

# Innovation and managing innovation



**ASSIGN  
BUSTER**

There are different types of innovation. Joseph Tidd and John Bessant describe in their books four broad categories of innovation. (Tidd & Bessant, 2009) Following these categories are referred as the 4Ps of innovation:

- ‘ product innovation’ – changes in the things (products/services) which an organization offers
- ‘ process innovation’ – changes in the ways in which they are created and delivered
- ‘ position innovation’ – changes in the context in which the products/services are introduced
- ‘ paradigm innovation’ – changes in the underlying mental models which frame what the organization does

For example, the new version of a car, a new bank account offer and a new home personnel computer are all examples of a product innovation. In comparison to a product innovation a change in the production process and machines used to manufacture the car or the home computer these examples are process innovations. Similar the example of the new bank account offer if this came up by changing procedures and sequencing in the bank office. Characteristic for services is the merge of a process and product innovation. For example a new weekend trip package could be combination of both types of innovations.

The third type is the ‘ position innovation’. In this context an innovation changes the perception of the customer through repositioning of the

established product or process. For example, to use shower gel also to wash and clean clothes is a good example of a ‘position’ innovation.

Sometimes innovation opportunities emerge when people start to think outside the box. A very good example of a paradigm innovation is Henry Ford. He fundamentally changed the way of transportation people. He achieved this neither by inventing the motor car (Invention of the motor car was 1999) nor because he changed the way of manufacture and produce an automobile (also the inventor of the conveyer production). His idea was to change the underlying model for the automobile production in this time. He changed the perspective of producing automobiles from handmade specialist product to a few wealthy customers to a mass product with a price a normal household could afford. The ensuing shift from craft to mass production was nothing short of a revolution in the way cars (and later countless other products and services) were created and delivered. This example shows that a paradigm innovation also requires intensive product and process innovation – for example, in component design, in machinery building, in the layout of the factory and in the social system around which work was organized. (Edelhoff, 2009)

Not only Henry Ford changed an industry. In the last decades the shift to low-cost airlines and the increasing numbers of goods sold in the internet are recent examples of ‘paradigm’ innovation – changes in mental models.

## **From Incremental to Radical Innovation**

Every Innovation is new, but the question is how new. So we can divide innovations between incremental and radical. (doing the same, better & .....)

For example, a new version of a car model is incremental while coming up with a completely new electric driven concept car which is made out of new light weight carbon fibre is radical. Similarly, further development of the accuracy and speed of a saw mill is not the same as replacing it with a computer-controlled laser cutting process. This example shows there are degrees of new innovation, running from minor, incremental improvements to radical changes which changes the way things are done and we use them.

These changes are often present to a particular industry, but sometimes they are so radical and extensive that they are able to change the core of society. The major steps in today's communication and information technology have affected almost every person on this planet and will continue to gain importance.

Figure : Dimension of innovation – from incremental to radical & from component- to system level

## **Mapping Innovation Space**

In the figure below each of the 4Ps of innovation can take place along an axis. Hence the blue circle indicates the potential innovation space within a business can operate, the innovation is able to run from incremental to radical change.

Whether the innovation utilizes all the space is a question of the innovation strategy. The way day-to-day change is approached within an organization differs from the approach how to handle a radical step change in products or processes. Here it is essential to keep in mind that the perceived stage of novelty is the important part and that this novelty is in the perspective of the <https://assignbuster.com/innovation-and-managing-innovation/>

observer. For example, in a giant, technologically advanced organization like Volkswagen or Siemens the tracking of goods from suppliers by RFID and GPS is used and implemented in day to day business while such an expensive process might be totally new and innovative for a small car dealership or food processor. (Kern, 2006)

Figure : Innovation space

## **Sustaining or Disruptive**

Quite a lot of innovations involve a discontinuous shift but very few bring something completely new which changes a market conditions dramatically.

Most of them usually are incremental. In recent time ‘lean’ thinking came up in the production and service sector, which underlines the huge possibilities of continue improvements within a firm. (Kohlstedde, 2007)

However this continues improvement idea is hampered through the new approach of the platform concept or robust design. This idea bases on the development of a future general design which will dominate the market as well as used by the competitor. A good example for such a robust design is the Walkman originally developed by Sony. This first design of a portable cassette and radio player system dominated the market for the whole product lifetime of cassettes. Also car makers tend to change their development process from each single model to a platform strategy.

(Wallentowitz, Freialdenhove, & Olschewski, 2009) The Volkswagen AG introduced platforms which are used for different brands of the company group. This not only saves costs but also helps them to dominate the market with faster model updates and exchanges. The platform and robust design

strategy of firms is a powerful way of recover the high initial investments such as Research and Development as well as market analysis.

## **The Challenge of Discontinues improvement**

The common innovation process happens in a set frame, following certain rules and ways of thinking. This ‘ game played’ by competitors is to innovate by doing what has been done before like product- or process innovations or even position- and paradigm innovations, but doing it better. In this competition of ‘ playing the same game’ some firms manage to do better than others and can gain a competitive advantage through these innovations, but the ‘ set of the game’ is accepted and do not change.

Very rare something happens that breaks up this framework and changes how the game is played. This will not happen every day but when this arises the rules and boundaries of a market change rapidly. This will result in upcoming new opportunities and challenge the existing players in their way of working, thinking and doing business.

A discontinues improvement occurs out of a technological and conditions stable market, where is a long period of continuous improvements and variations around a basic product or service. The strategy, before the discontinues improvement was, ‘ doing what we do, but better’. When such an innovation happens one or more of the basic conditions like technology, markets, social, regulatory etc. change rapidly. Now the time of ‘ doing different’ begins and the ‘ rules of the game’ change so the opportunity space for new innovations appears. Such a rapid technology change is happening right now with the development of LED’s in the light market. From

the invention of the originally light bulb in the late nineteenth century by Edison and Swan the light market gets more and more restricted by the government. Furthermore the development of the LED light was a major step for the whole market and will influence our daily life in the future. With this upcoming technology new enterprises emerge in the market as well as the inventor Shuji Nakamura with the company Nichia Corporation. This discontinues improvement faces the market dominating companies very hard. Either they adapt to the new light technology or they will lose market share very rapidly.

In the process the underlying

‘ rules of the game’ change and a new opportunity space for innovation opens up. ‘ Do

different’ conditions of this kind occur, for example, when radical change takes place

along the technological frontier or when completely new markets emerge.

An emerging

example of this could be the replacement of the incandescent light bulb originally

developed in the late nineteenth century by Edison and Swan (amongst others). This may be replaced by the solid state white light emitting diode technology patented by

Nichia Chemical. This technology is 85% more energy efficient, has 16 times the life

of a conventional bulb, is brighter, is more flexible in application and is likely to be

subject to the scale economies associated with electronic component production.

In their pioneering work on this theme Abernathy and Utterback developed a model

describing the pattern in terms of three distinct phases. Initially, under discontinuous

conditions, there is what they term a 'fluid phase' during which there is high uncertainty

along two dimensions:

- The target – what will the new configuration be and who will want it?
- The technical – how will we harness new technological knowledge to create and deliver this?

No one knows what the 'right' configuration of technological means and market



needs will be and so there is extensive experimentation (accompanied by many

failures) and fast learning by a range of players including many new entrepreneurial

businesses.

Gradually these experiments begin to converge around what they call a ‘ dominant

design’ – something which begins to set up the rules of the game. This represents a

convergence around the most popular (importantly not necessarily the most technologically

sophisticated or elegant) solution to the emerging configuration. At this point

a ‘ bandwagon’ begins to roll and innovation options become increasingly channeled

around a core set of possibilities – what Dosi calls a ‘ technological trajectory’. 38 It

becomes increasingly difficult to explore outside this space because entrepreneurial

interest and the resources which that brings increasingly focus on possibilities within

the dominant design corridor.

This can apply to products or processes; in both cases the key characteristics become stabilized and experimentation moves to getting the bugs out and refining the

dominant design. For example, the nineteenth-century chemical industry moved from

making soda ash (an essential ingredient in making soap, glass and a host of other products)

from the earliest days where it was produced by burning vegetable matter through

to a sophisticated chemical reaction which was carried out on a batch process (the

Leblanc process) which was one of the drivers of the Industrial Revolution.

This process

dominated for nearly a century but was in turn replaced by a new generation of continuous

processes which used electrolytic techniques and which originated in Belgium

where they were developed by the Solvay brothers. Moving to the Leblanc process or

the Solvay process did not happen overnight; it took decades of work to refine and

improve each process, and to fully understand the chemistry and engineering required

to get consistent high quality and output.

The same pattern can be seen in products. For example, the original design for

a camera is something which goes back to the early nineteenth century and – as a

visit to any science museum will show – involved all sorts of ingenious solutions. The

dominant design gradually emerged with an architecture which we would recognize –

shutter and lens arrangement, focusing principles, back plate for film or plates, etc. But

this design was then modified still further – for example, with different lenses, motorized

drives, flash technology – and, in the case of George Eastman's work, to creating

a simple and relatively 'idiot-proof' model camera (the Box Brownie) which opened up

<https://assignbuster.com/innovation-and-managing-innovation/>

photography to a mass market. More recent development has seen a similar fluid phase

around digital imaging devices.

The period in which the dominant design emerges and emphasis shifts to imitation

and development around it is termed the ‘transitional phase’ in the Abernathy and

Utterback model. Activities move from radical concept development to more focused

efforts geared around product differentiation and to delivering it reliably, cheaply, with

higher quality, extended functionality, etc.

As the concept matures still further so incremental innovation becomes more

significant and emphasis shifts to factors like cost – which means efforts within the

industries which grow up around these product areas tend to focus increasingly on

rationalization, on scale economies and on process innovation to drive out cost and

improve productivity. Product innovation is increasingly about differentiation through

customization to meet the particular needs of specific users. Abernathy and Utterback

term this the ‘ specific phase’.\*

Finally the stage is set for change – the scope for innovation becomes smaller and

smaller whilst outside – for example, in the laboratories and imaginations of research

scientists – new possibilities are emerging. Eventually a new technology emerges which

has the potential to challenge all the by now well-established rules – and the game is

disrupted. In the camera case, for example, this is happening with the advent of digital

photography which is having an impact on cameras and the overall service package

around how we get, keep and share our photographs. In our chemical case this is happening

with biotechnology and the emergence of the possibility of no longer needing

giant chemical plants but instead moving to small-scale operations using live organisms

genetically engineered to produce what we need.

Table 1. 2 sets out the main elements of this model. Although originally developed

for manufactured products the model also works for services – for example the early

days of Internet banking were characterized by a typically fluid phase with many

options and models being offered. This gradually moved to a transitional phase, building a dominant design consensus on the package of services offered, the levels and

nature of security and privacy support, the interactivity of website, etc. The field has

now become mature with much of the competition shifting to marginal issues like relative

interest rates.

The pattern can be seen in many studies and its implications for innovation management are important. In particular it helps us understand why established

organizations often find it hard to deal with discontinuous change.

Organizations build

capabilities around a particular trajectory and those who may be strong in the later

(specific) phase of an established trajectory often find it hard to move into the new one.

(The example of the firms which successfully exploited the transistor in the early 1950s

is a good case in point – many were new ventures, sometimes started by enthusiasts in

their garage, yet they rose to challenge major players in the electronics industry like

Raytheon. 39) This is partly a consequence of sunk costs and commitments to existing

technologies and markets and partly because of psychological and institutional barriers.

40 They may respond but in slow fashion – and they may make the mistake of

giving responsibility for the new development to those whose current activities would

be threatened by a shift. 41

<https://assignbuster.com/innovation-and-managing-innovation/>

Importantly, the ‘fluid’ or ‘ferment’ phase is characterized by co-existence of old and

new technologies and by rapid improvements of both. 41, 42 (It is here that the so-called

TABLE

‘sailing ship’ effect can often be observed, in which a mature technology accelerates in

its rate of improvement as a response to a competing new alternative – as was the case

with the development of sailing ships in competition with newly emerging steamship

technology. 43, 44

Whilst some research suggests existing incumbents do badly, we need to be careful

here. Not all existing players do badly – many of them are able to build on the new

trajectory and deploy/leverage their accumulated knowledge, networks, skills and

financial assets to enhance their competence through building on the new opportunity.



42â€ Equally whilst it is true that new entrants – often small entrepreneurial firms –

play a strong role in this early phase we should not forget that we see only the successful

players. We need to remember that there is a strong ecological pressure on new

entrants which means only the fittest or luckiest survive.

It is more helpful to suggest that there is something about the ways in which innovation

is managed under these conditions which poses problems. Good practice of the

‘ steady-state’ kind described above is helpful in the mature phase but can actively

militate against the entry and success in the fluid phase of a new technology. 46 How do

enterprises pick up signals about changes if they take place in areas where they don’t

normally do research? How do they understand the needs of a market which doesn’t

exist yet but which will shape the eventual package which becomes the dominant

<https://assignbuster.com/innovation-and-managing-innovation/>

design? If they talk to their existing customers the likelihood is that those customers

will tend to ask for more of the same, so which new users should they talk to - and

how do they find them?

The challenge seems to be to develop ways of managing innovation not only under

'steady-state' but also under the highly uncertain, rapidly evolving and changing conditions

which result from a dislocation or discontinuity. The kinds of organizational

behaviour needed here will include things like agility, flexibility, the ability to learn fast,

the lack of preconceptions about the ways in which things might evolve, etc.

- and

these are often associated with new small firms. There are ways in which large and

established players can also exhibit this kind of behaviour but it does often conflict

with their normal ways of thinking and working.

Extensive studies have shown the power of shifting technological boundaries in creating

and transforming industry structures - for example, in the case of the typewriter,

the computer and the automobile. Such transformations happen relatively often - no

industry is immune (see Box 1. 3 for an example).

Worryingly the source of the technology which destabilizes an industry often comes

from outside that industry. So even those large incumbent firms which take time and

resources to carry out research to try and stay abreast of developments in their field may find that they are wrong-footed by the entry of something which has been developed

in a different field. The massive changes in insurance and financial services which

have characterized the shift to online and telephone provision were largely developed

by IT professionals often working outside the original industry. 6 In extreme cases we

find what is often termed the ‘not invented here’ – NIH – effect, where a firm finds

out about a technology but decides against following it up because it does not fit

with their perception of the industry or the likely rate and direction of its technological

development. Famous examples of this include Kodak’s rejection of the Polaroid

process or Western Union’s dismissal of Bell’s telephone invention. In a famous memo

dated 1876 the board commented, ‘this ‘telephone’ has too many shortcomings to be

seriously considered as a means of communication. The device is inherently of no value

to us.’