product or service, within an existing category, ahead of its competitors

- **Transformational (or disruptive) innovation.**

Disruptive innovations are ideas that are capable of radically changing the market behavior after being implemented

In the following, these types of innovations are presented, which are considered as being the most important ones:

- ❖ product innovation;
- ❖ process innovation;
- ❖ system innovation.

Product innovation is one of the most widely used forms of innovation. It is preferred by most companies because it can be achieved based on either an idea, a product already on the market, or it is based on a radically new idea, a revolutionary concept, that changes the existing products on the market.

Several examples for product innovation:

- use of new materials;
- use of new intermediate products;
- new functional parts;
- use of radically new technology;
- fundamental new functions (fundamental new products).

In terms of process innovation, this type of innovation refers to the internal components of an organization. Innovation on processes increases the yield and improves the efficiency of the organization by changes made to the production processes and the used management models. In this type of innovation, the processes undergo a number of changes, which can be total or partial, but the product remains the same or is subject only to some small changes, related to price, reliability, quality or presentation on the market.

Several examples for process innovation:

- new production techniques;
- new organisational features (introduction of new technologies);
- new professional software.

Product innovation is preferred because it brings visible changes, immediately felt by businesses on the market. In contrast, process innovation is felt in time, and it brings a number of advantages in terms of market share, price and increased efficiency for the organization in question.

A technological product innovation is the implementation/commercialisation of a product with improved performance characteristics such as to deliver objectively new or improved services to the consumer. A technological process innovation is the implementation/adoption of new or significantly improved production or delivery methods. It may involve changes in equipment, human resources, working methods or a combination of these.

Examples of TPP innovations in selected service industries

Wholesaling of machinery, equipment and supplies

- Creation of web sites on the Internet, where new services such as product information and various support functions can be offered to clients free of charge.
- Publication of a new customer catalogue on CD (compact disc). The pictures can be digitally scanned and recorded directly on the CD where they can be edited and linked to an administrative system giving product information and prices.
- New data processing systems.

Road transport companies

- Use of cellular phones to reroute drivers throughout the day. Allows clients greater flexibility over delivery destinations.
- A new computer mapping system, used by drivers to work out the fastest delivery route (i.e. from one destination to another). This makes it possible to offer clients faster deliveries.
- The introduction of trailers with eight globe-shaped containers instead of the usual four.

Post and telecommunications companies

- Introduction of digital transmission systems.
- Simplification of the telecommunications net. The number of layers in the net has been reduced by using fewer but more highly automated switching centres.

Banks

- The introduction of smart cards and multipurpose plastic cards.
- A new bank office without any personnel where clients conduct "business as usual" through the computer terminals at hand.
- Telephone banking which allows clients to conduct many of their banking transactions over the phone from the comfort of their own homes.
- Switching from image scanning to OCRs (Optical Character Readers) in the handling of forms/documents.
- The "paperless" back-office (all documents are scanned for entry into computers).

Software consultancy and supply companies

- The development of a whole range of different customer packages in which clients are offered varying degrees of assistance/support.
- The introduction of new multimedia software applications that can be used for educational purposes and thus eliminate the need for a real life human instructor.
- Making use of object-oriented programming techniques in automatic data processing systems development.
- The development of new project management methods.
- Developing software applications through computer-aided design (CAD).

Technical consultancy companies

- A new method of purifying water abstracted from lakes for use as household drinking water.
- Offering customers a new "supply control system" which allows clients to check that deliveries from contractors meet specifications.
- The development of a standard for construction work carried out in already densely built-up areas (where care has to be taken not to inflict damage on any of the surrounding buildings).

Advertising and marketing companies

- Delivering lists of potential customers on diskette together with a list filing system (software) that allows the client firms themselves to analyse and draw samples from the list.
- Being able to assist clients in direct marketing campaigns by offering to distribute pre-labelled advertising leaflets, etc., addressed to selected households.
- Initiating a control process to check by phone with random households that they are actually receiving the adverts/leaflets they are supposed to.
- Delivering the software applications needed for clients themselves to be able to analyse data along with statistical databases.

A system innovation includes activities that require significant resources (including information) from different fields and it also requires the involvement of governmental entities, academic environment, and other businesses and can stretch over long periods of time. In such a demarche, the entire business model can undergo major changes, leading to a different behavior towards many or all of the internal and external stakeholders (customers, employees, suppliers, etc.). This type of innovation has the obligation to comply with a number of regulations coming from governmental institutions, either cultural or social, because it faces considerable interface problems.

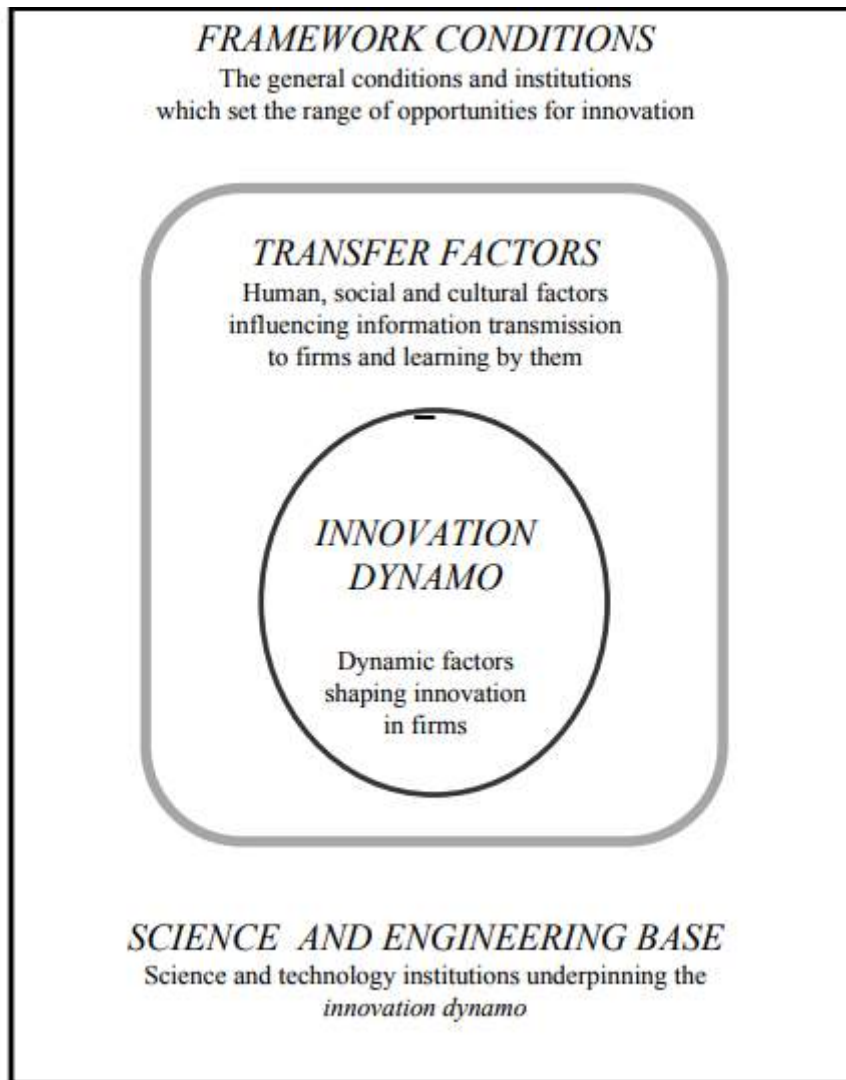


Figure 1: The complexity of the system innovation Source: <http://www.oecd.org/science/inno/2367580.pdf>

The Linear Innovation Model

The model is summarized with the following steps:

Basic research → Applied research → Development → (Production and) Diffusion.

The continuity of use for this model, despite much opposition, is partially attributed to its simplicity.

Other innovation models

Innovation research has generated additional models that attempt to address deficiencies seen in the linear model. Sources of ideas that can generate value have been broadened, recognizing that some highly successful innovations have not been the direct result of application of scientific or technology advances.

Variations of the linear model have been developed that include:

- **Technology push** - This has a small change from the linear model where marketing and sales is added after production.
- **Market pull** - This variant suggests that research and development is responding to a market need, resulting in this modification to the earlier model:

Market Need → Development → Production → Sales.

- **The Phase Gate Model** - This modifies the linear model by recognizing that there are feedback loops and time variations between steps, and establishes readiness criteria for moving between major phases of innovation development. Phase Gate approaches are often represented by a funnel.

In the 1980's, Proctor and Gamble developed the "Connect and Develop" model to address the increasing costs of keeping all research and development within the company, representing an example of open innovation. In this model, parts of research and development come from outside the company as a result of networking and partnerships.

Advantages of finding the right innovation model

Detecting the need for change, or finding new places to generate growth can present significant challenges for any company or organization. Having an innovation model that facilitates and promotes understanding of how things change could make the difference for the long term survival of the business. An effective model:

- Provides a conceptual framework and promotes innovation thought
- Aids faster identification of new sources of innovation
- Facilitates better timing for market introduction
- Helps find innovation opportunities aligned with timeframes needed for the business
- Reduces likelihood of competitive disruption
- Increases return on innovation investment
- Improves ability to anticipate needed innovation
- Sustains competitive advantage and enables long term growth

In summary, an innovation model could be a key element for creating competitive advantage and is critical for sustained growth in today's business environment.

"You never change something by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."

- Buckminster Fuller (1895 - 1983), American Systems Theorist, Author, Inventor, and Futurist

- New trends in innovation: business innovation, management innovation, open innovation

Business model innovation

In today's rapidly changing business environment, managing innovation effectively has become an essential requirement for staying competitive. Long term sustainability for a business may be determined by a company's ability to competently direct innovation resources to address a constantly changing market and economic environment

Business model innovation is probably the most challenging of the innovation types as it will likely present an organization with major requirements for change.

A business model is a simplified representation of how the business makes money. For a starting business, business model generation will include choices for the following strategic decisions:

1. **Identity** - This decision will include choices for mission, vision, core values and brand identity. It establishes how the business wants to be known to its customers.
2. **Core resources** - This will include choices for core competencies, processes and strategic partners that allow realization of the opportunity value proposition.
3. **Target customers (or markets)** - Decisions are made for focusing offers to specific customers or segments that will best respond to the offers from the business.
4. **Channel strategy** - The channel for reaching the customer is identified along with choices for managing the customer relationship.
5. **Customer offers** - Choices for products and services are identified that will create value for the customer by solving problems and meeting specific needs or desires. This will also include choices for the customer experience.
6. **Supply chain strategy** - Choices are made for how the product and services will be created and delivered to the customers and at what cost.

After viability the business (when the revenues gathered from the customer offers exceed the costs to provide the products and/or services) must identify how it will be sustained in the face of competition. Choosing a competitive advantage strategy [7 on decision network] typically identifies the areas where the company will focus its innovation efforts (or investments) to maintain or increase the value provided to its customers over time.

Business model innovation looks for change opportunity in these foundational decisions. For long running businesses, these fundamental decisions may have become embedded in the culture, creating significant resistance to change.

Unlike other types of innovation, changes to the business model require changes to the foundational decisions upon which the business operates. Therefore, business model innovation will likely be radical, and in many cases, transformational. Most innovation is incremental, such as product innovation, where technology enhancements are routinely included in product updates as a way of increasing performance or reducing costs

Changing the business model design brings much higher risk due to the potential for disruption to the current business. For large businesses, recognizing and managing this kind of transition can be critical to long term survival. Start-up businesses have the advantage since they can iterate and adapt their business model as they are in the process of an initial business model design. This suggests why many disruptive innovations may come from start-up businesses or small isolated teams in established businesses

Several example for business innovation:

- IBM that has managed changes in customer offers from mainframes to personal computers to technology services
- Apple that has evolved its customer offers of personal computers to music delivery devices and service that ultimately included cellular phones
- Dell's innovation of a new distribution model by allowing online customization that capitalized on improving internet technology
- Walmart's fundamental changes to a networked enterprise structure and value chain

When is it time for business model change?

- Evidence of commoditization or declining industry margins
- Indications of over served customers
- Inability to keep pace with changes in your industry
- Base industry technology being used in outside industry products
- Opportunities coming from the current product/service portfolio to serve customers in outside industries
- Degradation in innovation metrics such as sales attributed to new products

Management innovation

You can define management innovation as the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals

Open Innovation

Open Innovation largely based on transferring knowledge, expertise and even resources from one company or research institution to another.

This assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they seek to improve their performance

Citizens, users and Civil Society Organisations have central role to play in bringing innovation to the market. They create a demand for innovative products and services, they can fund and / or finance

projects that are relevant to them, they can be at the source of innovative ideas worth spreading and scaling up and they can have a say in what research is meaningful to them and can impact their lives.

CLOSED INNOVATION PRINCIPLES	OPEN INNOVATION PRINCIPLES
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

Source: Table I-1 from *Open Innovation: The New Imperative for Creating and Profiting from Technology* by Henry Chesbrough (Harvard Business Review Press, 2005)

You can see the main differences between the „traditional“ closed and newly „emerging“ open innovation principles in the above table.

Open Innovation Platforms

There are many examples of successful Open Innovation platforms in Europe, with different models for supporting Open Innovation either in more conceptual or more practical ways. The following are just two among many such examples.

The Demola platform (www.demola.net) is an international organization that facilitates co-creation projects between university students, companies and researchers, both locally and internationally. Demola is a co-creation concept that is geared to solving real challenges. Every project has an outcome – be it a new concept, a demo, or a prototype. If the partner company finds the outcome useful, the company can license or purchase the outcome, and take it for further development. Each partner has a clear role, and the work is guided by simple procedures. Contracts, intellectual property rights, licensing models, and other legal requirements are in place and meet international business standards and practices.

High Tech Campus Eindhoven (www.hightechcampus.com) in the Netherlands brings together more than 140 companies, startups and institutes. Some 10,000 researchers, developers and entrepreneurs are working on developing future technologies and products that will affect the lives of billions of people. The ecosystem of open innovation helps Campus-based companies to accelerate innovation, by offering easy access to high tech facilities and international networks.

Campus companies (including Philips, NXP, IBM and Intel) strategically decide what knowledge, skills and R&D facilities they share in order to achieve faster, better and more customer-oriented innovation in the fields of health, energy and smart environments. High Tech Campus Eindhoven reports that Campus companies are responsible for nearly 40% of all Dutch patent applications.

- Concept and tasks of the innovation management

Decisions critical to successful innovation

Those involved with innovating will generally tell you that generating ideas is not the difficult part of being successful with creation and change. Numerous decisions will be made that impact the progression and ultimate success of good ideas. These good ideas need to be related to solving a real business problem or growing an opportunity. Questions that hint at these decisions include:

- Is the potential innovation aligned with the business strategy?
- How does the proposed change generate value for the customer?
- What investment is required? Will the needed investment generate an acceptable return?
- What would be the impact of the innovation on the current business? Could it disrupt existing profits?
- How long will it take for the new concept to be realized and impact the business?
- How might the innovation change or disrupt current markets?
- Will the new concept generate new revenue or reduce costs?
- How will the innovation enhance existing or create new barriers to competition?
- Is there easy access to the competencies needed to realize the new concept?

Innovation management covers all measures to promote and exploit innovations in the company. Not only the new is the focus, but also the benefit of the innovation. The goal is new and improved products, new business models or new processes.

Innovation management describes the decisions, activities, and practices that move an idea to realization for the purpose of generating business value. It is managing the investment in creating new opportunities for generating customer value that are needed to sustain and grow the business or company.

Proper innovation management helps

- in generating new business models
- creates new products, services and technologies designed for the changing market.
- boosts customer satisfaction and employee engagement.

For innovation management process to be successful, it is essential that the company support an innovation culture and make employees feel valued. This will encourage employees to generate quality ideas in return.

Innovative management deals with all measures to promote innovation in organizations and to generate benefits, for example:

- New products and services to conquer new markets.
- Improved products and services to stand out from the competition.
- Improve internal processes to strengthen the company from the inside or to save costs.
- Development of new business models to use new sources of income.

Innovation management is two major pillars:

- On the one hand, the shaping of framework conditions, so that ideas are always created in the company and implemented into successful innovations. **The focus here is on organizational development activities.**
- And, on the other hand, the actual innovation, active search, development and implementation of ideas. **This requires, for example, creativity and project management.**

Innovation management is very versatile. The fields of action of innovation management include, among others

- Future management: Identification of trends and future opportunities and risks.
- **Development of the innovation strategy and planning of the innovation activities**, for example with an innovation roadmap.
- **Organization and roles in innovation management**, such as decision-making structures and process ownership.
- Ideas management to find, develop and evaluate ideas.
- **Innovation process for transforming an idea into a successful innovation:** concept development, business plan, solution development, prototyping, implementation and marketing.
- **Designing an innovation culture that promotes innovation.**
- Portfolio management and innovation control (for example, innovation indicators) to control innovation activities.
- Dealing with patents and protective rights.



- **Open innovation and innovation networks to exploit external sources of innovation and resources.**
- **Change management in the context of innovation projects.**

The diversity of activities in innovation management also makes it clear that they are integrated into all business areas. Innovations are all about.



- Overview of Strategic Planning (VMOSA – Vision, Mission, Objectives, Strategies and Action Plans) for the SMEs

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Sources:

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- <http://www.cpaireland.ie/docs/default-source/business-resource/ifac-business-planning-guide---practical-application-for-smes.pdf?sfvrsn=2>

“The innovative firm thus has a number of characteristic features which can be grouped into two major categories of skills:

- ❖ strategic skills: long-term view; ability to identify and even anticipate market trends; willingness and ability to collect, process, and assimilate technological and economic information;
- ❖ organisational skills: taste for and mastery of risk; internal co-operation between the various operational departments, and external co-operation with public research, consultancies, customers and supplier; involvement of the whole of the firm in the process of change, and investment in human resources.”

VMOSA (Vision, Mission, Objectives, Strategies, and Action Plans) is a practical planning process used to help any organization define a vision and develop practical ways to enact change.

Why should your organization use this planning process? There are many good reasons, including all of the following:

- The VMOSA process grounds your dreams. It makes good ideas possible by laying out what needs to happen in order to achieve your vision.
- By creating this process in a group effort (taking care to involve both people affected by the problem and those with the abilities to change it), it allows your organization to build consensus around your focus and the necessary steps your organization should take.



- The process gives you an opportunity to develop your vision and mission together with those in the community who will be affected by what you do. That means that your work is much more likely to address the community's real needs and desires, rather than what you think they might be. It also means community ownership of the vision and mission, putting everyone on the same page and greatly increasing the chances that any effort will be successful.
- VMOSA allows your organization to focus on your short-term goals while keeping sight of your long-term vision and mission.

So, when should you use this strategic planning process? Of course, it always makes sense for your organization to have the direction and order it gives you, but there are some times it makes particularly good sense to use this process. These times include:

- When you are starting a new organization.
- When your organization is starting a new initiative or large project, or is going to begin work in a new direction.
- When your organization is moving into a new phase of an ongoing effort.
- When you are trying to invigorate an older initiative that has lost its focus or momentum.
- When you're applying for new funding or to a new funder. It's important under these circumstances to clarify your vision and mission so that any funding you seek supports what your organization actually stands for. Otherwise, you can wind up with strings attached to the money that require you to take a direction not in keeping with your organization's real purpose or philosophy

VISION (THE DREAM)

There are certain characteristics that most vision statements have in common. In general, vision statements should be:

- Understood and shared by members of the community
- Broad enough to encompass a variety of local perspectives
- Inspiring and uplifting to everyone involved in your effort
- Easy to communicate

MISSION (THE WHAT AND WHY)

Developing *mission statements* are the next step in the action planning process. An organization's mission statement describes *what* the group is going to do, and *why* it's going to do that. Mission statements are similar to vision statements, but they're more concrete, and they are definitely more "action-oriented" than vision statements. The mission might refer to a problem, such as an inadequate housing, or a goal, such as providing access to health care for everyone. And, while they don't go into a lot of detail, they start to hint - very broadly - at *how* your organization might go about fixing the problems it has noted. Some general guiding principles about mission statements are that they are:

- *Concise.* Although not as short a phrase as a vision statement, a mission statement should still get its point across in one sentence.
- *Outcome-oriented.* Mission statements explain the overarching outcomes your organization is working to achieve.
- *Inclusive.* While mission statements do make statements about your group's overarching goals, it's very important that they do so very broadly. Good mission statements are not limiting in the strategies or sectors of the community that may become involved in the project

OBJECTIVES (HOW MUCH OF WHAT WILL BE ACCOMPLISHED BY WHEN)

Once an organization has developed its mission statement, its next step is to develop the specific objectives that are focused on achieving that mission. Objectives refer to specific measurable results for the initiative's broad goals. An organization's objectives generally lay out how much of what will be accomplished by when.

STRATEGIES (THE HOW)

The next step in the process of VMOSA is developing your strategies. Strategies explain how the initiative will reach its objectives. Corporate strategy involves the entire organization. It concerns itself with the survival of the business as a minimum objective and added value as a maximum objective. It covers the range and depth of the business's activities and directs the changing and evolving relationship of the business with its environment.

You will need to highlight your innovation strategies. There are three factors that need to be studied to assist you in formalizing these strategies. A brief explanation on these three factors are as follows:

- ❖ **Structure** - The linkages across functional departments are necessary for a successful innovation strategy. Continuous flows of information and knowledge across functional boundaries are crucial in facilitating an innovative organization. For example, the research and development department will obtain feedback from the marketing and customer services department on the product's strengths and weaknesses. This information will provide the research and development specialists a clearer picture on consumers' needs and wants.
- ❖ **Environmental** - Technological changes, consumers' psychographics (i.e. classification of people according to their attitudes, aspirations, and other psychological criteria), and government regulations will affect your innovative strategy. You may have developed a very successful product now, but over time there could be new technologies which provide for a more advanced product; consumers' taste might change as they mature; and the government might want to open up the economy and promote free trade with neighboring countries, which may dramatically increase the level of competition.
- ❖ **Core Competencies** - Your business's ability to deliver innovative products and services on a sustainable basis depends on its core competencies. Your management and other key staff will play an important role in driving this strategy to success. Their mindset must be imaginative, receptive to outside comments and be able to take prudent risks. They must have an analytical mind and be able to spot future trends by studying the current market.

The goal of a business strategy is to achieve a sustainable competitive advantage over your rivals. Competitive advantages come in two forms, as expounded by Michael Porter. They are cost advantages and differentiation advantages.

- ❖ Cost advantage is achieved when your business can produce the same products and services at a lower cost.
- ❖ Differentiation advantage is achieved when your business's products and services are superior to your competitors'.

These advantages ultimately lead to higher margins than those of your competitors. A business's sustainable competitive advantage is achieved by continuously developing existing and creating new resources and capabilities in response to rapidly changing market conditions. Human resources represent one of the most important value-creating assets in developing a competitive advantage.

In today's competitive environment, intangible resources are more likely to produce a competitive advantage because they are rare and difficult for competitors to imitate. Examples of intangible resources include brand, human capital, supply chain optimization, innovation, design excellence and reputation.

There are a number of ways that your competitive advantage can be built on the following assets:
Intangible assets:

- ❖ To continuously train and educate your employees. You need to ensure that their skills and knowledge are up-to-date with the market.
- ❖ To provide benefits and attractive remuneration packages to motivate employees.
- ❖ To provide a more positive, supportive, and innovative work environment for your employees.
- ❖ To diversify approaches to ensure staff are motivated to provide suggestions for business improvement.

Tangible assets:

- ❖ To invest in research and development for your products and services.
- ❖ To provide a technologically advanced facility for your research and development department

ACTION PLAN (WHAT CHANGE WILL HAPPEN; WHO WILL DO WHAT BY WHEN TO MAKE IT HAPPEN)

Finally, an organization's action plan describes in great detail exactly how strategies will be implemented to accomplish the objectives developed earlier in this process.

Action steps are developed for each component of the intervention or changes to be sought. These include:

- ❖ Action step(s): What will happen
- ❖ Person(s) responsible: Who will do what
- ❖ Date to be completed: Timing of each action step



- ❖ Resources required: Resources and support (both what is needed and what's available)
- ❖ Barriers or resistance, and a plan to overcome them!
- ❖ Collaborators: Who else should know about this action

Of course, once you have finished designing the strategic plan or "VMOSA" for your organization, you are just beginning in this work. Your action plan will need to be tried and tested and revised, then tried and tested and revised again

- Several tool for supporting the strategic (and change) management: SWOT analysis, the voice of customers, competitor analysis, portfolio analysis, stakeholder analysis

Sources:

- <http://www.innovationmanagement.se/imtool-articles/35-ways-to-cultivate-innovation-and-organizational-learning/>
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A) Strengths, Weaknesses, Opportunities, Threats (“SWOT”)

Analysis In any consideration of the factors surrounding the organization, there is one technique which is frequently used to explore the general environment: this is the SWOT analysis. It involves a process of scanning the internal and external environment of the organization, which is an important part of the strategic planning process. Environmental factors internal to the organization usually can be classified as strengths (S) or weaknesses (W), and those external to the organization can be classified as opportunities (O) or threats (T).

A simple SWOT (strengths, weaknesses, opportunities, threats) analysis - is a useful way of summarizing the current and future status of the organization - can be very potent in linking a firm's internal competencies and capabilities into the opportunities and threats presented by the external environment.

In devising a SWOT analysis, there are several factors that will enhance the quality of the material:

- ❖ Keep it brief – pages of analysis are usually not required.
- ❖ Relate strengths and weaknesses, wherever possible, to critical success factors.
- ❖ Strengths and weaknesses should also be stated in competitive terms if possible. It is reassuring to be ‘good’ at something, but it is more relevant to be ‘better than the competitor’.
- ❖ Statements should be specific and avoid blandness – there is little point in stating ideas that everyone believes in.
- ❖ Analysis should distinguish between where the company wishes to be and where is it now. The gap should be realistic.

It is important to be realistic about the strengths and weaknesses of one’s own and competitive organizations. The SWOT analysis provides information that is helpful in matching the firm’s resources and capabilities to the competitive environment in which it operates. As such, it is instrumental in strategy formulation and selection.

The following diagram shows how a SWOT analysis fits into an environmental scan:

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Economies of scale • Specialist marketing expertise • Exclusive access to natural resources • Patents • New, innovative product or service • Strategic location • Cost advantages through proprietary know-how • Strong distribution networks • Strong brand names with solid reputation 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Lack of marketing expertise • Undifferentiated products and service (i.e. in relation to your competitors) • Poor location of your business • Weak distribution channels • Poor quality goods or services • Weak brand name and reputation in market • Lack of patent protection • High cost structure
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Developing and expanding your market • Mergers, joint ventures or strategic alliances • Moving into new attractive market segments • A new-found market • Loosening of rules and regulations • Removal of international trade barriers • A market led by a weak competitor • Unfulfilled needs and wants • New technologies 	<p>THREATS</p> <ul style="list-style-type: none"> • A new competitor in your home market • Price war • Competitor has a new, innovative substitute product or service • New regulations • Increased trade barriers • Taxation may be introduced on your product or service

Table...: An example for SWOT analysis Source: <http://www.cpaireland.ie/docs/default-source/business-resource/ifac-business-planning-guide---practical-application-for-smes.pdf?sfvrsn=2>

A business's strengths are its resources and capabilities that can be used as a basis for developing a competitive advantage

Your Business's Weaknesses The absence of certain strengths may be viewed as a weakness. The weaknesses identified are to be studied and rectified, making sure that steps are taken to ensure that these weaknesses will not occur again in future. You cannot go forward with weaknesses.

Opportunities in the External Environment and Future The external environmental analysis may reveal new opportunities for profit and growth. Opportunities need to be worked on. Examples of such opportunities are highlighted in the above table.

Threats from the External Environment Changes in the external environmental also may present threats to the business. Examples of such threats are highlighted in the above table.

B) Listening voice of customer

1. Make sure the “voice of the market” pervades every part of your organization. Bring customers into your company offices and plants for visits, joint problem solving and planning sessions, celebrations, focus groups, conferences, barbecues, presentations, and the like. Get everyone in your organization out to see customers or into the real world on a regular basis.

2. Make your senior managers responsible for at least some business development and ongoing customer service. They should be spending 25 to 35 percent or more of their time with customers (the same amount of time should also be spent with external and internal partners). Ensure that some part of their compensation is linked to your team or organization’s new business or product development success. Don’t allow managers to only cost cut and quality control their way to profitability and performance bonuses. Make sure it’s balanced with innovation and growth.

3. A favorite example of servant-leader innovation is the architect who waited to put the sidewalks into his new residential complex until the buildings’ customers had worn paths in the grass. Then he laid the sidewalks over those paths.

4. The people selling in your target markets and serving your customers are innovating every day to meet unexpected needs, beat out a competitor, or capitalize on a new opportunity. Unless you have a user-friendly, easy process (not an administrative bureaucracy) for gathering all that experience and market intelligence, you’re recklessly squandering one your organization’s richest sources of innovation. You might hire a business student to seek out and document all this innovation and entrepreneurship.

5. You should also build an ongoing process to keep this experience base updated and widely available to everyone. This, rather than strategic planning, is the kind of planning a strategic improvement team should be working on. But you want to be sure that they keep the process easy to use and user-friendly.

6. Identify your leading-edge external customers and partners and bring them into your product and service development processes. Ideally, these are customers and partners who extensively use your products and services. But they keep pushing everything and everybody to the limit. They are always looking for new and better ways to use your products and services.

7. Find out what problems they’re trying to solve that no one else in your market provides solutions for. But don’t confuse leading-edge customers with those that scream the loudest, are the most loyal, or give you the most business. Many good or vocal customers don’t push your thinking or teach you how to apply your product and services in new ways. Leading-edge customers are often “bleeding edge” customers as well. They’re not always easy or fun to deal with.

8. Establish active user and support networks. Provide regular face-to-face, electronic, print, or audio-video forums to help customers, external partners (like distributors and suppliers), and internal partners exchange experiences, ideas, and problem solve. Capture and disseminate all this learning throughout your organization.

9. Keep asking your customers and partners lots of “What if?” questions. Take good notes and circulate them throughout your organization. Beware of people trying to write all this off as just wishful thinking. Remind them that somebody’s wishful thinking brought us every service and product we use today, developed our modern economy, and gave us one of the richest lifestyles in the history of the world. Leaders find ways to translate wishful thinking into the “logical and obvious” products and services we eventually take for granted.

C)Competitor Analysis

When conducting a competitive analysis you need first of all to identify your competitors’ products and services and the market segments that these products and services are in. You need to also identify the barriers which may hinder your entry into the market. For each competitor, determine what their market share is and estimate how long before new competitors enters the market. The purpose of this is to calculate how much time you have to establish yourself in the market and how much profits you can reap before new competitors begin entry and create impact. When competing in the same market, it is also important to identify your competitors’ strengths and weaknesses, so that you can study their strengths and oppose them, and you can study their weaknesses and learn how to avoid them and yet take advantage of them. If your target market is new and does not have any competition, then you will enjoy a head start in your market until competitors start to enter. While establishing yourself and expanding your market, you will need to also strategize what actions you need to take to create certain levels of barriers to entry so that it will not be too easy for new competitors to enter into your market, such as seeking patents and trademarks.

Some examples of barriers to a market may include:

- ❖ a high cost of investment
- ❖ a competitively priced market
- ❖ the time it takes to set up your business
- ❖ changing technology
- ❖ the lack of quality personnel
- ❖ customer resistance to change to your brand (i.e. customer loyalty)
- ❖ existing patents and trademarks
- ❖ industry reputation

Understanding your Competitors

It is useful for a business’s management to know as much as possible about each of its rival’s strengths and weaknesses, cost structure, culture and management style, organizational system,

strategies, mission and objectives, major markets, size, sales, production methods and asset structure. Competitor analysis needs to encompass the following:

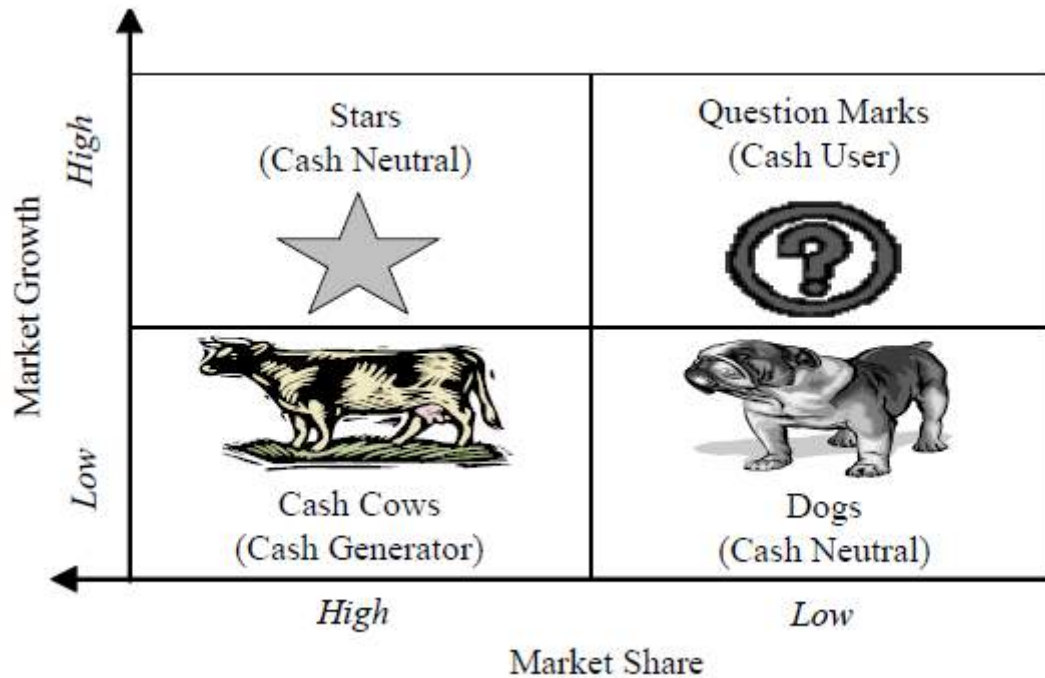
- ❖ Prices and pricing history of competitors' brands, particularly the environmental changes that caused alterations in pricing strategies.
- ❖ Timing of competitors' promotional campaigns, and the effect of these timings on how competitors perceive their target audiences.
- ❖ Themes and concepts used in competitors' promotional materials. This requires the collation of a folio of each competitor's advertisements.
- ❖ Information on the strengths and weaknesses of each rival business's products and how these compare with the outputs of your business.
- ❖ Market sectors covered by competitors, their packaging, distribution arrangements, sales promotions, and public relation events.
- ❖ Competitors' product development strategies: introduction by competitors of new products or product features, or competitors' acquisitions of other businesses in order to obtain their brands. • Competitors' terms of sale, credit periods, levels of after-sales service, and so on.
- ❖ The financial performance of competing firms.
- ❖ The reasons why competitors choose to operate in particular markets.
- ❖ How competitors are organized or structured: distribution systems, categorization of departments by branch or functions; nature of subsidiaries, etc.

D)Portfolio analysis

It is very common for businesses to have more than one product or service. These products and services will probably be in different product life cycles and require different input of resources. In the early 1970's the Boston Consulting Group ("BCG") developed a model to help businesses manage and analyze their product portfolios. The model is known as the BCG Growth-Share Matrix and is now used all over the world for analyzing product portfolios. The Product Portfolio Analysis is based on two major factors:

- (i) Relative market share – for each product, the share of the organization's market divided by the share of the market leader.
- (ii) Market growth rate – for each product, the market growth rate of the product category.

The BCG Growth-Share matrix is made up of four quadrants that describe your business's products in relation to market share and market growth rate. The matrix helps you to understand each of your product's life cycle and position in the market better by charting each product in one of the four quadrants:



The BCG matrix provides a framework for allocating resources among different business units and allows one to compare the performance of each product at a glance. Resources are allocated to business units according to where they are situated on the grid as follows:

- **Cash Cow** – a business unit that has a large market share in a mature, slowly growing industry. Cash cows require little investment and generate cash that can be used to invest in other business units.
- **Star** – a business unit that has a large market share in a fast growing industry. Stars may generate cash, but because the market is growing rapidly they require investment to maintain their lead. If successful, a star will become a cash cow when its industry matures.
- **Question Mark (or Problem Child)** – a business unit that has a small market share in a high growth market. These business units require resources to grow market share, but whether they will succeed and become stars is unknown or potentially less likely.
- **Dog** – a business unit that has a small market share in a mature industry. A dog may not require substantial cash, but it ties up capital that could better be deployed elsewhere. Unless a dog has some other strategic purpose, it should be liquidated if there is little prospect for it to gain market share.

Overall, the strategy is to take cash from the cash cows to fund stars and invest in future new products that do not yet even appear on the matrix. Cash may also be invested selectively in the question mark quadrant to turn them into stars with the others being milked or even sold to provide funds for use elsewhere

E.) Stakeholder analysis

Stakeholder management is a critical component to the successful delivery of any project, programme or activity. A stakeholder is any individual, group or organization that can affect, be affected by, or perceive itself to be affected by a programme. Effective Stakeholder Management creates positive relationships with stakeholders through the appropriate management of their expectations and agreed objectives. Stakeholder management is a process and control that must be planned and guided by underlying principles. Stakeholder management within businesses, organizations, or projects prepares a strategy using information (or intelligence) gathered during the following common processes.

The stakeholder identification

The first step in your stakeholder analysis is to brainstorm who your stakeholders are. As part of this, think of all the people who are affected by your work, who have influence or power over it, or have an interest in its successful or unsuccessful conclusion. Remember that although stakeholders may be both organizations and people, ultimately you must communicate with people. Identify, recognize and acknowledge stakeholder;

- Determine their influence and interest;
- Establish communication management plan
- Influencing and engaging stakeholder

Prioritize your stakeholders

You may now have a long list of people and organizations that are affected by your work. Some of these may have the power either to block or advance. Some may be interested in what you are doing, others may not care. Map out your stakeholders on a Power/Interest Grid as shown by the image, and classify them by their power over your work and by their interest in your work. There are other tools available to map out your stakeholders and how best to influence them.

For example, your boss is likely to have high power and influence over your projects and high interest. Your family may have high interest, but are unlikely to have power over it. Someone's position on the grid shows you the actions you have to take with them:

- High power, interested people: these are the people you must fully engage and make the greatest efforts to satisfy.
- High power, less interested people: put enough work in with these people to keep them satisfied, but not so much that they become bored with your message.
- Low power, interested people: keep these people adequately informed, and talk to them to ensure that no major issues are arising. These people can often be very helpful with the detail of your project.
- Low power, less interested people: again, monitor these people, but do not bore them with excessive communication.

Understanding your stakeholder

You now need to know more about your key stakeholders. You need to know how they are likely to feel about and react to your project. You also need to know how best to engage them in your project

and how best to communicate with them. Key questions that can help you understand your stakeholders are:

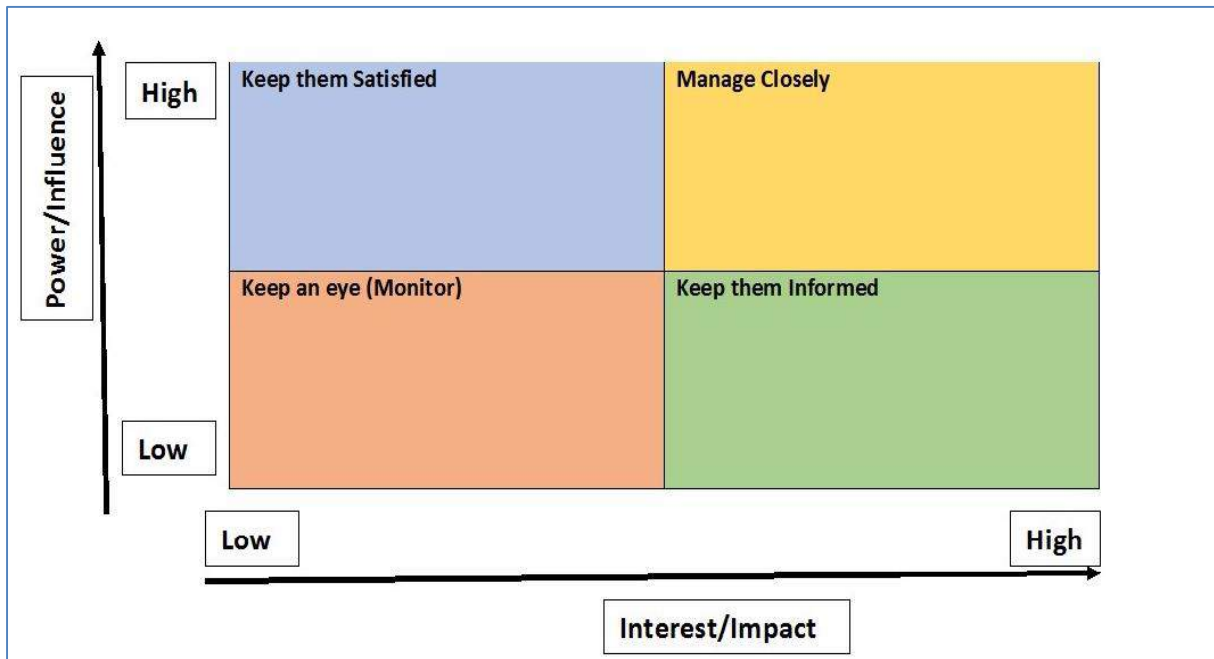
- What financial or emotional interest do they have in the outcome of your work? Is it positive or negative?
- What motivates them most of all?
- What information do they want from you?
- How do they want to receive information from you? What is the best way of communicating your message to them?
- What is their current opinion of your work? Is it based on good information?
- Who influences their opinions generally, and who influences their opinion of you? Do some of these influencers therefore become important stakeholders in their own right?
- If they are not likely to be positive, what will win them around to support your project?
- If you don't think you will be able to win them around, how will you manage their opposition?
- Who else might be influenced by their opinions? Do these people become stakeholders in their own right?

Key principles of stakeholder engagement

- Communicate: To ensure intended message is understood and the desired response achieved.
- Consult, early and often: To get the useful information and ideas, ask questions.
- Remember, they are human: Operate with an awareness of human feelings.
- Plan it: Time investment and careful planning against it, has a significant payoff.
- Relationship: Try to engender trust with the stakeholders.
- Simple but not easy: Show your care. Be empathetic. Listen to the stakeholders.
- Managing risk: Stakeholders can be treated as risk and opportunities that have probabilities and impact.
- Compromise: Compromise across a set of stakeholders' diverging priorities.
- Understand what is success: Explore the value of the project to the stakeholder.
- Take responsibility: Project governance is the key of project success

Engaging and communicating stakeholders

With a clear understanding of your Stakeholders, engaging and communicating can be achieved through a variety of channels based upon who the stakeholder is.



- High power, interested people: Manage closely. Best channels: Issue, Change Logs, Status Meetings
- High power, less interested people: Keep satisfied. Best channels: Steering Committee, Board Meeting Updates
- Low power, interested people: Keep informed. Best channels: In-Person, Video, Email Updates
- Low power, less interested people: Monitor. Best channels: Send Email, Status Reports



- Insights on innovation management and on the performance of stakeholders (Tangible results of IMP³rove project)

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Source: <https://www.slideshare.net/IMProveAcademy/tangible-results-from-improve-insights-on-innovation-management-in-europe>

The IMP³rove project, short for Improving Innovation Management Performance with sustainable IMPact project, was initiated to accelerate Europe's global competitiveness through innovation. Because small- and medium-sized enterprises (SMEs) are the main source of jobs and employment in Europe, the European Commission DG Enterprise launched IMP³rove to support Innovation Management. The project benefited from the innovative spirit of more than 2,000 SMEs that were involved in this venture. It was a win-win situation; the companies gained valuable insights into their Innovation Management performance while IMP³rove received valuable new information for its platform and database.

The key beneficiaries of IMP³rove are SMEs, consultants, intermediaries, financial advisors, and policy makers. During testing, all stake-holders experienced the benefits of the IMP³rove approach:

SMEs learn how to apply the holistic approach to Innovation Management. They gain a clear understanding of their strengths and weaknesses in Innovation Management and are given a roadmap to improve their Innovation Management performance. This roadmap is part of the IMP³rove consulting workshop for SMEs during the IMP³rove testing. SMEs can assess the short- and mid-term impact of the assessment, benchmarking, and consulting to continuously improve their Innovation Management performance.

Management consultants benefit from IMP³rove in numerous ways. By receiving training in the IMP³rove approach, they are able to apply this approach within their SME network and differentiate themselves as experts in IMP³rove, which is perceived to become the European standard in Innovation Management assessment. They are given access to European benchmarks, additional tools in Innovation Management, case studies, potential SME clients, and—last, but not least—a European network of Innovation Management experts.



Intermediaries across Europe leverage IMP³rove as an additional innovative service that they can introduce not only to their SME network but also to their network of consultants who support SMEs to improve their Innovation Management performance. As Innovation Management becomes more and more important, intermediaries have a ready-to-use, fully tested approach that is designed to become a common European standard. This will facilitate cross-border cooperation when SME are looking for suitable partners abroad.

Financial actors obtain valuable insights into the future growth potential of SMEs, and a more complete scenario that helps reduce investment risks. These insights are gained either during the due diligence or in preparation for the exit. Policy makers benefit from IMP³rove, as it provides current data on the success of Innovation Management. The IMP³rove benchmarking database reveals how SMEs in various industry sectors and countries perform, and where improvements could be made.

Policy makers can also gain insights into which Innovation Management proficiency enhancements could be further developed for SMEs, consultants, intermediaries, financial actors, and policy makers themselves.

IMP³rove takes an integrated approach to Innovation Management in three areas. First, the various dimensions of the A.T. Kearney House of Innovation are integrated. The innovation strategy drives the organisation's innovation culture, the innovation life cycle management processes, and determines the enabling factors. Secondly, the IMP³rove approach systematically integrates a web-based Innovation Management assessment and benchmarking with an individual end-to-end consulting process and systematic follow-up processes for continuous improvement. The IMP³rove online platform provides the tools for IMCs to provide a well-structured consulting process that meets the high-quality standards throughout Europe and meets the needs of SMEs. Third, IMP³rove is a Europe-wide effort designed to become the European standard in Innovation Management assessment, development, and consulting for SMEs and is based on a European benchmarking database. The IMP³rove Assessment allows SMEs to benchmark their company's Innovation Management performance against other SMEs of similar size, industry, and location.

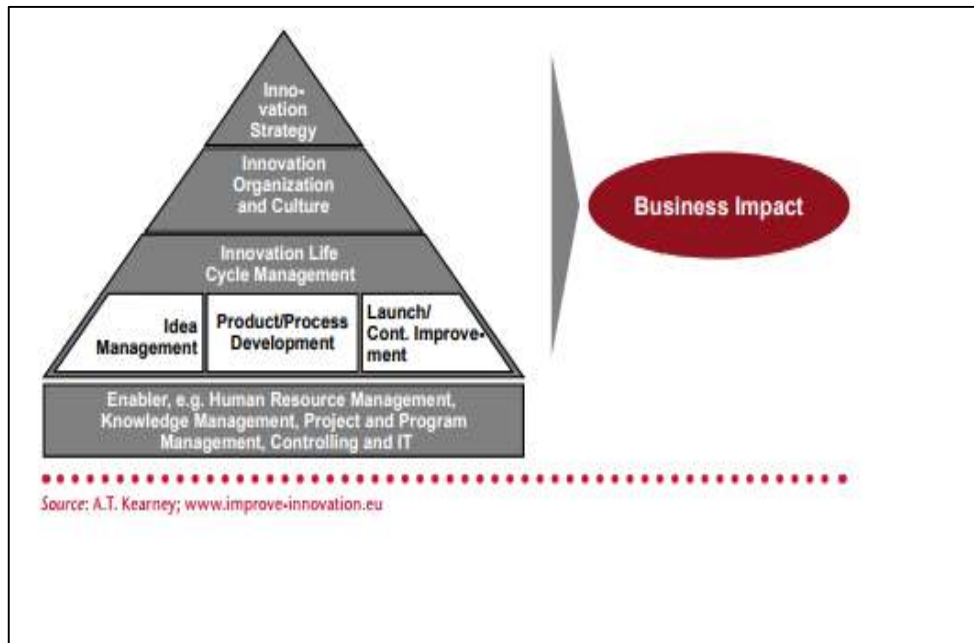


Figure.....: The A.T. Kearney “ House of Innovation”

The integrated IMP³rove process is designed to create sustainable improvements of the SME’s Innovation Management performance. This process combines online assessment for efficient and systematic data gathering and analysis of the SME’s Innovation Management, and personal consulting for effectiveness of the measures to improve the Innovation Management performance. As shown in Figure 6, it is structured in distinct phases: the benchmarking process, the consulting process, and the follow-up process for high impact. These key processes are divided into subprocesses and are supported by the IMP³rove online platform. The IMP³rove approach thus combines online processes with personal consulting processes.

The IMP³rove Assessment allows a systematic evaluation of the company’s Innovation Management performance based on a structured and formalised questionnaire. After completion, the SME can request one or several detailed reports with current benchmarks that point out the key strengths and weaknesses in Innovation Management. The IMP³rove Assessment has a strong focus on Innovation Management activity results, and the report provides the basis for a thorough discussion with an IMP³rove expert to develop custom recommendations.

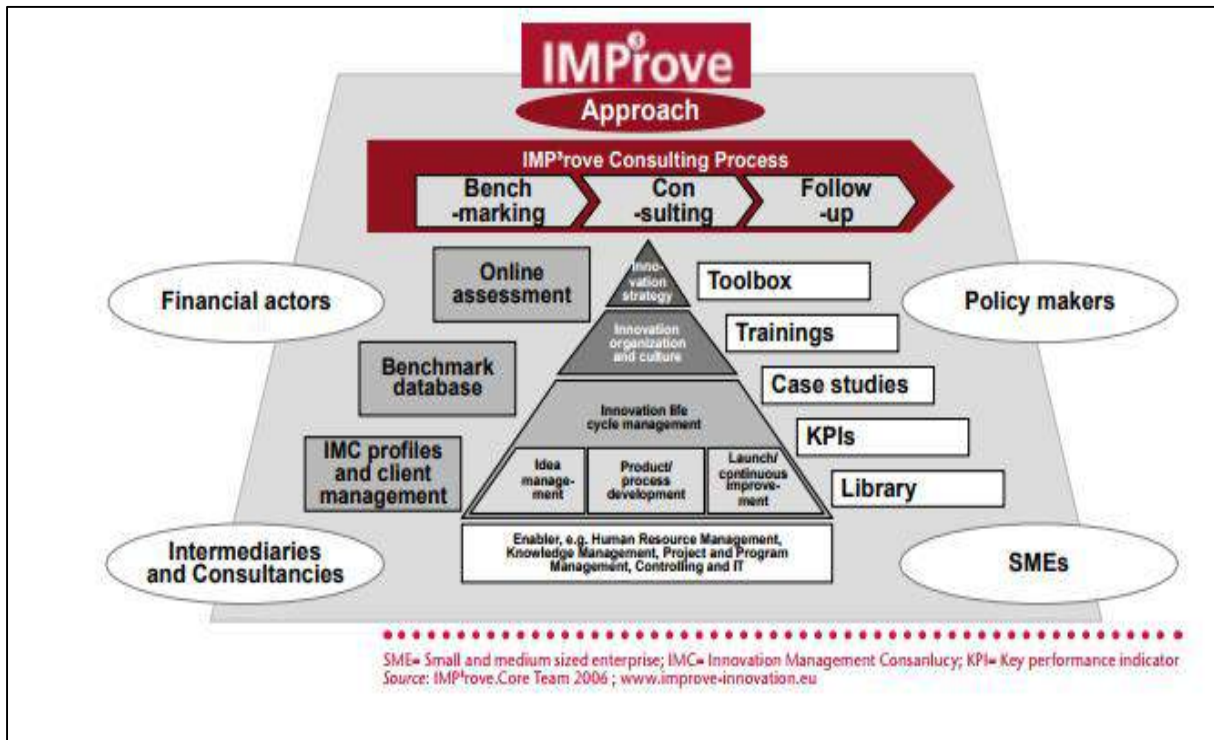


Figure....: The IMP³rove approach (Source: https://www.improve-innovation.eu/wp-content/uploads/2010/07/Europe_INNOVA_paper_10_insightsoninnovation-2008.pdf)

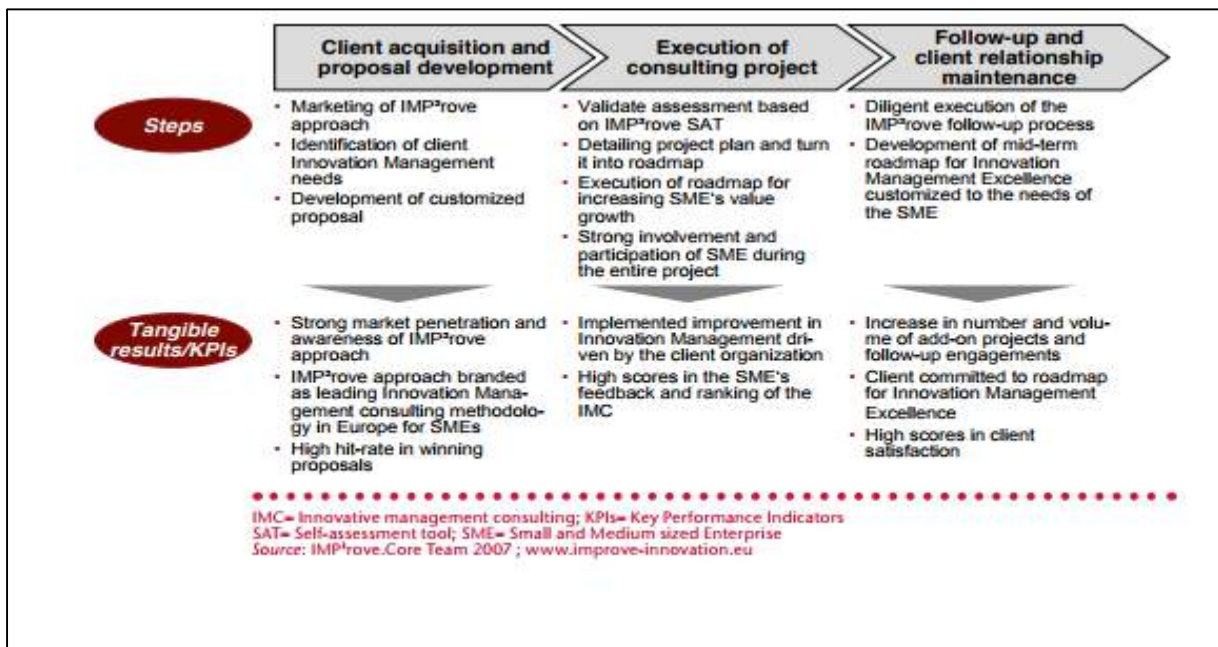
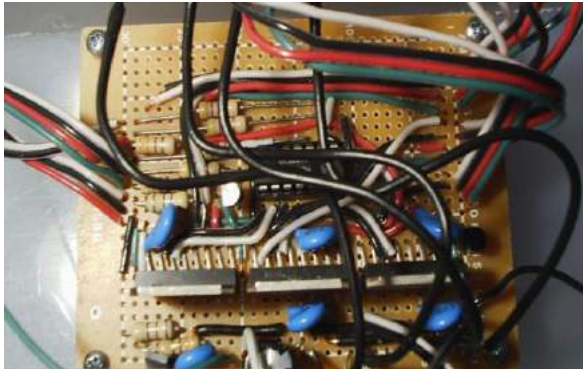


Figure...: The result of the consultation process ((Source: https://www.improve-innovation.eu/wp-content/uploads/2010/07/Europe_INNOVA_paper_10_insightsoninnovation-2008.pdf)



- New product development process (NDP)

Photo courtesy of and copyright Free Range Stock:

<https://freerangestock.com/photos/4610/handmade-circuitry.html>

Sources:

<http://innovationexcellence.com/blog/2013/05/27/8-step-process-perfects-new-product-development/>

<http://productlifecyclestages.com/new-product-development-stages/>

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New product development is typically a huge part of any manufacturing process. Most organizations realize that all products have a limited lifespan, and so new products need to be developed to replace them and keep the company in business. Just as the product life cycle has various stages, new product development is also broken down into a number of specific phases.

New product development is a crucial process for the survival of firms, especially small businesses. The small business environment today is very dynamic and competitive. For small enterprises to withstand competition from multinationals, they have to continuously update their products to conform to current trends. The new product development process is the cycle that a new product has to undergo from conceptualization to the final introduction into the market.

Developing a new product involves a number of stages which typically center around the following key areas:

The Idea: Every product has to start with an idea. In some cases, this might be fairly simple, basing the new product on something similar that already exists. In other cases, it may be something revolutionary and unique, which may mean the idea generation part of the process is much more involved. In fact, many of the leading manufacturers will have whole departments that focus solely on the task of coming up with ‘the next big thing’.

Research: An organization may have plenty of ideas for a new product, but once it has selected the best of them, the next step is to start researching the market. This enables them to see if there's likely to be a demand for this type of product, and also what specific features need to be developed in order to best meet the needs of this potential market.

Development: The next stage is the development of the product. Prototypes may be modified through various design and manufacturing stages in order to come up with a finished product that consumers will want to buy.

Testing: Before most products are launched and the manufacturer spends a large amount of money on production and promotion, most companies will test their new product with a small group of actual consumers. This helps to make sure that they have a viable product that will be profitable, and that there are no changes that need to be made before it's launched.

Analysis: Looking at the feedback from consumer testing enables the manufacturer to make any necessary changes to the product, and also decide how they are going to launch it to the market. With information from real consumers, they will be able to make a number of strategic decisions that will be crucial to the product's success, including what price to sell at and how the product will be marketed.

Introduction: Finally, when a product has made it all the way through the new product development stage, the only thing left to do is introduce it to the market. Once this is done, good product life cycle management will ensure the manufacturer makes the most of all their effort and investment.

Thousands of new products go on sale every year, and manufacturers invest a lot of time, effort and money in trying to make sure that any new products they launch will be a success. Creating a profitable product isn't just about getting each of the stages of new product development right, it's also about managing the product once it's been launched and then throughout its lifetime.

This product life cycle management process involves a range of different marketing and production strategies, all geared towards making sure the product life cycle curve is as long and profitable as possible.

The New Product Development process is often referred to as The Stage-Gate innovation process, developed by Dr. Robert G. Cooper as a result of comprehensive research on reasons why products succeed and why they fail. A Stage-Gate System is a conceptual and operational road map for moving a new-product project from idea to launch. Stage-Gate divides the effort into distinct stages separated by management decision gates (gatekeeping). Cross-functional teams must successfully complete a prescribed set of related cross-functional activities in each stage prior to obtaining management approval to proceed to the next stage of product development.

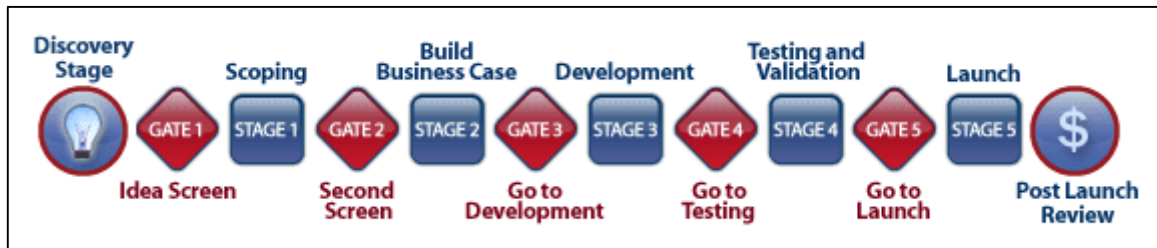


Figure...: The Stage-Gate model (Source: <http://www.prod-dev.com/stage-gate.php>)

When implemented properly, Stage-Gate delivers tremendous impact:

- Accelerates speed-to-market
- Increases likelihood of product success
- Introduces discipline into an ordinarily chaotic process
- Reduces re-work and other forms of waste
- Improves focus via gates where poor projects are killed
- Achieves efficient and effective allocation of scarce resources
- Ensures a complete process - no critical steps are omitted

PART II.



- Review different creativity and innovation tools and techniques to help generate better ideas and turn them into reality

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Sources:

- <https://www.mycoted.com>
- Instant Creativity: Simple Techniques to Ignite Innovation & Problem Solving by Brian Clegg. ISBN : 0749448679 | Date : 2007-02-01
- <https://www.interaction-design.org/literature/article/three-ideation-methods-to-enhance-your-innovative-thinking>

Creativity and Innovation Techniques, provides an introduction to a range of tools and techniques for both idea generation (Creativity) and converting those ideas into reality (Innovation)

You can classified these techniques into sub-categories which will identify Techniques for;

- **Problem Definition** - including problem analysis, redefinition, and all aspects associated with defining the problem clearly.
- **Idea Generation** - The divergent process of coming up with ideas.
- **Idea Selection** - The convergent process of reducing all the many ideas into realistic solutions
- **Idea Implementation** - Turning the refined ideas in reality.
- **Processes** - Schemes and techniques which look at the overall process from start to finish

Several concrete tools without limitation

I.) Problem definition

Dimensional Analysis

The dimensional analysis technique is a checklist (Jensen, 1978) that can contribute to reveal and clarify the problem more accurately and precisely. You can use as an aide memoir for initial exploration of a

problem or evaluating options, particularly those associated with human relations, rather than of a technical nature.

Substantive Dimension ('What?')

- Commission/omission? Doing something wrong, or failing to do something?
- Attitude/deed? Is it necessary to change attitudes or practices?
- Ends/means? Is the irritant we see the actual problem or merely a symptom of it?
- Active/passive? Active threat or source of irritation?
- Visible/invisible? Is the problem masked (e.g. covert human relations issues)

Spatial Dimension ('Where?')

- Local/distant? Is it merely local or are there some remote influences
- Particular location(s) within a location. Recognise the exact area concerned.
- Isolated/widespread? Is the problem isolated or linked to several other problem areas.

Temporal ('When?')

- Long-standing/recent? Which parts are new and which are old?
- Present/Impending? Is the problem happening or looks as though it may happen?
- Constant/ebb-and-flow? Is the problem always there, irregular or cyclic?

Quantitative ('How much?')

- Singular/multiple? Is there a single cause or are there many?
- Many/few people? How many people are affected by the problem?
- General/specific? Is the problem applicable to a broad category or very specific sub-area?
- Simple/complex? Are there several elements to the problem with complex interactions?
- Too much/too little? Appears as a shortage or surplus?

Qualitative ('How serious?')

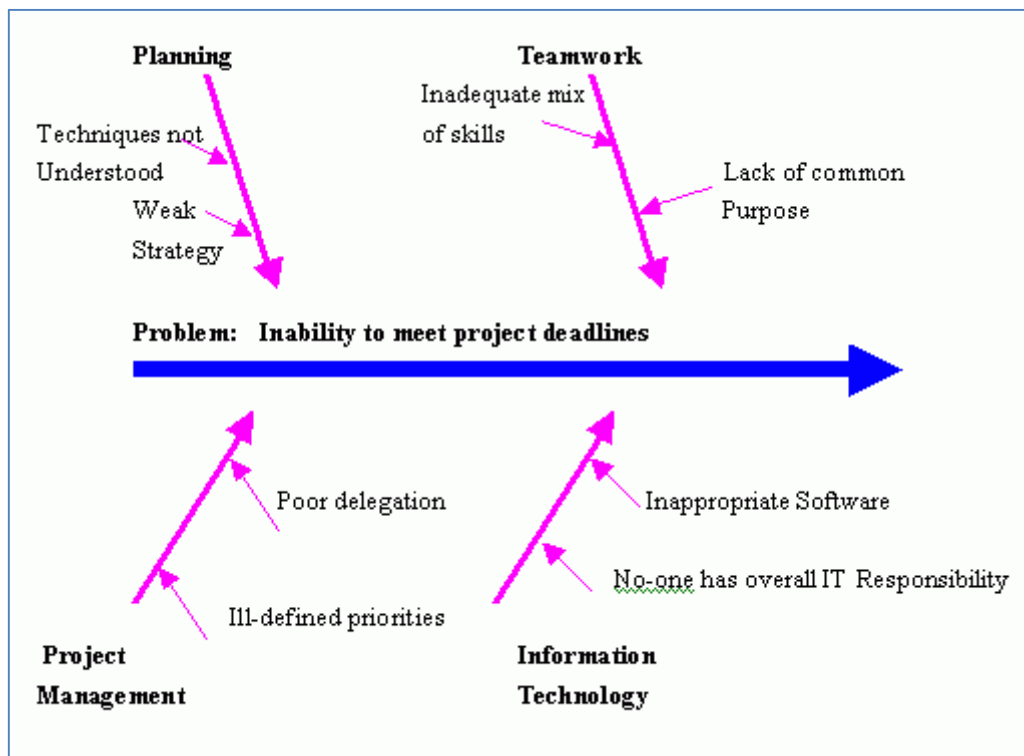
- Philosophical/surface, is it an issue with deep values or surface practicalities?
- Survival/enrichment? Is it a live-or-die issue, or one to do with managing quality?
- Primary/secondary? What priority does the issue have top or bottom?
- What values are being violated? See Jensen's definition of a problem (above).
- To what degree are they being violated? Qualifies previous answer.
- Proper/improper values? Not all values should be honoured.

Fishbone or Ishikawa diagram

The fishbone diagram (see below) originally developed by Professor Kaoru Ishikawa, is often referred to as an Ishikawa Diagram. The technique can help to structure the process of identifying possible causes of a problem.

The diagram encourages the development of an in depth and objective representation ensuring all participants keep on track. It discourages partial or premature solutions, and shows the relative importance and inter-relationships between different parts of a problem.

The method is ideally organized over a number of meetings, enabling the team to become deeply immersed in the problem. Fresh suggestions regarding possible causes can arise during the break and members are more likely to forget who originated every idea, thus making subsequent discussions less inhibited.



The procedure is as follows:

- On a broad sheet of paper, draw a long arrow horizontally across the middle of the page pointing to the right, and label the arrowhead with the title of the issue to be explained. This is the 'backbone' of the 'fish'.
- Draw spurs coming off the 'backbone' at about 45 degrees, one for every likely cause of the problem that the group can think of; and label each at its outer end. Add sub-spurs to represent subsidiary causes. Highlight any causes that appear more than once – they may be significant.
- The group considers each spur/sub-spur, taking the simplest first, partly for clarity but also because a good simple explanation may make more complex explanations unnecessary.
- Ideally, it is eventually re-drawn so that position along the backbone reflects the relative importance of the different parts of the problem, with the most important at the head end.
- Circle anything that seems to be a 'key' cause, so you can concentrate on it subsequently.

II.) Idea generation

Classical brainstorming

- Arrange the meeting for a group of the right size and makeup (typically 4-8 people)
- Write the initial topic on a flipboard, whiteboard or other system where everyone can see it. The better defined, and more clearly stated the problem, the better the session tends to be.
- Make sure that everyone understands the problem or issue
- Review the ground rules
 - a. Avoid criticising ideas / suspend judgement. All ideas are as valid as each other

- b. Lots, Lots & Lots - a large number of ideas is the aim, if you limit the number of ideas people will start to judge the ideas and only put in their 'best' or more often than not, the least radical and new.
- c. Free-wheeling. Don't censor any ideas, keep the meeting flow going.
- d. Listen to other ideas, and try to piggy back on them to other ideas.
- e. Avoid any discussion of ideas or questions, as these stop the flow of ideas.
- o Generate ideas - either in an unstructured way (anyone can say an idea at any time) or structure (going round the table, allowing people to pass if they have no new ideas).
- o Clarify and conclude the session. Ideas that are identical can be combined, all others should be kept. It is useful to get a consensus of which ideas should be looked at further or what the next action and timescale is.

III.) Idea selection

Consensus mapping

The consensus mapping technique (Hart et al., 1985) helps a facilitator and group reach consensus about how best to arrange a network of up to maybe 20 – 30 activities that have to be sequenced over time into a useable plan of action (e.g. outlining a 10-year network of sequentially linked activities to deal with a complex environmental pollution issue). These will usually be activities that could be done in a range of orders – i.e. the order has to be approved – it is not given by the internal logic of the activities themselves.

The technique has parallels to many of the usual project planning methods (and could if necessary feed into them) but operates at a purely qualitative, outline, level.

It merges elements of standard clustering techniques such as KJ-method and Snowball Technique with elements of sequential mapping Causal Mapping incorporated into a wider consensus-seeking procedure that has associates with Eden;s SODA method. Here is the suggested procedure:

1. **Present the ideas:** Devise a master list, via any suitable means, detailing all the ideas to be used in the single coherent action plan required, e.g. brainstorm the activities needed to implement some idea or project. Everyone copies the master list onto Post-its, or equivalent, one idea per slip.
2. **Form groups:** The facilitator form 2 – 4 task groups, each of 5 – 9 individuals in each.
3. **Private clustering:** Individuals in groups makes their own private attempt to group the ideas into related clusters or categories.
4. **Sharing in triads:** Join together in pairs or triads within each task group to describe one another's clusters.
5. **Group clustering:** Individual task groups combine to try merging their private clustering into a shared clustering they can all accept.
6. **Group review:** following group clustering, clarification of the original ideas, and re-evaluation of them takes place.
7. **Facilitators create and present a 'Strawman' integrated map:** each task group delivers their group clusters to the facilitator they then take a break. During the break, staff members consolidate the group cluster maps into a single overall cluster map, containing all the ideas, categories, and relationships generated by the groups. This 'Strawman map' is presented to the group as a whole when they come back together.
8. **Map reconfiguration:** The whole group splits itself again into the respective task groups, and each one uses the 'Strawman Map' for motivation and stimuli for developing its own map in

which cluster of activities are linked sequentially. Links made of ribbon or yarns are better than pen lines at this stage, because they can be changed.

9. **Plenary presentation:** Each task group exhibits its map of sequentially linked clusters to the others.

10. **Map consolidation:** Representatives from each task group meet to construct a single final map that combines the features of all the maps.

The complete procedure works best with a trained group, but the mapping element could easily be adapted to informal solo use.

Anonymous voting

The reason for using anonymity in a creativity method is to encourage participants to feel safe enough to take creative risks. It is useful for groups that have significant pressures or anxieties between participants. It is a basic feature of all nominal group methods and is an excellent way of protecting people against accidental or unintentional inter-personal pressures, in climates where there is basic goodwill towards differences of viewpoint, and a commitment to respecting them.

Methods such as Anonymous Voting cannot offer a particularly robust form of anonymity, and in climates where there is a serious risk of 'bullying' or significant levels of paranoid anxiety, this method could lead naive participants to exposing themselves to unacceptable risks, particularly when they return to the 'outside world'. Facilitators need to be clear that the levels of risk they are asking participants to take are realistic. (There are software systems such as "Group Works" which offer much better anonymity.)

The method assumes that you start with a publicly visible list of perhaps 30-100 serially numbered ideas from some ideas generation process.

1. The leader indicates the length of short-list each member is to produce (usually ca. 5-9 items – 10-15% of the number of ideas on the list), and the ranking convention (e.g. 'A' is most preferred, followed by 'B', 'C', etc.).
2. Members privately select their own short-list of ideas. They write each ideas they select on a card with its serial list number.
3. They decide how they want to order the ideas on their short list, and write the appropriate rank letter ('A', 'B', 'C', ... etc.) on each card.
4. The cards are handed in face down to the leader, who gathers everybody's cards, shuffles them, and tallies the votes on a flip-chart by ideas number. In this way, the vote remains anonymous.
5. Notice that using numbers for serial list position and letters for rank order avoids the risk of confusing a list position with a rank, as might happen if numbers were used for the rank. If you prefer to use numbers for the rank order, you could avoid confusion by using different number ranges. For instance, if you use 1-9 for ranks and start your serial numbering from 10, there can not be confusion.

IV.) Idea implementation

There are two implementation checklists presented here, the first by VanGundy and the 2nd by Isaksen, Dorval and Treffinger. Each has subtle differences in their perspectives.

Implementation Checklist 1 (VanGundy, 1988)

- ❖ Resources are the resources (time, personnel, equipment, money, information) sufficient for executing this idea?
- ❖ Motivation, are there others with equal motivation and commitment required for successful implementation?
- ❖ Resistance, is the idea likely to come across any 'closed thinking' and/or resistance to change in general?
- ❖ Procedures, are there any procedural complications to get over
- ❖ Structures, are there any structural obstacles to surmount (e.g. bad communication channels)?
- ❖ Policies, What official/unofficial policies need to be overcome?
- ❖ Risk, will risk taking be tolerated by those responsible for implementation and if so to what level?
- ❖ Power, do any power struggles exist relating to the idea that might obstruct implementation?
- ❖ Clashes, are there any clashes of personalities that may hinder advancement in the implementation?
- ❖ Climate, is the organisational environment one of teamwork and co-operation or suspicion and distrust?

Implementation checklist 2 (Isaken, Dorval and Treffinger, 1994)

- ❖ Relative advantage
 - Will the plan obviously progress what is currently in place?
 - What are the advantages/benefits in accommodating it?
 - Who will gain from it?
 - How will implementing it reward others or me?
 - How can you promote its benefits to all?
- ❖ Compatibility
 - Is it consistent with current practice/thinking?
 - Can it be demonstrated to meet a particular groups requirement?
 - Is it a better course of action to an existing shared goal
 - What group(s) would support it, its objectives and actions?
 - Can it be named/put together more constructively
- ❖ Complexity
 - Is it straightforward to understand?
 - Can it be clearly translated to different people?
 - Does it take long to communicate to others?
 - How might it be illuminated, made simpler, easier to understand?
 - Can I demonstrate the new idea/object effortlessly?
- ❖ Trialability
 - How can you reduce ambiguity concerning the ideas new elements?
 - How can the adopter try out section, before deciding to use it all?
 - How can you persuade adopters to try part of it?
 - Should it require full adoption, but partial trials are insisted upon, what then?
 - How can you alter it to make it more simplistic for trial?
- ❖ Observability
 - How easy is it for an adopter to locate/acquire it? Is it visible?

- Can it be made more visible? How?
- Is it possible to make it easier to understand?
- Can it be better communicated?
- Are there reasons for not making it visible now?
- ❖ Other questions to help gain acceptance for you Plan
 - What other resources could help? How best to use them?
 - What important obstructions are there? How can they be surmounted?
 - How to deal with challenges/opportunities it creates?
 - What might initiate action? ... and the next steps?
 - How to build feedback into it to allow for potential improvements?

V.) Processes

The Productive Thinking Model is a framework rather than a technique; that is, various creativity techniques such as brainstorming and lateral thinking can be applied at different stages of the process.

Step 1: "What's Going On?"

Establishes a context for the problems or opportunities being addressed, exploring different ways of stating the so-called "itch", exploring what factors, circumstances, and entities are involved, and what a solution might look like.

There are actually five sub-steps to this phase:

- "What's the Itch?", generating a long list of perceived problems or opportunities, often re-stating similar ones in several different ways, and then looking for patterns and clusters with the mass in order to select one key "problem" to address
- "What's the Impact?", digging deeper into the issue and identifying how it affects the world
- "What's the Information?", describing various aspects of the problem in detail
- "Who's Involved?", identifying other stakeholders in the issue
- "What's the Vision?", identifying what would be different if the issue were resolved, in the form of a "wish" statement (e.g., "If only my dog didn't run away when I let him outside.")

Step 2: "What's Success?"

The second step establishes a vision for a future with the problem solved or the opportunity exploited. In this stage often active imagination is used to imagine, explore, and describe how things would be if the issue were resolved. This vision then informs a process of creating a clearly articulated view of the future, using a tool called "DRIVE", short for:

- Do - what do you want the solution to do?
- Restrictions - what must the solution NOT do?
- Investment - what resources can be invested?
- Values - what values must you live by? (e.g. environmentally friendly, etc.)
- Essential outcomes - what are the essential outcomes?



Step 3: "What's the Question?"

The third step frames the challenge by turning it into a question. This is accomplished through brainstorm-like techniques eliciting as many questions as possible, and then clustering, combining, and choosing the question or questions that seem most stimulating.

Step 4: "Generate Answers"

Through the use of brainstorming and other idea-generating techniques, the fourth step is designed to create a long list of possible solutions problem question. One of those solutions (or several, combined) is selected for further development.

Step 5: "Forge the Solution"

Uses a specific tool called "POWER" to develop the selected solution into something more robust. POWER is short for:

- Positives - what's good about the idea?
- Objections - what's bad about it?
- What else? - what does it remind you of?
- Enhancements - how can what's good about it be made better?
- Remedies - how can the things that are bad about it be corrected?

Step 6: "Align Resources"

The final step translates the selected, developed solution into an action plan that may include, among other things:

- to do lists
- time-lines and milestones
- lists of people who need to get involved
- lists of issues that need further work

"People adopt ideas when social, personal and financial trends intersect - a confluence that may seem random but usually happens 'by design.'"

- Clement Mok (1958 -), Canadian Graphic Designer and Author



- Innovation planning, development, and continuous improvement

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Source: <http://www.innovationmanagement.se/imtool-articles/how-to-evaluate-ideas/>

To make innovation management a routine part of business, many organizations follow a disciplined and cyclic approach. Ideation is the first step to innovation and incentives and feedbacks help encourage a steady flow of ideas. The next step in a well-managed innovation process is to identify the most valuable and viable ideas. Companies can then move forward to create prototype products based on the shortlisted ideas and implement them to see how they work. In the final step of full implementation, it is important to evaluate the outcome to see whether the desired business goals were met once the ideas were implemented.

Using business decisions as an innovation framework

At Decision Innovation, we advocate using the **business decision network** as the framework for innovation. The business decision network exposes all the decisions creating value for the business, making it easy to see where innovation might create or enhance value for the business. Types of innovation are identified by the type of decision being made. For example, a target market decision would be the source of market innovation opportunities. Similarly, a brand strategy decision would lead to brand innovation opportunities.

The innovation frameworks above focus on different elements already included in the decision framework.

- Category lifecycle points toward which decisions in the business strategy are likely to generate value for a product or service category.
- Industry patterns suggests decision groups that might generate new value in a given industry.
- Impact or scope suggests the potential change impact innovative decisions can have on the business. Innovation in strategic decisions will have greater impact, while changes lower in the network are more likely to generate incremental value. In either case, the decision framework enables an evaluation of potential impact, including positive or negative changes to current markets, profits, or competition.
- Internal or external focus is a consequence of which strategic decisions are considered when innovating. For instance, choice of a strategic partner would imply an external focus.
- Innovation measurement is enabled by the decision network where outcomes can be traced to the sources of innovation, the decisions that created new or sustained value.

When using a decision network as an innovation framework, each decision provides the basis for creating ideas focused on a real business problem, making each idea a potential innovation.

Idea development

Idea development may include business case preparation, prototype development, project management initiation or test marketing

Many organizations make mistakes in their idea review processes that result in rejecting the most potentially innovative ideas in favor of less innovative ones, warns Jeffrey Baumgartner. Here are some ways to avoid this unfortunate fate.

Organizational innovation is not just about generating creative business ideas. It is also about reviewing ideas in order to identify those which are most likely to become successful innovations. Unfortunately, many organizations make mistakes in their idea review processes that result in rejecting the most potentially innovative ideas in favor of less innovative ones.

In some instances, the idea review process is a simple matter of a manager reading through a batch of ideas and selecting those she believes will work best for her firm. This is most often the case in smaller firms run by a single owner and manager. In most medium to large businesses, however, a structured evaluation process is necessary in order to:

Identify the ideas that are most likely to succeed as innovations for the company.

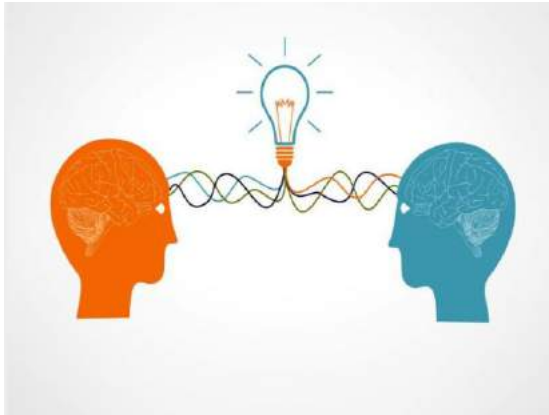
Ensure that complex ideas are reviewed by people with the appropriate expertise necessary to understand what would be necessary to implement the idea – and what might go wrong.

Enable a middle manager to defend the idea to senior management, stakeholders, and financial officers who may need to grant budgetary approval of the idea.

Make it possible to review a large number of ideas in a resource efficient manner.

Improve the idea by identifying potential implementation problems and preparing suitable actions to overcome those problems. Sadly, this last aspect is often lost in formal idea review procedures.

Idea generation and innovation are two interrelated factors at the organizational environments. Innovation starts with ideas and therefore is regarded as an important variable of the innovation capacity of the organizations. The way individuals and organizations collect, disseminate, exchange, and use knowledge influences idea generation. Additionally, management of the flow of technological information leads to generating ideas effectively as an important part of an organization's innovation capacity



- Innovation culture and implementation – Learn the essential elements of innovative corporate culture

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Source:

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Corporate Culture

Corporate culture exists at the intersection of corporate memory, corporate history, business context and operational effectiveness. Corporate culture is what defines what a company is, why it does what it does, and in many ways sustains a presence and a facade to the outside world. Corporate culture is what directs how people work and think, what creates tangible and intangible restrictions, establishes risk tolerances and sets attitudes and behaviors. There's probably no more powerful intangible force in any business than corporate culture.

A culture that sustains and supports innovation is one that encourages reasonable risk and uncertainty in the goal of larger, more profitable products and services. It is a culture that is based on experimentation and discovery, because many good ideas or insights exist outside the corporate boundaries. That suggests as well that innovative cultures have porous boundaries – people, ideas and concepts flow into, and out of, the organization constantly. Innovative cultures understand that generating and developing new ideas is an iterative discovery process, which isn't perfect and certainly doesn't always create the product or service that customers want. Innovative cultures also understand that when failure occurs, rather than sweep the failure under the rug, the firm attempts to extract

learning and new insights so that the “failure” leads eventually to a new success. Innovative cultures understand intrinsic reward systems, encouraging innovators to work on their ideas and to stay involved and engaged. Innovative cultures sustain innovation as a way of operations, rather than thinking of innovation as an occasional, sporadic process. Innovation cultures welcome different points of view, different perspectives and seek to association disparate ideas and technologies into new products and services.

How do we shift an existing culture

Corporate cultures respect Newton’s laws. They like to remain at rest, comfortable in their inertia, and will remain that way until acted on by a powerful force. Likewise, culture will resist the change force as a matter of course. That means that to change a culture you need constant force in a positive direction for a long period of time. This means that change to a corporate culture must be slow and steady, and the best change is change the culture wants to make, not feels forced to make. This means change begins by creating a vision about the future and telling a story that the culture can adopt. Once the culture and those individuals who keep and shape the culture believe the story, they will work to weave the new story into the fabric of the existing culture. Factors like what is recognized and rewarded, what executives say, and well as what they do, matter. Early in the shift, the culture will examine early successes and especially early failures to see what is rewarded and what is buried. Actions speak louder than words. Saint Anthony of Padua said it best: Let your words teach and your actions speak. Shifting a culture requires a significant commitment from senior leadership, but also buy-in from the people who are keepers of the culture. These are the people who collect and tell stories about the culture and reinforce the culture through their decisions, commitments and investments.

The three “R”s

We often talk about the three “R”s when shifting a culture: reward/recognition, recruiting and retraining. If we want people, and therefore the culture, to do new things, we need to improve the skills and capabilities of the people who are on board (training) and recruit new skills and perspectives to help the company and the culture think in new ways (recruiting). Which is why your human resources or talent management team must be a vital contributor to the work of changing the culture. Recognition, rewards, evaluation, training and recruiting are all activities they are actively involved in, and which influence the corporate team and the culture.

The Learning Organization

The term "learning organization", not to be confused with organizational learning, was popularized by Peter Senge. It describes an organization with an ideal learning environment, perfectly in tune with the organization's goals. Such an organization is a place "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole (reality) together." (Senge 1992).

This subsection will focus largely on the work of Peter Senge, and it will serve as a basis for understanding:

1. The ideal organizational environment for learning, knowledge management (KM), innovation, etc, as described through the term "the learning organization".
2. The leadership qualities necessary for promoting and encouraging this ideal environment.

The learning organization depends upon the mastery of five dimensions:

Systems thinking: The notion of treating the organization as a complex system composed of smaller (often complex) systems. This requires an understanding of the whole, as well as the components, not unlike the way a doctor should understand the human body. Some of the key elements here are recognizing the complexity of the organization and having a long-term focus. Senge advocates the use of system maps that show how systems connect.

Personal mastery: Senge describes this as a process where an individual strives to enhance his vision and focus his energy, and to be in a constant state of learning.

Mental models: "Deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action" (Senge 1990). These must be recognized and challenged so as to allow for new ideas and changes.

Building shared vision: Shared vision is a powerful motivator. A leader's vision does not necessarily become shared by those below him. The key here is to pass on a picture of the future. To influence using dialogue, commitment, and enthusiasm, rather than to try to dictate. Storytelling is one possible tool that can be used here.

Team learning: The state where team members think together to achieve common goals. It builds on shared vision, adding the element of collaboration.

Learning organizations need a leader who can bring out the best in their employees, and has a leadership style that is flexible. As Gephart et al. (1996) noted, leaders and managers can support individuals and teams by: 1) demonstrating a behavior of learning, 2) offer systems that promote learning, 3) empower and stimulate others for new ideas, 4) make sure that knowledge and learning is being spread throughout the organization, 5) share leadership, and 6) ensure resources are in place that emphasize the organization's commitment to learning.

For example, leaders and managers make mistakes and should learn from them. Likewise, leaders and managers must also acknowledge that employees make mistakes and encourage them to learn from their mistakes as well. Leaders and managers should also empower their employees to contribute creative ideas to problems. They should seek help from other departments of the organization for solutions to problems and share those solutions accordingly. The aforementioned examples demonstrate how learning can be strengthened in an organization.

Masood, Dani, & Backhouse (2006) asserted that organizational culture has a major influence on the performance and long-term success of organizations. Gephart et al. (1996) contended that the culture of a learning organization: 1) advocates and rewards learning, 2) encourages risk taking and experimentation with ideas and 3) values all employees. Organizations should encourage its employees to question processes and offer solutions. Additionally, if an organization encourages and



promotes employee trust and respect, then it allows employees to take risks with new ideas about problems or processes. Finally, an organization must appreciate and value the diverse employees' respective ideas.

To modify the organizational structure towards innovative organization, the following suggestions can be given:

- ❖ Improving organizational innovation by creating climate based on informal relationships,
- ❖ Shifting from current planning systems to decentralized and new planning systems,
- ❖ Applying participatory decision making approaches in which all stakeholders involve,
- ❖ Making informal control and monitoring without complicated organizational hierarchy,
- ❖ Making available training programs about organizational innovation process for both employees and managers employees' and managers' awareness as well as changing their attitudes towards organizational innovation through affordable educational programs.

❖ Challenges, lessons learnt from innovation management

Sources:

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CHALLENGES FACING INNOVATION MANAGERS IN ENTERPRISES

- ❖ Ensure innovation has a strong executive mandate across your organization. If leadership are not willing to support it, success can only be incremental at best.
- ❖ Understand your own organizations strengths and weakness, then be flexible in the innovation strategy you choose, then adapt it as you see what is working and what is not.
- ❖ Don't kill innovation with tradition operational KPIs, such as ROI, before they've ever had a chance to get traction. Use constraining, not strangling controls by setting short iteration cycles and reviewing the outcomes achieved before making further investment decisions.
- ❖ Open up the organization network for collaboration by making it easy for people to meet, share what they working on and the information their learning. Encourage people to build up, not break others ideas.
- ❖ Build a culture of intrapreneurship in your business. Find and empower people doing the work to make them as successful as they can be to further drive change in the business.
- ❖ Make a long term commitment to invest as change takes time and needs support, funding and protection to build momentum over time.

CHALLENGES HINDERING INNOVATION IN YOUR ORGANIZATION

- ❖ **Employees aren't empowered to innovate**

Many managers fear that innovation will distract employees from their day-to-day roles. As a result, vast majority of employees do not feel empowered to take risks or try new ideas. Internal innovation requires the support of leadership and managers to take hold across the organization.

- ❖ **Employees aren't motivated to innovate**

Once employees are empowered, they must also feel motivation to innovate. Motivation initiatives like inventor incentive programs, contests, or even unstructured time can help encourage employees to spend time innovating.

- ❖ You're missing an innovation strategy

Like any organizational initiative, developing a concise innovation strategy is crucial. An innovation strategy dictates the direction of innovation and its operational implementation. Without one, innovation efforts risk misalignment.

- ❖ Innovation is centralized to one functional group

In many organizations, innovation is the responsibility of solely one functional group, like R&D or product development. The myth that one functional group is more suited to innovate than others is a severe hindrance to the pace of innovation; each department provides a unique perspective on the problems of customers which can be critical for driving successful innovation.

- ❖ Lack of collaboration

Collaboration is the key to innovation. While many organizations understand the importance of collaboration internally, collaboration externally can be equally important. Innovation ecosystems bring together industry partners, customers, and even competitors to drive innovation in the industry forward.

- ❖ Lack of diversity

Hiring for innovation and subsequently building diverse teams can provide the organization's innovation initiatives with a wealth of ideas generated from different perspectives.

- ❖ Current products offer are successful

Many organizations risk complacency once their current product offerings have reached success. The fear of pulling investment, resources or customer attention from existing offerings can be one of the biggest hindrances to future innovation. However, constant innovation is the key to sustained success long-term.

- ❖ Missed connections with customers

Deep customer empathy is the key to understanding changes in demand and staying abreast of future trends; it provides the organization with a roadmap for what problems to solve next. Utilizing customer feedback sessions regularly can help keep your organization tuned in to the needs of your customers.

- ❖ You are measuring innovation incorrectly

Measuring and benchmarking innovation is core to constantly improving its success. However, traditional KPIs, like sales volume or revenue, may not give your organization the best insight into success. Instead, try measuring on the amount of new ideas generated, percent of time spent on innovation, or the investment value of innovation-related initiatives.

CHALLENGES OF OPEN INNOVATION

In an effort to create new products more efficiently and effectively, many companies are regularly and in a formalized way encouraging ideas from outside sources. These external sources include individuals and organizations, such as customers and vendors.

However, before any organization can reap the economic benefits of open innovation, it must overcome a number of legal, operational and cultural challenges. The top three obstacles to the successful implementation of open innovation programs are:

- Managing intellectual property issues and other legal risks
- Processing ideas quickly, efficiently
- Establishing an efficient internal structure

CHALLENGES FOR SME'S: MANAGING RISKS AND INNOVATION

- ❖ Successful innovation is in large measure an issue of identifying and controlling risk. The smaller the business, the more likely it is that survival will depend on effective risk management.
- ❖ The processes of innovation in most SMEs (in contrast to those in large firms and in the “high tech” minority of SMEs) are poorly understood.
- ❖ The lack of understanding of innovation in small firms is also reflected in the financing arena, where “technological” proposals are characteristically assessed more pessimistically in terms of financial risk by financial institutions than the statistics warrant. In fact, “technological” business opportunities are more likely, not less, to be successful than the generality of businesses of similar size
- ❖ In practice, the methods used for managing portfolios of R&D and new product introduction in a large centralised organisation has little real application in an SME context - for example, the ability of a big firm to spread the risk over several parallel product developments with a range of risk/reward ratios is rarely available to an SME.
- ❖ The challenge here is to codify good practice and enshrine it in well designed, SME-specific tools and methodologies which can be applied in a rapid, reproducible way by firms and their advisors.

LESSONS LEARNT FROM INNOVATION MANAGEMENT:

As competitive pressures mount and customers press for higher quality standards, tighter cost control and faster response times from suppliers, SMEs find it increasingly vital to accelerate process and product innovation

Innovation is fast becoming one of the most important factors for an organization's success and growth. As such, cultivating innovation in your company should be a critical organizational initiative.

If open innovation was easy, every company would be doing it, and doing it well. The fact that it's difficult, gives those with successful implementations a competitive advantage.

Before any organization can reap the economic benefits of open innovation, it must overcome a number of legal, operational and cultural challenge

Innovation and organizational learning are inextricably connected. A company must learn from its mistakes and cultivate multiple pathways for recognizing and leveraging the best ideas effectively, whether those ideas come from inside or outside of the organization

It is necessary to have an organizational culture that supports innovation to change a product, process or service. This type of culture encourages individuals to think autonomously and creatively in applying their intellect to challenges of the organization.

Edwards (2000) interpreted organizational innovation as the process where these creative ideas and new processes are encouraged and even implemented. Hage (1999) stressed that innovation is important to global competition. **Therefore, organizations must encourage innovation by fostering team building instead of silos, allow employees to see processes from a new perspective, and take risks or chances with new ideas.**

In order to determine if innovation is taking place in the organization, it must be put into practice to see if new ideas have created success or failure.

If innovation suggests that organizations must encourage team building, see processes from a new perspective, and take chances, then organizational learning is important for innovation to occur. The key for organizations to create environments conducive to continuous improvement and job satisfaction is to align the three cultures of management which will positively impact the ability of an organization to learn and innovate.

To achieve organizational success, it is critical that the organization create and maintain an environment that promotes learning, innovation, continuous improvement and job satisfaction. This can be accomplished by aligning the three cultures which results in the organization continuing to move forward with aggressive progress towards its mission, vision, and goals



PART III.

Cargill Coating Starches – Renewable Binders for the Paper Industry (Study case)

Source: https://ec.europa.eu/research/bioeconomy/pdf/13-case-studies-0809102014_en.pdf

Foreword:

As a world leader in advancements in bioeconomy research and innovation, the EU is well placed to improve the management of its resources and to open up new and diverse markets in food, feed, energy and bio-based products. As the EU bioeconomy strategy identifies, establishing a more competitive bioeconomy in Europe holds great potential for creating sustainable economic growth and jobs that cannot be outsourced, often in rural, coastal and industrial areas. At the same time, development of bioeconomy markets will help address societal challenges such as food and energy security, natural resource scarcity, the need for sustainable economic recovery and mitigation of the impacts of climate change.

As the EU strategy highlights, the bioeconomy is currently worth €2 trillion in annual turnover and accounts for more than 22 million jobs and approximately 9% of the workforce. In the coming years, significant growth is expected to arise from sustainable primary production and food processing. In addition, the development of biorefineries will enable many sectors within the bioeconomy to convert biomass into higher-value every day products, such as food, feed, chemicals, plastics, textiles, pharmaceuticals and cosmetics, which have traditionally been manufactured from fossil carbon sources.

When selecting and analysing case studies, the following question were taken into consideration:

What is the role of different kinds of innovation (technological, financial, process, etc.) in the development of new markets and the transformation of existing ones, and how can public policies best foster innovation in the bioeconomy?

Cargill Coating Starches – Renewable Binders for the Paper Industry

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Introduction to the Business Case

Developments within the paper making industry are being driven both by the global economic downturn and by the higher degree of consolidation coupled with overcapacity in the graphic sector. Innovative technologies have been developed and deployed, with the focus being on cost optimization at maintained high quality, whilst creating more sustainable solutions based on renewable resources.



Cargill has developed high performing and innovative solutions for paper coating applications which successfully replace petroleum based synthetic binders and chemicals thus enabling cost and energy optimisation of paper making processes. Coatings usually applied in the paper and board industry are suspensions composed of pigments and latex as synthetic binder used to fix (or bind) the pigments to paper. These developments support the need for renewable papermaking processes in the creation of more sustainable products. Cargill has almost 50 years of experience within the industry, creating a solid foundation of understanding and advanced expertise. Based on this experience the company has continuously developed its product range and portfolio in order to use energy efficiently, using the lowest amounts of chemicals possible in the production. This has allowed Cargill to meet evolving and demanding environmental standards. Made from renewable resources, Cargill's coating starches are produced from cereals and they can replace the traditional fossil fuel based binders. The products are 100% biodegradable, chlorine free and support more sustainable papermaking processes. There are two main centres involved in these developments, bridging the gap between research and the market; the Application and Development Centre in Krefeld, Germany and the site in Vilvoorde, Belgium focusing on product and process development for industrial starches. Additional collaborations with suppliers, universities and scientific institutions have also aided the development of more sustainable products in the paper industry.

The Business Case

Since Cargill set up its Application and Development Centre in Krefeld, Germany in the mid-1960s, they have been a key player within the field, and have advanced expert knowledge in research and innovation within the papermaking industry. Specifically, Cargill has a deep understanding of various coating technologies– which is a combination of production processes and the actual machinery used to apply the coating to the paper for improving printability of the paper and thus its quality and value; this is the basis for their success as a leading manufacturer of coating starches. When partnering with Cargill, customers gain access to a team of experts who combine a unique breadth of knowledge and experience. Their local dedicated sales and technical teams are regionally connected and organized to best meet customers' needs and to provide a reliable service network around the region. 11 Paper making productions and their innovation Sustainability is important, not just due to the need to keep costs of inputs to a minimum but also to satisfy customer needs and the transition to a more sustainable, resource efficient bioeconomy. The challenge today is no longer simply to provide customers with goods and service, but also to do this with minimal impact on the environment. Made from renewable resources, coating starches such as C*Film®, C*iCoat® and C*iFilm® series are cost effective solutions allowing the replacement of petroleum synthetic binders. Cargill products are developed to meet the technical requirements in terms of production efficiency and quality. Cargill has developed some coating starch series that are specially designed for high solids coating. These high powder solids captured the imagination of coating technologists, who have known about the advantages of high solids coating for a long time. In the coating area there is excellent rheology or fluidity (which is a physical test method indicating the flow properties of the coating during the application process which has a high influence on its processing at the normally high speeds) of the coating starches which perfectly meets the requirements of this demanding application. Advanced instrumentation techniques have helped in the understanding of rheological behaviour of starch, its

interactions with other coating colour components and its interactions between the coating colours and the base paper. Mastering this complexity allowed Cargill to develop products that provide solutions for the different coating processes under a variety of conditions. There are many integral processes in the development of novel technologies within the paper making industry including desk and laboratory research, pilot schemes and customer testing. Throughout these processes, teams of senior managers from the research and development, sales and productions teams govern the process. Based on the market assessment and the ability to identify customer requirements, market needs are identified and the focus is on innovation activities.

Economic and market challenges

For all products from renewable resources the cost of raw materials is an important competitive factor. But the use of renewable resources also implies that cereal farmers will continue to be an essential partner in the bio-based value chain. In addition to the feedstock, because starch production, in general, is an energy intensive industry, the cost of energy is the second most important competitive factor.

The economic and market challenges faced by the European paper industry over the last years have been analysed by various interactions with customers, institutes and universities. Results have been subsequently validated, prioritised and converted into new product development activities which have led and will continue to lead to new improved products that were introduced in the market enabling higher replacement rates of synthetic components. **Due to the significant investment costs in machinery the paper and board industry needs to run at high machine utilisation rates in order to remain profitable. Therefore, new products and solutions have to be proven before they can be implemented in production, to avoid the risk of production downtime.** This validation process can be very time consuming and intensive for the industry, requiring good knowledge and planning and involves extensive lab and pilot scale testing.

Creating and maintaining new and novel networks and connections is an important part of the successful development of new more sustainable products and processes. In this case, collaboration with other innovative suppliers to the industry, providing a constant technology feed to the pipeline of projects executed together with other companies, universities and scientific institutions, was essential.

Cargill's starch operations are spread across Europe and serve the customers base from the closest location, helping to ensure that supply chains and transport distances from feedstocks to processing plants to printers and customers are kept as short as possible. This helps demonstrate the necessary diffuse nature of bio-based value chains which is distinctively different from a fossil based linear model.

Conclusions

Cargill's coating starches are made from renewable raw materials, are biodegradable and chlorine free. **These coating starches are replacing petroleum based binders to make the papermaking process more renewable, more resource efficient and more sustainable. These innovative solutions help**



support the need for greener papermaking processes and are relevant for all paper making industries across Europe.

Barriers

- Volatility of raw material prices and high energy prices
- Lack of public co-funding for pilot and demonstration plants

Enabling factors

- Increasing consumer demand on recyclability or compostability of end products, could help increase the focus on the use of bio-based materials in paper and board industry (consumer demand could play a factor).
- The development of standards around bio-based content for paper would assist in the increase uptake and use of coatings from renewable, rather than finite fossil based resources.
- Increased access to public funding for research and development activities and pilot plants would help pave the way towards the market place for new and innovative products
- Drive to use renewable resources over finite ones
- Potential for adding value to the agricultural supply chain

B) Crescentino Advanced Biofuels Plant – Biochemtex, M&G Study case II.

Introduction to the Business Case

The Biofuels market in the EU is primarily driven by the Renewable Energy Directive (RED) and the Fuel Quality Directive (FQD), which aim to obtain a 10% binding target for renewable energy in transport by 2020, and reduce greenhouse gas (GHG) emissions by 6%, respectively. According to the RED, by 2020 there will be a demand for approximately 30 million tons per year of biofuel in the EU. To meet these targets, innovative technologies have been employed to develop and produce advanced biofuels from sustainable biomass.

The cellulosic ethanol initiative which is presented in this case, was conceived to appraise the whole value chain from “field to tank”. The concept behind the business model, developed by Biochemtex, was to build a plant where biomass is available, allowing full compatibility with local needs. The feedstock used to produce cellulosic ethanol is locally sourced from agricultural residues such as wheat straw, rice straw or from energy crops grown on marginal lands. The possibility to utilise marginal and partially contaminated land to grow perennial non-edible crops also provides an effective solution to improving soil quality and fertility. This business model allows farmers to generate new net incomes in addition to the conventional food production.

The Business Case

There have been significant advances in the biofuels industry in both the EU and the US over the last decade. Due to significant development of innovative solutions in the biofuels sector across the EU, the EU is now a frontrunner for biofuel production in the world. This was enabled by industrial scale initiatives of leading EU companies such as BetaRenewables, Abengoa, Dong and Clariant.

Furthermore, the development of the world’s first commercial scale cellulosic ethanol plant developed by Biochemtex in Italy (Crescentino) hugely benefitted the industry. This plant, which is managed by IBP and BetaRenewables, is capable of producing up to 40 000 tons per year of cellulosic ethanol.

In this plant, a feedstock mix of wheat straw and arundo donax are used to produce ethanol. Rice straw (which is considered to be a waste product in the local area) is also going to be used in the near future. The goal is to demonstrate the compatibility of cellulosic ethanol production with the local territory and its agricultural schemes and habits, and avoid impact on existing uses of biomass, and in this way prevent its price fluctuations.

Research and development and technological leadership were crucial for the progression of the project and for the construction of the biorefinery. Furthermore, financial support which was provided by both private investors (Biochemtex) and by public funds (Piedmont Region, Italian state, EU) was crucial to the realisation of this transformative sustainable development. The construction of commercial biorefineries, particularly those that are the ‘first of their kind’ is extremely capital intensive. Therefore it would not have been possible for Europe to be the first region to realise this ground-breaking development without significant public and private contributions.

Infrastructure

The plant was built on the brown field site (formally an industrial area) of an abandoned steel works, with most infrastructures already present. The site was adapted accordingly and took approximately two years to build. The total investment cost of the infrastructure development was more than €150 million euros.

The ground-breaking nature of this renowned project has attracted a great deal of interest both within the EU and from many other nations who have recognised the potential of ligno cellulosic bioethanol production. The inauguration event in October 2013 attracted more than 800 visitors globally with predominantly business to business interactions that resulted in positive feedback.

The positive impact of cellulosic ethanol production are highlighted below

- ❖ Utilization of locally sourced sustainable biomass (rice straw) that would otherwise be considered waste, resulting in high energy efficiency
- ❖ Local farmers have the opportunity to generate new income streams from the utilisation of marginal land that would not otherwise be used, and to make a profit from rice straw, which has previously been considered a waste product. Many farmers around the world simply burn rice straw when present in excess quantities causing additional CO₂ emissions and local air pollution problems
- ❖ Huge GHG emission savings (up to 80%) vs fossil fuel
- ❖ The creation of highly technical jobs which cannot be outsourced in the EU's world leading industrial biotechnology sector
- ❖ **Technology innovation and development of proprietary expert knowledge (patented) which attracts international interest and encourages investment in sustainable technologies**
- ❖ 100% Water recycling
- ❖ Regeneration of an industrial wasteland simultaneously revitalising and bringing prosperity to this region.

Challenges in the development of the bioethanol industry

Throughout the development process, the cost of raw materials was a very important factor, as was the logistical transport of plant material from the field to the biorefinery. Additional costs that were carefully considered and calculated included purchasing of enzymes/yeasts and maximising the subsequent process efficiency. In the future, efficiencies may be improved by i) obtaining a higher product yield from biomass; ii) by the development of new processes that would enable the utilisation of broader feedstock such as agricultural residues, Municipal Solid Waste (MSW), industrial wastes and by developing additional applications for the bioethanol that can contribute to the bioeconomy, such as in the biochemical industry. (For example bioethanol is currently being produced in the EU for the production of high value chemicals and pharmaceuticals.)

Aside from the previously mentioned RED and FQD targets, there are no other specific national measures or incentives in place to help foster the development of biofuels and to help biofuels access the market. The lack of a long term and stable policy framework was the main barrier in accessing the market and in order to raise investor confidence, a stable policy framework is required until at least 2030. The current debate on the future of biofuels in the post-2020 EU strategy continues to damage investors' confidence in this area in which the EU has significant technological strengths with the ongoing impact that European biofuels industries invest not within but outside the EU in a globally competitive world. However, the EU Commission (in the framework of the FP7) did support the construction and operation of the Crescentino plant. Although this is not a direct market support, it helped pave the way towards finalising plant construction and ultimately helped put in place some of the necessary supports to help EU produced cellulosic ethanol reach the market.

Results

The first commercial plant that converts local ligno cellulosic material residues, wastes and dedicated crops into bioethanol has been developed by Biochemtex, in Italy. It demonstrates the capabilities that can be achieved in the biofuels sector in the EU with no or minimal (only in marginal and unused areas) change in land use. Overall, the project has established a new kind of relationship between the biorefinery and the agricultural sector, which will lead to new opportunities for farmers.

A lack of certainty and predictability around the development and implementation of public policy can have a devastating effect on emerging industries. On the other hand, supportive and enabling public policy development has the effect of attracting the kind of investments and loans from banks and industries necessary to establish such a transformative new industry. Furthermore, politically intervention can have a negative impact on the availability of certain feedstocks in terms of price and availability. This puts the EU at a disadvantage to other countries such as the US and Brazil where supportive agricultural policies are put in place to underpin the development of the bioeconomy.

Conclusions

Barriers

- The need for adoption of market stimulation measures for 2G bioethanol such as the adoption of a specific binding targets for advanced biofuels, either as part of the Renewable Energy Directive or based on the US Renewable Fuels Standard
- At an EU level, a decision in favour of a binding target for truly advanced biofuels in 2020 and beyond is needed as quickly as possible.
- The lack of a long term, stable, predictable and supportive regulatory framework for sustainable advanced biofuels with a clear development trajectory up to 2030 that clearly demonstrates a full acceptance of the role of advanced biofuels in decarbonising transport and in reducing EU dependence on imported fossil sources
- The need for dialogue around the benefits of moving away from fossil fuel sources towards renewable sources of second generation fuel in the context of their environmental, economic and socioeconomic benefits
- Lack of supportive fuel specifications for ethanol blending above 10% - In order to allow bio-based chemicals to enter the market there is a need for a clear certification and labelling system which ensures that only the chemicals and products that are bio-based are labelled accordingly. This will provide certainty of sustainability and biobased content for consumers and will help build confidence in bio-based products.

The need to facilitate access to combined EU funding for high financial risk investments in first of their kind and flagship biorefineries in Europe, where possible building on abandoned industrial sites in order to encourage regional rejuvenation

Enabling factors

- The drive of the Fuel Quality Directive and the Renewable Energy Directive to reduce CO2 emissions in the transport sector
- The potential to reduce CO2 emissions by up to 80%
- Abundant, sustainably sourced feedstock (wheat straw, arundo donax, rice straw)
- Potential to create jobs and growth throughout the supply chain from primary production to end consumer product
- Ongoing B2B and B2C communications efforts
- Demand by manufacturers and consumers for lower CO2 emissions fuels for cars



- EU technological leadership in the field of lignocellulosic biofuel development
- National, regional and industry investment in demonstration biorefinery

GLOSSARY

Innovation diffusion is defined as the way in which innovations spread, through market or non-market channels, from first implementation anywhere in the world, to other countries and regions and to other industries/markets and firms.

Open innovation: In an effort to create new products more efficiently and effectively, many companies are regularly and in a formalized way encouraging ideas from outside sources. These external sources include individuals and organizations, such as customers and vendors.

Technological product and process (TPP) innovations comprise implemented technologically new products and processes and significant technological improvements in products and processes. A TPP innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities. The TPP innovating firm is one that has implemented technologically new or significantly technologically improved products or processes during the period under review.

A technologically new product is a product whose technological characteristics or intended uses differ significantly from those of previously produced products. Such innovations can involve radically new technologies, can be based on combining existing technologies in new uses, or can be derived from the use of new knowledge.

A technologically improved product is an existing product whose performance has been significantly enhanced or upgraded. A simple product may be improved (in terms of better performance or lower cost) through use of higher-performance components or materials, or a complex product which consists of a number of integrated technical sub-systems may be improved by partial changes to one of the sub-systems

Technological process innovation is the adoption of technologically new or significantly improved production methods, including methods of product delivery. These methods may involve changes in equipment, or production organisation, or a combination of these changes, and may be derived from the use of new knowledge. The methods may be intended to produce or deliver technologically new or improved products, which cannot be produced or delivered using conventional production methods, or essentially to increase the production or delivery efficiency of existing products.

Worldwide TPP innovation occurs the very first time a new or improved product or process is implemented.

Firm-only TPP innovation occurs when a firm implements a new or improved product or process which is technologically novel for the unit concerned but is already implemented in other firms and industries.

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