Is there a formula for innovation?

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New ideas often emerge when we cannot make things fit into existing systems or into the categories we have available to us. This is also true of innovation projects. For many years we have tried to squeeze innovation into the existing project management model, which has resulted in innovation being impeded or even destroyed. We cannot afford this to happen any longer. We must invent an entirely new language for innovation processes in the early phases, because a new language opens up for new possibilities and new perspectives.

My first claim is that *in relation to innovation processes, a new concept is needed for the early phases of a project*, since the early phases are very different from the later phases. I have chosen to call the early phases a "preject".
My second claim is that *models and "language" can advance innovation processes, thereby increasing the chances of a good result, but there is no actual formula for innovation*.

In the following I will argue for the above claims. The article starts with a brief description of the background, which is three years of research at a large Danish company (Novo Nordisk). Then the concept of innovation (incremental, radical and social) is clarified and I describe the difference between a preject and a project. This leads to a presentation of the Diamond of Innovation I have developed through my research. The model constitutes a "language" that can enhance the understanding of innovation processes and knowledge creation in the early phases. Then a proposal is made for how innovation prejects can be managed in practice. Four management roles are outlined, which are relevant in connection with innovation in the early phases, and a number of practical recommendations are made. The article concludes with some management-related recommendations concerning innovation strategy and innovation processes, and finally relational competence is emphasized as one of the most important competences of the network society.

Background

From 1996 until 1999 I was a researcher at Novo Nordisk A/S. My project was aimed at studying the early phases of innovation. I wanted to find out what encourages and what discourages innovation processes in project groups working towards creating new concepts. My research resulted in part, in a PhD thesis, which I defended in June 2000, and in part, in a book, "Innovation in the Making", which was published in 2001. The company obtained a "Creativity & Innovation Toolkit", which I implemented in 2000 in Novozymes. One of my tasks as innovation coach was to travel to subsidiaries in North and South America, Asia and Europe to support and boost development of new markets and new products through creativity and innovation. But what is creativity and innovation? Let us start with a conceptual clarification.

Incremental and radical innovation

The concept of innovation was coined by the Austrian economist Joseph Schumpeter in the 1930s. It is defined as a new creation that generates economic value. Schumpeter's perspective derived from an economic background, and it was therefore a natural assumption for him that value was economic. Today it makes more sense to take a broader perspective, in that value can be different and more than economic. For example, Peter Drucker[1] points to **social innovation** as a significant value-creating process. Social innovation is based on social needs rather than technology. It is about new ways of organizing, new forms of interaction, new constellations and new work forms and functions. Social innovation is not reflected directly on the bottom line, but can indirectly have a great influence on a company's result.

In general a distinction is made between incremental and radical innovation. **Incremental innovation** refers to minor innovations, in which what is already available is used in a new way – be it technology, a core competence, a product, a market. It is turned, so to speak, 90 degrees to obtain a new creation, which has few costs, is low risk and requires little development time, and which increases turnover and earnings. Incremental innovation is thus the kind of innovation that can readily be seen on the bottom line.

In contrast, **radical innovation** is trickier to deal with, because it seldom fits into the company's strategy and because it is difficult to devise a formula for it. It refers to surprising new creations, which often consist in bringing together technology, values and concepts that have not previously

been connected. Sometimes a radical innovation, like, for example, the Internet, can seem insignificant at first, but later on this type of innovation turns the existing competition parameters upside down.

Preject versus project

The early phases of an innovation process do not resemble what is normally defined as a project. What makes these early phases so difficult to handle is the lack of "language" dealing with innovation processes. Innovation processes are thus often forced into the usual project management models with goals, milestones, etc., and in many cases this kills what is original about the idea and thereby the actual innovation potential. It is therefore necessary to expand the language somewhat so that we can differentiate between a preject[2], the early, often chaotic processes, and a project, which arises after the goal has been identified.

The prefix "pre" means before; that is, the preject comes before the project. The preject is goal-seeking and divergent, whereas the project by definition is goal-directed and convergent. The preject is non-linear and demands "chaos time", whereas the project by definition is linear and time-limited. Finally, the preject is process-driven and requires an extended and open decision space, while the project is result-driven and requires quick decisions. There is thus a great difference between the process and the type of management needed. The preject cannot be forced into a project template because it is about an entirely different type of process, a very open, information-seeking process, where a group of people probe a field for new possibilities. Companies should dedicate time to these types of processes in order to achieve the highest possible innovative potential – especially if the company is striving for radical innovation. So-called "skunk work"[3] is in my opinion not sufficient, partly because researchers today are hard pressed in terms of time and efficiency, which means that there is too little time for experimentation, and partly because experiments are often based on individual interests rather than dedicated strategic project groups. In the following I will explain in more depth what the preject is about by introducing the Diamond of Innovation.

The Diamond of Innovation

We thus juxtapose early innovation processes and the preject. The trouble is, however, that they are hard to describe, and one of the main questions of my research was therefore: what are innovation processes and how can they be described? The Diamond of Innovation suggests answers to these questions, in that its purpose is to improve our understanding of what takes place in groups that work towards creating new knowledge, and to give them a "language" for speaking about it – and thereby further the innovation process.

The model has four parameters, all of which should be in play if the innovation process is to be successful. They are: knowledge, relations, ignorance and concepts. However, it should be noted that the process is, of course, dynamic, and the division into dimensions is therefore artificial and analytical.

The Diamond of Innovation
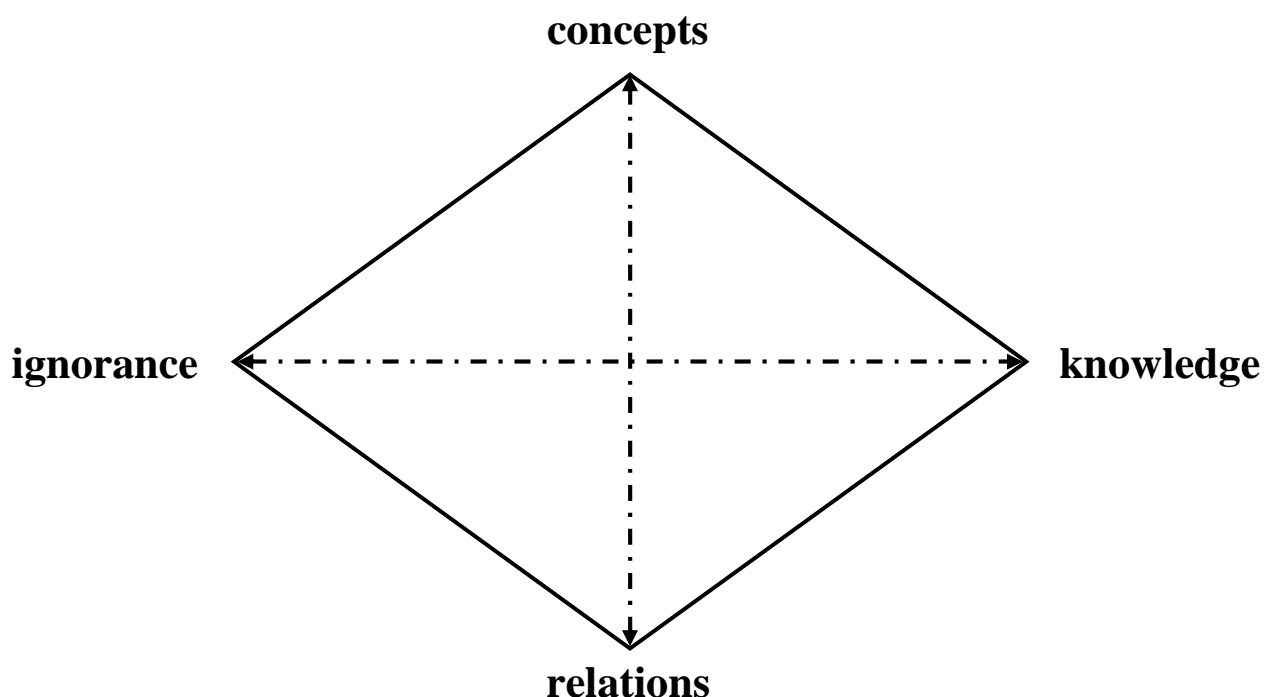
Knowledge: Obviously, knowledge is needed for knowledge creation and innovation. Yet knowledge has many dimensions, and knowledge is not static but under constant development and change. Knowledge is thus both the scientific knowledge described by researchers and experts, who can explain the background and data that form the basis for their conclusions, and the knowledge the individual has developed herself, through experience, reflection and practice. The latter is part of the individual's "mental programming" and the problem here is that this often remains the same, even though the person's knowledge develops and changes. This may seem strange, because the person in most cases is unaware of it. When this happens, this type of knowledge can contribute to "locking" the group's development rather that opening up for new possibilities. An example is the expert who says that something is impossible. If one accepts this "verdict", as many groups politely do, one cuts oneself off from possibilities that could otherwise lead to new ways of thinking. Instead, one should explore why something is impossible by questioning the underlying assumptions (mental programming). Sometimes they can be shifted if they are challenged in a constructive way. It is therefore essential to be highly aware of what type of knowledge the development of new concepts is based on.

Relations: Often the significance of relations in project groups is toned down on the basis of a rational picture of the world. Yet in reality, the quality of the relations has a great impact on whether the innovation processes yield the desired result: the crystallization of something new. Relations are what connect people. They can be sympathy or antipathy, understanding or lack of the same, including or excluding others, or having power, sharing power or being powerless. Relations in groups are often formed without any discussion since it takes place at the same time as everything else. However, it is wise to work consciously with the relations because they form the basis for building the mutual trust needed for venturing into areas of new possibilities. In my research I found that where a common starting point had been created along with an intersection of contributions from all participants there were far greater chances of achieving innovative crystallization[4] than in those cases where the matter at hand was addressed directly. Relations can be worked with concretely by talking about the expectations, wishes and level of ambition in relation to the project, or by taking turns telling each other about one's own interests, both in relation to the preject, but also to life outside. Here, there is great potential for improvisation. What is important is taking conscious action to create mutual trust and respect.

Ignorance: This dimension is the most important and at the same time, the most surprising. Ignorance is about in part, what we know we do not know, in part, what we do not know that we do not know, and finally, what we cannot fathom could be known. The problem with ignorance is that it is an uncertain and anxiety-provoking field to venture into, and this leads most people to prefer to retreat to firmer ground, that is, to work with their knowledge. Part of the socialization process we all have gone through (at school, among other places) is about hiding ourselves when there is something we do not know. Dealing with ignorance can therefore seem like "exposing oneself" to others by making oneself susceptible to criticism. This is why relations of mutual trust are an essential requirement for working with the area of ignorance. At the same time it is important to point out that according to my research *it is in the field of ignorance that the spark of something new is most often ignited.* If the aim is to work with radical innovation, one must work intensely towards diving into this field. This is done primarily by asking questions – and by continuing to ask questions. Einstein once said that the greatest challenge facing science is precisely asking questions, for as soon as the question has been formulated, the solution has almost been found.

Concepts: When groups develop new concepts, they do so for the most part using words. They talk together, present things to one another, discuss, ask questions, and come up with ideas and suggestions. Yet often words are not sufficient when new concepts are to be crystallized. One of the barriers is the degree to which certain things are taken for granted within the group. This taken-for-grantedness often involves something very basic, which has never been discussed. It is therefore in many cases based on a false understanding. This is reinforced by a tendency *not* to ask clarifying questions. A suggestion for what could be done in practice is that a group could, for example, discuss what IT really is when they start an IT preject. This is seldom done, and such a suggestion is likely to meet resistance, but try conducting a clarifying dialogue on something completely basic and see what happens! Another way of advancing conceptualization is to use other ways of describing than words: for example, drawing what one is talking about, or illustrating relationships using figures, arrows, etc. In addition, metaphors can be used, or entirely new concepts, slogans or images can be created. Prototypes can help in externalizing ideas. By creating a concrete model, the group can communicate in an entirely new way that encourages innovation[5]. To sum up, it is important to use many different methods to promote the conceptualization of the new.

The intersection between the axes

The four dimensions should be exploited to the fullest through fruitful, dynamic interaction. The poles of the axes are complementary in the sense that they reinforce one another. Concepts and relations are not contradictory; on the contrary, both are often worked on at the same time, in that greater differentiation and nuancing of concepts gives rise to a deeper understanding and thereby better relations. If one starts by working on developing relations, for example, by talking about expectations, this conversation will also conceptually expand the understanding. The perpendicular axis represents communication and putting things into perspective. The poles of the axes of knowledge and ignorance are not the opposites of each other either. It is possible to have both knowledge and ignorance of an area. What is central to this axis is the movement back and forth between knowledge and ignorance. Based on existing knowledge, questions (ignorance) are posed, some of which can be answered on the basis of new information and knowledge, while others are refined into more nuanced and precise questions, which in turn leads to the procurement of new knowledge, and so on. The horizontal axis can thus be considered a knowledge and ignorance management axis, which is aimed at building new knowledge. When it crosses the communication and perspective axis the ideal result is that a new concept is crystallized, after which very little work is needed for the preject to become a project. Now goals can be set and tasks can be delegated with areas and hypotheses to be explored and tested.

Preject management

I am often asked what needs to be done specifically if one wants to work with preject management based on the Diamond of Innovation, and this has led me to develop four roles, which can support the development of the four dimensions. The project leader can choose to perform all of these functions himself or he can choose to develop innovative competences among the participants in the group by letting the roles rotate between them. Performing shared leadership is an educational process, which increases the participants' understanding of both leadership and innovation processes and which can help them manage this type of process in their future tasks. Here, I will briefly describe the leadership roles:

The innovation gardener works to develop the relational competence in the group. This means being aware of the participants' well-being, which is connected with each individual person's motivation and opportunity to contribute. The gardener is also responsible for establishing and maintaining a group climate based on mutual trust and for keeping the energy level high and declaring "time out" when it is flagging. Finally, the gardener is responsible for creating a common starting point for the group, for example, a vision for the preject. The role can be expanded to also include relations to people outside the group, in the form of both internal and external networks.

The innovation jester helps the group explore what they do not know. This leader is responsible for stimulating the group to ask questions and propose ideas. There are five types of questions that are relevant to work with. The "stupid" questions (which can only be asked by a truly ignorant person; experts cannot, for example, ask stupid questions about their own areas), the "crazy" questions (the truly odd, surprising or annoying questions that provoke), the "impossible" questions (questions asked about something everyone knows cannot be done; here, it should be remembered that much innovation has emerged when people have not known that something could not be done!), the "burning" questions (questions based on the participants' motivation, on something the participants are burning to figure out), and the "hypothetical" questions (all questions that have something to do with whether something could, would, should be doable; and "what if…" questions).

The innovation conceptualizer tries to get the participants in the group to describe and illustrate information and knowledge in different ways. This leader is responsible for clarifying concepts and agreements/disagreements in the group. It is constructive to have a certain degree of disagreement in the group to create a dynamic field of tension, where different perspectives can enrich each other. But what is key is that the participants are aware of the disagreements right from the start, so that they do not come as a sudden surprise at an unpropitious time.

The innovation challenger assists the group in building a solid knowledge base. This leader's main task is to challenge all the knowledge and information that emerge as potential contributions to knowledge creation. This involves in part, screening the group's knowledge, and in part initiating "rude" questions to the established knowledge, whether it comes from an internal or an external
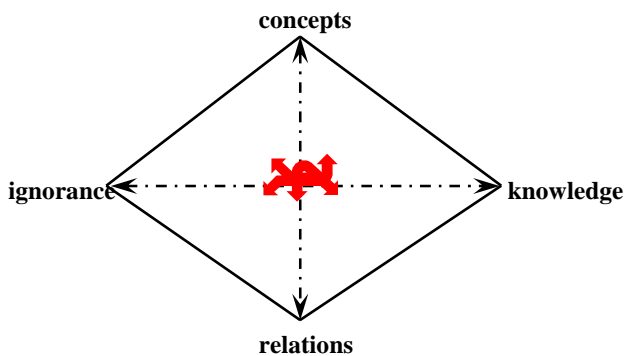
source. It may seem very impolite to question experts' underlying assumptions, but the advantage, as previously mentioned, is that these assumptions can often be shifted.
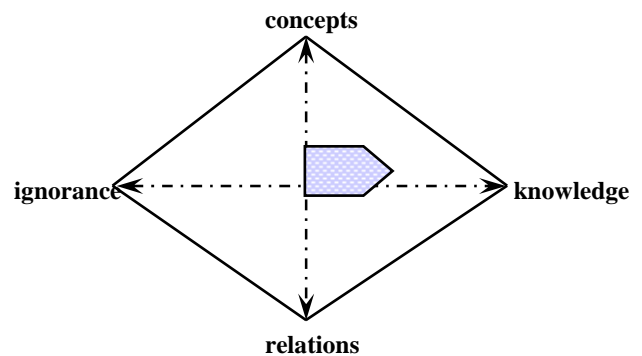
Classification of innovation processes

When I advise companies about innovation processes I often start by asking them to try to clarify their typical innovation processes in the model in order to gain a better understanding of the company and be able to compare their process with those of other companies. On this background some typical figures of the company can be made in relation to size, trade, strategy, etc. As illustrated in the model below, many large "old" companies position themselves in the arena defined by knowledge and concepts, which mainly comprises incremental innovation. Biotech companies, on the other hand, conceive of themselves as working more within the arena between ignorance and concepts. Only small start-up companies express that their close relations have had a great influence on their company becoming a success, and they say that the quality of the relations is often lost when the company grows. Where most companies have "gaps" in the model is thus in the relations dimension. It may therefore be worthwhile planning to take initiatives here. But how can relations in groups and organizations be developed?
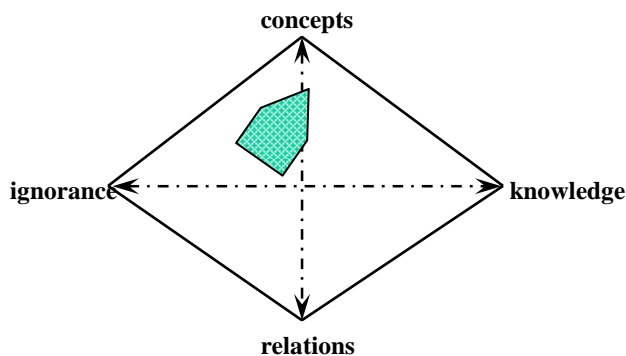
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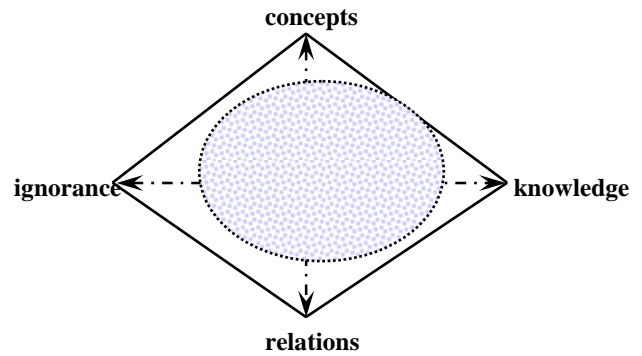
concepts

ignorance — knowledge

relations

Typical project in large

concepts

ignorance — knowledge

relations

Typical Project in small Biotech

concepts

ignorance — knowledge

relations

Innovative

concepts

ignorance — knowledge

relations

Relations and trust

The American author and management consultant Margaret Wheatley[6] has attempted to illustrate one of the greatest challenges of our times by contrasting two concepts: "the speed of light" with "the speed of life". On the one hand, companies are driven, because of increased competition and globalization, among other things, to constantly become more efficient, which, put bluntly, means less time for more work, but on the other hand, many people, including top managers and specialists opt out because they cannot find meaning in their work. Time, efficiency and superficiality thus conflict with meaning, depth and quality of life. Relations are connected with meaning and depth, but they are overlooked or forgotten when people are too busy. The danger is thus in part that valuable employees will leave the company, which thereby loses both knowledge and competences, and in part that the pressure of time, superficiality and the absence of deep relations make companies less innovative and therefore less capable of survival in the long run. Finally, fruitful

knowledge management takes place precisely when relations are cultivated and is absent when pressure is put on individual workers to take care of their own job only. Paradoxically, therefore, *efficiency can only really be achieved by giving employees more time* to build up relations in the local environment and across organizational boundaries. One concrete measure I can suggest is creating a rotating innovation gardener function in individual departments. Yet for this to work as intended it is important that the manager take it seriously, working towards providing feedback and constantly improving the function. Likewise, it is essential that time is allocated to cultivating and improving the mutual relations. Here, storytelling can be a good method, or one could initiate "simple conversations" on relevant issues[7]. The same methods can be used in large events across the departments of an organization, or a number of Innovation Cafés can be initiated[8].

A formula for innovation?

If I were to attempt to answer the question posed in the title of this article, I would conclude that there is no real formula for innovation – at least, not yet. However, a "language" is emerging that makes it easier to understand and put into words the early innovation processes, which can help further them. In this article I have used the Diamond of Innovation to describe the preject and to argue that companies should incorporate this phase as a separate part of their project portfolio. This means working with new dimensions and new management roles, where I have put special emphasis on relational competence. Which dimensions the individual company should work on depend, however, on how the company works with the different dimensions and how it positions itself in the Diamond of Innovation. Here, it should be added that it may not be the actual position in the model that is important, but rather the quality of the dialogue the manager facilitates in the attempt to plot the company into the model.

Furthermore, top management should prepare an innovation strategy aimed at defining the desired balance between radical and incremental innovation. Here, it should be decided what types of innovation the company wants to direct its efforts toward, and how this balance should be reflected in concrete goals and the allocation of resources. Each company has its own specific balance, which can vary, even within the same year. What is important is that top management is always aware of this. However, it is not always necessary to have radical innovation in the company. Some companies manage fine without it. One possibility is, for example, to "outsource" radical innovation

to small companies, or to be on the lookout for buying small companies when they are working on an innovative idea within the company's core area. What is really decisive is that top management makes a strategic choice.

A globalized world puts heavy demands in terms of innovation on companies that wish to survive and grow. It is becoming increasingly difficult to survive by doing "business as usual". Real innovative power lies, in my opinion, in the company's relational competence, because good concepts can no longer be created by individuals, but must be created in dynamic communities capable of combining knowledge and ignorance in previously unknown but highly relevant ways. Moreover, it is very worthwhile investing in developing relational competence, in that this is also the network society's utmost competence – not just internally in the company, but to a very high degree also externally, both in relation to professional development and exchange of ideas with universities, and in relation to customers, users and society in general.

One of the new possibilities being tested internationally in front-edge companies is different forms of collaboration with artists[9] . In connection with creativity and innovation, artists can help invent new methods. For example, an artist's approach can be useful in the field of ignorance by provoking new questions or by posing provoking questions about what has been agreed upon (knowledge). Furthermore, artists can help illustrate and conceptualize discussions and solutions in the group. However, what is essential here is not that it has to be *artists*; rather, it is that artists generally think and act differently than knowledge workers in the business community. It is what is different that is refreshing and significant – if, of course, there is the openness and respect needed to receive it.

In conclusion, a real formula for innovation does not exist. However, companies can do a lot to increase the chances of innovation taking place, both strategically, organizationally, in terms of management, and not least, in connection with the development of workers' competences.

[1] Peter Drucker, 1985, "Innovation & Entrepreneurship", Pan Books.

[2] The concept derives from a collaborative project with Henrik Herlau carried out in 1996, where for pedagogical reasons, we felt we had to invent a concept that in part differentiated between these two types of processes and in part could readily be understood as connected with the project.

[3] The concept of "skunk works" is registered as a "trademark" of Lockheed, who under this name built, in secret, XP-80 Shooting Star, the first American production jet (Trott, 1999, p. 210).

[4] Innovation crystallization is defined as the result of a process involving a collective transformation of accumulated and integrated knowledge to a new concept or a new prototype, see Lotte Darsø: Innovation in the Making, 2001, p. 172.

[5] Michael Schrage, 2000, "Serious Play", Harvard Business School Press.

[6] Margaret Wheatley, 1999, "Leadership and the New Science" and 2002, "Turning to One Another", Berrett-Koehler Publishers, Inc.

[7] Inspiration from Margaret Wheatley, 2002, "Turning to One Another", Berrett-Koehler Publishers Inc.

[8] Lotte Darsø, 2001, "Innovation in the Making", Samfundslitteratur, p. 376.

[9] Lotte Darsø, 2004, "Artful Creation. Learning-Tales of Arts-in-Business", Samfundslitteratur