PERFORMANCE/ BENCHMARKING CHAINS AND NET-WORKS

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Abstract

In this paper a study is presented that had as goal to develop a management instrument (benchmarking)for co-innovation projects on basis of a set of performance indicators for chains and net-works of firms. To base the indicators on a sound basis relevant theories were studied, like industrial economics, resource-based theory, marketing theory, net-work theory and also specialised theories related to flexibility, innovation and quality care. Thereafter a framework was developed. The framework consist of a quick scan of performance measurement and comparative benchmarking to get a global idea of the possible improvements. For the aspects that need to be improved a more fine tuned approach is the measurement of performance related tot the different processes and a benchmark thereof. In the fine tuned part of the framework we distinguish capacities, realisation and perspectives. The quick scan part is used to get a global idea of the performance of different apple chains in The Netherlands, France and New-Zealand. It appeared to be a useful approach to get an idea about the performance of different chains with help of desk research and published information. Finally, some conclusions are drawn.

Keywords: performance, benchmarking, chains, net-work

1. Introduction

The purpose of the research discussed in this paper was to develop a management instrument for co-innovation projects (to be used in practical situations) on basis of a modular approach to measure performance and to make benchmarking possible of chains and net-works. The instrument has to give a set of relevant performance indicators and the factors that are of influence on the performance. This means that besides measuring also understanding, explaining and managing performance was of interest.
A number of trends in the business environment have stimulated the application of external net-works and chains as an organisational form. Vertical co-operation in chains is used to develop new products, to reduce costs and risks, to obtain knowledge and to respond more quickly to customers requirements. Horizontal co-operation in net-works is used to meet the challenges of changing demand, increased competition, swift technological change and internationalisation.
On theoretical grounds like transaction cost economics (T.C.E) and the theory about social capital these types of external organisations are expected to have a positive influence on the results of chain and net-works. However the measuring of the results of chains and net-works, the performance has been neglected thus far. There are methods available to measure the performance of a firm (f.i balanced score card), an industry like poultry (the Porter approach) and on a macro level. Without a method to measure and determine the performance of chains and net-works it is also difficult to manage the alliance.
The standard approach for measuring the performance of firms and industries can not be used for chains and net-works. Because the co-operation in chains and net-works is only used for a part of all the activities of a firm. This implies, that new data related to the chain or the net-work has to be assembled and that available information for firms and industries has to be decomposed. Besides this aspect also the goal of the chain and net-work is of influence on the measuring of performance. The purpose of the co-operation may be diverse. It can be oriented

to flexibility in order to respond to changes in consumer demand, or to the development of new products, to guarantee the quality or safety of the products etc.
In this paper in paragraph 2 the theories that may be used to develop a method to measure performance in chains and net-works are discussed. In this part theories on the micro, meso and macro level will be discussed. There after the outline of a new approach to the measuring of chain and net-work performance will be given in paragraph 3 and its possible use in benchmarking illustrated. In paragraph 4 the results of a first case-study will be described. The case was based on 4 apple-chains in 3 different countries. In paragraph 5 a number of conclusions and interesting remaining research questions will be given.

2. Theoretical concepts

The changes in the market that have resulted in the application of external net-works and chains makes it necessary to measure the performance on a number of aspects and not only on profitability. In our research project we decided to measure the performance on the following points: profit, innovation, flexibility/ responsiveness, quality maintenance systems and logistics. We performed a broad survey of the theoretical literature on performance and benchmarking to provide a sound theoretical background for our framework. In the survey we concentrated on the aspects around profit, innovation, flexibility/responsiveness and quality care systems. In this paragraph we present a short review of the treatment of performance and benchmarking in several disciplines. These theories mostly deal with performance on meso and micro level, because that are the levels where chains and net-works are found.

Neo-classical approach
In neo-classical economic theories the performance of firms, industries and countries are mainly measured and compared through efficiency[1] and effectivity[2] indicators (Bunte, 1998).

Industrial economics
In the general concept of industrial economic theory (Scherer and Ross,1990) the performance of an industry is the result of the basic conditions with respect to demand and supply and the market-structure (number of firms, location, concentration, entry barriers etc.). These factors determine the possible conduct with respect to competition that on his turn determines the performance (efficiency, profit, etc.). The external situation and governmental policies are considered as given in this approach.

Porter (1980, 1985) has further developed this theory to a theory of competitive advantage. He distinguishes two basic types of competitive advantage; low costs or differentiation. These advantages are based on five competitive forces: the entry of new competitors, the threat of substitutes, the bargaining power of buyers, the bargaining power of suppliers and the rivalry of existing competitors. The sources of competitive advantage is according tot Porter based in the value chain, which desegregates a firm is his strategically relevant activities. He distinguishes the following primary activities (inbound logistics, operations, outbound logistics, service, marketing and sales) and four support activities (firm infrastructure, human resource management, technology development, and procurement).
The value chain of the firm is embedded in a larger stream of activities that Porter calls the value system. These vertical linkages are frequently overlooked. However, gaining and sustaining performance depends not only on a firms value chain, but how the firm fits in the

[1] The indicator is based on the relation between output and input.
[2] The effectivity indicator measures the relation between output and target

overall value system. The performance of a firm, chain or net-work can be improved by co-ordination and co-operation between chain and net-work members. Both product (logistics) and information flows are crucial.

The resource-based theory
This theory (Rumelt, 1984) defines a firm's performance by a bundle of unique resources and relationships. These resources and relations has to be adjust and renewed as time, competition and change erode their value. This is the main task of general management. These resources must be combined in such a way, that the firms position is different in the eyes of the buyers (like better quality, lower price). To lead to sustainable above normal profits the resources must be valuable, rare, not perfectly imitated and not be substitute easily.

Hamel and Prahalad (1994) have state that it is not enough to build on your existing core competence or make a new combination of existing core competencies, but you have to create the core competencies that you expect are necessary to compete in future.

Marketing.
In recent marketing literature performance is dependent on the market orientation of firms or industries. A market orientation includes (1) the systematic gathering of information on customers and competitors, both present and potential, (2) the systematic analysis of information for the purpose of developing market knowledge and (3) the systematic use of this knowledge to guide strategy. A better performance is achieved through product differentiation, product innovations, quality, service or suitable product range. Hunt and Morgan (1995) argue that there may be great ambiguity as to precisely what attributes are making the product perceived to be superior. Furthermore ambiguity may exist as to the resources which are used. Another argument is the presence of a tacit dimension in implementing a market orientation effectively.

Net-work theory
In the net-work approach (Håkansson, 1989) an organisation is seen as functioning in a net-work of relations with buyers, sellers, partners, governments etc. The nature of these relations can differ. Håkansson distinguishes three basic variables in a net-work, namely, actors (persons that fulfil activities or manage inputs), activities (transformation and transaction activities) and inputs (physical, financial or human). Between the actors a mutual relation is present. This relation is characterised by his content (what is exchanged), nature (strengths and quality of relations) and structural (internal and external)aspects. The social structure of the net-work is an important factor for the behaviour of firms. The components of the social structure are trust, information exchange and common problem solving methods.

Flexibility
Volberda (1992) sees flexibility of firms as a organisation and management problem.
The flexibility potential is determined by the aspects technology (routine/non-routine), structure (mechanistic/ organic) and culture (conservative/innovative). The desired flexibility is determined by the turbulence in society and markets like dynamism, complexity and unpredictability. The actual flexibility is a result of the potential flexibility and the procedures activated by management to reached the desired level of flexibility. This may be a mix of operational (routines), structural (organisational adaptations) and strategic (related to the goals of the firm) aspects.

Innovation

Innovation is seen as an investment (Scherer and Ross, 1990). In Cobbenhagen (1999) the results of a pair wise comparison of firms are published. The research confirmed the existing ideas about innovation. Cobbenhagen based its research on the theory of the resource based school. In this theory resources and capabilities are important. Capabilities which are heterogeneous, not materialised, not or badly transferable, firm specific, resource-based and related to central qualities of the firm form the basis for his performance. The theory further assumes that society and markets can be influenced by the firm. A successful innovative firm has in internal "locus of control". This locus takes its own position as a starting point and presumes success can be forced, It also enables persons to learn more and faster from external knowledge and to indicated what knowledge is needed. Finally it makes better choices. In this theory the firm is considered a bundle of separate units. For chains the findings of Cobbenhagen's research result in the organisation of innovation teams which are multidisciplinary and in which persons from different firms in the chain are taking part. Innovation in chains is there for depending on processes, outputs and surrounding of the chain and of the inputs, processes, outputs, capacities and surrounding of the firms that are part of this chain.

Quality care

Total chain quality care is the part of a total management task that is decisive for the formulating and realisation of the quality policy of the chain. It gets a usable form in a chain quality system, which are the organisational rules, responsibilities processes and resource available for realisation quality care at chain level. However, the model is not validated, the performance is measured via the intensity of co-operation. To evaluate the chain quality system a reference model is developed Dutch quality Price (Nederlandse kwaliteitsprijs) (Hardjono et al, 1996). In this model are distinguished organisational aspects (capacities) and results (realisation). The organisational aspects are leadership, personal management, strategy, resource management and process. The aspects of the realisation are: valuation by personal, customers, society and the results of the enterprise.

Conclusion

The survey of the literature gives the following key-elements of performance. The neo-classical theory focussed for a long time on costs as the main determinant of performance. In industrial economics the structure, conduct performance model was long time leading. Porter gives a broad overview in which activities directed at low-costs or a differentiation strategy are important. Furthermore, vertical linkages (value

Theory	Key elements	Relevant aspects for performance measurement
Neo-classical theory	Relative costs differences caused by differences in labour productivity	Costs, Productivity, economies of scale, efficiency and effectiveness
Industrial economics	- Scherer and Ross (1990) Structure, conduct performance model - Porter 80/85 Strategy (low costs or differentiation), the competitive forces, the value chain (nine strategic activities create value by using purchased inputs, human resources and technology), the value system (co-ordination and co-operation, product flows, information flows)	Basic conditions, market structure and conduct. Strategy: low costs or differentiation The value chain: nine strategic activities create value by using purchased inputs, human resources and technology The value system: co-ordination and co-operation, product flows, information flows

The situation for the different varieties is almost the same. The costs of Braeburn are relatively high, but they sale high quality to and this variety is sold to countries on the Northern hemisphere when they don't have apples of their own. The production costs of Elise and Elstar are relatively high, but this is compensated by a very efficient logistical system. The cost price of Gala is relatively low because the production scale is large, while the distribution system is less efficient as that of Elstar and Elise.

Innovation and responsiveness
In France relatively less new varieties are developed then in New Zealand and the Netherlands. In new Zealand new varieties are the strategy to get a competitive advantage and to compensate for high distribution costs. In the Netherlands there is a permanent search for varieties that are adapted to the less good growing conditions in this country.

Care.
Everywhere we see the growing importance of production that is in accordance with the demands of buyers for instance the Eurep/gap norm of the European supermarket organisations. Every producers will have to meet these norms in future. In the Netherlands and New Zealand we see in addition an orientation towards environmental friendly methods of production while in France the use of quality marks is more common

Figure 3. The scores of the different apple chains on performance indicators

	NL-Elstar	***NL-Elise***	***Frankrijk-Gala***	***NZ- Braeburn***
Market results	***	****	****	*** (relatively high distribution costs)
Operations	***	***	***	***
Innovation and responsiveness	***	***	**	***
Care	*** (stress on MBT 1)	*** (stress on MBT)	*** (stress on quality marks)	*** (stress on tracing en tracking)

1.) Environmentally friendly production methods
Legend: The more points the higher the score (Source: LEI on basis of different information)

This case study underlines that all chains and net-works do have strong and weak aspects. This makes summarisation of performance in one score not a useful approach. Besides that not all clients have the same demands. The may differ in appreciation of the same performance score. The quick scan method gave signals of the weaker aspects of the different chains and net-works. This means it is a just instrument to determine on which aspects the process benchmark has to concentrate. A problem is that in public sources only a few figures about chains and net-works are found. This means that collecting data from chains directly or from experts with help of inquiries is necessary. This demands a lot of time. The alternative is to use data for the whole industry.

5. Conclusions

1. The competitive position and power of firms, chains and net-works are only in relation to that of others of interest. In this paper a method is discussed to determine the competitive position. However, of more importance are the reasons for a certain position and the possibilities to improve. The developed quick scan methods give the essence of this approach. The deeper analysis with help of process benchmarking is only given in the form of list with relevant aspects.

2. The case study made clear that in public sources hardly any information about chains and net-works is found. A further complication is that firms can participate in different chains or net-works. This situation results in the necessity to process the data available to information about the study object. However, this may not result in a very expensive instrument.

3. The study of relevant literature made clear we had to distinguishes between capacities and realisation. It also gave a number of relevant items and indicators and underlined our idea to choose for a multidimensional measurement of performance. Beside that it also stressed the need for adaptation to quick changing situations and thus for learning capacities of organisations. Finally, it made clear that the importance of the different aspects has to be weighted in relation with the strategy of the chain.

4. The method developed will be used for chains and net-works. Therefor the aspects that can not be influenced by chain or net-works and are the same for all chains and net-works studied are not taken into account. The approach is therefor not suited to determine the impact of the government on the competitive power of chains and net-works.

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