

## **Domain modelling of risk taking related to innovation in dyadic business relationships: A conceptual study with cases**

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### **Abstract**

Supporting innovative behaviour and risk-taking can be a strategic capability that generates sustainable competitive advantage in a dyad relationship. This study focuses on mapping concepts and variables that are central to risk-taking for innovation in dyadic relationships in business-to-business contexts. Thus, the purpose of the study is to identify relevant concepts and to create a classification method regarding this particular phenomenon. Domain modelling methodologies are used to examine 7 carefully selected dyadic cases. Each of the 7 cases is analysed in order to find relevant concepts related to the problem domain, and then the connections between the applicable concepts are discussed. This risk mapping can be of help venture capitals or other financing parties. The method helps to increase our current understanding through structuring knowledge into classes, attributes, and relations. The implication for the extant literature is discussed, and further studies are proposed. This is one of the first studies on this topic.

Keywords: Innovation, dyad, risk-taking, problem domain model

## Introduction

Innovating new products, services or processes are of high importance to business organizations, especially in contemporary business environments than ever before. Innovation can generate various positive implications for the firm, including strengthening its position in the market, increased cash inflow and profit, creating and sustaining competitive advantage, creating breakthrough innovations (defined as Foster's S-curves) and even the creation of completely new markets. Hence, both practitioners, as well as academic researchers, are putting more and more emphasis on innovation. However, the engagement in innovation often carries certain risks to the innovating firms, including monetary, juridical and market implication.

Especially in business-to-business markets, firms do not innovate in isolations. Rather, in recent years, it has become increasingly evident and scientifically acknowledged that innovation process is non-linear and highly interactive (Kaufmann et al. 2003), and is stimulated and influenced by other actors in the innovating firm's business networks (Tether and Tajar, 2008). Particularly, innovation in business-to-business context often requires combining the ideas, knowledge, capabilities and technologies of interconnected actors. These dyadic relationships offer access to critical knowledge and resources necessary for successful innovation that can be enormously challenging for individual firms to obtain. In this study, we examine the critical concepts that are essential to understand innovation and risk taking in dyadic business-to-business relationships.

According to Foster (1986), most of the managers of companies that enjoy transitory success assume that tomorrow will be more or less like today. Significant changes are unlikely, unpredictable, and they in any case come slowly. Foster's S-curve is a graph of the relationship between the effort put into improving a product or a process and the results one gets back from that particular investment (see Figure 1). The S-curve sets the limit to a particular technology. The quotation from Foster (1986, p. 34) explains the importance of an S-curve. *"If you are at the limit, no matter how hard you try you cannot make progress. The problem for most companies is that they never know their limits. They do not systematically seek the one beacon in the night storm that will tell them just how far they can improve their products and processes."* According to Foster, S-curves usually come in pairs. The gap (or the movement) between the pair of S-curves represents a technological discontinuity - a point when one technology replaces another. Rarely does a single technology meet all the customers' requirements and the many technologies compete with each other. This Foster's view on the technology development highlights the importance of the risk-taking in the business networks as without the risk-taking it might be hard to jump from one S-curve to another.

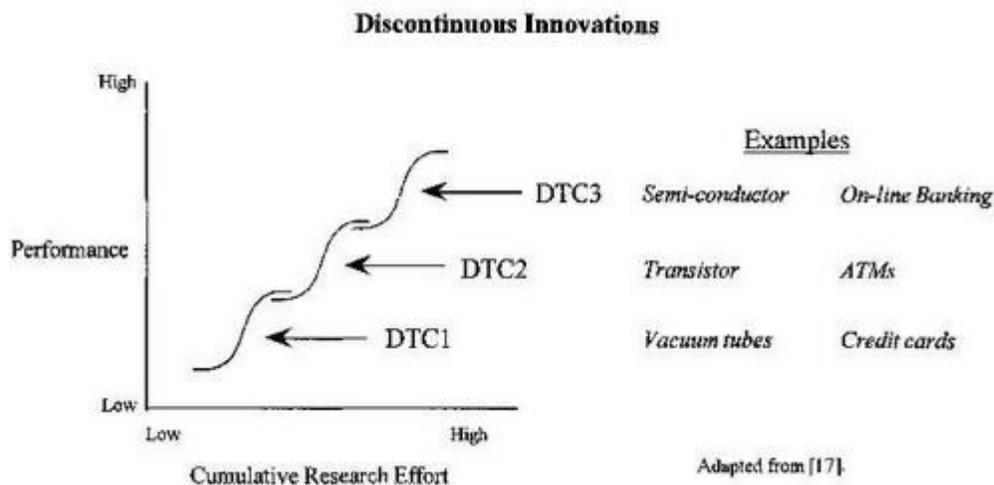


Figure 1: Foster's S-curve (Lambe & Spekman, 1996)

Despite the increased focus on innovation in the recent years, several gaps exist among our existing knowledge on innovation in business. The creation of an innovation ethos across company borders supporting entrepreneurial behaviour, related risk-taking and linking risk financing has not been covered properly in the existing literature. Against this backdrop, the purpose of this study is to identify and examine the critical concepts that are needed to understand risk-taking to refine innovations in a dyadic business relationship. This mapping concept can act as a tool for venture capitalist in their evaluation the potentiality of innovations. Accordingly, we try to answer the following questions: What are the concepts needed for future research? How can dyad relationships be classified by risk-taking? What further research could be done within this area?

To achieve this purpose, we collect information regarding innovation and associated risk taking in real-life cases in business-to-business contexts. Our cases include also breakthrough or would be breakthrough innovations (both business and technology) such as the business model of Marja Kurki, active loudspeaker, float glass, Benecol and Xylitol. Then we employ Domain Modelling method (Sommerville 2004; Pressman, 2004) to identify the key concepts from the cases, and then subsequently the identified concepts are further discussed in light of the extant studies. The identification of the concepts related to the problem domain from real-life cases creates the solid argument why the selected concepts are needed to be discussed.

By doing so, the paper contributes to IMP studies on dyadic relationships by discussing risk taking thoroughly in it while creating innovative products and business models. This aspect is relatively scanty discussed in this research discipline. Managerial contribution is built how should navigate in case working with innovation with their partners and how the third parties can recognise opportunities to help companies to come to the market with ideas by financing acting as a middle man. In our cases, financing was provided mostly by the dyad companies. It can be asked how the domain modelling of the risk taking can help third party financing actors in evaluating the potentiality of innovation.

The rest of this paper is organized as follows: we first explain the methods used to conduct this study, including details of the cases employed. Then the case-wide concepts, variables and analysis are

presented. This is followed by discussions on literature and possible further studies. In the last section, we discuss the findings further, and put forward the possible theoretical and the managerial implications of this study.

## **Methodology**

In this study, we applied the domain modelling method, which is a method of analysing and modelling real world entities and the relationships that exist between them. The entities and their inner relationships collectively forms and describes the problem domain space (Scaled Agile Framework, 2014). To apply the method successfully, we followed the study by Ruokolainen and Mäkelä (2007), which also used the same to create a domain model. The method is strongly inductive. From a case or cases the concepts ideas are identified. Secondly, these concepts are abstracted and finally these abstracted concepts are studied further with the help of the literature. It provides an innovative angle for this study and is helpful in constructing a deeper body of knowledge for the area of the risk-taking related to innovation in dyad relationships. To focus on describing concepts and constructing the domain model is a means of approaching the ontology of the problem area. Ontology is referred to here as the computer science term, which is derived from the same origin as the philosophical term. In computer science use, the term ‘ontology’ refers to a set of representational expressions that characterise concepts within a domain and the relationships between these concepts. Gruber (1995) describes ontology in knowledge engineering, as an explicit specification of conceptualisation, stating that what “exists” is that which can be represented.

“Domain analysis and modelling are used for producing models that include the concepts of that specific problem domain in the form of classes, attributes, and relations” (Ruokolainen and Mäkelä, 2007, p. 188). In its simplest form, a domain model presents only the vocabulary of the problem area under investigation. However, in more complex situations, which represent real-life scenarios, domain models can be created through application of several types of presentation diagrams, for example, such as state transition diagrams, dataflow diagrams, and domain models (Ruokolainen and Mäkelä, 2007). For example, an object-oriented method, Gen Voca (Batory et al., 1992), is used for hierarchical domain analysis and modelling. Similarly, class diagrams are used to describe problem domains through the application of Unified Modelling Language (Rumbaugh and Booch, 1995). In this study, we have applied to construct the domain model of risk-taking related to innovation in dyadic business-to-business relationships.

In addition to Ruokolainen and Mäkelä (2007), we also depend on Sommerville (2004) and Pressman (2004), who provide a clear guideline on how to perform domain modelling, albeit in the context of software engineering. According to these authors, a problem domain comprises real-world issues and concepts regarding to the problem that the system is being developed and directed to solve. Concepts and real-world issues that are self-explanatory, imprecise, signify meta-language, and do not belong to the research topic should not be considered to be modelled into the domain. Therefore, in our study, we identify the building blocks of the domain model with the help of real-life cases, which has been raised to a higher level of generalization and abstraction for the ease of conceptualization. The case research-inspired descriptive details raised in this paper demonstrate our main understandings into the phenomenon under investigation (Yin, 2009).

To identify and illustrate the main concept related to the domain under scrutiny, these researchers have used related details from eight real-world cases. Following the case selection guideline by Eisenhardt (1989), the cases are not randomly picked. Rather, these have been selected based on strict selection criteria set by the researchers, which are: (a) each case contains a dyadic relationship, (b) the context of the case is business-to-business relationships, (c) the participating firms are engaged in selling or purchasing innovative products or services, (d) the case clearly demonstrating a risk-taking or a risk-avoiding behaviour. The aim of sampling is to study the replication of the concepts in different types of cases. Accordingly, the following cases are selected (see Table 1).

**Table 1: Cases used for domain**

Case	Industry	Customer	Supplier	Offering	Type of Companies
First Case: Western Silk Products	Textile	Marja Kurki	Silk Fabric Producers	Silk fabric	Start-up Established Enterprise
Second Case: Information System Access	ICT	Nokia Siemens Networks	Service Provider	Information system	Established Enterprises
Third Case: Chat System	ICT	Nokia Siemens Networks	Service Provider	Chat system	Established Enterprises
Fourth Case: Active loud speaker	Audio Industry	Genelec	YLE	Active loud speakers	Start-up Established Enterprises
Fifth Case: Float Glass	Glass Industry	Pilkington	Triplex	Revolutionary manufacturing process	Established Enterprises
Sixth Case: Benecol	Food Industry	Raisio	Johnson & Johnson	Cholesterol lowering food	Established Enterprises
Seventh Case: Xylitol	Food Industry	Finnish Sugar	Hoffman-La Roche	Caries preventing food ingredient	Established Enterprises

We provide the relevant description of each case that will be used to address the purpose of domain modelling/concept validation in the next stage. Our sample of cases has two unique characteristics. First, as mentioned our cases included breakthrough innovations. Genelec is the leading firm in its global segment. Float glass is the only way to make flat glass. Benecol is sold as an ingredient for functional food worldwide and Xylitol is used as a sweetener in candies and chewing gums worldwide. Second, we do not talk in them third party financing. In one case, the active loud speaker, there is mentioned a local bank giving a bank collateral to entrepreneurs. In other cases financing was provided by the dyad companies. Basic information regarding the five selected cases is presented in Table 1.

## The cases

**The 1st case** – western silk products: Marja Kurki is a company that produces silk scarves and ties to consumers. Its sales exceeded €30 million in 2011, coming from Europe, China and Korea. Ms. Marja Kurki, who named the company after herself, described the start of her career as an entrepreneur setting-up a start-up company about 30 years ago. At that time, she had a strong vision of the need for colourful western-style silk clothes. The vision turned out to be an innovative business model. For her first designs she needed to import silk fabrics from a silk fabric producer, which was in China. She was not able to get a small quantity of a silk fabric to produce a small test batch from her start-up company's silk supplier, but was required to order a large amount of the fabric. The Chinese manufacturer did not consider her proposal for producing the small batches of silk for her needs. Their factories were designed to produce the large batches of silk fabrics. This would have caused her company to go into bankruptcy, if a disaster had occurred at market entry. However, the problem did not stop the entrepreneur from pursuing her dreams. Rather, Marja Kurki's vision turned out to be an innovative business model, as she started her own silk production business. Today, Marja Kurki is a company that produces silk scarves and ties to consumers.

The case described how the start-up company needed to take a risk before entering the market. In addition, it also tells about the relationship with a Chinese silk fabric manufacturer. The manufacturer was not ready to take risks, despite its new customer presenting an innovative business model at that time. We argue that they were unwilling to change its processes for an unknown and risky start-up, and thus were avoiding risks. The customer, on the other hand, was ready to take a risk and, therefore, the customer was risk favoured. This dyad relationship can be called a 'captive relationship' or 'customer risk-taking driven relationship', because any alternatives may not have existed; either they enter the market with their own risk or they do not take the risk at all.

**The 2nd case** – information system access: Nokia Siemens Networks (NSN) is a multinational company, established in 2007 from Nokia Networks and Siemens Communication. A supplier of NSN proposed to use its system, which was developed for IT shopping, to allow visitors to access the Internet. This idea was further enhanced by copying a concept used by Nokia. NSN's IT department was unwilling to take a risk allowing third-party users access to the system, although its risk was considered minimal. They considered that there were possibilities for misuse.

In this case, the customer was finally unwilling to take a risk to apply the solution that was further developed from the proposal of a supplier. The customer, NSN, in this case can be regarded as risk averted. This kind of dyad relationship can be called 'Supplier risk-taking driven relationship', meaning that a supplier takes all the needed risks. In an extreme case, a customer could use its position to squeeze extra benefits or information out of the supplier without any intention of cooperation.

**The 3rd case** – a chat system: The third case also involves NSN. The company was engaged in a joint innovation campaign with one of its suppliers. One of the ideas was to create a cross-organisational chat functionality to ease day-to-day communications between the customer and the supplier. A successful implementation was finally achieved incrementally by using ideas from both sides of the dyad. In this case, both parties were ready to renew the way they operate and take risks related to the new technologies. This kind of dyad relationships can be called 'business-opportunities driven relationship' or 'opportunities driven relationship'.

The major challenge to create and the implement of an inter-organizational chat system that were provided by Cisco and Microsoft was technology-related. NSN used Cisco's technology, and the supplier used the technology provided by Microsoft, which created the incompatibility of technologies between NSN and the supplier. Finally, after discussing several options, the companies agreed to start using a new platform for the ease of compatibility and implementation, Google's chat system, which was known to work together with Cisco's WebEx Connect. The latter part of the case makes it visible how risk-taking can dependent on third parties. We tag this latter part of the phenomenon as "dependent risk-taking".

**The 4th case** – active loudspeaker: In the mid-1970s, the Finnish Broadcasting company YLE was building a new radio house in Helsinki. Juhani Borenius, then YLE's acoustician, asked his friends, Ilpo Martikainen and Topi Partanen, if they could design an active monitoring speaker. Martikainen had already designed loud speakers and stereos. In two weeks Martikainen and Partanen, the later founders of Genelec a now globally known professional active monitoring speaker manufacturer from Finland, built the first prototype. It was far from the perfect speaker, but promising enough to raise serious interest within YLE and elsewhere. In early 1978, after two years of thorough R&D work in co-operation with YLE, the first speaker was ready. At that same time, Genelec was founded. In April 1978, YLE ordered 340 speakers from Genelec. YLE paid one third of the purchasing price when the order was placed. However, it required bank collateral for the prepayment from Genelec. The local bank financial took a risk by proving the bank collateral. (Genelec 2008:11-13, Uusitalo, 2013).

In this case, both parties were willing to invest in the relationship and the risks were shared between the parties, and even between the supplier and their bank. This relationship can also be defined as 'business-opportunities driven relationship'. YLE co-operated with Genelec after a prototype was introduced and took a risk by ordering the speakers. Martikainen and Partanen started the co-operation without knowing if any orders would be introduced by YLE. Genelec was established just before the order was introduced. The bank involvement as a risk-sharer exemplifies that a risk can be recursively shared further in that partner's network. It can be called 'recursive risk-sharing' in the business network context.

**The 5th case** – float glass for safety glass: In the 1950s, Pilkington, a UK-based flat glass manufacturer, developed a new method of manufacturing high quality flat glass so-called 'float glass' to replace plate glass. The difficulties and costs in the production of plate glass were well known in the industry. The fixed capital and operational costs of a plate glass line were enormous. The line was also noisy and it provided a lot of dirty grinding powder. Pilkington wanted to test the new float glass as the raw material for safety glass without anybody knowing. Here, they had problems. It was difficult to sell large amounts of float glass to save money, and test acceptance without premature fuss. On this, Pilkington approached some of their good customers and, with the help of Triplex Safety Glass, Pilkington gradually introduced float glass as a safety glass (and to the car manufacturers) without anyone knowing the difference. The float glass process was announced to the world in January 1959. "One thing we were good [at] was security," said Sir Alastair Pilkington, the inventor of float glass. "People easily fail to understand that the greatest secret about a new process is not how to do it, but it can be done". The process was a complete surprise to the industry. Float glass revolutionized the completely flat glass industry in the 1960s and the 1980s. (Uusitalo, 1995).

The market entry risk was minimized as the new material was tested in silence. If the test had failed, it would have revealed that the ordinary glass process had problems and that the problems had been fixed

by now. Moreover, nobody would have got the knowledge of the new concept tested. In this case, the risk-taking was hidden from the market. It illustrates one nature of the risk-taking – risk-takers might not be willing the share of their plans to any third parties. In this case, Triplex Safety Glass took the risk and they tried to minimize the impact of the possible failure. This dyad relationship can also be categorized under the heading ‘customer risk-taking driven relationship’

**The 6th case** – Benecol: The cholesterol-lowering effect of plant sterols was known as early as the 1950s, and since that time scientists all over the world have studied plant sterols and their properties. In the late 1980s, Raisio, a small Finnish food manufacturer, developed a manufacturing process to turn plant sterol into fat-soluble stanol ester, suitable for food production. The findings of the three-year clinical stanol ester study were published in a prestigious scientific journal in 1995. At the same time, the first product, Benecol margarine, was launched in Finland. The international press followed Raisio and Benecol very intensively. In the spring of 1997, Raisio was overwhelmed with co-operation offers coming from all over the world. The company was in doubt about whose offer to accept. In 1997-98, Raisio signed an agreement with the US-based Johnson and Johnson group. The company got the sole right to use the Benecol trademark and patents in global markets. Johnson and Johnson introduced the first products in the U.S. in the spring 1999, one year later than planned. Later on, the worldwide agreement was cancelled since the sales did not grow as planned. Moreover, Benecol was just one product in the Johnson and Johnson huge portfolio (Uusitalo and Grønhaug, 2008).

In this case, the supplier, the company Raisio, took all the financial risks based on the expectations of high revenues. The customer, Johnson and Johnson, did not need to share risks because of the one-sided licensing agreement proposed to the company by Raisio. Raisio probably believed in the power the new invention, Benecol, after its introduction won vast amount of publicity. Through this case, it is seen that risk-taking can be driven with a vast amount of hype, meaning that one of the parties takes a risk not related to its real value of the innovation. This dyad relationship can also be called ‘Supplier risk-taking driven relationship’ as the supplier takes all the needed risks. In 2014, Raisio bought the Benecol businesses in the Great Britannia, Ireland and Belgium from Johnson and Johnson. In the US Johnson and Johnson continues as a licensing partner, but Raisio has all rights to Benecol globally for the first time since 1997.

**The 7th case** – Xylitol: xylitol is a good-tasting bulk sweetener that is lower in calories and dentally safe (reduces the development of dental problems, i.e. cavities). The manufacturing process of it was difficult and expensive. Finnish Sugar, a Finnish sugar manufacturer, created the manufacturing process for xylitol in 1970. The same year Finnish Sugar together with Institute of Dentistry at Turku University started clinical research with xylitol. Hellas, a local candy and chewing gum manufacturer joined the group. Hoffmann-La Roche, a giant Swiss drug maker, also co-operated within the study. In 1974, the production of xylitol started in Finland. In 1975, Hellas launched the first xylitol chewing gum, Xylitol Jenkki, both in Finland and in the U.S.

In 1976, Finnish Sugar created a joint venture with Hoffman-La Roche for the production and marketing of xylitol. The FDA, the U.S. drug administrator, had permitted the addition of xylitol to marmalade and jams in 1963. In 1977, after having discovered tumours in the long-term toxicological tests of xylitol with several animals, the FDA regarded xylitol as a cancer-causing agent. The National Caries Program cancelled its plans to carry out a xylitol chewing gum in the U.S. The leading chewing gum manufacturer, Wrigley, withdrew also from xylitol research program. After several tests in the early 1980s the FDA concluded in 1986 that xylitol was safe for human use. At the same time

Hoffman–La Roche lost its interest on xylitol and the joint venture with Finnish Sugar was over. Finnish Sugar bought the company out from Xyrofin.

In this case, both the supplier, Finnish Sugar and the customer, Hoffman La-Roche took the financial risks by creating a 50-50 joint venture, Xyrofin. This was the first 50-50 joint venture of Hoffman La-Roche. In all others it had a majority share. This illustrates the interest of Hoffman La-Roch in Xylitol. This dyad relationship can also be called ‘Opportunity driven relationship’ as both companies take the needed risks.

### **Case wide analysis: Concepts and variables identification**

Based on the cases, we now identify and map the case-wide concepts, as well as the key related variables for the classification of dyadic relationships in relation to risk taking in innovation. All seven cases are employed to gain a deeper understanding of the concepts and attributes, and to create a taxonomy based on the identified concepts.

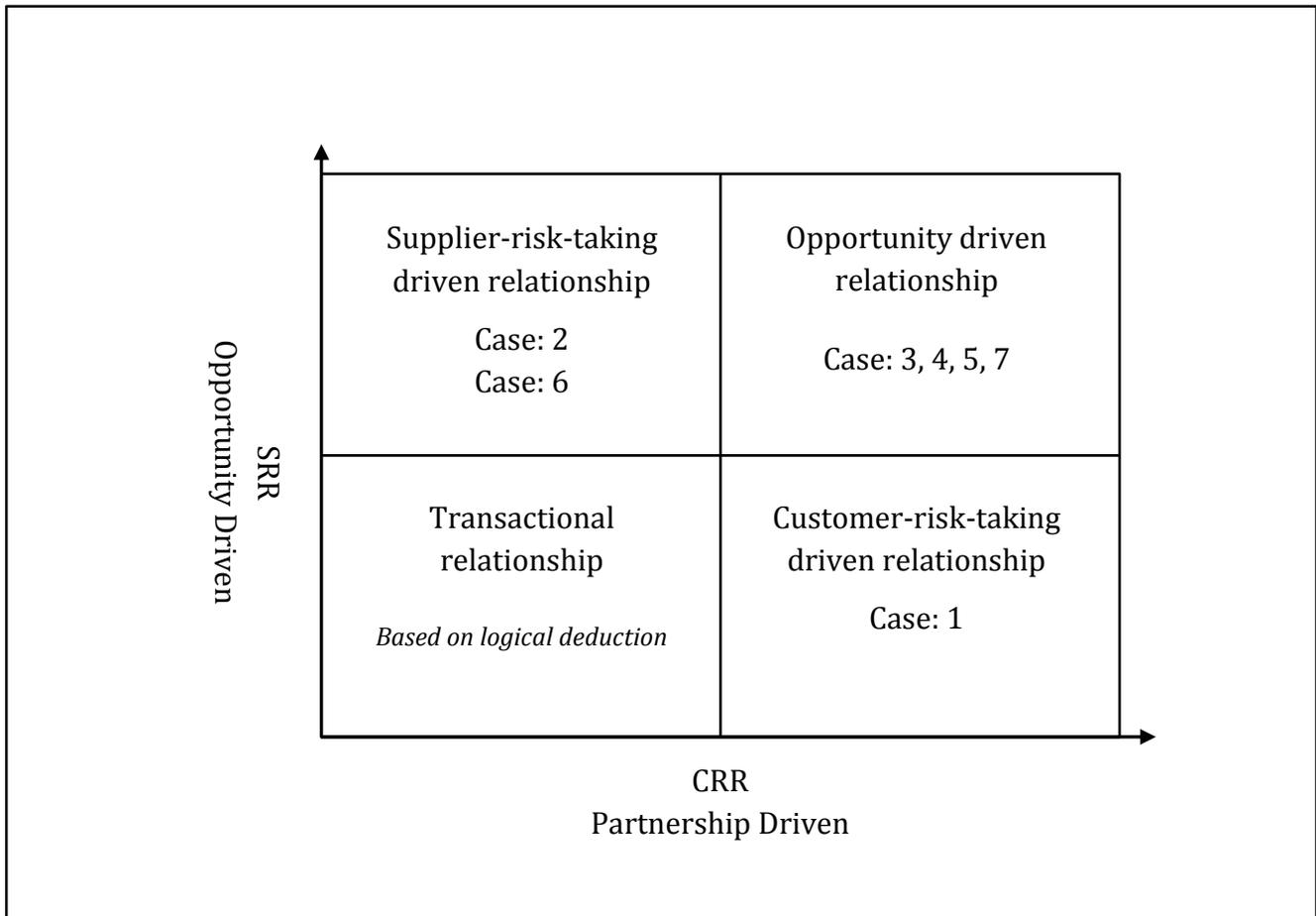
The first concept, as well as a variable, concerns the customer’s readiness to take risks in a dyad relationship. In the first case, the customer was ready to take a significant risk and thus it can be said that its risk-taking readiness was high. In the second case, the customer was unwilling to take a risk and thus the company risk-taking readiness was low. This variable can be called Customer Risk-Taking Readiness (CRR). It can be argued that in the partnership mode, where trust is expected to be in place, customer risk-taking readiness is higher. Therefore, it can be further argued that CRR is partnership driven.

The second concept, as well as the related variable, concerns a supplier’s readiness to take risks in a dyad relationship. In the fourth case, the supplier was ready to risk and to pay all related costs, and, therefore, its risk-taking readiness can be regarded high. In the first case, the supplier was not ready to take any risks, and therefore, the supplier’s readiness to take risk was low. This variable can be called Supplier Risk-Taking Readiness (SRR). The motivation for the risk-taking capability of the supplier could be the business opportunity available. If the opportunity can be regarded as rewarding, the supplier will be more willing to take risks. Thus, the SSR can be regarded to be opportunity driven.

The product of these two variables describes a dyad relationship’s risk-taking capability (DRRC). The classification of the relationships is described in Figure 2. With the help of the variables, the 2x2-matrix (see Figure 2) can be formed as described. The 2x2-matrix includes the following quadrants:

- (1) Transactional Relationship, describes the cases in which neither of the parties is willing to take risk;
- (2) Supplier Risk-Taking Driven Relationship, describes that only the supplier in a dyad relationship will take risks;
- (3) Customer Risk-Taking Driven Relationship, means that the risks are more or less solely taken by a customer; and
- (4) Business-Opportunities Driven Relationship, means that the risks are shared in the dyad relationship.

The seven dyad cases described previously can be located easily in the 2x2-matrix based on the discussion in each of the case: the cases one and five are customer risk-taking driven relationships; the cases two and four are supplier risk-taking driven relationships; and the case three is opportunity driven relationships.



**Figure 2: Dyadic relationship matrix in regards to business organization’s readiness to take risks to innovate**

## Literature review on the concepts

Next, we discuss the concepts, related to risk taking in regards to innovation in dyadic relationships, which were identified through the cases. The concepts are summarized in Table 2.

According to Gosselin and Bauwen (2006), the commitment level of a relationship can be measured by two variables: relationship proneness and competence development proneness. They measure to what degree the two parties are committed to each other. The commitment to each other is called Strategic Congruence. This study discusses how much each party in a dyad relationship is willing to take a risk in order to gain potential business benefits. Therefore, we measured CRR and SRR in a dyad relationship. This study demonstrates that the commitment level between the actors can be analysed from a different perspective: the mutual commitment to the potential of future businesses rather than the current relationship. We propose to name the output of these two variables as Risk-Taking Congruence.

In this study, we have divided the dyad relationship into the following categories: Business-Opportunities Driven Relationship (BODR); Transactional Relationship (TR); Customer Risk-Taking Driven Relationship (CRTDR); and Supplier Risk-Taking Driven Relationship (SRTDR). We share Gosselin and Bauwen's (2006) view of the instability of a relationship if one of the parties' commitments is missing. In the Business-Opportunities Driven Relationship, mutual commitment to take a risk exists. Both sides see a business opportunity and they are willing to commit to taking risks. We named the lower-left corner as Transactional Relationship, as neither of the partners proposed risk-taking.

A number of the concepts related to risk-taking identified by this study like Dependent, Recursive and Hype Risk-takings have been addressed scantily by the literature. However, in a general level, for example, Zahra (2006) proposes that incompetence in risk-taking can lead to strategic simplicity. It is assumed that the transactional relationship could die, as there are no forthcoming opportunities to feed the businesses. This was also found by Araujo et. al. (1999). Future qualitative studies could concentrate on how the risk-taking culture affects the profits of companies in the different categories proposed in Figure 2. Do those dyad relationships that rely on mutual business opportunities produce more sustainable incomes in the companies than the others in the quadrant?

Risk-taking readiness can be related to informal and formal cooperation. Informal cooperation is based on trust developed through social exchange. This can be attained only over time, where the parties experience that the other party is trustworthy. In the case where both parties trust each other, risks can be assumed to be shared more easily. In informal cooperation, business comes first and visibility later if ever, whereas in formal cooperation, visibility comes first and business later, if trust can be developed. Formal cooperation does not always lead to real cooperation, and real cooperation is often not visible. Informal cooperation is developed by those who are directly involved in the business exchanges between companies, such as line managers at the middle organisation level. Formal cooperation, on the contrary, is usually established at higher management level (Håkansson and Johansson, 1988). In formal cooperation, the parties are interested in illustrating the presence or intended presence for the counterpart.

Webster (1992) has discussed the range of a marketing relationship. He divides the evolution of the relationship into seven phases. Figure 2 might describe the maturity of the relationship, for example, in

the early phase the relationship is transactional, as Webster describes. The present study also further contributes to discussions on the development of the Buyer-Seller Relationship (Ford, 1980). One of the variables related to the development of this relationship concerns uncertainty in the relationship: the uncertainty indicates that either seller or buyer or both ones need to take risks. The phenomena can be called Risk-Driven Evolution of the dyad relationship.

Previous studies propose that managers in established companies are risk averse, while entrepreneurs are risk-takers and innovators (Busenitz and Barney, 1997). Based on that, a study could be conducted on whether business networks that mainly consist of big companies differ from networks that consist mainly of small companies, from the perspective of risk-taking. In other words, can it be concluded that entrepreneurs who have networked with each other produce more innovative solutions, than their counterparts in the large enterprises do?

Drucker (1985) states that while many of the major innovations have not come from big companies those organisations still have a significant role to play in developing technologies. Larger companies might have tendencies for more formal cooperation than SMEs: it might mean that the networks consisting from small companies are more innovative. This phenomenon can be called Risk Intensity of the Business Network.

**Table 2: Identified concepts**

<b>Concept</b>	<b>Source</b>	<b>Discussion in the literature</b>
Customer Risk-Taking Readiness	Cases 1 and 2	Gosselin and Bauwen's (2006)
Supplier Risk-Taking Readiness	Cases 2 and 4	Gosselin and Bauwen's (2006)
Transactional Relationship	Logical deduction	Gosselin and Bauwen (2006)
Supplier Risk-Taking Relationship	Case analysis of this study	Gosselin and Bauwen's (2006)
Customer Risk-Taking Relationship	Case analysis of this study	Gosselin and Bauwen's (2006)
Business-Opportunity Driven Relationship	Case analysis of this study	Gosselin and Bauwen's (2006)
Dependent Risk-Taking	Case 3, 7	Not addressed directly; risk taking in discussed Zahra (2006) and Araujo et. al. (1999)
Recursive Risk Sharing	Case 4	Not addressed directly; risk taking in discussed

		Zahra(2006) and Araujo et. al. (1999)
Hidden Risk-Taking	Case 5	Not addressed directly; risk taking in discussed Zahra(2006)
Hype Driven Risk-Taking	Case 4	Not addressed directly; risk taking in discussed Zahra(2006)
Sole Supplier Driven Risk-Taking	Case 5	Discussed by purchasing literature
Informal or Formal Relationship	Case	Håkansson and Johansson (1988)
Risk Driven Evaluation of the Relationship	Case 4	Ruokolainen (2008)
Risk Intensity of the Network		Drucker (1985)
Risk -Taking Congruence	All cases	Gosselin and Bauwen (2006)
Dyad Relationship's Risk-Taking capability	All cases	Håkansson and Johansson, (1988);
Risk-Driven Evolution of the dyad relationship	Case 4	Ford, 1980; Webster, 1992;

## Conclusion

The research question was raised: what the concepts would be needed for further studies? This study was able to identify a number of concepts related to the current research topic, and thus it explained the concepts in the current problem domain (see Table 2). The literature was reviewed, and an extension to the existing studies concerning dyadic relationships was proposed. In the analysis of the concepts illustrated by the sample cases, this study was able to demonstrate the common concepts across the company cases' borders by creating a 2x2-matrix. They were explained the matrix's axis and the meaning of each quadrant. It was able to locate the company cases into the 2x2-matrix through careful analysis. Table 2 illustrates the proposed concept, their source and if and how they are addressed in the literature. This paper proposes a number of studies that could concentrate on creating new knowledge on the top of the existing research.

Table 2 demonstrates that there are a number of concepts that are scantily discussed in the literature related to this study's problem domain, and discussion part of this paper identified research gaps in the current literature in this study's topic. The concepts and analysis method proposed here need further

investigation and development. It is important to understand how risk-taking to related innovation can be studied further systematically in business networks especially to make networks innovative. Our study paves the way for the further studies of this under-researched topic.

According to Håkansson (1987), innovation is the interplay of knowledge between the actor's ability to apply that knowledge in practice, using the knowledge by mobilizing resources, and coordinating these resources between actors with an efficient combination of firm-specific technological capabilities. However, taking risks and sharing risks can be a quite important part of the innovation process. Håkansson's (1987) definition of innovation does not describe, how companies agree to the employment of these resources and capabilities, which can include taking risks alone or sharing them. In general, in the Industrial Marketing and Purchasing field the focus of the studies have been on how to acquire, manage and develop technologies within the framework of permanent business relationships (for example, Ford et al., 2002).

We would like to propose that innovation definitions should also have an element concerning the capabilities of taking risks, sharing them and agreeing related profits in a business network. A good example of this is a risk sharing in a business network situation, where the companies agree about the fair share from the market price for each other, which is used in a Japanese Keiratsu model. The other option would be that every actor adds its own costs on the top of others' costs and, thus, out-priced the innovation from the market. The risk-taking in a network can be called business networks' innovation, as the shared risk-taking is an essential part of the new business created.

### **Theoretical implications and suggestions for future researches**

This study introduced taxonomy to classify risks in a dyadic business relationship in a case that the innovations were introduced. It also linked that to third party financing. This taxonomy has not been introduced prior to this study and, thus, the study contributes to the extant knowledge of marketing and supply management research disciplines. The taxonomy and the concepts introduced by this study help study the topic more profoundly. The risk taking has been considered as of the main characteristics related to innovations. The study increases the understanding of the risk-taking in dyadic relationships, thus, paves the avenue to discuss in several future studies also in business networks.

A previous study (Ruokolainen, 2008) proposes that start-up technology companies create a significant risk for their customers if they deliver complex products to the business-to-business market. Start-up technology companies employ their existing relationships to find their first customers. In the active loudspeaker case (case 4) between YLE and Genelec, the importance of the previous personal relationship was clearly visible. The existing relationship can be employed to gain a mutual commitment in case a risk needs to be taken. Are risks lowered if a personal level of trust exists? Further studies could explore these.

The termination of business relationships has received considerable attention recently (Alajoutsijärvi et al., 2000; Giller & Matear, 2001; Gedeon et. al., 2009; Havila and Tähtinen, 2011; Tidström and Åhman, 2006). The reasons for business relationships to end vary greatly. We identified the inability to take risks as a potential reason for relationship termination. However, the ability taking risks or the inability of taking risks has not been mentioned in the relationship ending literature. The present study

suggests this as one reason for business relationship termination. On the other hand, what keeps a business relationship alive? Is it the ability to take risks?

Can the risk sharing be also difficult in a formal relationship? Can formal relationships focus solely to minimise risks? The messages of formal cooperation can also be directed at competitors (“this market is not for you”), suppliers (“supply us; we are the leaders”) or suppliers of complementary products (“our systems are worth developing”). Similar remarks can be aimed at other stakeholders. Informal cooperation is used when the parties are interested in business with the counterpart’s network without visibility, which may prevent potential moves by competitors. Companies with a strong position usually use formal cooperation, while weaker companies seek informal cooperation. Seeking the strong position can lead that counterparty to take all the risks. The informality and formality of the relationship could be considered for further research. In the cases in this study, it was seen that the either a supplier or a customer took risks unilaterally, which lead to failures in practice (see example cases 4 and 5).

The different actor size in the dyad is interesting matter. In two cases (Benecol and xylitol) the suppliers were small while the customers were large global firms. Both dyads were unsuccessful although the risk maps were different. In Marja Kurki’s case (case 1), the supplier was large and customer small. This case was successful as well as the dyad between Genelec, a start-up, and YLE, an existing large company. Again, the risk maps were different. It would be interesting to look at what else we have to take into account.

It would be interesting to study if risk-taking would have any effect on the speed of the evolution of the relationship from the Markets and Transactions phase to the Buyer-Seller Partnership phase as described by Webster.

### **Managerial implications**

The classification of risks helps venture capitalists to evaluate the potentiality of a business idea. For example, if the risk balance were totally unilateral as in Benecol's case (case 6), the classification would help the third party financier to evaluate the business potential critically. The hype in Benecol's case was created by the stock market analysts who do not have hardly anything to risk. The third party financier must be more careful to invest in that kind of business.

Last month in Monaco, Finnish company Toroidion unveiled the 1MW Concept, a completely Finland-designed-and-built supercar. The car has one megawatt output (1,341 hp). Each wheel has its own motor, with two 200- kilowatt motors in the front and two 300-kilowatt in the back. Given that electric motors produce 100% of their torque at zero rpm, Toroidion is expected to be fast off of the line. The 1MW is built on a new unique powertrain model, one that is designed to be scalable for different applications, implying both racing and street versions to come. The power train model has been kept very secret just as float glass discussed earlier (Gibson, 2015). It seems that Toroidion illustrates a solution in the next S-curve (Foster, 1986). Can the taxonomy that was introduced by this study (see Figure 2) help Toroidion to select a business partner?

In order to complete this study on the 2x2-matrix (see Figure 2), we also need to understand the strategic movements that the management can employ in practice. In this context, it can be generally

said that companies make their strategic movements based on their own status and their relationship with a supplier. Basically, the unstable situations exist in the up-left corner and the low-right corner (see Figure 2). The unstable situations represent the possibility of the business discontinuance. The possible options that company management can do in these cases are listed below.

There three options for the downright corner as follows:

1. As in Marja Kurki's company case (case 1), companies can accept the situation and take an extra risk of facing insolvency. This means that there is no immediate change in a dyad relationship. In long run, the relationship can be switched to transactional.
2. The other option is to end the existing dyad relationship with the supplier in question and to find a new supplier with whom a mutual risk-taking relationship can be built. In this case, the switching costs should be considered.
3. One of the options is to make a relationship-building effort to reach mutual benefits, if the risk taking is too unstable to be considered. This proposes that the relationship is switched to be in the upper right corner.

In the case where the supplier is willing to take risks, but the customer is not, the options could be:

1. The supplier can terminate the trial to build a partnership with the existing customer and search for a new customer.
2. The supplier can try to further negotiate and invest in the relationship to gain an improved position. The aim is to change the relationship to offer business opportunities for both sides.
3. The supplier can accept the situation and not search further new opportunities. The relationship in a long run is needed to be switched to transactional.

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