Cyclic Innovation Model: Circular vision in open innovation

Authors:
Prof. Dr. Ir. Guus Berkhout – Professor at University of Delft and founder European Centre of Innovation
Ir. Jan Willem Rietdijk – Executive Director Business Advisory Services of E&Y for Netherlands and Belgium

Introduction
The basic idea behind innovation is to successfully bring new products and services to the market. No matter how good the design or how clever the development behind a (technological) invention may be, it cannot be classified as an innovation if the market introduction fails: there is no innovation without customers. A new product-service combinations may only be regarded as an innovation if it fulfils explicit or implicit human needs.

Innovation is more than just a technology breakthrough: economic, social, and cultural aspects are often decisive and it is the symbiosis of these factors that will determine what is a true innovation.

To gain a deeper understanding of innovation, we looked at a cross-disciplinary innovation framework that has been developed over many years which connects technological development with market transitions and engineering capabilities with social forces. In this framework, known as Cyclic Innovation Model (CIM), the complex interaction between those different worlds is presented by cyclic processes, where feedback and feed forward are equally important. Front-end innovation may start in any cycle of the framework. Interrelated parallel developments in all cycles lead to a significant acceleration in the implementation of new concepts. The framework may inspire the development of new technology to anticipate emerging social needs and concerns. It can also be used to guide the
deployment of existing technology in new products and services. Moreover, the obstacles that hinder rapid application can be identified in the model and a roadmap for fast implementation drawn up. The cyclic model may make a significant contribution to realizing new innovations that are aimed at a sustainable society.

**Dynamics in innovation**
Everything around us is changing, innovation processes need to change too. Future innovation is a matter of building socio-technical networks that continually interact and adapt. This means that innovation models themselves need be updated. Strong and increasing competition, shortening products life cycles and the spread, mobility and specialization of knowledge together with other changes in the business landscape create new challenges for companies. The concept of “Open Innovation” launched by Henry Chesbrough, meets these challenges by suggesting more open business models. Companies need to utilize more external sources and channels in the ongoing process of innovation, as well as bringing their own innovation to the markets. Involving customers at an early stage is part of this concept.

The adoption of a more open attitude and behaviour is always challenging, but open innovation requires a new type of management. Companies like Philips have succeeded in adopting a more open attitude to their business models. Innovation is chiefly about people; open innovation inspires and challenges. Open innovation mobilizes talents from inside as well as outside of a company’s boundaries.
Philips & Open innovation

Philips Group Corporation is the largest electronics company in Europe. For Philips, the most important aspect of open innovation is collaboration. Nowadays, it offers co-operation to academic institutes and companies in many ways, eg it favours joint ventures as a form of collaboration. The most important effort of openness is Philips’ High Tech Campus in Eindhoven. This campus offers a highly advanced infrastructure, active engineering support, and ample opportunities for Philips’ researchers to interact with other companies and institutes. There are facilities for start-ups, such as a technology incubator and MiPlaza, which enables research on nano and microsystems technology.

Philips strongly encourages its workers to found ventures. Its Technology Incubator has been designed for Philips’ employees to create new ventures from promising research projects that are not suitable for core businesses. The incubator offers funding, facilities, business planning and partnerships to new start-ups. Philips is an example of a company, which revenue and R&D investments has stayed almost the same during the examined period, but it has been able to receive more patents every year. Also Philips adopted open innovation as part of its R&D strategy and it relies on research collaboration and spinning out new ventures.

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1 Implementation of open innovation paradigm. Lappeenranta University of Technology · Finland
From linear to cyclical interaction
Whereas traditional innovation models are linear, successful innovation processes tend to be interconnected cycles with feed forward and feedback connections between networks. Now is the time to rethink innovation models.

The Cyclic Innovation Model (CIM) looks at innovation processes from a broad perspective. Based on practical experience, it has developed by the Delphi-consortium\(^2\) over many years.

The Cyclic Innovation Model (CIM) moves away from the traditional linear-chain innovation concept and represents a circle with four ‘nodes of change’: scientific research, technological development, product creation, and market transition. Furthermore, between these nodes there are four interacting ‘cycles of change’, through which the dynamic processes in the nodes inspire, correct and supplement each other\(^3\).

\(^2\) [http://www.delphi.tudelft.nl/](http://www.delphi.tudelft.nl/)

\(^3\) Since 1/1/2009 a new Chinese law is approved to transform the Chinese economy into a ‘circular economy’. This ambition is fully consistent with the concept of CIM.
Collectively, they may be seen as the fundamentals of complex, boundary crossing innovation processes as they occur in open innovation environments nowadays. From that perspective, the CIM is a cross-disciplinary view of change processes and their interactions.

A fundamental characteristic of the proposed innovation model is that it describes a full circle rather than a chain; innovation may start anywhere at any time. The result is an ongoing accumulation of value creation that is realized by the reinforcing cycles of the full circle. In the CIM, new technologies (e.g. resulting from new scientific discoveries) and changes in the market (e.g. arising from new life styles) continually influence each other in a cyclical manner and the dual nature of this innovation will shape the future.

Innovations may lead to changes in society that are incremental or radical, small or large, as such, the Cyclic Innovation Model allows greater diversity in its classifications. Class-1 innovations are based on changes in one node only, e.g., existing product-service combinations that are introduced with a fundamentally new marketing concept. Similarly, class-2 innovations are based on changes in two nodes. In class-4 innovations (the ‘four-star innovations’) new scientific insights play a crucial role, initiating new technologies,
new product-service combinations and changes in the market, for instance, the life and nanoscience innovations that will change our life dramatically in the future.

**Key benefits of the CIM**

One of the main reasons for stimulating open innovation via the CIM is to leverage scale and investments, expertise and know how, to reduce time to market and support the accumulation of competencies in specific areas. Ultimately, value creation is easier with partners than with competitors and the CIM describes a world of symbiosis.

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**Innovating the Dutch water sector with the CIM**

The Netherlands have an excellent track record in the water business, but growth is less than half of the world average. Recently, a taskforce was formed to investigate the reason for this disappointing performance and to propose a plan of action to increase exports by a factor of two. The taskforce used the Cyclic Innovation Model to measure the performance. Figure 1 was used to position the key players in the innovation arena, their role in the Dutch water sector was assessed and the interrelationship between those players was investigated. Two major system errors became evident within a few months.

The taskforce concluded that:

1. “The sector is very fragmented with hundreds of players. There is insufficient symbiosis between science and business”.
2. “The sector is very technology-oriented; many players have relatively little insight in transitions that are taking place in today’s global market”.

Next, the taskforce investigated the opportunities in the global market via a bottom-up process (the lower part of CIM), next it made an inventory of the technological strengths of the national technology players (the upper part of CIM). From this analysis, clusters consisting of partners that involve all cycles of the CIM model were proposed. These clusters are active now, and some of them are very successful internationally.

Looking back, experience shows that the CIM is very powerful in functioning as a common framework in a fragmented sector. Communication between the many diverse players improves significantly, because everybody can identify its position in the arena as well as its relationship with other players. Experience also shows that a ‘circle captain’ is needed to synchronize all actions and interactions around the innovation circle.
Integral framework for leadership

Every innovation process needs to have a clear view of the future: ‘processes without a vision are processes without a soul’. This view must be shared by all organisations in the network.

A view of the future (vision) is fed by external developments in the market (based on underlying social change) and the internal ambitions of the organisation(s) involved. We define vision as the ability to choose the right ambitions within the context of global trends. Such a vision, therefore, has an eye on both customer and company value. In order for a company to realize its vision, it needs to establish a transition path, clearly setting out the steps needed to move from the present to the world of the future. Specific innovation projects that support the transition path should be managed by the CIM model (see figure 1).

Figure 2 The leadership circle4 shows that innovation processes should be embedded in a (new) business model.

The well-known stage-gate model has long been a popular ‘innovation model’ in many companies. However, the leadership circle, positions this concept as a phased

transition path. We believe that an innovation model should show the actual processes involved (like the CIM does).

The leadership circle combines an inspirational vision of the future (visionary component of leadership) with a differentiation strategy (strategic component of leadership) and sufficient social skills to realize the ambition (operational component of leadership).

Images for the future that are connected with transition paths and process models are key components in generating successful innovation projects. Figure 2 shows the three interrelated components that provide the basic modules for building a new business model (business model innovation).

**Hurdles to overcome in innovation**

Despite living in an interconnected world, the barriers to creating new business remain. Figure 1 can be used to indicate two possible obstacles in today's innovation practice.

First, the scientific research may be excellent, but a lack of communication with the industry will lead to the results not being translated into business applications that are economically relevant (a barrier between the left and right sides of figure 1). Here, science and industry have separate agendas. Second, a company or industry, or even a society, that may excel in designing and building technical solutions could still underperform because of a communication gap between the technical and social communities (a barrier between the upper and lower part of figure 1). The technology push can only succeed when connected to a change of behaviour (social change).
Conclusion
Experience with the CIM shows that key to innovation is the use of a shared mental framework, that would allow more creative and intense interaction between a large numbers of rather diverse players. The CIM model can be instrumental in rethinking the innovation process within a company, industry or society; in this respect, the CIM is multi-scale. From this perspective, the framework acts as an interdisciplinary communication model, connecting diverse people with diverse roles within and across different networks: scientists and market specialists, and engineers and social experts.

Innovation projects without an inspiring image of the future give rise to processes without a ‘soul’. In the end, it is all about creating value for both the customer and the company (dual value creation). The CIM enables clear guidelines how the innovation process should be designed and implemented along a planned transition path. In order to develop breakthrough innovations, every CIM node should be involved.