



EBU5608 Product Development and Management

Topic 4 – Innovation

Agenda

- What is innovation?
- Types of innovation
- Models of innovation
- What makes an innovative company?



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Innovation

- Innovative **ideas** = products, or not ...
 - this module is all about identifying innovative ideas that may be turned into products
- Most large companies contain **R&D** divisions
 - Companies like Tencent, Microsoft, Apple, Tesla, Sony etc.
- There is constant research into the next potential product to increase **turnover** and **profit**



Basic principles of innovation

- Innovation appears to have its origin in Latin „Innovare“ –
 - meaning to **renew**, to **make new** or to **alter**, new way of doing things
- Innovation characteristics:
 - Process from idea generation to commercialization
 - The adoption of change,
 - Radical change in traditional ways vs. incremental change,
 - New device or something new to society

Innovation?

○ Quick questions to think about:

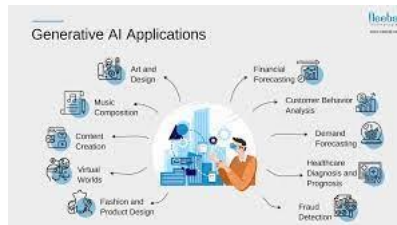
1) What do you understand by the term '**innovation**'?

- “the creation and application of new knowledge to improve the world” [1].
- Innovation is where an idea becomes reality.
- Innovation turns great ideas into value, prosperity, productivity and wellbeing.
- It is the mechanism by which we adapt to new opportunities and challenges [1].
- Innovation is the practical application of new inventions into marketable products and services.



Invention?

- 2) What do you understand by the term '**invention**'?
Invention – creation of something new/new idea or the formulation of new ideas for products or processes
- 3) Give one example of '**invention**'.



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Invention and Innovation - what is the difference?

3) Is there a difference?

Differing opinions

Innovation = theoretical conception + technical invention + **commercial exploitation**

● OR

○ An **invention** can still become an **innovation** even if it is **unsuccessful**, provided it made it to the marketplace

● e.g. Sinclair C5 car



Sinclair C5 Electric Vehicle – Invention or Innovation?



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Sinclair C5 Electric Vehicle – Invention or Innovation?

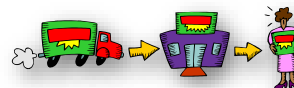
- This was invention from the early 80's.
- This was an electric vehicle aimed at saving money, cutting pollution, easy to drive.
- Designed by Clive Sinclair - owner the electronics company Sinclair Spectrum.
- The concept was very good as was the technology of the product, but there was no market for it, as it was considered unsafe and much too geeky!
- It was marketed as an alternative to cars and bicycles but ended up appealing to neither group of owners.
- It was available in shops with several months delay; particular, in winter, thus not ideal time for an open-topped vehicle.

Innovation and Product Development

- An innovation is successful implementation of a **new** or significantly **improved product** (good or service), or **process**, a **new marketing method**, or a **new organisational method** in business practices, workplace organisation or external relations.
- A creative process in which **two or more existing things are combined** in some novel way to produce unique new thing.
- Innovation is the management of all the activities involved in the process of idea generation, technology development, manufacturing and marketing of a new (or improved) product or manufacturing process or equipment.

Innovation

- Innovations can fall into two main categories:
 - **Product** (or service) innovation
 - **Process** Innovation
- There are also other categories that can be seen in the table on the next slides



Types of innovation

Product Innovation	The development of a new or improved product
Process innovation	The development of a new manufacturing process
Organisational innovation	A new venture division, a new internal communication system, introduction of a new accounting procedure
Management innovation	TQM (Total Quality Management) systems. BPR (business process re-engineering)
Production innovation	Quality circles, just-in-time (JIT) manufacturing system, new production planning software
Commercial/marketing innovation	New financing arrangements, new sales approach e.g. direct marketing, e-commerce
Service innovation	Telephone financial services or on-line services e.g. customer support

Product Innovation

- In most cases we think of innovation relating to **actual products**
 - New technologies
 - Leading edge products
 - Gadgets, etc
- **Advantages** of launching new or improved products on to the market include [2]:
 - Increased market share
 - Public relations – e.g. news coverage
 - Enhanced reputation as an innovative company
 - Opportunity to build early customer loyalty
 - Added value
 - Higher prices and profitability
 - Competitive advantage

However, creation of some innovative products can instigate **other innovations**

Innovation (cont.)



- **Product** innovation can lead to **process**, **management** and/or **organisational** innovation
- The **digital camera** replacing film cameras, eg:
 - **Changes** had to take place in manufacturing, marketing, sales and repair functions
 - **Business focus** shifted to digital cameras for the consumer market
 - **Marketing staff** were required for promotion and education of customers (and distributors)
 - **Production** of the cameras is different – new processes, equipment and human skills
 - **Complementary goods** are different (i.e. memory cards instead of film)

Process Innovation

- Has to do with finding more **efficient** and **effective** ways of
 - **Producing** existing products
 - **Delivering** existing products
 - Can also include producing or delivering **new** products were appropriate
- **Advantages** are
 - Reduced **costs**
 - Improved **quality**
 - More responsive **customer service**
 - Greater **flexibility**
- **Disadvantages**
 - Loss of **jobs** – especially if work is outsourced
 - Need for **re-training** of workers



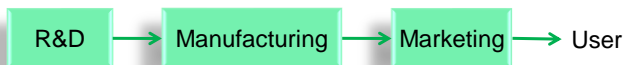
Models of innovation - what is the source?

- **Serendipity**
 - Innovation luck? '*Eureka!*'



- Linear models (3 models)

1. **Technology push**



- Scientists make unexpected discoveries
- Technologists apply them to develop product ideas
- Engineers and Designers turn them into prototypes for testing
- Manufacturing devise ways of producing the products efficiently
- Marketing and sales will promote the product to the potential customer

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Models of innovation - market pull

- Linear Models – 2. **Market pull**



- Identified in 1970's,
- Studies showed that market was influential in the innovation process,
- This is a more customer driven model and is used by the majority of industries today,
- Market Research supports this model,
- Customer requirements are then conveyed to R&D for design and engineering and then manufacturing for production.

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Models of innovation - university & industry liaison

- Linear Models – 3. **Universities & industry liaison**

Creation of **new knowledge**,
dominated by universities and
large science-based
organisations

Technology
development,
dominated by
organisations

Consumers express
their **needs and wants**
through the consumption
of products



Science & Technology
base

Technological
developments

Needs of the
market

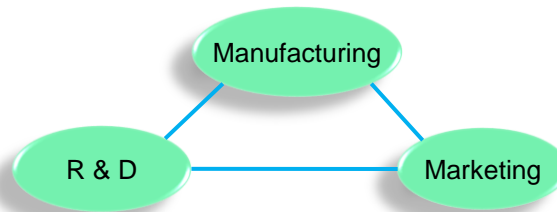
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Models of innovation - simultaneous coupling

- **Simultaneous coupling**

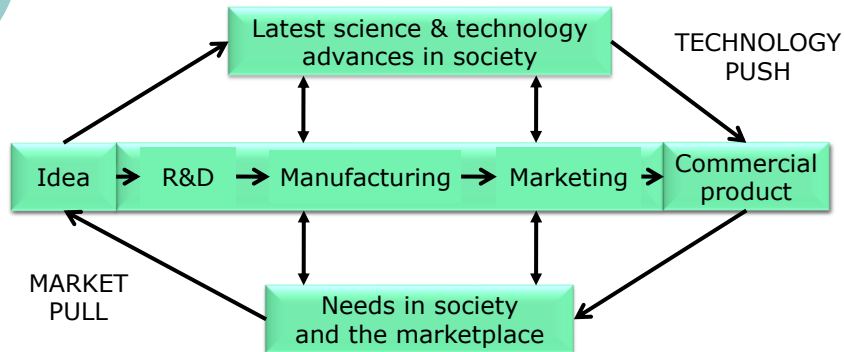


- Identified in the 1980's,
- Within this model, the moment of innovation is unknown (unlike the linear models),
- The groups work together simultaneously and create innovation.

Models of innovation - interactive

○ Interactive

- Innovations occur due to work in universities, industry and from market demand



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Models of innovation - interactive (cont.)

- This model takes **simultaneous** coupling one step further
- No explicit **starting** point
- Identified in 1980's/1990's by Rothwell and Zegveld
 - They believed that society had an influence on innovation and vice versa [10]
- The diagram represents the links between the **organisation** and its internal and external linkages with the **marketplace** and **science** base
- Organisations which can **successfully** manage this process will be the most **successful innovators**
- This diagram allows for **feedback** through the different stages of the development of innovations.

What makes a company innovative?

- We have discussed types of innovation and sources of innovation
- Now we move on to what makes a company innovative
- Think of some **examples**
 - What companies have been very successful with an innovative product?
- One answer could be that it is a company that has
 - incorporated an interactive model of innovation and
 - can be characterised by the features on the following slides



What makes a company innovative?

Organisational requirement	Characterised by
Growth orientation	A commitment to long-term growth rather than short-term profit
Vigilance	The ability of the organisation to be aware of its threats and opportunities
Commitment to technology	The willingness to invest in the long-term development of technology
Acceptance of risks	The willingness to include risky opportunities in a balanced portfolio
Cross-functional cooperation	Mutual respect among individuals and a willingness to work together across functions
Receptivity	The ability to be aware of, to identify and to take effective advantage of externally developed technology
' slack '	An ability to manage the innovation dilemma and provide room for creativity
Adaptability	A readiness to accept change
Diverse range of skills	A combination of specialisation and diversity of knowledge and skills

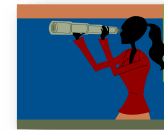
What makes a company innovative - investment

- Growth orientation
 - **Not all** companies' priority is for growth
 - Often **family run** companies want to stay the same size, thus remaining manageable without external intervention
 - **Innovative** companies are those that wish to grow their business
 - This is a **long-term** process, and investment is required
 - Companies show this R&D investment in their **company reports**
 - E.g. Amazon, Microsoft, Siemens, Tencent, others?



What makes a company innovative - vigilance

- It is vital to be aware of what markets and competitors are doing
- **SWOT** analysis is an important tool
- Identifying **threats, opportunities** etc.
- Often carried out by **marketing** team, but should be encouraged in **all departments** at all levels
- **R&D** team University liaison
- Many companies have specific teams to **monitor** competition and opportunities



What makes a company innovative - commitment to technology

- **Long-term** commitment is needed, and appropriate resources must be financed
- There is not always an immediate return on **investment**
- Some companies **moved away** from this during the IT/Telecoms recession
- **Creativity** is only seen in a climate of commitment to innovation
 - Need to employ and retain innovative **staff**



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What makes a company innovative - acceptance of risks

- Not all investment in innovation will be realised in **turnover** or **profit**
- Not all inventions will become **innovations**
- **Risk assessment** strategies and balanced product portfolios are crucial to success
- The business **strategy** must consider risk and commitment



What makes a company innovative - cross-functional cooperation

- Reduction/removal of inter-departmental **conflict**
- The biggest conflict is often between **marketing** and **R&D** functions
 - Opinions differ over business **objectives** and the ability to commit to firm **dates**
 - The marketing function does not always understand what is involved **technically** to create product



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What makes a company innovative - receptivity

- The ability to accept technologies from **outside** of the company and use them to create new innovations
- It is very difficult to create everything 'in-house'
- Strength to identify areas of **focus**
- **Joint activities** allow knowledge sharing
 - e.g. IBM, Microsoft joint activity to create mutually beneficial technology, including web services and creating industry standards



What makes a company innovative - slack

- Allowing individuals time to **think** and investigate new technologies etc.
- Some **flexibility** on milestones
- **Encouragement** for group discussions, attending conferences etc.



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What makes a company innovative - adaptability

- Ability for companies to **adapt** as required
- Innovative products can lead to **changes** in process etc.
- Need to encourage a **climate** that accepts change
- Can be easier in **smaller companies** with less processes.
 - From its origins in explosives, DuPont added other businesses like lacquers and synthetic rubber before inventing the first polyesters, nylon, Teflon, and the first phenothiazine insecticide.



What makes a company innovative - diverse range of skills

- Ensuring that a company has a **work force** with a diverse range of skills
- Important to have employees with the appropriate **industry knowledge**
- Good **management** knowledge and experience
- Strong overall team with the correct **mix** of skills and experience
- Innovation ecosystems rely on a wide range of skills, such as technicians, engineers, discovery scientists, technologists, entrepreneurs, and investors.



Summary

- What is innovation?
- Types of innovation
- Models of innovation
- What makes a company innovative?

Reading

- Department for Business, Energy & Industrial Strategy (2021), UK Innovation Strategy-Leading the future by creating it, *Innovation Today – Learning from the pandemic to create the world's best innovation ecosystem*, pp.11, 17-20.
- Deborah. L. Roberts, Roger Palmer and Mathew Hughes (2021), *Innovating the product innovation process to enable co- creation*, RADMA and John Wiley & Sons Ltd.



Further Reading

- <https://youtu.be/3T-NBDGovno> (a video about innovation)
- <https://www.uspto.gov/kids/videos.html> (short videos about new inventions here, like 3D printing, driverless cars, etc.)



References

- [1] UK Innovation Strategy Leading the future by creating it, Department for Business, Energy & Industrial Strategy, July 2021, page 11
- [2] https://en.wikipedia.org/wiki/Sinclair_C5
- [3] UK Innovation Strategy Leading the future by creating it, Department for Business, Energy & Industrial Strategy, July 2021, page 17

