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# MEASURING AND ANALYSING THE EFFECTS OF M&A'S ON INNOVATION IN THE AGRI-FOOD INDUSTRY

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Allard Höfelt

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## Management summary

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While many academic and managerial studies on Mergers and Acquisitions (M&A's) have focused on the effects on performance, only a limited number of scholars have as yet studied the impact of M&A's on the innovative performance of companies. However, an increase in a company's capabilities to innovate can lead to substantial benefits, not only to the company itself but also to consumers. So far, the studies that have looked at the impact of M&A's on innovation offer divergent conclusions. A recent study of Batterink may be the most extensive study into this field so far, but many gaps knowledge remain to be filled. Among others, Batterink recommends more in-depth case studies on specific situations in this field.

One such specific situation is to focus on companies that are placed in the low technology sector. While this category is usually not seen as an important subject for studies on innovation, a catch-up in innovating behaviour has been signalled in recent years. The observed catch-up effect and the perceived lack of attention to this sector are the main reasons to focus on this sector. Specifically, the research focuses on the agri-food sector.

The objective of the research is to contribute to current knowledge on innovation management by providing a deeper understanding of the effects of an M&A on the innovative performance of agri-food companies. The central research question is :

To what extent may a company's innovative performance be improved following an M&A of agri-food companies ?

The objective and central research question have been addressed by means of a review of literature and four case studies on agri-food companies that have conducted an M&A in recent years. From these sources, a clear link between an M&A and a higher level of innovation is difficult to prove. A positive early effect, however, of an M&A on innovation has been observed in the cases, but a negative late effect on innovation. The combination of this positive early effect and negative late effect leads to an inverted U shape of the indicators for innovation over the years following the M&A. Such a shape has been observed most clearly in the case of the M&A between Unilever and Bestfoods.



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## 1. Research design

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This chapter describes the way in which the research that has been committed for this research paper has been carried out. In formulating this chapter, the structure as proposed by Verschuren and Doorewaard (1999) has been followed. This means that the chapter has been divided into a conceptual design (sections 1.2 to 1.4) – consisting of the formulation of the research objective, the research framework, the research issues and the definition of concepts –, and a technical research design (section 1.5) – in which the research materials, strategy and planning are detailed.

### 1.1. Introduction and backgrounds

---

In recent years, academic and managerial studies on Mergers and Acquisitions (henceforth abbreviated to M&A's) show an upheaval in interest in the effects on performance, and these studies often focus on the obvious consequences of such M&A operations – e.g. the possibilities to enter into new markets, or achieving higher effectiveness by economies of scale and scope (a.o. de Man and Duysters, 2005). Only a limited number of scholars have yet studied the impact of the different types of strategies to acquire external knowledge (e.g. *licensing-in*, *outsourcing*, *cooperation*, and *M&A*) on the innovative capabilities of companies.

However, an increase in a firm's innovative performance can lead to substantial benefits – not only to the company itself, but also to the consumers (Cefis *et al.*, 2007a). In turn, for various reasons, these benefits to consumers may lead to additional benefits to the company. In the case of M&A's, one of these various reasons is the pleading argument that can be presented to antitrust authorities that assess the market dominance of a merged firm. A wished-for M&A that would normally not be allowed as the relative sizes of the companies involved would position the merged company past the threshold of what is considered acceptable, may be allowed to proceed, if the argument – that the M&A operation *may* lead to an increase in the company's level of innovation, which in turn *may* lead to increased consumers' benefits – is found valid. This is therefore an important extra reason for companies that are (planning on) experiencing an M&A to strive for an increased level of innovation.

So far, studies that have looked at the impact of M&A's on innovation offer divergent conclusions. Reasons for divergences may be the vast differences between industrial sectors, firm sizes, periods, and other situational dependencies of the subjects observed. While a recent study of Batterink (2009) may be the most extensive study into this field so far, many knowledge gaps still remain to be filled in. Among others, Batterink recommends more in-depth case studies on specific situations in this field.



One such specific situation would be to focus on companies that are placed in the so-called 'low technology' category (see section 1.4 for a definition). Companies that are classified into this category – although this is a very general term and a large overlap exists between the different categories – can be described as traditional companies; they require limited use of modern technology and need only limited capital investments. While this category is usually not seen as an important subject for studies on innovation, a catch-up in innovating behaviour has been signalled in recent years (Chesbrough and Crowther, 2006; Batterink, 2009). The observed catch-up effect and the perceived lack of attention to the low-tech category are the main reasons to focus on this category.

Of the various companies that are classified into this low-tech category, this research paper specifically focuses on companies that are active in the agri-food sector. Companies in the agri-food sector can be said to be representative for the low technology industry: this sector is the largest sector of the low-tech category (Hatzichronoglou, 1997; Kirner *et al.*, 2008; Batterink, 2009). But there are other reasons; e.g. in this industry specific factors can be distinguished that may or may not have a significant effect on innovation (such as whether or not a company is organised as a cooperative). Furthermore, in regard to M&A's it can be said that the food industry is the most interesting of the low-tech category, as significant consolidating movements have been witnessed in this sector in recent years.

This research paper attempts to contribute to current knowledge on the field by looking into the effects of M&A's on the innovative capabilities of agri-food firms.

## 1.2. Research objective and research questions

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In this section, two important research issues that belong to the conceptual design have been defined: the research objective and the research questions. The research objective indicates in a useful and feasible way the contribution of the project to theory, while the research questions efficiently steer towards the fulfilment of the research objective (Verschuren and Doorewaard, 1999; 't Hart *et al.*, 2005).

The *objective* of this research is :

- to contribute to current knowledge on innovation management by providing a deeper understanding of the effects of an M&A on the innovative performance of agri-food companies.



Using this research objective as a basis, a *central research question* and a number of *sub questions* have been formulated. Answering these question serves to meet the research objective.

The *central research question* is :

*CRQ* To what extent may a company's innovative performance be improved following an M&A of agri-food companies ?

Related to this question, a number of sub questions have been formulated in order to gain more profound insights in the relationship between M&A's and innovative performance. Answering these questions serves to improve the understanding of the implications in the central question.

The *sub questions* are :

*SQ1* What relevant information can be extracted from scientific literature on M&A's, innovation management, and the link between the two concepts in all sectors ?

*SQ2* What are the most important indicators to measure the innovative performance of companies in all sectors ?

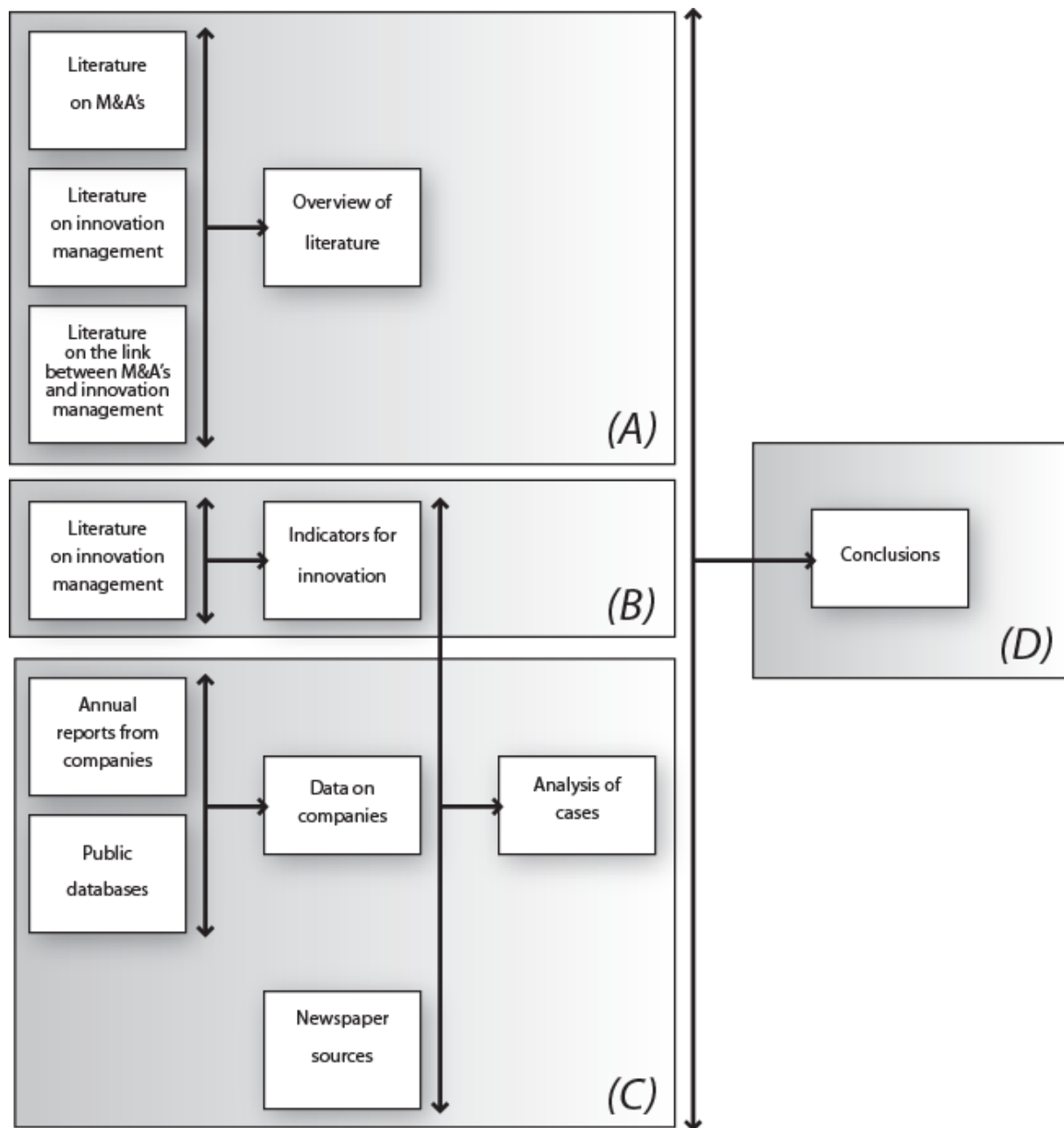
*SQ3* Do agri-food companies that have recently conducted an M&A have a relatively high score on the indicators that measure innovative performance ?

### 1.3. Research framework

---

In order to have a better insight into the research questions and the ways in which these will be dealt with, Verschuren and Doorewaard (1999) advise to sketch the outlines of the research into a schematic and visualised research framework. *Figure 1* shows such a research framework; the different ways in which the activities have been performed are discussed more extensively further on in this paper.





**Figure 1: Research framework** (based on Verschuren and Doorewaard, 1999)

Steps (A), (B), and (C) correspond to the sub questions *SQ1*, *SQ2*, and *SQ3* and form the various steps that have been taken in the research. In step (A), knowledge from various literature sources on the subjects of M&A's, innovation management, and the link between these two concepts are reviewed, answering *SQ1*. In step (B), knowledge from various literature sources are analysed in order to list the most important indicators to measure the innovative performance of companies, answering *SQ2*. In step (C), data on a selected number of companies that has been obtained from public sources – notably annual reports from these and other companies and public databases – is searched for the indicators for innovation. The data of these companies on these indicators, together with information



on these companies that has been derived from a review of newspaper articles, is used to describe four case studies. These case studies serve to answer SQ3. Finally, in the last step (D), all knowledge that has been obtained from answering SQ1, SQ2, and SQ3 is gathered and used to answer the central question and reach conclusions.

#### 1.4. Definition of key concepts

---

A number of concepts that have been used throughout this research paper may be ambiguous, may not be familiar to the reader, or may simply have been used in a different way than in other situations. To clarify these issues, Verschuren and Doorewaard (1999) recommend to give definitions for the key concepts that are used in the research paper. These definitions can be found in this section.

- Innovation

Many different definitions can be applied for this broad concept, but innovation may be described as involving *“the conversion of new knowledge into a new product, process, or service and the putting of this new product, process, or service into use either via the marketplace or by other processes of delivery”* (Johnson et al., 2008). The concept of innovation and the definition of the concept has been discussed more extensively in the next chapter (the whole of section 2.2 for the discussion of the general concept and subsection 2.2.2 specifically for the discussion of the definition).

- M&A (Mergers and Acquisitions)

For the purpose of this research, as shall be seen in section 2.1.2, a ‘merger’ has been defined as *the process of integration of two or more previously independent companies that are more or less equal to each other to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards*. An ‘acquisition’ has been defined as *the process of integration of two or more previously independent companies that need not be equal to each other to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards* (based on Scheuing, 1994; Nawas, 1995; Nguyen and Kleiner, 2003).

The M&A’s that are to be researched need to have a significant impact on the involved companies in order to have a measurable the impact of the M&A on innovation. In addition, the companies must be of sufficient size, so that public data can be found.



Therefore, this research limits the choice of companies that perform an M&A to the criteria as formulated in the European Commission's Merger Regulation or the Dutch Competition Authority (NMa). These threshold criteria have been extensively defined by these authorities, but basically the case is to be presented to the European Commission's Competition Authority if "*the combined aggregate worldwide turnover of all the undertakings concerned is more than EUR 5000 million [and the] aggregate [European] Community-wide turnover of each of at least two of the undertakings concerned is more than EUR 250 million*" (EC Regulation No. 139/2004), and to the NMa if the combined turnover exceeds "*€5,500,000 if the agreement, concerted practice or association involves only undertakings whose core activity is the supply of goods [or] €1,100,000 in all other cases*" (Dutch Competition Act, 2007).

Furthermore, given the relevance and availability of data, only M&A's that have been announced less than ten years ago – from August 1999 onwards – are looked into.

- Low technology industry

There are several ways to define the low technology industry, but each definition faces three main problems: the identification of the technology content of an industry, difficulties with the broadness of the concept of technology, and a degree of arbitrariness in setting boundaries (Hatzichronoglou, 1997). Circumventing these issues, the OECD (*Organization for Economic Co-operation and Development*) has classified all industries based on the industry's average research and development (R&D) expenditure. Four main technological categories have been defined: high, medium-high, medium-low and low. Industries belong to the low technology sector if, on average, in their industry sector less than 2.5% of total turnover is expended on R&D.

Much criticism has befallen the OECD approach. Most critics refer to the assumption that a high level of R&D investments equals a high level of innovativeness, thereby not considering other ways to attain increases in innovation (Hirsch-Kreinsen et al., 2005; von Tunzelmann and Acha, 2005). While this may lead to inaccurate results when comparing different sectors with each other on this basis, it may be assumed that when comparing companies within one given industry the above definition is functional.



- Agri-food company

When referring to agri-food companies in this research, those agri-food companies that have recently experienced, are experiencing, or are planning to experience an M&A activity are meant specifically. The term agri-food indicates the company's involvement in the production or processing of food products made from agricultural commodities.

To make the term agri-food more practicable for this research, a number of NACE industrial categories have been selected that fit this term. The NACE code system is used by the European Union as its standard to categorise activities from all possible industries, and is comparable to similar international classification systems such as SIC and NAICS. For this research, agri-food companies are defined as falling in a number of different categories, as detailed in *Appendix A* of this paper (EC Regulation No. 1893/2006 (Rev. 2)).

### 1.5. Research strategy and research material

---

In this section and the next, the technical research design is discussed. This technical research design addresses two topics: the *research strategy* and the *research material* (Verschuren and Doorewaard, 1999). These topics are discussed subsequently in this section.

Not much information is known on the subject of the impact of M&A's on innovation in agri-food companies. The findings of Batterink (2009) do provide a first knowledge base, but many gaps remain to be filled; one such gap concerns the low technology industry. Verschuren and Doorewaard (1999) recommend to choose a *theory developing research* in cases where gaps in knowledge have been observed in the build-up of a theory. A theory developing research is described as a good way to develop new theories or fill gaps in existing theories on "*a discipline [which] has as yet only been researched by very few people*" (Verschuren and Doorewaard, 1999). Therefore, the objective and overall focus have been formulated in such a way as to typify the main work as a theory developing research. However, this research features elements of a *theory testing approach*, in that it is tested if the general findings of Batterink (2009) hold true in specific circumstances.

Verschuren and Doorewaard (1999) formulate five different strategies that can be followed in conducting a theory-oriented research. These five strategies are (i) the survey, (ii) the experiment, (iii) the case study, (iv) the grounded theory approach, and (v) the desk research. In this research, elements from the latter three strategies can be distinguished. First, of the steps that have been described in the research framework (section 1.3), all steps feature elements of the *grounded theory*



*approach*. A grounded theory approach is a method that strives to gain theoretical insights with limited prior knowledge. The approach requires theory and data to be repeatedly compared, an inquisitive attitude from the researcher, and a careful use of procedures and techniques (*ibid.*). Second, all steps contain elements from the *desk research* strategy, where material produced by others – literature, secondary data, and official statistical materials – are analysed without any direct contact with the research object (*ibid.*). Third, step (C) in the research framework makes use of the *case study* strategy: this strategy strives to gain “a profound insight into one or several objects or processes that are restricted in time and space” (*ibid.*) in order to give a holistic and qualitative insight into the matter at hand. Also, a small number of research units should be analysed in a labour-intensive way – with more depth than breadth – using qualitative data and research methods, and preferably by means of a triangulation of methods and sources (Verschuren and Doorewaard, 1999; 't Hart et al., 2005). Of the other two possible strategies that can be used to conducting a theory-oriented research – the *experiment* and the *survey* strategy –, no elements can be found.

In section 1.3, the research framework has been set up in four distinct steps. By following these steps, an overview is created of the situation that is being examined and these findings are compared to agri-food companies that have recently conducted an M&A. Conclusions should lead to an expansion of theory on the field. These steps follow the steps of the empirical cycle of fundamental research ('t Hart et al., 2005): observation and induction takes place in the first chapter, steps (A) and (B) deduce the problem from a general situation to a specific situation, step (C) tests the suppositions, and step (D) evaluates the findings. Conclusions and recommendations for further research may provide an incentive to a new empirical cycle.

Each of the three sub questions in this research correspond to a separate step in the research framework (*Figure 1*). All three steps require a specific approach method and sources of information, leading to a triangulation of methods and sources. The sources that are used in the three steps and in answering the sub questions are shown in *Table 1*. To answer SQ1, information is derived from various literature sources – on M&A's, innovation management, and the link between these two concepts – by means of search methods (using key words, extracts, reviews, and other ways). To answer SQ2, information is derived from literature on innovation management in the same way. To answer SQ3, information is derived from literature as well, but, additionally, a content analysis is performed that makes use of documents.



sub question	step in framework	methods	sources
<b>SQ1</b>	step (A)	search method	literature
<b>SQ2</b>	step (B)	search method	literature
<b>SQ3</b>	step (C)	search method	literature
		content analysis	documents, reports, databases, newspapers

**Table 1: Research material with its sources and methods**

‘Literature’ sources in this table include articles from scientific magazines and books. ‘Reports’ and ‘documents’ consist of (annual) reports and other documents from companies. ‘Databases’ consist of public databases that are company-specific and contain relevant data. ‘Newspapers’ consist of relevant (historical) articles from newspapers and magazines.



## 2. Literature on M&A's and innovation

---

In this chapter, the first and second sub questions (*SQ1* and *SQ2*) that have been raised in *section 1.2* are addressed. The whole of this chapter serves to address *SQ1*, but *SQ2* is addressed specifically in *section 2.2.4*. The sub question were :

*SQ1* What relevant information can be extracted from scientific literature on M&A's, innovation management, and the link between the two concepts in all sectors ?

*SQ2* What are the most important indicators to measure the innovative performance of companies in all sectors ?

In the two sections in this chapter, the two concepts of M&A's (*section 2.1* and subsections) and of innovation (*section 2.2* and subsections) are discussed separately. Discussing these concepts – based on literature – serves to gain the understanding that is required to answer the first sub question and, with the added knowledge from the third chapter, the central question.

### 2.1. Mergers and acquisitions (M&A's)

---

In the next five subsections, the concept of M&A's will be discussed, in the following order:

- 2.1.1. In the first subsection, the partnering continuum is discussed. This continuum serves as an introduction to M&A's and places it on a scale of partnering maturity and complexity.
- 2.1.2. In the second subsection, the concepts of mergers and acquisitions have both been defined. These definitions are followed by the discussion of some characteristics of M&A's and two near-related forms. Furthermore, horizontal, vertical, and conglomerate M&A's will be introduced.
- 2.1.3. In the third subsection, some motives and reasons for M&A are reviewed. This is followed by a short look at the rate of M&A failures, followed in turn by a short discussion on the merger paradox. Next, after a look at the factors that may influence the likelihood of M&A success, four different approaches to measure the success of M&A are discussed with their advantages and disadvantages.
- 2.1.4. In the fourth subsection, the occurrence of M&A's in the low-tech and agri-food sectors are discussed separately. Also, the concept of cooperatives and its characteristics is explained.



- 2.1.5. In the fifth and final subsection, the economical side of M&A's and its impact on legislation is discussed. This serves to provide an understanding of the reasons why M&A's are seen as anticompetitive and therefore, in some cases, not allowed. Also, the concept of efficiency defence and its relevance are discussed.

### 2.1.1. Introduction and the partnering continuum

In this subsection, various forms of partnering and its importance are introduced, serving as an introduction of the most extreme occurrence of partnering: M&A's. First, the benefits of partnering are explained. Second, the partnering continuum is introduced and explained. Third, Thompson and Sanders' (1998) model of partnering continuum is discussed. Fourth, a combination of the models of Maccoby's (1997) and Gaughan's (2007) is discussed.

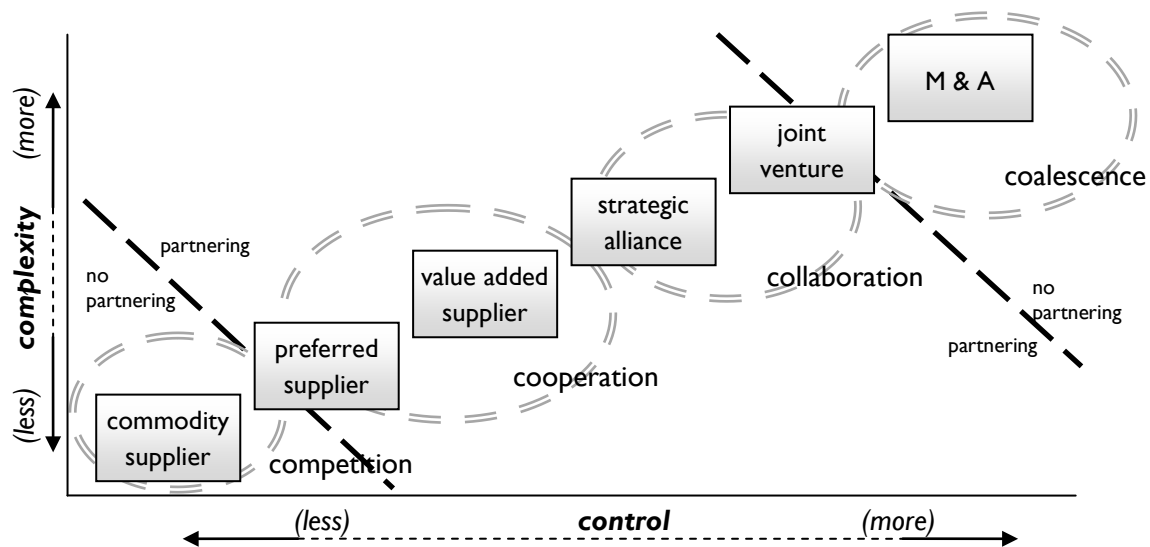
In the struggle to survive the intense competition in business, one key strategy is to bundle forces with other companies by partnering with other companies. The benefits that one or another form of partnering may bring are substantial: a company that works together with other parties will be able to save money, will have an increased chance of success in penetrating new markets, and will have more success in introducing new products. Also, a competitor's technologies or skills can be acquired (Hamel *et al.*, 1989). Partnering can even lead to advantages to parties that are not involved directly; suppliers, for instance, that actively work together with external parties will be able to better serve their customers, will be more proactive in finding solutions, be more participative in new ventures, and – generally – have a stronger interest in the long-term relationship and the quality of their own products (Maccoby, 1997).

Thus, partnering with other companies, which would otherwise be direct competitors, can bring important advantages to all parties concerned. However, it is not a charitable process to work together with others in order to achieve one's objective; all partnering (except its extreme form of the M&A) could be described as a continuation of competitive behaviour by different means. Nor should partnering be seen as devious; parties that fail to grasp the finesses of their partnering will have a greater chance to be taken advantage of, or – alternatively – will create the circumstances that will end the partnering (Hamel *et al.*, 1989).

Many different forms of partnering exist. The variety of forms that it can take may only be limited by the variety of human behaviour: some are long-term, some short-term, some are complex, some one-dimensional, *etc.* All, however, can be differentiated into broader groups. A popular way to visualise the different forms of collaboration is the 'partnering continuum', where an increasing level of partnering is plotted against an increasing level of complexity, control, intensity, or value added.



Some authors (e.g. Thompson and Sanders, 1998) prefer broad categories, while others prefer more specific terms (e.g. Maccoby, 1997; Gaughan, 2007). In Figure 2, three partnering continuums (i.e. Thompson and Sanders (1998), Maccoby (1997) and Gaughan (2007)) have been combined into one figure.



**Figure 2: A partnering continuum** (adapted from Maccoby, 1997; Thompson and Sanders, 1998; Gaughan, 2007)

In this partnering continuum, increasing levels of partnering between two or more companies have been drawn, against an increasing degree of complexity and control. The lowest and the highest form in the partnering continuum are not form of partnering, but are still included in the partnering continuum as being continuations on the axes. It can be argued that other dimensions could be placed along the axes with the same effect, such as the addition of value, the investment of capital, or the cost of reversal (Gaughan, 2007).

The first of the two partnering continuums follows Thompson and Sanders' (1998) model. In this model, four forms are described. Each next form is more complex and corresponds to a higher degree of potential benefits and a higher degree of objectives alignment (the axes in the original model of Thompson and Sanders). The least complex form on the partnering continuum – but not a form of partnering – is *competition*, which includes traditional relationships between owners, contractors, competitors, or suppliers where no or minimal partnering takes place (Thompson and Sanders, 1998). The next two forms are *cooperation* and *collaboration*. Both are comparable forms of 'working together', but collaboration has been defined in the model as a somewhat more complex form. Both represent types of partnering where the involved parties benefit from each other's help. However, there is a feeling of distrust with firms never forgetting that the partner may ultimately be out to destroy them (Hamel et al., 1989). The most complex form on the continuum is *coalescence* –



sometimes referred to as the *consolidation* or *concentration* form –, where mutual strategic goals are being formulated that are linked to the individual goals of all partnering participants; completion of these goals becomes the interest of all parties (Hoban and Francis, 2002). This last form on the continuum is no longer a form of partnering, as there is no longer any difference between the two partnering companies.

The second of the two partnering continuums combines Maccoby's (1997) and Gaughan's (2007) models. Roughly the same scheme is followed, but more specific forms on the partnering continuum are given instead of the broader forms. The least complex form on the continuum is the *commodity supplier* form, where the mutual dependence of supplier and client determines the relationship. This form could be compared with the *competition* form in the previous continuum, and is not yet a form of partnering. In the form one step more complex, another company's qualities may be appreciated giving that company a special status among the lot – the *preferred supplier* form. Next, mutual services may be customized and value may be added to both parties; this can be described as the *value added supplier* form. Although the borders remain vague, these two forms may be compared to the *cooperation* form of the previous continuum. A higher form, surpassing purely contractual relationships, is the *strategic alliance* form, where two or more companies concentrate on a single product or project and share visions, needs, values, and even trust (Maccoby, 1997). Higher on the ladder of complexity and control is the *joint venture* form, where two (or more) partners deliberately “combine certain assets and work towards jointly achieving a business objective” in a formalised way (Gaughan, 2007). If an alliance could be compared to a marriage between two people, a joint venture could be compared to that same couple having a baby. Both forms could be compared to the *collaboration* form of the previous continuum, and even to the *coalescence* form. Finally, the most complex form on the partnering continuum is the situation where one company completely takes over the other company or companies, or, alternatively, two (or more) companies fuse together into a new entity: the *M&A* (or *merger and acquisition*) form. The M&A form is a form of *coalescence* from the previous continuum, and is no longer a form of partnering. One difference between the M&A and joint venture forms is the length of time involved: an M&A usually involves an indefinite period (*ibid.*).

In this subsection, various forms of partnering have been discussed. These different forms can be visualised in a partnering continuum, with an increasing level of partnering plotted to complexity, intensity, or value added. Four broad forms of partnering can be distinguished: competition, cooperation, collaboration, and coalescence. Also, more specific forms of partnering can be used in the continuum. Of these more specific forms, an M&A, which can be seen as part of the coalescence form, is the most extreme form of partnering: it is the most complex and value adding form that



requires the greatest investment of capital, allows the greatest degree of control, and has the highest costs of reversal of the various forms.

### 2.1.2. Definition and characteristics of M&A's

In this subsection, the definition and basic characteristics of M&A's will be discussed. First, a definition of both separate terms and of the combined term will be given. Second, differences between M&A's will be discussed. Third, the similar terms of takeover and consolidation will be explained. Fourth, M&A's will be broken down into being either horizontal, vertical, or conglomerate, and these three types are explained.

Many different definitions of the concepts of mergers and acquisitions exist. Given the broadness of the subjects, there is little consensus on a single definition for both concepts and every author seems to have his own interpretation. A number of elements feature in many definitions, though, and have been taken into account in the formulation of the following two definitions. Therefore, for the purpose of this research, using a number of definitions as a base (a.o. Scheuing, 1994; Nawas, 1995; Nguyen and Kleiner, 2003), a 'merger' has been defined as *the process of integration of two or more previously independent companies that are more or less equal to each other to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards*. An 'acquisition' has been defined as *the process of integration of two or more previously independent companies that need not be equal to each other to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards*. The combination of both definitions leads to an 'M&A' being defined as *the process of integration of two or more previously independent companies to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards*.

The terms mergers and acquisitions are often conflated because of their similarity – in that two previously separate entities fuse into one (new) entity and the other(s) will go out of existence – and because of the somewhat blurred boundary between the two. The most obvious difference between the two usually is the size of the involved firms: in an acquisition, a smaller company is taken over voluntarily or involuntarily by a (much) larger company. Another difference is that mergers are typically friendly of nature, while acquisitions tend to be more unfriendly or even hostile (Bruner, 2002). Friendly M&A's are characterized by single bidding parties in mature industries, with ample cash, seeking to invest in growth, while unfriendly or hostile M&A's typically take place with multiple competing bidders from companies with limited manager ownership and below-average performance (Weston, 1994).



Apart from M&A's, two other forms of the *coalescence* form of partnering are frequently referred to in literature or common speech, which need to be mentioned here because of their similarities with M&A's: the 'takeover' and 'consolidation'. A takeover is a somewhat vague and colloquial term, but is usually associated with unfriendly M&A's, and a consolidation is special in that the one company that comes out of the transaction is a newly created company: instead of the regular  $A+B=A$ , a consolidation equates  $A+B=C$ , with C being a new company (Gaughan, 2007).

M&A's can be broken down into *horizontal*, *vertical*, or *conglomerate* M&A's. If two directly competing companies that are active with the same activities in their network or serve the same clients merge, it is called a horizontal M&A. Similarly, an M&A between companies that have a buyer-seller relationship with each other is called vertical. A conglomerate M&A occurs in the situation where two companies merge that do not have a buyer-seller relationship and are no competitors of each other (Bishop *et al.*, 2005). This last type of M&A applies when a company wants to establish itself in a new market (Gaughan, 2007). As shall be seen in subsection 2.1.5, these differences have their effects on market power and the legislator's appreciation thereof.

To conclude this subsection, it has been seen that M&A's are very similar concepts. However, some differences exist: mergers typically occur between two more or less equally sized firms and they tend to be friendly in nature, while acquisitions tend to be not so. M&A's can occur as horizontal, vertical, or conglomerate, with horizontal being between companies that are active with the same activities, vertical between companies that have buyer-seller relationships with each other, and conglomerate between non-competitive and non-vertically aligned companies.

### 2.1.3. M&A motives and M&A success

In this subsection, M&A motives and reasons as well as M&A success and ways to measure this success will be discussed. First, a number of motives and reasons for M&A's are listed. Second, it is explained by using quotes from literature that a high number of M&A's can be considered failures. Third, the merger paradox is introduced as well as some reasons for its occurrence. Fourth, a few of the critical success factors for a successful M&A are listed. Fifth, four different ways of measuring the success of an M&A are discussed, and their advantages and disadvantages are explained.

Two of the most commonly cited motives for an M&A are the potential for (increased) growth or expansion, and the prospect to be able to realise synergy – which means that the whole (the post-M&A company) realises more benefits than the sum of the individual (pre-M&A) components. Other common motives may be diversification – a company may wish to diversify its products or services and grow outside of its current industry –, financial or economical motives – e.g. economies of scale,



horizontal or vertical integration, higher market share or more market power, etc. –, a search for better management, improved R&D or innovation, improved distribution methods, or tax motives (Chesbrough and Crowther, 2006; Antoniou and Zhao, 2007; Gaughan, 2007). More generally, Trautwein (1990) has classified many such motives into seven major groups of motives or ‘merger motive theories’. Of these seven, three theories are most common: the *valuation theory* – an M&A delivers gains through the possession of private valuation information that the market does not have –, the *empire-building theory* – an M&A benefits managers wishing to maximize their own profit –, and the *process theory* – M&A’s are the outcomes of external series of processes (Trautwein, 1990).

It should be noted that sometimes feelings and personal reasons may be important (additional) triggers to an M&A, rather than such rational motives alone. For instance, a tie of friendship between two companies or their managers can be an important reason for an M&A, or simply the pride – *hubris* – of managers striving at personal interests (a.o. Gaughan, 2007).

Usually, M&A’s that have been triggered by these motives fail to achieve their goals; most sources agree that the majority of all M&A’s can be considered a failure. When giving the percentage of these M&A ‘failures’, sources vary substantially, perhaps as a consequence of the difficulties in defining success and failure as shall be seen later on in this subsection (a.o. Slowinski *et al.*, 2002; Epstein, 2004; Schenk, 2008). A few quotes illustrate the points of the high amount of failures and of the difficulties in agreeing on the amount of failures: “*various studies show that approximately 70 percent of mergers and acquisitions fail to meet their expected financial performance*” (Slowinski *et al.*, 2002), “*loss in shareholder value is staggering, [... and] 61 percent of recent mergers destroyed shareholder wealth*” (Epstein, 2004), “*acquirer gains are negative in about one-half of the takeovers while total gains are negative in about 25 percent of the takeovers*” (Berkovitch and Narayanan, 1993). Also, the amount of post-M&A divestitures is significant: “*I studied the diversification records of 33 large, prestigious U.S. companies over the 1950-1986 period and found that most of them [more than 50% (1992)] had divested many more acquisitions than they had kept. The corporate strategies of most companies have dissipated instead of created shareholder value*” (Porter, 1996), and “*a substantial fraction, almost 44%, of a sample of large acquisitions [...] have been divested*” (Steven N. Kaplan and Weisbach, 1992).

Moreover, even when an M&A can be considered a success as a whole, negative effects will still be present. Such negative effects that an M&A may have on the new entity are a lowering of the company’s innovation, a decrease of growth, an increase of operational costs, less effective management, or a decline in market growth (Schenk, 2002). The reasons for such failures may be due to the unpredictability of the market, problems in the formulation of mandates, and managerial errors (Gertner, 2000).



Notwithstanding the high rate of failure, M&A's still take place frequently. This has led some to refer to the 'merger paradox'; this paradox questions the high popularity of M&A's while the theoretical chances at being successful are slim. The answer to the paradox may lie in that academic research focuses on aspects that may not be appreciated as such by managers (Brouthers *et al.*, 1998). Or it may be that sometimes there's simply no (perceived) alternative as competitors would make use of the opportunity to grow stronger themselves (Bruner, 2004). Another possible answer to the merger paradox may be the lure of an M&A's potential benefit outweighing the risk of failure: after all, notwithstanding the large rates of failure, it is possible to succeed in achieving one's targets through an M&A (Schenk, 2008).

To increase the likelihood of their M&A becoming successful there are methods that managers may apply: they should set goals based on known critical success factors that are essential for the success of an M&A. Such critical success factors include the formulation of a strategic vision, the seeking of a strategic fit, a clearly formulated deal structure, the conducting of their 'due diligence' on the other party, a careful planning of the pre-M&A phase as well as the post-M&A integration, and a close examination the external environment (Epstein, 2004).

An M&A can only really be considered successful retrospectively. Four methods that are mentioned in literature will be discussed here that can be used to measure whether or not the M&A has been successful.

The first method to measure the success of an M&A is to evaluate the outcomes on the degree of achievement on the criteria on which the decision to perform the M&A had been based; e.g. if the primary reason for a M&A was growth and the merged entity (obviously) succeeds in increasing its growth rate, the M&A might be called a success. However, this should not be the sole criterion, as can be seen in the case of a merged company that reaches the targets required by the pre-M&A criteria (in this case growth) but underperforms in all other areas: in this case, the M&A can clearly not be called a success. After all, the managers' motives might well be misinformed, inappropriate, or wrong (Bruner, 2002).

The second way to measure the success of an M&A would be the *clinical research method*, where executives of merged companies are being surveyed or interviewed, during which their perception on M&A success is being asked outright. This method has significant drawbacks, though, as the results may be biased, hazy, or not representative for the whole of the population (Bruner, 2002).

The third and most commonly used method of measuring the success of an M&A are the *financial measuring methods*, as maximizing these factors would usually be the prime objective of both



managers and shareholders. Two such financial measuring methods are listed in literature, the first being accounting studies. Such studies look at relevant accountancy factors – such as net income, return on equity, leverage, and liquidity of the firm –, and investigate how these values fluctuate before and after the M&A (Bruner, 2002). The second way is to use market-based studies: to compare the prices of shares – or the P/E ratios on shares – before and after the M&A to seek abnormal returns on the merged company's shares (a.o. Benfratello, 2000).

These financial measuring methods have significant drawbacks, though. The latter – market-based studies – are vulnerable to “*confounding events*” (Bruner, 2002) by relying on such principles as perfect competition and rationality of shareholders, which may not hold true for individual cases. The former – accounting studies – has been criticized for being retrospective only (and thus not relevant to future cases), and sensitive to inflation and differences in reporting methods. Another drawback of the accounting studies is that the financial data that are really important – unfavourable data that are especially relevant when required to evaluate the lack of success of an M&A – may not be disclosed or otherwise may well be somewhat embellished (*ibid.*). Generally, financial criteria to measure M&A performance have such disadvantages that “*no self-respecting executive would judge a corporate strategy this way*” (Porter, 1996).

Next to these drawbacks, evaluating the success of an M&A purely on financial grounds ignores many other significant elements that are critical to the success of a company: the so-called intangible assets. Therefore, the fourth method of measuring the success of an M&A is to measure these intangible assets; if one is able to measure these assets, results will prove highly valuable for a researcher (or a manager) and one will experience fewer drawbacks than when using one of the other methods. In fact some go as far as saying “*measuring the value of such intangible assets is the holy grail of accounting*” (Robert S. Kaplan and Norton, 2004). The problem, however, with intangible assets is precisely that they are difficult to measure: they are intangible and therefore somewhat elusive. Some of these assets are worth more to some companies than to others, depending on their fit with the company's strategy. Also, they tend to affect performances only indirectly or on the long run (*ibid.*).

Intangible assets can be divided into three main categories, according to Kaplan and Norton (2004). The first category is *human capital*. This term refers to the resources that are embedded in a company's employees, such as skills and knowledge. As Adam Smith describes human capital, “*the acquisition of such talents, by the maintenance of the acquirer during his education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in his person*” (Smith, 1776). The second category is *information capital*, which refers to the level of a company's infrastructure and to the various applications that provide support to the organisation (Robert S. Kaplan and Norton,



2004). The third category of intangible assets is *organization capital*. This category can be said to be the most diverse of the three and the most difficult to measure. It refers to a company's culture, to the quality of its leadership, to a clear alignment between objectives, goals, incentives, and individuals, and to the degree in which teamwork is promoted throughout the company (*ibid.*).

Generally, whether or not an M&A can be called a success is determined by the same factors that determine whether or not any company is successful. Chances at success can be increased, and, to the company, the rewards may be substantial: a successful M&A will harvest many of the initial motives and promises – synergies, growth, increased levels of innovation, economies of scale, and more.

To conclude this subsection, it has been seen that companies may have many different motives to perform an M&A: they may wish to grow or realise synergies, they may strive at diversification or have financial or economical motives, or have one of a variety of other motives. Alternatively, they may be driven by other reasons, such as ties of friendship, managerial pride, or personal enrichment. Whatever the motives or reasons, most M&A's can be seen to fail to achieve their goals and a large percentage of M&A's are even divested later on. Still, M&A's do take place frequently, perhaps because of differences between academic and managerial focus, there may be no perceived alternative, or the lure of an M&A's benefits may lead a company to ignore the risks. If a company still wishes to conduct an M&A notwithstanding the possible negative effects, it can increase the likelihood of success by setting M&A goals based on known critical success factors. Whether or not an M&A retrospectively can be considered successful can be measured by one of four methods: by evaluate the outcomes on the achievement of the pre-M&A goals, by a clinical research method where company executives are interviewed or surveyed, by financial measuring methods where accountancy studies or market-based studies are used to evaluate the success, or by measuring the value of a company's post-M&A intangible assets. This last method has the least disadvantages but is the most difficult to perform.

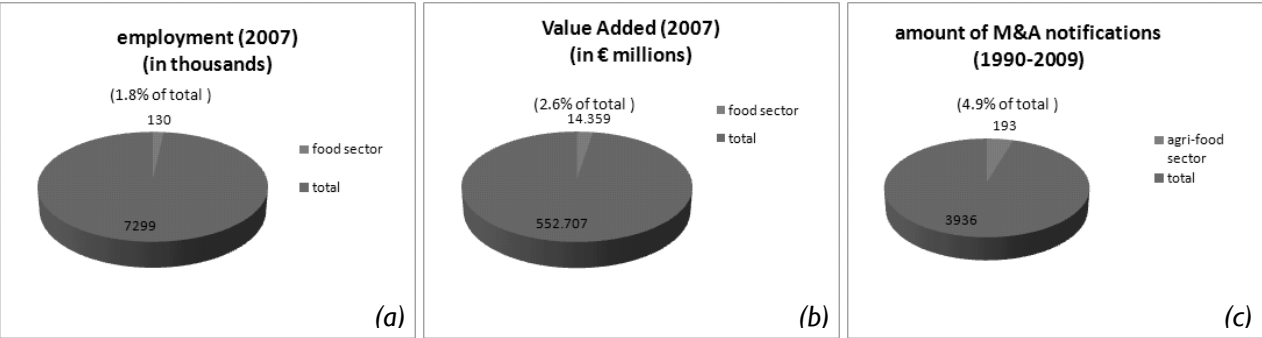
#### 2.1.4. M&A's in the low-tech and agri-food sector

In this subsection, the occurrence of M&A's in the low-tech sector and in the agri-food sector will be discussed. First, the occurrence of M&A's in these sectors will be examined. Second, differences in behaviour regarding M&A's between the low-tech and agri-food sectors and other sectors will be looked at. Third, the concept of cooperatives will be introduced. Fourth, the characteristics of M&A's that take place between cooperatives will be discussed.



Many M&A's have taken place in the agri-food sector in the past years. While in all sectors of industry taken together M&A's are reported to occur in large waves with periods of high M&A activity (a.o. Gaughan, 2007), evidence for such an M&A wave in the low-tech and agri-food sectors in specific cannot be substantiated (e.g. Pålsson and Monteiro, 2002). It is clear, though, that in recent years M&A's have been prevalent in these sectors: as shall be seen more extensively in the next chapter. Of the 4129 M&A's that were submitted to the European Union's Competition Commissioner since 1990, 193 cases – nearly 5% – were classified in the agri-food sector as it has been defined for this research (European Commission Competition, 2009). If the definition were to include broader criteria – e.g. by including producers of beverages, etc. – this number would rise even higher. Another study, a 2001 study on Canadian M&A's in a ten years' interval, even reports 9% of all M&A's to belong to the agri-food sector (Rude and Fulton, 2001).

To compare the amount of M&A's in the agri-food sector with the total amount of M&A's, *Figure 3* gives an indication of the significance of the food sector in terms of employment and value added – i.e. turnover minus costs of procurement – in comparison to the total of the Dutch industry, services, and other sectors. The term 'food sector' in these charts is used as it has been defined by the Dutch Statistics Bureau, the definition of which slightly differs from this report's definition of the agri-food sector. From this indication of the economic significance of the food sector, it can be deduced that the (agri-)food sector has witnessed a relatively high amount of M&A's.



**Figure 3a, b, and c: Pie chart overviews of the size of the food sector as compared to the total of all sectors in the Netherlands in 2007 with regard to (a) employment, and (b) value added and (c) the amount of M&A notifications from 1990-2009** (data from CBS, 2009; European Commission Competition, 2009)

Research on the topic confirms these relatively high percentages. Companies from the low-tech or low technology sector – which has been defined in *section 1.4* as the total of companies that expend less than 2.5% of their total turnover on R&D and of which the agri-food sector forms a considerable part – generally have other priorities than companies from the high-tech sector. High-tech companies have a great craving for learning, but prefer flexibility and autonomy in achieving this. Forms of



cooperation, notably alliances, are therefore usually preferred by such high-tech companies over less flexible and integrative M&A's, while low-tech companies attach less priority to flexibility and autonomy and prefer M&A's (Hagedoorn and Duysters, 2000).

When looking at M&A's only, the low-tech sector can be said to be different from the high-tech sector in two specific ways. First, because companies from the high-tech sector spend more on their R&D costs, they employ more scientists, engineers, and technicians. Because of difficulties in transferring the (tacit) knowledge that is inherent to these employees, high-tech companies would be more induced to engage in vertical than in horizontal M&A's, and low-tech companies less so. Second, companies from the high-tech sector tend to face shorter production cycles; this necessitates a more active role in the vertical chain to facilitate the acquisition of assets and the bringing of new products to the market. This in turn may induce high-tech companies to perform relatively more vertical M&A's, and therefore the low-tech companies – again – to perform relatively more horizontal M&A's (Aydogan, 2002).

The agri-food sector is typical in that a large amount of companies that are active in it are organised as cooperatives. A cooperative features a special member-patron relationship, different from the traditional company model, where the “*firm [is] owned and operated for mutual benefit by the users*” (Rhodes, 1983). A cooperative is a private form of business that is controlled by its users, who bring in the capital and are the cooperative's stakeholders and owners. Furthermore, the goal of the company is usually not the maximizing of profit as it is with ordinary companies but the maximizing of its users' welfare (Barton, 1989; Kyriakopoulos et al., 2004).

The absence of a mandate to maximize the company's profit might suggest that cooperatives would be immune to the ‘merger mania’ that companies that are otherwise organized experience. The sheer amount of mergers – more than acquisitions – among cooperatives, however, is a clear indication that this is not the case. Cooperatives have their reasons for committing themselves to M&A's: they may strive for economies of scale and reduced costs, they may wish to decrease the level of competition, they may wish to buy themselves into a new market, they may wish to obtain additional resources, or they may be forced to grow larger to remain competitive with publicly traded firms that are themselves merging and acquiring (Richards and Manfredo, 2003; Hudson and Herndon, 2004). For these reasons, it comes as no surprise that the majority of M&A's that occur between cooperatives are horizontal in nature, as was the case for M&A's in the agri-food sector and the low-tech sector (Hudson and Herndon, 2004).

To conclude this subsection, it has been seen that in the agri-food sector, the low-tech sector, and in M&A's between cooperatives, the horizontal type of M&A dominates. The low-tech and agri-food



sectors have witnessed relatively large amounts of M&A's, which may be explained by the sectors' characteristics. Typical for the agri-food sector is that a large amount of companies is organized as a cooperative, where the company strives to maximize the users' welfare, instead of profits alone.

#### 2.1.5. Merger law and efficiency defence

In this subsection, the reasons why legislators strive to prevent large M&A's will be discussed. First, the increasing awareness of efficiency defence is explained. Second, the economic theory on which current legislation is built is detailed. Third, four ways in which M&A's can contribute to lower costs will be given – this to explain the effects that occur in the economic model. Fourth, the implications of the economic model on efficiency defence are briefly discussed.

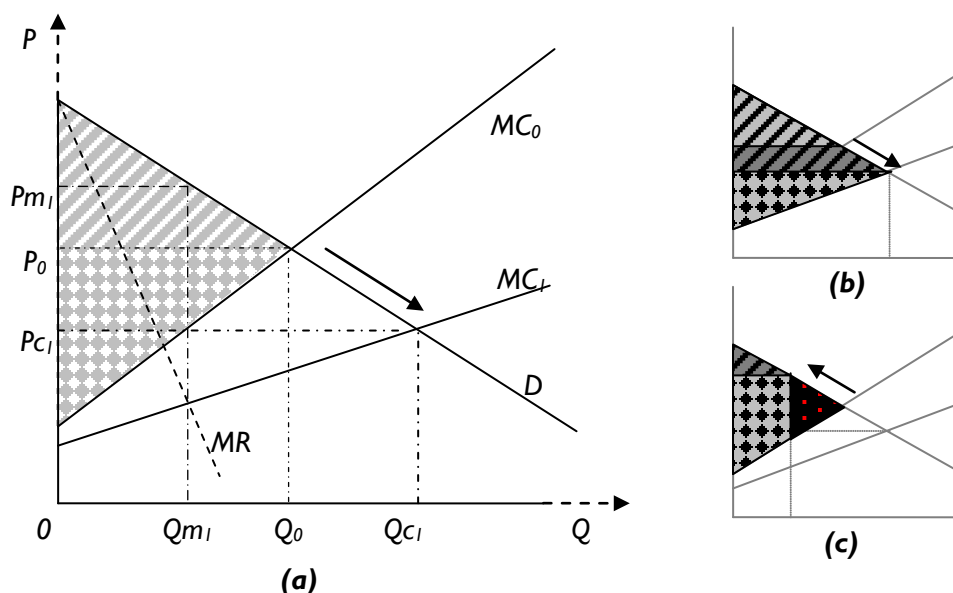
Of the different types of M&A's (horizontal, vertical, and conglomerate; see subsection 2.1.2), horizontal M&A's are the greatest focal point to antitrust authorities, as a horizontal M&A – by definition – forces the removal of a direct competitor from the market and facilitates the creation of unfair market power. However, the other types of M&A's may also be harmful to free competition, e.g. through agreements to block or eliminate (potential) competitors on the market (Viscusi *et al.*, 2005). To counter these negative effects of concentrated power resulting from M&A's, and in order to promote free market competition, worldwide antitrust laws have been set into place, serving as 'firewalls' against "*conspiracies to monopolize a particular industry*" (Sherman Anti-Trust Act, 1890).

Since the 1960's, though (notably Williamson, 1968), the awareness that M&A's and increased market power can also bring benefits to consumers – that may outweigh the negative effects – has grown. The process of weighing both the negative effects and the benefits is often referred to as 'efficiency defence', or, in other words, "*the global assessment of both positive and negative merger effects, for the declared purpose of improving the merger control outcome*" (Cosnita and Tropeano, 2006).

Slowly, the concept of efficiency defence has entered legislation as well. For instance, the current M&A regulations of the European Council state that "*in order to determine the impact of a concentration on competition in the common market, it is appropriate to take account of any substantiated and likely efficiencies put forward by the undertakings concerned. It is possible that the efficiencies brought about by the concentration counteract the effects on competition, and in particular the potential harm to consumers, that it might otherwise have and that, as a consequence, the concentration would not significantly impede effective competition, in the common market or in a substantial part of it, in particular as a result of the creation or strengthening of a dominant position*" (EC Regulation No. 139/2004).



To be able to understand the reasoning behind this and similar regulations better, it may be useful to look at the economics that lie behind an M&A. Figure 4 illustrates the possible effects of an M&A on the market.



**Figure 4: The trade-off between productive efficiency and market power in the evaluation of an M&A** (adapted from Williamson, 1968; and Coloma, 2007)

In Figure 4, the pre-M&A demand curve (D) and (average) marginal costs curve (MC<sub>0</sub>) have been drawn. The market will force the price and quantity of the products that the company produces to an equilibrium situation at P<sub>0</sub> and Q<sub>0</sub>. If the marginal costs will decrease as a consequence of an M&A (MC<sub>1</sub> < MC<sub>0</sub>), this will ultimately lead to a new equilibrium with a new price (P<sub>C1</sub>) and quantity (Q<sub>C1</sub>). This new equilibrium brings additional benefits to consumers, as the consumer surplus increases (Figure 4b) – the consumer surplus is the difference between demand and supply above the equilibrium price (the diagonally hatched areas in Figure 4b) (Coloma, 2007).

However, if the degree of competition on the market is not high enough to force the newly merged company to transfer the gains in efficiency to consumers by means of a lower market price (P<sub>C1</sub>), an M&A can lead to a monopoly, where the company does not need to consider the market demand anymore. In this case, both the price level (P<sub>m1</sub>) and quantity offered (Q<sub>m1</sub>) will be determined by the equilibrium of the company's marginal revenue (MR) and the post-M&A marginal costs (MC<sub>1</sub>), and, as a result, the consumer surplus will decrease. Worse, a 'deadweight loss' effect will occur (the red dotted area in Figure 4c), as some of the economic efficiency is not even reclaimed by the producer surplus (the checkered areas) (*ibid.*).

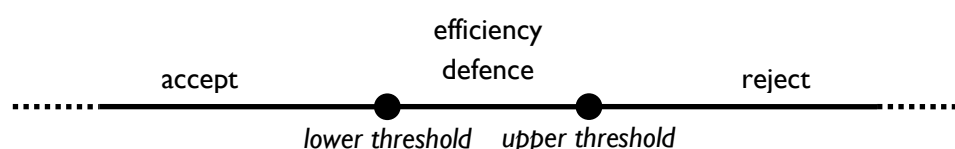


In practice, these two alternative scenarios are at play simultaneously, acting as opposing forces. The result of their working determines the effect of the M&A on the market. In some situations the negative effects will outweigh the consumers' advantages, and in others the positive effect on consumers will dominate (Williamson, 1968; Perry and Porter, 1985).

In order to move to the new post-M&A market equilibrium, it has been supposed that an M&A is an effective way for a company to lower its marginal costs. Some reasons can be given why this is true; Bishop *et al.* (2005) distinguish four ways in which M&A's can contribute to efficiency gains. In turn – and on the long run –, efficiency gains will allow lower marginal costs. These four ways have been listed here (Bishop *et al.*, 2005) :

- *Increases in pricing efficiency*: a vertical integration within a company's supply chain will allow a more efficient pricing mechanism within the chain.
- *Increasing productive efficiency*: the advantages of economies of scale or scope, of improved efficiencies in management, or of increased buying power will allow a more efficient use of a company's resources.
- *Preventing profit expropriation*: the benefits of some of a company's investments may be reaped by competitors. By increasing its competitive power, a company can decrease this effect and harvest more for itself.
- *Lowering of transaction costs and fewer incomplete contracts*: a more complete integration of its vertical supply chain will allow a company to cut losses through contractual loopholes and costly monitoring or incentive mechanisms.

As has been seen, an M&A that leads to a monopoly is undesirable – and for this reasons is being prevented by legislators –, but an M&A that leads to increased market power can bring more benefits than negative effects and may therefore be acceptable. Within the grey area that lies between a complete monopoly and a situation of perfect competition, a company that wishes to conduct an M&A may opt for efficiency defence to justify its proposed increase of market power (see Figure 5).



**Figure 5: Lower and upper thresholds for M&A acceptance** (Röller *et al.*, 2006 quoted in Cefis *et al.*, 2007a)

It should be noted that there are other reasons to claim efficiency defence. This may be the case whenever the basic argument holds; *i.e.* that the benefits to consumers outweigh the negative effects



of decreased competition. This has important implications, as shall be seen further on in *subsection 2.2.6*, for situations where an M&A leads to an increased level of innovation, which benefits society.

To conclude this subsection, it has been seen that legislation is being implemented to disallow many M&A's, because of the role M&A's play in the creation of monopolies. Monopolies are undesirable to society because of their negative redistribution effect on consumer surplus and the deadweight losses. However, concentration can also bring economic benefits to consumers, by causing efficiency gains and indirectly lowering prices and increasing quantities. Therefore, M&A's that lead to increased market power may be acceptable in some cases. A company that believes this to be true for its own projected M&A can apply the argument of efficiency defence, although efficiency defence can also be claimed for other reasons. If granted by the proper antitrust authorities, an M&A that would have been forbidden on other grounds will be allowed. However, innovations that do not lower prices do not fit this logic easily, rendering the cases more difficult.

## 2.2. Innovation

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In the next six subsections, the concept of innovation will be discussed, in the following order:

2.2.1. In the first subsection, the concept of innovation will be briefly introduced.

2.2.2. In the second subsection, the concept of innovation is defined and explained, and some barriers and catalysing factors are given.

2.2.3. In the third subsection, the way in which innovation occurs in the low-tech and agri-food sectors, and in companies that are organised as a cooperative, are discussed.

2.2.4. In the fourth subsection, indicators that can be used to measure the degree of innovation in a company are listed, and their relevance is explained.

2.2.5. In the fifth subsection, the concept of open innovation is introduced, and the ways in which companies can use this to acquire external knowledge are discussed.

2.2.6. In the sixth and final subsection, the linkage between M&A's and innovation is investigated, and the implications of the existence of such a linkage are explained.

### 2.2.1. Introduction

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In this subsection, the concept of innovation will be briefly introduced.



The importance of innovation to the success of a company has been signalled ever since Schumpeter's formulation of his theory of 'creative destruction' in the twilight of the economic crises of the 1930's. In his approach, Schumpeter claims that the innovative performance of entrepreneurs is the driving force behind long-term economic growth, and any theoretical construction that omits the "*fundamental impulses [... on] the capitalist engine [... that] come from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization [... is] like Hamlet without the Danish prince*" (Schumpeter, 1942, original emphasis).

Innovation may arguably be as old as mankind. However, such an Schumpeterian organic force of industrial growth that relies on innovation can retrospectively, on a large scale, be traced back to the last half of the nineteenth century with the rise of large-scale enterprises and work specialization (Chandler, 1994), and has ever-increasingly been adapted directly or indirectly into the strategies of many companies from every sector, scale, and culture (Drucker, 2007). Innovation has become "*mandatory, a life-or-death matter for the firm*" (Baumol, 2002), and even on a national and international level, the importance of firms' innovativeness is being recognized, e.g. in the European Union formulation of the Lisbon Strategy in 2000.

Schumpeterian thought and subsequent studies define innovation as a primary factor explaining why some firms prosper and others fail. A company that achieves a high level of innovation will have a higher productivity and income, and better chances at survival and growth. Furthermore, such a company will be more successful in adapting to rapidly changing environments, executing its strategies, and dealing with new technologies (Baumol, 2002; Fagerberg, 2005).

### 2.2.2. Definition and characteristics of innovation

In this section, first the concept of innovation is defined and briefly explained. Second, several different ways to classify various types of innovation are discussed, and the interrelatedness of the concept is emphasized. Third, a few barriers and catalysing factors that obstruct or increase innovation have been listed.

Innovation has been defined as involving "*the conversion of new knowledge into a new product, process, or service, and putting this new product, process, or service into use, either via the marketplace or by other processes of delivery*" (Johnson et al., 2008). Other authors define the concept as "*the first or early use of an idea by one of a set of organizations with similar goals*" (Becker and Whisler, 1967) or "*the adoption of an idea or behaviour that is new to the organization adopting it*" (Daft, 1978). For this research, the definition of innovation of Johnson et al. (2008) has been adopted, as it features many important elements and includes most elements of the other definitions.



Innovation is a broad concept, and therefore it may be worthwhile to mention some things that innovation is *not*: innovation should *not* be confused with invention – although the two concepts are closely linked; whereas invention indicates the first occurrence of an idea for a new product or process, innovation can be seen as the first attempt to implement inventions in practice. A time lag that may span up to decades usually separates invention and innovation (Fagerberg, 2005). Another term with which innovation should *not* be confused is creativity; the latter merely serves as one of the possible inputs for the former (Amabile, 1996). Furthermore, innovation is *not* something that can be captured into a linear model, as in applied science: it should be seen and described as a continuous process (Kline and Rosenberg, 1986).

Innovation is often placed on a continuum, with increasing values of added value and novelty. Innovations with relatively little added value and novelty are usually described as *incremental* innovations, while innovations with relatively much added value and novelty are usually described as *radical* innovations. Some authors even mention the extreme form of *revolutionary* innovation, which includes clusters of innovation with a far-reaching impact (Fagerberg, 2005).

All these types of innovation should not be seen as single actions; generally all innovation is the result of lengthy preparations and of other (interrelated) innovations \* (Fagerberg, 2005). An innovation is not a “well-defined, homogenous thing [...] entering the economy at a precise date [...] point in time” (Kline and Rosenberg, 1986), but a result of a number of sub processes all acting together and forming an integrated process (Myers and Marquis, 1969). Studying such a process requires a systems perspective, rather than merely a focus on individual innovations (Fagerberg, 2005).

Apart from being classified on how radical the type of innovation is, the concept has been chopped up in other dimensions as well; Schumpeter (cited in Johannessen *et al.*, 2001) distinguished five types according to which innovation can be classified: innovation in <sup>(i)</sup> new products (or services), <sup>(ii)</sup> new means of production, <sup>(iii)</sup> new sources of supply, <sup>(iv)</sup> (the exploitation of) new markets, and <sup>(v)</sup> new ways to organise the industry. Furthermore, innovation is often forked into either *product* or *process innovation*, where the product innovation applies to new or improved products or services being introduced to the market, and process innovation applies to new or improved ways to produce

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\* Illustrating the ever-presence of innovation, Niccolò Machiavelli already remarked “*in the antiquity and continuity of dominion, the memory of innovations, and their causes, are effaced; for each change and alteration always prepares the way and facilitates the next*” Machiavelli (1513). This bears a remarkable similarity to modern theories on innovation.



these products or services (Fagerberg, 2005). A third type of innovation that is often mentioned alongside the previous two is *systems innovation* (or *systemic innovation*), where an innovation requires significant adjustments to all parts of the system that designs it (Teece, 1996).

Pre-Schumpeterian thoughts on innovation expected it to occur randomly (*'manna from heaven'*) and impossible to strive at *per se*. Since then, barriers and catalysing factors have been found that affect the chance that the phenomenon occurs. Identifying these is vital, considering that only a fraction of all innovative projects actually reach the marketplace (Griffin and Page, 1993; Hollander, 2002). A few of the barriers that have been identified are lack of organizational alignment, insufficient resources to pursue new ideas, no formal innovation strategy, and a lack of goals and measures (Fortuin, 2006). Speaking more generally, all of these might be described as falling in one of Schumpeter's three categories of barriers: the fundamental uncertainty of all innovation projects, the necessity to act quickly and enjoy the advantages, and the natural resistance (*inertia*) to new ideas or new ways. To overcome these barriers, leadership and vision are required, which should originate from a visionary entrepreneur or from more pluralistic forms of firm leadership (Fagerberg, 2005). More practically, showing leadership and vision can be performed by being open to new ideas and solutions, avoid getting stuck in a predetermined path, absorbing external knowledge, and stimulate experimentations with new solutions (*ibid.*).

However, it should be noted that due to the non-linearity and uniqueness of each innovation process, one should be careful to generalise conclusions. Any part of the innovation process should be seen as multidirectional and many iterations and much flexibility should be expected and is indeed demanded in order to maximize chances of success (Fortuin, 2006).

In this subsection, it has been said that innovation is a broad concept, but should not be confused with invention or creativity. Also, every innovation is unique and therefore the concept cannot be captured into a linear model. Innovation is often placed on a continuum from incremental innovation to radical innovation, while some even mention revolutionary innovation. Innovation can be classified according to product innovation, process innovation, or systems innovation, with each of these three building on different manners in which the innovation takes place. Barriers to innovation are many, but originate from the fundamental uncertainty of innovation, the necessity to act quickly, and the natural resistance to new ideas or new ways. These barriers can be overcome by showing leadership and vision, by being open to new ideas and solutions, or by other means.



### 2.2.3. Innovation in the low-tech and agri-food sector

In this subsection, the way in which innovation occurs in the low-tech and agri-food sectors is discussed. First, issues that obscure the definition of the sectors are further looked into, as these issues hinder research. Second, the importance of the low-tech sector is underlined. Third, the characteristics of the low-tech sector in relation to innovation are discussed. Fourth, the characteristics of the agri-food sector in relation to innovation are discussed.

Companies that are active in the high technology sector are the traditional subjects for research on innovative behaviour. This may be seen as a logical extension of the definition, as indeed not much innovation – itself greatly dependent on technology – would be expected in a sector with a low level of technology. However, these definitions are neither as simple as they appear, nor may the lack of attention be entirely merited, as shall be discussed in this subsection.

Issues with definitions obscure the ability to perform research on innovation, as has been hinted at by the difficulties in defining the different technology sectors in *section 1.4*. The blurred boundaries between the sectors, difficulties in assigning subsectors to higher sectors (e.g. whether plant biotechnology belongs to the biotech or agricultural sector (von Tunzelmann and Acha, 2005)), and difficulties in dealing with firms that are active in more than one sector can all significantly affect the results of comparative studies between sectors. The case of such a plant biotechnology company illustrates the problem at hand; if it were to be categorised as an agricultural company this would give a boost to the innovative activities of the low-tech sector. It should be noted that there are other ways to differentiate sectors that may be better suited besides the OECD standard (which classifies largely by product range) – e.g. *Pavitt's taxonomy* classifying by technology characteristics or *Sutton's taxonomy* by a combination of R&D and advertising expenditures (*ibid.*).

However, the issues with definitions do not justify the lack of focus on the low-level technology sector. One glance at the figures would appear to provide a strong case for asking more attention on this sector: as they are defined at the moment, the whole of the high-tech industry taken together merely account for some three percent of all economic activity in Europe (Hirsch-Kreinsen *et al.*, 2005), “rising to 8.5 per cent if medium-high-tech industries like motor vehicles are included” (OECD, 2003). More or less the same can be said of their relative share in employment and production. In other words, it may well be that the high-tech industry has a large technological advantage over other industries; they may not necessarily be the most important for the economy and our society at large.



Companies that are active in the low-tech sector are generally seen as the more traditional companies. Their relative limited dependability on modern technology and on large capital investments, their less volatile market conditions, the historical views on industries associated with the sector, and other reasons sometimes lead the sector, somewhat derogatorily, to be called the 'sunset industries'. However, as von Tunzelmann and Acha (2005) aptly quote Ernest Hemingway in this case, "*the sun also rises*", and this is precisely what seems to be the case in recent years: a significant catch-up effect in innovation has been signalled in the low-technology industry. Particularly, low-tech companies seem to have chosen paths of 'open innovation' to achieve their increased levels of innovation (Chesbrough and Crowther, 2006; Batterink, 2009). Open innovation is a relatively new phenomenon in which companies strive to obtain or acquire knowledge from external sources, as shall be described more elaborately in *subsection 2.2.5*.

If the nature of the innovations themselves is to be examined, it can be concluded that there are major differences in scope between the high-tech and low-tech industries. Firstly, as might be expected, innovations in the high-tech sector are more oriented on technology and R&D, while in the low-tech sector there is a tendency to strive at equilibrium between technology and non-technology. This may be due to their more firm establishment in highly competitive markets (Hirsch-Kreinsen, 2008). Chesbrough and Crowther (2006) specifically relate this to M&A's: in the low-tech sector, innovation is usually not strived at *per se* but rather it occurs as a side-effect of a search for growth, while in the high-tech sector the search for an increased level of innovation may be an important reason – or even the main reason – for an M&A. Secondly, innovations in the low-tech sector usually fall in the incremental innovation category (see *subsection 2.2.2*), rather than in the radical one as is often the case in the high-tech sector (Hirsch-Kreinsen, 2008).

Out of the companies that are classified under the low-tech sector, those that are active in the agri-food sector, which – as defined in *section 1.4* – consists of companies involved in the production or processing of food products made from agricultural commodities. These companies have been observed to be subject to a move from a situation where suppliers are the dominant factor to a situation where the market eventually determines the success of the company (a.o. von Tunzelmann and Acha, 2005). Whether a consequence or a catalysing factor of this move, the industry's traditional reliance on machinery suppliers has been replaced by a reliance on technologies, advanced instrumentation, electronics, biotechnology, pharmaceuticals, and other equipment that is specifically being developed by high-tech companies and laboratories (*ibid.*). Generally, it can be said that the agri-food is catching up in innovation, just as the low-tech sector has been observed to do (Batterink, 2009).



Notwithstanding this rising trend, innovation in the agri-food sector is still low. For instance, the introduction of radically new food products is rare, amounting to only 2.2 percent of the total of food product launches in Europe (Costa and Jongen, 2006). Also, they have a high failure rate, with about 40 to 50 percent of all new food product introductions discontinued within a year (*ibid.*).

Significant barriers that occur specifically in the agri-food sector can be distinguished that explain the lack of success in innovation. First, economic factors have been found to substantially contribute to the lack of success in innovation, especially the lack of sources of finance, and the high expenditures that are required to innovate (Garcia Martinez and Briz, 2000). Second, the consumer's highly critical and demanding view on the safety and quality of food products make their choice more difficult to assess and predict. The lack of understanding of the consumer's precise wishes contributes to difficulties in introducing new innovations (Grunert and Valli, 2001; Costa and Jongen, 2006). Third, agri-food companies appear to lack the competencies that are required to innovate; e.g. an adequate organisational structure, or sufficient qualified personnel and knowledge (Batterink *et al.*, 2006).

To conclude this subsection, it has been seen that less research on innovative behaviour has been performed on the low-tech sector than on the high-tech sector. Furthermore, issues with broad and overlapping classifications complicate matters. Still, the low-tech sector is large and of substantial economic importance, and this would justify more research on innovation in the sector. Low-tech companies are relatively less dependable on modern technology and large capital investments than companies in other sectors, and face less volatile market conditions. Nonetheless, the sector is catching up with regard to innovation. There are differences in scope though between the high-tech and low-tech companies; firstly, low-tech companies are less oriented on technology and R&D and will be less inclined to see innovation as an important reason for an M&A. Secondly, innovations in the low-tech sector are usually incremental innovations rather than radical ones. Agri-food companies also can be seen to catch up in innovative behaviour, perhaps as a consequence of an increased market-driven orientation. Still, innovation in the sector is low, and an increase of innovation is hindered by economic factors, difficulties in understanding the consumer's wishes, and a lack of competencies.

#### 2.2.4. Measuring innovation

In this subsection, having discussed the necessity for companies to innovate and the different ways to do so, it becomes valuable to determine the extent to which companies innovate. This is important both for research institutes wishing to observe the phenomenon and to the companies themselves – or their competitors – wishing to benchmark their position. First, the necessity of measuring and the difficulties in doing so are discussed. Second, the indicators mentioned in literature to measure the



degree of innovation in a company are listed, and their advantages and disadvantages are mentioned. Third, these indicators are summarized for future reference.

Trying to measure innovation brings special difficulties, due to the aforementioned unique and non-linear nature of the concept (*subsection 2.2.2*). In an effort to avoid these difficulties, innovation is often equalised with the level of investments in research and development (R&D), which enables an easy quantification and, accordingly, an easy classification (as seen in *subsection 2.2.3*). However, this equality supposes innovation to be a one-dimensional concept, depending – for all companies and sectors – solely on R&D expenditures. That this is not the case can be seen in the results of studies performed on data of the Community Innovation Surveys (CIS) (Cox *et al.*, 2002; Hirsch-Kreinsen, 2008), a series of studies that attempts to gather data on innovativeness throughout different sectors in Europe.

These Community Innovation Surveys are part of a long-running project to measure innovation at firm level throughout the European Union. Its prime advantage may lie in its holistic approach to innovation; the surveys use a process approach and seek indicators at different stages of the innovation process (the input stage, the throughput stage, and the output stage), while innovation studies that focus on R&D expenditures merely look at (one of) the factors of the input stage (Wubben, 2002).

Based on the results of the CIS studies, some authors have formulated lists of factors that can be used to measure the degree of innovation of a company – the innovation indicators. The most popular of these indicators will be discussed here, along with their advantages and disadvantages :

- R&D efforts can be measured by the R&D expenditure indicator – *i.e.* the amount of money invested in R&D activities –, the R&D intensity indicator – *i.e.* the ratio of total R&D expenditures and the turnover of the company – and by the ratio between the amount of employees carrying out R&D activities of the total amount of employees. An advantage of these three indicators is the wide availability of data, but a disadvantage is the neglect of small-scale ‘unsponsored’ R&D. Another disadvantage is the secrecy that some firms maintain to keep their information to themselves (Kleinknecht *et al.*, 2002; Hirsch-Kreinsen, 2008).
- The number of patents granted and of patent applications are two other output indicators of innovation that are frequently used. An advantage is that data are generally well available and reliable, but a disadvantage is that – obviously – innovations that have not been patented are not included in the numbers. Another disadvantage is that some patents may be much more important for the company than others, while they are all counted in the same way (Kleinknecht *et al.*, 2002). Another related indicator is the rate of utilization of patents



owned by the firm. This indicator has the disadvantage that it is very hard to obtain data, as companies are reluctant to publicize these data. Besides, many companies may not even have this data available internally (Chesbrough, 2003). Therefore, this indicator is not further looked at in this research paper.

- The number of announcements of new product and the number of new products that have been developed in the past year are two other output indicators for innovation. An advantage of these two indicators is, again, that the acquisition of data is relatively easy, but a disadvantage is that the selection of the sources of information can significantly affect the results. Other disadvantages are that numbers will at best be rough guesses, and that in some industries secrecy may hinder data acquisition (Kleinknecht et al., 2002). Two other related indicators are the company's sales from new products and share of new sales. The latter is the ratio between sales from new products and all sales. Both have the same disadvantages as the related indicators of new product announcements and new product developments, but have the additional disadvantage of difficulties in obtaining such information (Chesbrough, 2003).
- The time it takes for ideas to get from the laboratory to the market is another indicator for innovation, which differs from the others in that it deals with the throughput stage of the innovation process (Chesbrough, 2003). For this indicator, the disadvantages (guessing of results, difficulties in obtaining data, secrecy) are so many that this indicator will not be further looked into in this research.
- Two additional output indicators for innovation were found in the case study on Unilever's level of innovation (*section 4.1*). These are the number of scientific publications that are produced by the company and the citation impact of these publications.

In the next chapter (*chapter 4*), the indicators that have been found are used to quantify the degree of innovation in the selected agri-food companies. To summarize the list that has been given above and to give a clear overview, the indicators for innovation will be listed once more – this time they are sorted to the stage of the innovation process to which they belong (*i.e.* to either the input stage or output stage). With this list, this research paper's second sub question (SQ2) that has been raised in *section 1.2* is addressed. This sub question was :

SQ2    What are the most important indicators to measure the innovative performance of companies in all sectors ?



The input indicators for innovation are :

- the R&D expenditure of the company;
- the R&D intensity of the company: the ratio of total R&D expenditures and the turnover ;
- the ratio between the amount of R&D employees and the total amount of employees of the company (as a percentage).

The output indicators for innovation are :

- The number of patents granted to the company ;
- the number of patent applications of the company ;
- the number of new product announcements by the company in the past year ;
- the number of new products developed by the company in the past year ;
- the company's sales from new products ;
- the company's share of new sales: the ratio between sales from new products and from all products ;
- the number of scientific publications produced by the company ;
- the citation impact of the scientific publications produced by the company.

#### 2.2.5. Open innovation

In the previous subsections, it has been argued that the concept of 'open innovation' is increasingly used throughout all industries, and may present a valuable strategy to follow especially for low-tech and agri-food companies. In this subsection, this concept will be further discussed, to explain its meaning and its implications. First, the backgrounds leading to the signalling of the concept are explained. Second, the characteristics of the concept are detailed. Third, the possibility to innovate by acquiring external knowledge is discussed as well as the various modes to do so.

Previously, innovation was usually considered a purely internal affair: it was a sort of barrier to prevent competitive entry onto the market. Following the 'first mover' principles as advocated by Alfred Chandler (e.g. Chandler, 1994), it was considered vital to secure all such strategic assets – such as innovation – firmly within the company. It is nowadays still rather the norm than the exception that innovations are jealously guarded by their owners. Under this paradigm, any latecomer faces *“investments [that] not only had to be larger, [... but] also riskier, precisely because of the first movers' competitive strength”* (Chandler, 1994).

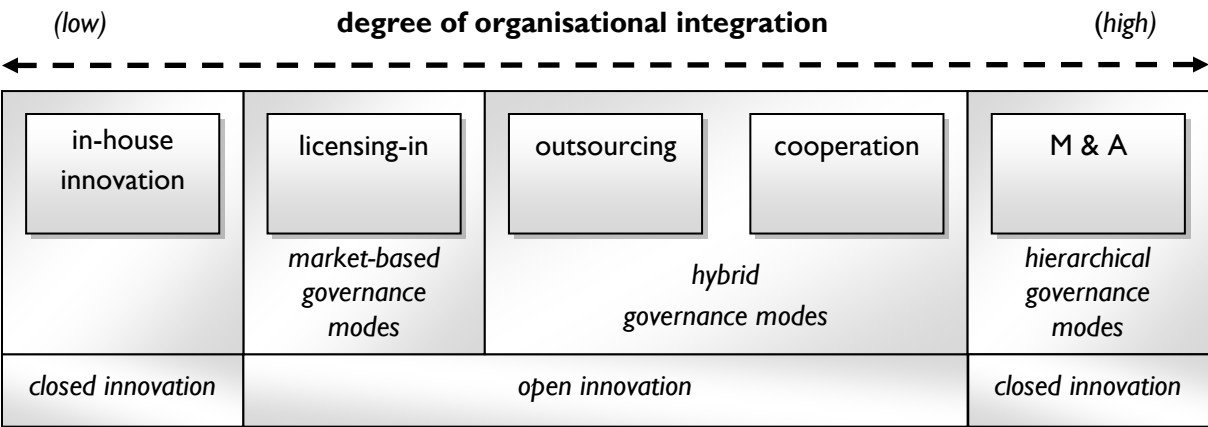


Recently, however, rivals have been seen to ‘over-innovate’ firms that were traditionally seen as innovative, while they started their catch-up with only limited knowledge of their own. This has led several scholars, most notably Chesbrough (2003), to signal a paradigm shift where innovation is not purely internal anymore: a transition may well have started away from the traditional closed innovation model to a new *open innovation model*.

The new paradigm differs from the more traditional views in some essential ways. The key feature of open innovation is the treatment of R&D as a separate and open system, allowing knowledge and ideas to move freely inside and outside the company, or as Chesbrough puts it, “*valuable ideas can come from inside or outside the company, and can go to market from inside or outside the company as well*” (Chesbrough, 2003). This can be achieved in a number of ways, e.g. by companies actively seeking out external sources and ‘fuelling’ them up with potentially beneficial information, by exporting spill-over innovation not fitting within the business model to other parties, or by defining new measurement units for innovation (*ibid.*).

But there is yet another way: the *acquisition* of external knowledge. After all, the knowledge that is required to innovate may as well be obtained from external sources. This holds true for ideas, paths to markets, and technologies as well (*ibid.*). Two possible sources exist from which to acquire knowledge; sources that are publicly available, such as universities and governmental institutions, or – alternatively – the option to acquire knowledge from other companies, by making use of one of a variety of knowledge acquisition strategies. Many different modes of knowledge acquisition strategies are possible, but Batterink (2009) has analysed four important modes and their relationship to performance in innovation – *licensing-in*, *outsourcing*, *inter-organisational cooperation*, and *M&A’s (mergers and acquisitions)*. Figure 6 illustrates these four strategy modes on a scale of increasing organisational integration; each strategy requires a specific level of organisational integration and a specific governance mode. This continuum of knowledge acquisition strategies should not be confused with the continuum of partnering that has been shown in section 2.1.1, although the modes are somewhat similar to the forms of partnering.





**Figure 6: Modes of innovation and the degree of organisational integration** (adapted from Batterink, 2009)

An M&A so completely integrates the source of external knowledge that it should be seen as a form of closed rather than open innovation. Still, it shares many of the characteristics with 'lower-level' knowledge acquisition strategies, though, of course, the most significant difference is the absence of a flow from the inside to the outside of the company.

To conclude this subsection, it has been seen that the newly signalled concept of open innovation – characterized by the possibility to acquire knowledge and ideas from outside the own company – is increasingly gaining weight. Open innovation can be achieved by acquiring external knowledge, using one of several possible strategies. On the continuum of organisational integration, the most extreme is the M&A knowledge acquisition strategy.

### 2.2.6. M&A's and innovation

In this final subsection of this chapter, the linkage between M&A's and innovation is investigated. First, the differences between M&A and other knowledge acquisition strategies are discussed. Second, the issue of the uncertainty on whether or not M&A's even contribute to an increase in innovation is raised and the implications of an answer on such a question are discussed. Third, the various possible linkages between M&A's and innovation are explained. Fourth, four reasons why M&A's may have a positive influence on the level of innovations, and three reasons why M&A's may have a negative such influence are discussed.

All the desirable effects of innovation make it an important goal for managers in all sectors to strive at, and – as has been discussed in the previous subsection – the means to achieve these ends are more often than before sought from external sources. Of the strategies to acquire knowledge from external sources, the most complex one is an M&A. Also, an M&A is categorically different from the other strategies, in a number of ways. Firstly, as seen earlier, it cannot be considered a strategy of

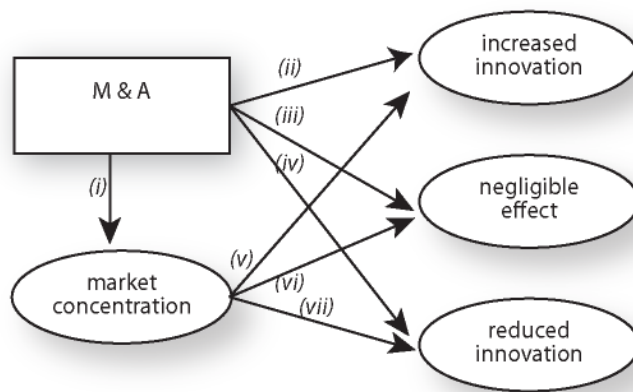


open innovation. Secondly, an M&A will be much more disruptive than the other strategies. Thirdly, an M&A is usually driven by other motives besides the need to innovate only.

These differences give rise to the question whether or not an M&A even contributes to an increase in innovation at all. Although a simple question, no definite answer has yet been given, as “*no extensive review of the empirical literature on this specific research topic is available*” (de Man and Duysters, 2005). Previously, conclusions seemed inconclusive or even negative (Hitt *et al.*, 1991; de Man and Duysters, 2005), but more recent studies cautiously indicate that a positive industry-wide correlation between a M&A and the level of innovation does exist (a.o. Cefis *et al.*, 2007a; Cefis *et al.*, 2007b; Batterink, 2009). A definitive answer on this question would have important consequences. Not only would it be beneficial to the merging entities, it would also provide an argument that may lead to the permission of an M&A that would otherwise not be allowed by national or international antitrust authorities. As seen earlier in subsection 2.1.5, the appeal to efficiency defence is based on the idea that an increased level of innovation is beneficial to society, and if an M&A positively contributes to innovation, it may be that the positive effects to society outweigh the negative effects that a monopoly position has on society (Cefis *et al.*, 2007a).

This all has been illustrated in Figure 7: an M&A can lead to an increased (*arrow ii*) or reduced (*arrow iv*) level of innovation directly, or – via an increase of their market concentration (*arrow i*) – to an increased (*arrow v*) or reduced (*arrow vii*) level of innovation indirectly. Alternatively, an M&A may have a negligible effect on innovation, either directly (*arrow iii*) or indirectly (*arrow vi*). It should be noted that more than one force might be at play at the same time – or separated by a time lag –, thereby augmenting or lessening each other’s effects and potentially obscuring results. For instance, *arrow ii* may be at work immediately after the M&A took place leading to an increase in the level of innovation, but *arrow vii* may start to work leading to a decrease after a one year’s lag. In such a case, the values for the level of innovation over the years after the M&A could be observed to have the form of an inverted U.





**Figure 7: Possible linkages between M&A, market concentration, and the degree of innovation** (adapted from Cefis et al., 2007a)

Although no clear answer on the earlier question – whether or not an M&A even contributes to an increase in innovation at all – has been given, four reasons can be given why an M&A could contribute to an increase in the level of innovation. First, for some M&A's one of the motives to conduct an M&A has been seen to be a search for an increase in innovation (although this motive has also been seen not to be as important in the low-tech sector as in other sectors). If the motive of an M&A is such an increase, it would be logical that the level of innovation in the years following the M&A would rise (de Man and Duysters, 2005). Second, an M&A leads to an increase in size of the firm, and economies of scale allow the now-larger firm to increase its R&D budgets. Larger budgets allow more and more ambitious projects to be researched, and the risks of innovation to be spread (*ibid.*). Third, the combination of knowledge of the two (or more) pre-M&A companies may allow innovations to emerge, or innovations to be realised faster, because the new company is able to combine complementary knowledge of the pre-M&A companies (*ibid.*). Fourth, codes of best practices regarding productivity in innovation can be exchanged between the two (or more) pre-M&A firms (*ibid.*). The second, third, and fourth of these reasons would be most relevant in the period that follows directly after the M&A took place. Only the first of these reasons, which has been seen not to be as important in the low-tech sectors as in other sectors, would be relevant for a longer period.

On the other hand, three reasons can also be given why an M&A could contribute to a decrease in the level of innovation. First, an M&A is a demanding and involving operation for a company, which may divert attention from both the company's management and employees away from innovation (de Man and Duysters, 2005). Second, the post-M&A company could be led to decrease its R&D budgets, as the M&A leads to underperformance in other business areas. With the high rate of failure of



M&A's, this would lead to a decrease in the level of innovation (*ibid.*). Third, an M&A leads to the integration of all of the innovations of the two (or more) companies. This – in contrast with more specifically tailored knowledge acquisition strategies – includes innovations that are not required for the post-M&A company's goals and cannot be used in a meaningful way, or to 'indigestibility' of innovations. If the post-M&A company is unable to 'digest' the newly acquired innovations, such innovation will be spilled (*ibid.*). Although the first of these reasons applies mostly to the period that follows directly after the M&A took place, the second and third reasons would be relevant for a longer period.

In this subsection, the importance of the question whether or not M&A's affect the innovative performance of a company has been discussed. No definite academic consensus yet exists on the effect of M&A's on innovation, but it has been seen that an answer to such a question would prove highly relevant as a pleading argument to companies that wish to perform a large M&A. Different forces may be at play simultaneously, which may potentially obscure results.

An M&A could increase the level of innovation for four reasons, as (a) such an increase is sometimes the motive of the M&A, it would be logical that post-M&A levels would indeed increase, (b) economies of scale will allow the post-M&A company to increase its R&D budget which will lead to more innovations, (c) the complementary knowledge of the pre-M&A companies can be combined, and (d) codes of best practices regarding productivity in innovation can be exchanged. However, an M&A could also decrease the level of innovation for three reasons, as (a) an M&A is a demanding operation that may divert managerial and employee's attention away from innovation, (b) underperformance in other areas after the M&A could lead to decreased R&D budgets and decreased levels of innovation, and (c) the indigestibility of spill-over innovations. Most of the positively influencing reasons are relevant for the period that follows directly after the M&A took place, while most of the negatively influencing reasons are relevant for a longer period.



### 3. Methodology of the case studies

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This chapter consists of two sections that discuss the reasons why the case study research strategy has been chosen as well as the selection process of the cases that are examined in the next chapter. In the first section, the reasons why a qualitative approach rather than a quantitative approach, and why the case study strategy rather than other research strategy have been chosen are given. In the second section, the process of deduction that led to the choice of cases is described and the indicators for innovation that have been found for these cases are summarized in a grid.

#### 3.1. Choice of the case studies strategy

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In the addressing of the first sub question (*SQ1*) in the previous chapter, it has been seen that although much knowledge is available on the concepts of M&A's and innovation, not much knowledge is available on the impact of M&A's on innovation. In an effort to fill one of the gaps in knowledge on this impact, this research has been set up as a theory developing research examining the impact of M&A's on the innovation performance of agri-food companies.

To fill these gaps in knowledge on the field, a qualitative approach was chosen rather than a quantitative approach. The latter could also have been chosen: in signalling the positive impact of acquiring a firm and innovation performance in his cross-study of 686 industrial firms, based on CIS-3 and CIS-4 data (see sections 2.2.4 and 2.2.6), Batterink used a quantitative approach to come to his findings (Batterink, 2009). Using available data on the innovative performance of European agri-food companies, his findings could have been tested quantitatively in a specific situation with a theory testing research rather than a theory developing research. No clear overall theoretical framework – with reasons and implications – for such a positive impact was found during the literature study. Rather than repeating Batterink's work using a smaller sample – as would be the case if a quantitative research on agri-food data would have performed –, it was chosen to contribute to the emerging knowledge on the area by looking at specific situations and by searching for insights on the impact of M&A's on the innovative performance of companies in the agri-food sector.

Having chosen the latter, the case study approach has been chosen, being a qualitative research strategy that fits the research objective well. In section 1.5, the case study strategy was seen to strive at gaining “*a profound insight into one or several objects or processes that are restricted in time and space*” (Verschuren and Doorewaard, 1999) in order to give a holistic and qualitative insight into the matter at hand. A small number of research units should be analysed in a labour-intensive way – with more depth than breadth – using qualitative data and research methods, and preferably by means of a



triangulation of methods and sources. The qualitative rather than the quantitative approach of this strategy favours a labour-intensive use of a small number of research units over larger numbers and allows more depth in the analysis. Furthermore, it provides a holistic view of the object or process involved (Verschuren and Doorewaard, 1999; 't Hart *et al.*, 2005).

Case studies have their advantages, e.g. they provide a holistic view of the situation, requires less pre-structuring and are therefore more flexible than other strategies, and results are slightly less artificial and therefore more likely to be accepted. However, it can also be disadvantageous to use a case study in some situations, e.g. the small number of cases often result the external validity to be questioned – in other words it is hard to generalise conclusions (Verschuren and Doorewaard, 1999). Furthermore, the choice of the cases that are researched is crucial: the choice of the sample of cases determines the limits of external validity and generalisation (Huberman and Miles, 2002).

Although an ideal case study includes a triangulation of both methods and sources, the four case studies in the next chapter do not include a triangulation of methods. It was not possible to include the latter in the time frame.

### 3.2. Selection of relevant cases

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Given the crucial role of the choice of the cases in determining the validity and generalisation of findings, this section describes the way in which the cases that are examined in the case studies in the next chapter have been selected. First, the process of deduction to a list of twenty-one M&A's between agri-food companies is described. Second, the selection of those M&A's to examine in the case studies is described. Third, the indicators for innovation that have been found for the four selected case studies are summarized in a grid.

Since August 1999, the European Commission has approved sixteen M&A's of Dutch agri-food companies. These, with five more M&A's that were approved by the Dutch antitrust authority – the NMa –, form the population. These twenty-one M&A's were selected out of all M&A's that were approved by these authorities if they met two conditions: that they (a) concerned agri-food companies based in the Netherlands, and (b) were approved after August 1999. The reason why agri-food companies have been chosen has been described earlier (in *section 1.4*) and the NACE categories to which they agri-food companies are classified can be found in *Appendix A*. The definition of agri-food companies in this research paper excludes beverages producing companies – one additional M&A would apply if these would have been included – to limit the list of M&A's to a more manageable amount. The reason why companies that are based in the Netherlands have been chosen is to limit the population to a manageable amount of companies that are comparable with each other.



The reason why only M&A's that have been announced after August 1999 have been chosen is that older M&A's would have been less relevant and that data for pre-1999 M&A's would be limited, which would make such M&A's impractical to research.

The twenty-one M&A's that form the population of Dutch agri-food companies that conducted an M&A since August 1999 can be found in *Table 2*. From this population, five M&A's concern Unilever, five concern CSM – including one that concerns both Unilever and CSM –, four concern Vion or its predecessors, two concern DSM, and the others concern companies that occur on the list only one time.

Case number	Date of approval	Company A	Company B
M.1802	25-1-2000	Unilever	Amora-Maille
M.1990	16-8-2000	Unilever	Bestfoods
M.2084	28-8-2000	CSM	European Bakery Supplies Business (Unilever)
Zaak 2103	12-10-2000	CSM N.V.	Continental Sweets Netherlands B.V.
M.2302	25-1-2001	Heinz	CSM
M.2350	1-3-2001	Campbell	ECBB (Unilever)
M.2972	31-3-2003	DSM	Roche Vitamins
M.3188	27-6-2003	ADM (Archer Daniel Midlands)	VDBO (UK, division of Unilever)
M.3337	13-1-2004	Best Agrifund	Nordfleisch
M.3535	17-9-2004	Van Drie	Schils
M.3702	17-1-2005	CVC	CSM
M.3818	4-5-2005	Gilde Buy-Out	DSM Bakery Ingredients
M.3968	28-10-2005	Sovion	Südfleisch
Zaak 5460	7-2-2006	Slachthuis Groenlo	Dumeco
Zaak 5476	24-4-2006	PepsiCo	Duyvis
Zaak 5703	20-4-2007 25-9-2006	Cosun	CSM
M.4617	21-8-2007	Nutreco	BASF
Zaak 5901	21-8-2007	Bloemenveiling Aalsmeer	Floraholland
M.4842	12-9-2007	Danone	Numico
M.5046	17-12-2008	Friesland	Campina
M.5204	25-6-2008	Vion	Grampian

**Table 2: List of Dutch agri-food companies that conducted an M&A from August 1999 to August 2008 (EC, 2009; NMA, 2009)**

Using the population of twenty-one M&A's, a selection was made of M&A's to examine in a case study. Four case studies were conducted in the end. Three involved one M&A from the population – the M&A's between Unilever and Bestfoods in 2000, between Danone and Numico in 2007, and between Friesland Foods and Campina in 2008. For these three M&A's, enough data on the indicators for innovation were available to construct a meaningful case study. A fourth case study was also performed concerning CSM, which is different from the other three case studies. CSM was the only company, out of the different companies that were involved in the M&A's from the population,



to provide detailed data on indicators for innovation on a divisional level. This allowed a much more detailed study on the indicators for innovation. CSM was involved in five of the M&As from the population, and rather than discuss these five case studies separately they have been combined into one case study. Therefore, eight M&A's from the population of twenty-one M&A's were selected for further examination in four case studies.

Of the other M&A's from the population of twenty-one, a number of M&A's did not qualify, as not enough data could be obtained. This was true for Vion – accounting for five M&A's of the population –, a Dutch food producing company that performed a series of M&A's culminating in its 2008 M&A with Grampian. Vion does not provide any public information on indicators for innovation. Also, the company only applied for two patents since 1998 – not very significant. The M&A between FloraHolland and VBA (Bloemenveiling Aalsmeer) did also not qualify for a case study. The M&A was approved in August 2007, but neither the post-M&A company nor both pre-M&A companies applied for any patents nor publicized data on indicators for innovation since 1998. On one occasion, however, did the post-M&A company mention the amount of its full-time employees that were active in R&D, for the year 2008: they are just three people out of 3,555, or 0.08% of all employees (FloraHolland, 2009). Three other cases from the population involving divisions of Unilever did not qualify for a case study as well: the M&A between Unilever and Amora-Maille – Amora-Maille's turnover was less than 1% of Unilever's and therefore the impact of the M&A on Unilever's indicators for innovation would have been very small – and two M&A's between parts of divisions of Unilever and other companies – their impact being limited as well. It was no longer possible to further examine the four remaining M&A's from the population – between DSM and Roche Vitamins, DSM and Gilde Buy-Out, Van Drie and Schils, Duyvis and PepsiCo, and BASF and Nutreco – within the time frame of this research, but these M&A's can be further investigated in future research.

In the next chapter, the four cases studies that were selected are described. The indicators for innovation that have been found for these cases are shown in *Figure 8*. Friesland Foods and Campina are not publicly listed companies and therefore, no information has been given on their quote on stock markets. The labels 'some' in *Figure 8* indicate that the indicator for innovation for the specific case study was only found for a limited number of years.



	Other indicators		Indicators for innovation								
	Turnover	Quote and corrected quote	R&D expenditure	R&D intensity	Ratio between R&D employees and all employees	Patents granted	Patent applications	Scientific publications	Citation impact	Sales from new products	Share of new sales
Case I: Unilever and Bestfoods	yes	yes	yes	yes	yes	some	yes	yes	yes	no	no
Case II: Danone and Numico	yes	yes	yes	yes	yes	no	yes	no	no	no	no
Case III: FrieslandFoods and Campina	yes	n/a	yes	yes	no	no	yes	no	no	no	no
Case IV: CSM	yes	yes	yes	yes	no	no	yes	no	no	some	some

**Figure 8: The four cases and the indicators for innovation found**



## 4. Case studies on M&A's and innovation

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In this chapter, the third sub question (SQ3) that has been raised in *section 1.2* is addressed. This sub question was :

SQ3 Do agri-food companies that have recently conducted an M&A have a relatively high score on the indicators that measure innovative performance ?

In the five sections of this chapter, this sub question is addressed by examining four cases of agri-food companies that conducted an M&A in recent years, in the following order:

- 3.1. In the first section, the case of the M&A between Unilever and Bestfoods is examined. The history of both companies and their record of previous M&A's are briefly described, and the indicators for innovation for this M&A are examined.
- 3.2. In the second section, the case of the M&A between Danone and Numico is examined. The history of both companies and their record of previous M&A's are briefly described, and the indicators for innovation for this M&A are examined.
- 3.3. In the third section, the case of the M&A between Friesland Foods and Campina is examined. The history of both companies and their record of previous M&A's are briefly described, and the indicators for innovation for this M&A are examined.
- 3.4. In the fourth and final section, the series of M&A's and divestments that CSM has conducted over the years are examined. The history of CSM, and its record of previous M&A's are briefly described, the divisional structure of the company is described, the indicators for innovation for the divisions that experienced an M&A or divestment are examined, and the indicators for innovation for the whole company over the years are examined.

### 4.1. Case I: The M&A between Unilever and Bestfoods

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In this section, the M&A between Unilever and Bestfoods and its impact on the indicators for innovation are examined. First, the M&A is introduced. Second, the history of Unilever and Bestfoods is briefly described. Third, the available indicators for innovation of the combination of Unilever and Bestfoods are examined.

On 16 August 2000, the Anglo-Dutch consumer goods and food producing company Unilever notified the European Commission of its intention to acquire the US food producing company



Bestfoods by way of a purchase of shares (Case M.1990, 2000). After the Commission declared its non-opposition to this M&A on September 28<sup>th</sup>, 2000, the process of integration could begin, starting on January 1<sup>st</sup>, 2001. Only a few months before the intention was announced, on March 8<sup>th</sup>, 2000, the French division of Unilever – Unilever France S.A. – had received another declaration of non-opposition from the Commission for an M&A with the French food-producing company Amora-Maille (Cas M.1802, 2000).

Unilever PLC (based in London, UK) and Unilever N.V. (based in Rotterdam, the Netherlands) are two companies with different shareholders but a combined management and operations. They effectively operate together as one dual-listed company: the Unilever Group (henceforth Unilever). Unilever is a major Anglo-Dutch consumer goods and food producing company and has been in existence since an M&A between a British and a Dutch company in 1930. Unilever operates internationally with an employee base of 174,000 and a turnover of € 40.5 billion in 2008. The company emphasizes its thirteen brands selling more than € 1 billion per year – including Blue Band, Dove, Knorr, Lipton, and Omo, but also a variety of other brands –, the activities of which are concentrated into four distinct categories (savoury, personal care, ice cream and beverages, and home care). Apart from its M&A's with Bestfoods and Amora-Maille in 2000, the company has had no M&A activity requiring non-opposition from Dutch or European antitrust authorities in recent years (Unilever, 1999-2009).

Amora-Maille is a relatively small French food-producing company especially known for its Dijon-based mustard producing facilities. In 1999, the year before its M&A with Unilever, it had a turnover of about € 350 million (Financieele Dagblad, 1999b), which was less than 1% of Unilever's turnover at that time. Its absorption into Unilever's structure would not have a substantial effect on Unilever's indicators for innovation. Therefore, this specific M&A is not investigated any further in this research. The reason why this specific M&A required the European Council's permission is that Amora-Maille realised nearly one-third of its turnover outside of France, which is a criterion for the M&A to be considered having a Community dimension (Cas M.1802, 2000). The price offered by Unilever for the M&A is reported to have been € 680 million, or sixteen times the company's expected yearly profit (Financieele Dagblad, 1999b).

Bestfoods, on the other hand, had a turnover of € 8.1 billion in 1999 – about 20% of Unilever's turnover in that same year. Therefore, its absorption into Unilever would have had a much more substantial impact than Amora-Maille's. Bestfoods – or the Best Foods Corporation – was a publicly listed US food producing company that operated internationally and derived nearly half of its 1999 turnover from countries in the European Union. In 1999, the company employed 44,000 people.



Bestfoods was – and still is – active in producing savoury products, mayonnaise, other dressings, bakery products, and in catering service. Two of the company's well-known brands are Knorr and Hellmann's. For the M&A, Unilever acquired all of Bestfoods' outstanding shares, worth US\$ 20.3 billion (Unilever, 1999-2009; Case M.1990, 2000).

Media have speculated that Unilever may have overpaid for the deal, while they would have been better off investing their billions in other companies or sectors that are expanding more rapidly. Although in July 2004 Rudy Markham – Unilever's Financial Director at that time – stated that at that point *“the return on invested capital from Bestfoods [is] now greater than the deal-specific weighted average cost of capital”* (Financial Times, 2004), the targets that had been set were not met and had to be lowered and dropped in 2004; the M&A with Bestfoods had been calculated to contribute to achieve these targets (Financieele Dagblad, 2001). These targets had been set in 1999 – as part of an ambitious 5-year 'path to growth' strategy – and were aiming at a 5% to 6% long-term growth in turnover. In February 2004, these targets were lowered to 3%-5%, and then, in July, all targets were dropped and no further prognoses were given (Financieele Dagblad, 2004a). Many different press articles over the years share the opinion that Unilever did indeed overpay, although some observers point at the positive sides of the M&A, i.e. that Unilever has had a significant increase in exposure in the food sector since the M&A (Financial Times, 2004). Generally, press releases and articles contribute to an image of an M&A that, although it failed to meet expectations, is at least still justified by Unilever's management to the outside world.

The years 2000-2004, after the M&A with Bestfoods, have been characterized by divestments, job shedding, and re-focus operations. The year 2004 ended, after the aforementioned consecutive lowering and dropping of targets, with a profit warning (Financieele Dagblad, 2004b). External factors – a decreased level of consumer trust and fierce competition of low-cost competitors – can be credited for having played their part in these years, but the M&A itself would certainly have been an important reason for the company's bad performance until 2004, as was confirmed by Anthony Simon (a senior ex-Bestfoods and ex-Unilever marketing manager) in a 2004 interview (*ibid.*).

After all these developments in the years prior to 2005, Unilever made a number of changes: a new management structure was announced in February 2005 with one instead of two CEO's, a re-focus operation was announced involving the selling of a number of major brands from September 2005 onwards, and several factories were closed and their employees fired in 2006 and 2007 (Elsevier, 2005a, 2005b, 2007b; Tweede Kamer, 2007). The results of all these operations were evidently positive, as 2007 and 2008 saw increases in turnover, profit margin, and share prices (Elsevier, 2008a). Comparing numbers before and after these operations is somewhat blurry, though, because

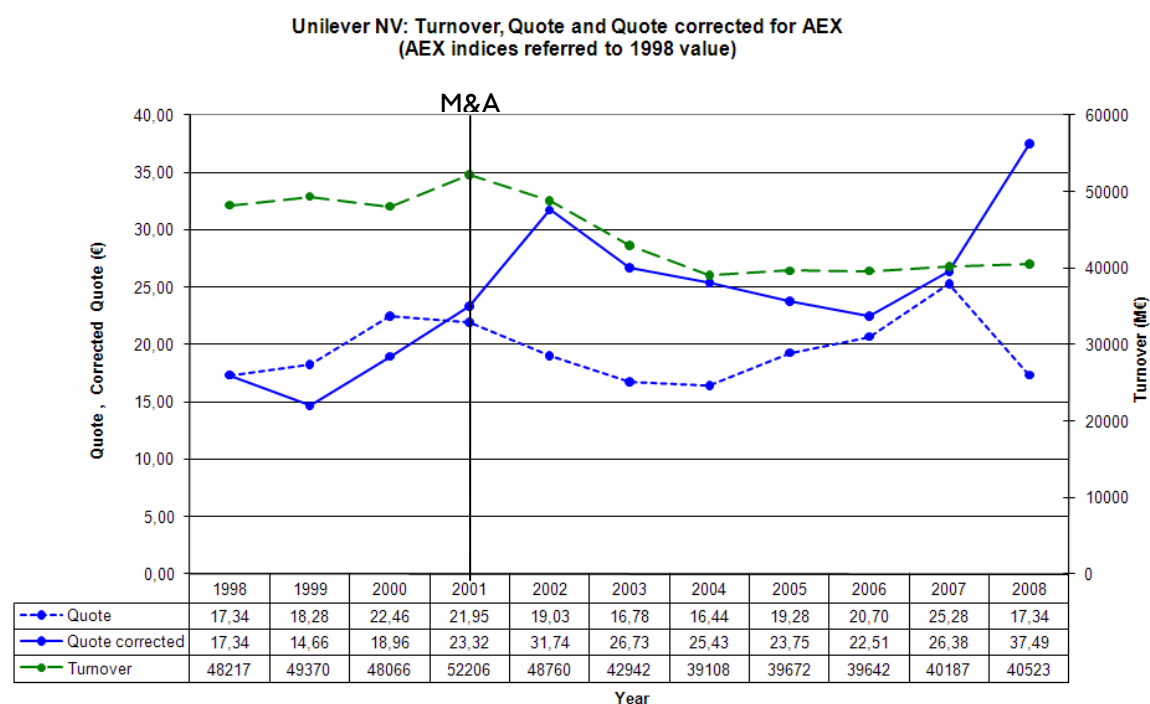


after 2004 Unilever changed its accounting policy to comply with the International Financial Reporting Standards (IFRS) resulting in the occurrence of large differences in all financial values in the company's statements before and after 2004. In April 2009, there have even been rumours of plans for a new M&A (Financieele Dagblad, 2009a).

In *Figure 9* and *Figure 10*, Unilever's yearly turnover (the green dashed lines with values on the right Y-axis), as well as both Unilever N.V.'s (the dotted blue line in *Figure 9* with values on the left Y-axis) and Unilever PLC's (the dotted blue lines in *Figure 10* with values on the left Y-axis) quotes on the last trading day of the year have been shown. Furthermore, quotes have been corrected for variations in indices (the solid blue lines in both figures with values on the left Y-axes). These corrected values are calculated by dividing the quote's yearly closing values by the ratio between the index' closing value in that year and in the first year, e.g. Unilever N.V.'s 2002 closing quote is € 19.03, but the AEX' closing value in that year was 322.73 while the AEX' closing value in the first year of the series, in 1998, was 538.36. Therefore, Unilever N.V.'s corrected 2002 quote is € 31.74.

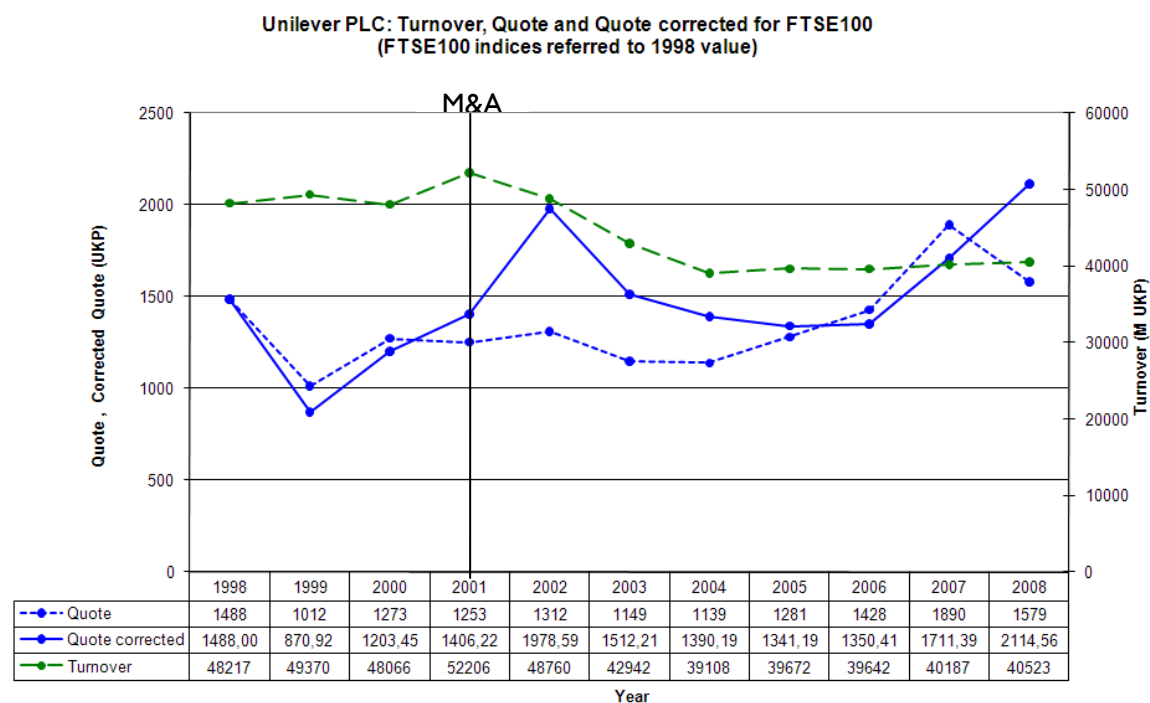
In *Figure 9* and *Figure 10*, many of the effects that have been described can be seen to have their effect: company turnover decreased from 2001 to 2004 and stabilized thereafter, and quotes fell from 2002 to 2004 and recovered after 2004. While Unilever N.V.'s and Unilever PLC's quotes show differences, both corrected quotes are very similar over the years and present a somewhat different picture than the uncorrected quotes. The corrected quotes both show a strong rise from 1999 to 2002, a peak in 2002, a strong decline in 2003, a gradual decline up until 2006, and finally a rise yet again in 2007 and 2008. The peaks of the corrected quotes in 2002 in both figures occur in the year after the M&A, when turnover had already started its decline. Only after more than one year after the M&A did the investors apparently start losing some of their confidence.





**Figure 9: Overview of Unilever's turnover and Unilever NV's AEX quotes and corrected quotes 1998-2008**

(Unilever, 1999-2009; Belegger.nl, 2009b; Financieel Dagblad: Beuzen, 2009a)

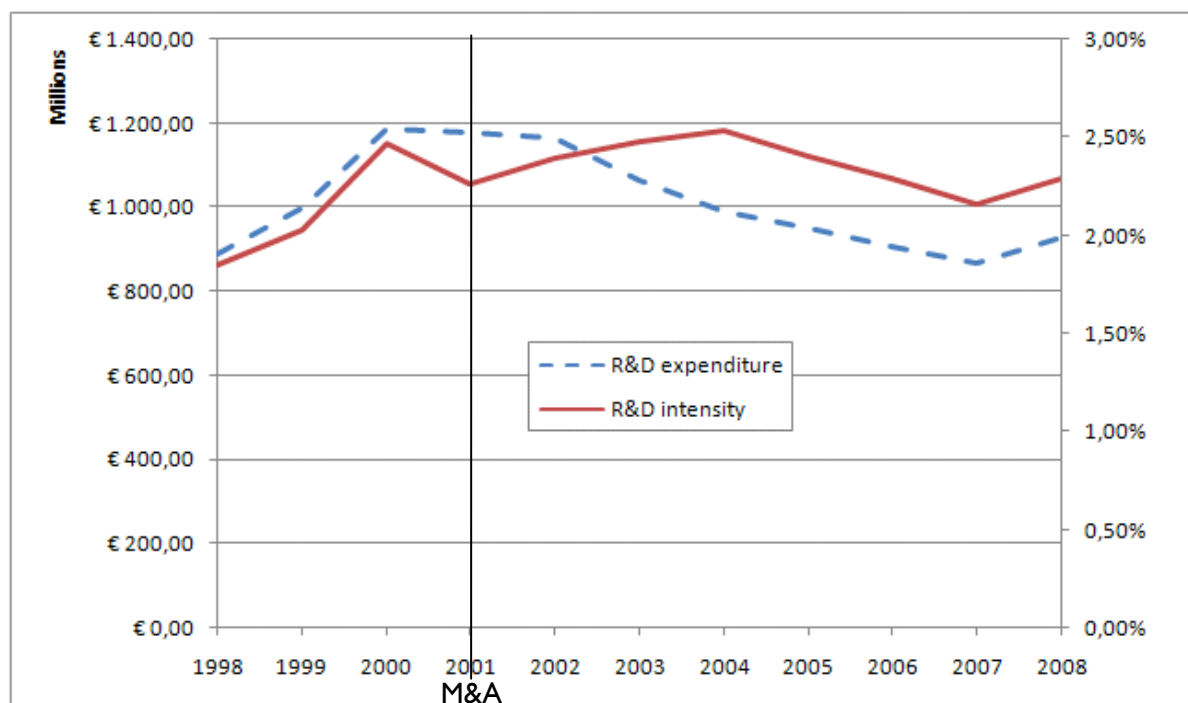


**Figure 10: Overview of Unilever's turnover and Unilever PLC's FTSE100 quotes and corrected quotes 1998-**

**2008** (Unilever, 1999-2009; Belegger.nl, 2009d, 2009g)



Figure 11 shows two of the indicators for innovation that have been found for Unilever and Bestfoods: R&D expenditure (the dashed blue line with values on the left Y-axis) and R&D intensity (the solid red line with values on the right Y-axis) for the years 1998-2008. R&D intensity has been defined as the ratio between R&D expenditure and company turnover. To compare pre-M&A data with post-M&A data, individual values for the companies on the indicators prior to the year of the M&A have been added up. It can be seen that R&D expenditure has been stable in 2001 and 2002 – the years directly after the M&A –, then decreased from € 1.17 billion in 2002 to € 0.87 billion in 2007, and then increased again to € 0.93 billion in 2008. In 2001 – the first financial year after the M&A –, R&D intensity decreased from 2.47% in 2000 to 2.26% in 2001, then gradually increased to 2.53% in 2004, fell to 2.16% in 2007, and rose again to 2.29% in 2008.



**Figure 11: Unilever's and Bestfoods' combined R&D expenditure and R&D intensity scores 1998-2008**  
(Unilever, 1999-2009)

The sudden decrease of R&D intensity from 2000 to 2001 is probably the direct result of the M&A: while Figure 11 shows the combined pre-M&A values of Unilever and Bestfoods (R&D intensity being the ratio between both firms' combined R&D expenditures and combined turnover), the two companies had very different R&D intensity values before the M&A – for Unilever this was 2.04% and



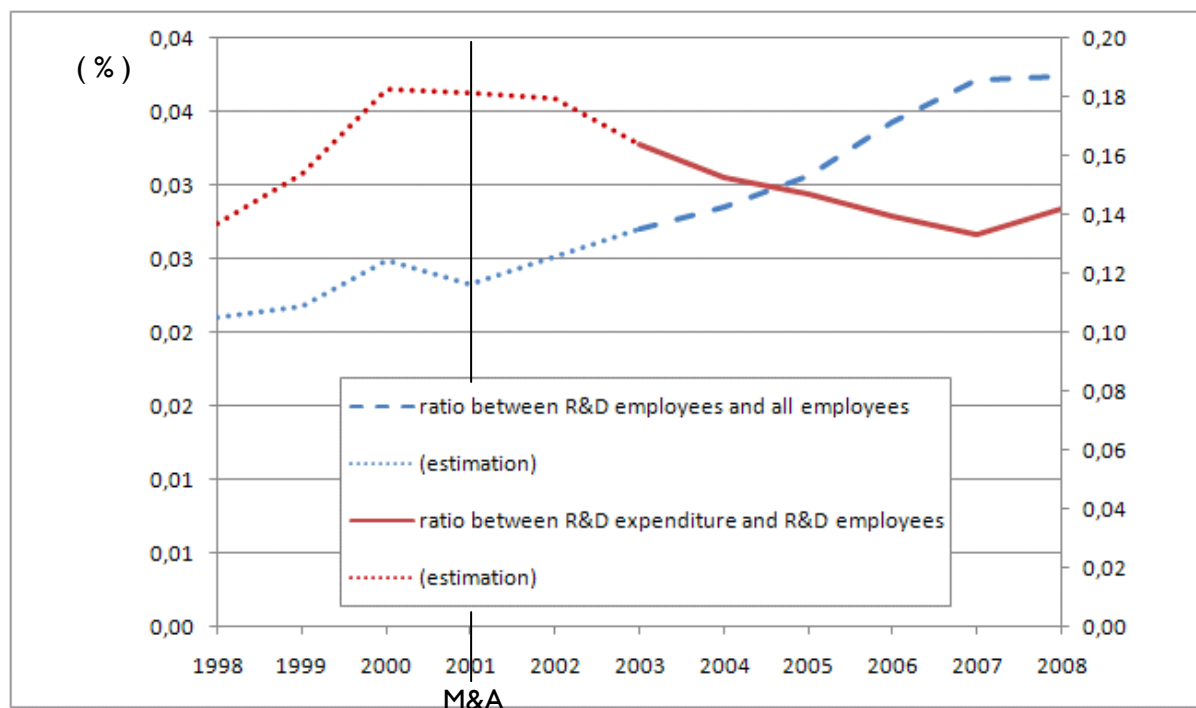
2.27% in 1998 and 1999 and for Bestfoods 0.80% and 0.81% respectively \*. It is understandable that R&D intensity suffered from integrating the activities of a company that has much lower R&D intensity. For the years after 2001, the increase in R&D intensity from 2001 to 2004 is remarkable, as in these years Unilever just experienced one important M&A, decreases in company turnover, operating profit, and (after 2002) R&D expenditure, and falling stock prices (and investors' trust). Only after 2004, when turnover stabilised and R&D expenditure continued to decrease, did the R&D intensity fall.

Figure 12 shows two other R&D related indicators for innovation for the combination of Unilever and Bestfoods in the years 1998-2008. The first of the two indicators is the ratio between R&D employees and all employees (the dashed blue line with values on the first Y-axis), and the second is the ratio between R&D expenditure and R&D employees (the solid red line with values divided by € 1,000,000 on the second Y-axis). Both these indicators are based on the availability of data on the amount of R&D employees. No data were available on the amount of R&D employees for the years prior to 2003, but as the number has remained stable from 2003 to 2008 (rising just 0.3% from 2003 to 2008 – from 6,500 to 6,520), the number of R&D employees has been estimated at 6500 in the years before 2003 as well. Although this estimation is especially vulnerable in the years around the M&A, those same years (2000-2002) saw a stable R&D expenditure and a relatively stable amount of R&D employees may therefore be expected. Still, caution should be observed in analysing the pre-2003 data; these estimated values in Figure 12 are shown as the small dotted continuations of the solid red line and dashed blue line.

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\* Although the companies only formally joined their activities on January 1<sup>st</sup>, 2001, no annual report has been published for Bestfoods as a separate entity for the year 2000. As the purchase took place in 2000, Unilever integrated Bestfoods in its consolidated 2000 annual report.





**Figure 12: Unilever's and Bestfoods' combined ratios for R&D employees vs. all employees and R&D expenditure vs. R&D employees 1998-2008** (Unilever, 1999-2009)

In this figure, the ratio between R&D expenditure and R&D employees shows no remarkable results. This is an obvious result, as the R&D employee base has been seen to be stable and the ratio therefore directly follows R&D expenditure. The ratio between R&D employees and all employees, however, shows a large increase from 2003 to 2008 from 2.71% to 3.75%. If the estimated pre-2003 values are taken into account, the only decrease is in the year 2001 after the amount of total employees was increased after the M&A. The steady rise of the ratio between R&D employees and all employees over the years can be explained by the steady decrease of non-R&D employees in the company given the near-stability of the R&D employee base: the result is an increased relative amount of R&D employees from an estimated 2.10% in 1998 to 3.75% in 2008.

In *Figure 13*, Unilever's and Bestfoods' patent applications and patents granted are shown (the solid blue and dashed red lines with values on the left Y-axis) as well as the ratio between patent applications and R&D expenditure (the green and purple dotted lines, multiplied by one million, on the right Y-axis). In the year 2001, the year that the first data were reported after the M&A took place, the amount of patent applications (the solid blue line) and patents granted (the dashed red line) rose from 2,149 to 2,362 and from 423 to 450, respectively. Although more patents were applied after 2001, the increase was less high than the years before: in 2002 and 2003, the amount of patent applications rose from 2,416 in 2002 – an increase of 54 – to 2,542 – an increase of 126 – in 2003. After 2003, the number of patent applications decreased rapidly to 1,319 in the year 2008. Data on



patent grants are only available from 2000 to 2004, but here too, first a rise – from 423 in 2000 to 450 in 2001 –, then a stabilization – to 447 in 2002 –, and then a decrease – to 393 in 2003 and 370 in 2004 – is signalled.



**Figure 13: Overview of Unilever's patent applications, patent grants and the ratio between patent applications and R&D expenditure 1998-2008** (EPOrg, 1998-2008; Unilever, 1999-2009)

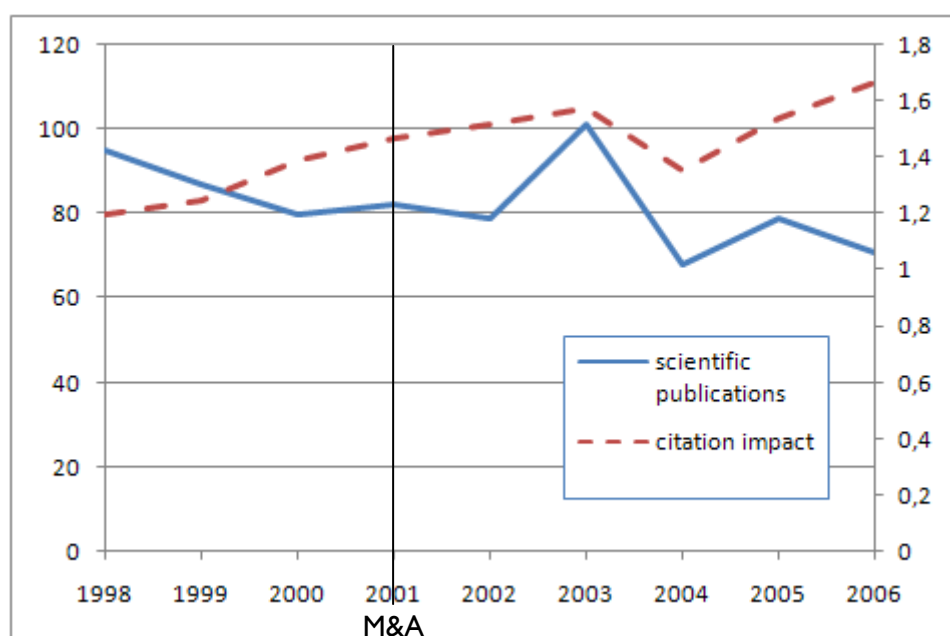
As seen earlier, Unilever's turnover decreased from 2001 – the first year after the M&A – onwards, and the company's R&D expenditure decreased as well as a result of the M&A, after 2002. These two factors probably explain the decrease in patent grants after 2002 and in patent applications after 2003. For the amount of patent applications, this can be verified by looking at the ratio between patent applications and R&D expenditure (the dotted green line in *Figure 13*): the jump in 2003-2004 is an indication of a time lag effect of one year between R&D expenditure and patent applications. If a one-year long time lag between the input indicator for innovation of R&D expenditure and the output indicator for innovation of patent applications is assumed, *i.e.* measured as the ratio between the number of patents in one year and the amount of R&D expenditure in the *prior* year (the dotted purple line), the decrease in the amount of patent applications after 2004 is more pronounced, as the pre-2004 values are relatively stable until 2004.

From *Figure 13*, therefore, the decrease in the amount of patent applications and grants after 2003 and 2002, respectively, can be interpreted as indirect negative effects of the M&A – as consequences



of decreased levels of company turnover and R&D expenditure. The direct effects of the M&A on these two indicators for innovation appear positive; patent applications increased for three more financial years, and patent grants started to fall after two financial years.

In *Figure 14*, two more output indicators for innovation are shown; the output of scientific publications (the solid blue line with values on the left Y-axis) and the citation impact of publications (the dashed red line on the right Y-axis) of Unilever. The amount of scientific publications fluctuates from 80 in 2000 to 82 in 2001 – the first year after the M&A – to 79 in 2002. In 2003, a peak level can be seen with 101 published articles, followed by a bottom level of 68 publications in 2004. Citation impact rose steadily after the M&A, until 2004 when it dropped to pre-M&A levels, then recovered and rose again.



**Figure 14: Overview of Unilever's scientific publications and citation impact 1998-2006 (CWTS, 2009)**

From the values in *Figure 14*, it can be seen that 2004 was a bad year for both the amount of scientific publications and the citation impact. In the years 2001-2003, however, the years directly after the M&A, citation impact steadily rose and publications remained equal. In this, both these indicators follow the trend of the company's other indicator for innovation that was mentioned previously, i.e. number of patent applications – with the greatest difference being both the indicator of scientific publications and of citation impact recovering more quickly in 2005 and thereafter. Here again, the difference between a negligible or a positive effect of the M&A on these two indicators *on the short term* (2001-2003) contrasts with the negative effects *on the long term* (2004). And here again,



the downward trend of company turnover (in 2001 and thereafter) and of R&D expenditure (in 2002 and thereafter) may have been the reason for these long term negative effects.

In this subsection, the M&A between Unilever and Bestfoods and its impact on the indicators for innovation have been examined. Unilever, a major Anglo-Dutch consumer goods and food producing company, performed an M&A with the US food producing company Bestfoods, by way of a purchase of shares. Media have speculated that Unilever may have overpaid for the deal, although Unilever’s management continues to justify the M&A. The years that followed the M&A, however, saw a lowering and then dropping of strategic targets, a profit warning, divestments, and job shedding. In 2005, Unilever re-focused and started selling major brands and closed some factories. The years thereafter saw increases in turnover, profit margin, and share prices.

Schematically, the indicators for innovation in the year of the M&A between Unilever and Bestfoods, the year immediately following the M&A, and the long term are shown here:

Unilever and Bestfoods	(in year of M&A)	(year after M&A)	(2/3 years after M&A)
R&D expenditure:	→	→	↓
R&D intensity:	↓	↑	↓
R&D employees/all employees:	↓ (estimated)	↑ (estimated)	↑
patents granted:	→	→	↓
patent applications:	↑	↑	↓
scientific publications:	slight ↑	slight ↓	inverted U
citation impact:	↑	↑	U

The indicators for innovation for Unilever after the M&A with Bestfoods show mixed results: on the one hand, most indicators show a rise in the year of the M&A or the year thereafter, but, on the other hand, R&D expenditure is gradually decreased in the years after the M&A leading to decreases in the other indicators in later years. These effects can be seen for R&D intensity, the number of patent applications, the number of scientific publications, and citation impact. Only the indicator of the ratio between R&D expenditure and R&D employees has seen a steady rise in the years since the M&A. The reason for the belated fall – after the earlier rise following the M&A – of these indicators may be the reduction of R&D expenditure, which itself was caused by the M&A. Therefore, on these indicators, a positive early effect and a negative later effect has been observed.

4.2. Case II: The M&A between Danone and Numico

In this section, the M&A between Danone and Numico and its impact on the indicators for innovation are examined. First, the M&A is introduced. Second, the history of Danone and Numico is briefly described. Third, the available indicators for innovation are examined.



On 12 September 2007, the French food-producing company Danone notified the European Commission of its intention to acquire the Dutch food producing company Numico by way of a purchase of shares, with its stated motive being the wish to broaden their product offering range by adding Numico's portfolio of infant alimentation and clinical nutrition products to its own portfolio. In October 2007, the Commission declared its non-opposition to this M&A (Case M.4842; Danone, 2000-2009)

Danone S.A. (Danone) is a major international food producing company that has been founded in 1919, and is the world's largest fresh milk producer and second largest bottled water producer. Since its acquisition of Numico's activities, it is also the world's largest clinical nutrition and second largest infant nutrition producer. The brands the company offers include Danone, Actimel, Evian, Volvic, Nutricia, and Fortimel. Apart from the sale of its biscuits division in 2007, the company has sold many other activities in the past decade. In 2006, the last financial year before the M&A, Danone had a turnover of € 14 billion and 88,124 employees. Only a few months before the M&A with Numico, in July 2007, Danone announced the selling of its biscuits division to the US-headquartered Kraft Foods (Danone, 2000-2009).

Royal Numico N.V. (Numico) is also a large international food producing company – although its turnover over the past years has been at most a quarter of Danone's – and has been founded in 1896. The company focuses on infant food and clinical nutrition products, after having sold its dairy and drinks divisions in 2001. The company is most active in Western Europe and the Asia Pacific areas. The company's principal brands are Nutricia, Cow & Gate, Milupa, Mellin, and Dumex. In 2006, the last financial year before the M&A, Numico had a turnover of 2.6 billion and 12,888 employees (Numico, 1999-2007).

Until 1999, Numico (or Nutricia as it was formerly known) had witnessed ten years of successful growth, with the company's turnover increasing eightfold and an acquisition of rival Milupa in 1996. In the years from 1999 to 2003, however, Numico suffered a number of setbacks, as Numico started a switch from a dairy to a vitamin firm – an operation that is generally regarded in the media as failure. As part of this re-focus organisation, the company performed two expensive acquisitions of US-based vitamins producers GNC and Rexall Sundown in 1999 and 2000 respectively. These purchases proved disappointments, and CEO van der Wielen admitted having overpaid for the Rexall Sundown deal and having neglected the performance of sufficient due diligence prior to the M&A's. In 2001, the Dairy & Drinks division was sold to Friesland Foods. Thereafter, in 2002, van der Wielen was replaced by – former Danone manager – Bennink (FEM, 2001; Financieele Dagblad, 2002a, 2002b).

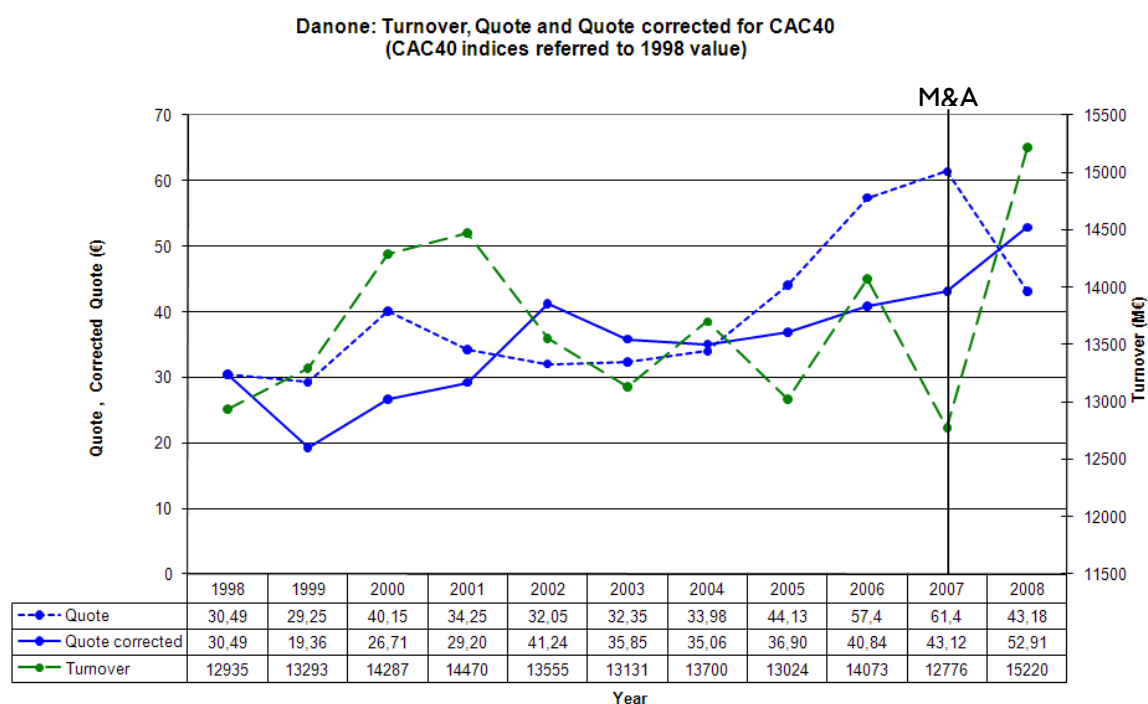


Under Bennink, Numico was started to focus exclusively on infant food and clinical nutrition products. As turnover and profits once again increased, in 2006, the company performed an M&A with Italian-based competitor Mellin. Bennink was rewarded with stock and options. In July 2007, Numico and Danone started negotiations on an M&A, with Danone offering € 12.3 billion. A definite agreement was promised within weeks, and, on September 12<sup>th</sup>, the European Commission received the notification of the proposed concentration that has been described in the beginning of this section. At the end of 2007, Numico's structure and financial results were consolidated in Danone's. Bennink was able to cash his stocks and options for something between € 35 million and € 81 million (Elsevier, 2007, 2008; Reuters, 2007).

Danone itself had also been the subject of several M&A plans and rumours in the years prior to the M&A with Numico. Nestlé, Kraft Foods, and PepsiCo had all shown their interest in Danone over the years, and market speculations became more serious in July 2005 and again June and July 2006 (BusinessWeek, 2005; Associated Press, 2006a, 2006b). Instead of such an M&A, in June 2007, Danone sold its biscuits division to Kraft Foods (for € 5.3 billion), and two weeks later started the negotiations that would lead to the M&A with Numico (Reuters, 2007).

Many of the events that have been described can be seen in the changes in yearly values of Danone's turnover, stock market quotes, and corrected quotes, the values of which can be seen to fluctuate over the years in *Figure 15*. Danone's turnover (the dashed green line with values on the right Y-axis) can be seen to have been relatively unstable, rising and falling almost every year in turn. Its lowest turnover since 1998, however, was in 2007, which was the year in which the M&A with Numico took place. In the next year, in 2008, turnover increased to the highest point since 1998. Both blue lines in the figure (with values on the left Y-axis) are the company's quote and corrected quote on the CAC40 index. Danone's quote has been corrected in the same way to fluctuations in the index as Unilever's in the previous section. Danone's quote varies, but Danone's corrected quote shows a relatively stable increase in the years before the M&A. Both uncorrected and corrected quotes reach a highest-to-date level since 1998 in the year of the M&A. In the year thereafter, the uncorrected quote plunges downwards, but the corrected quote rises with an increased slope to a new height.

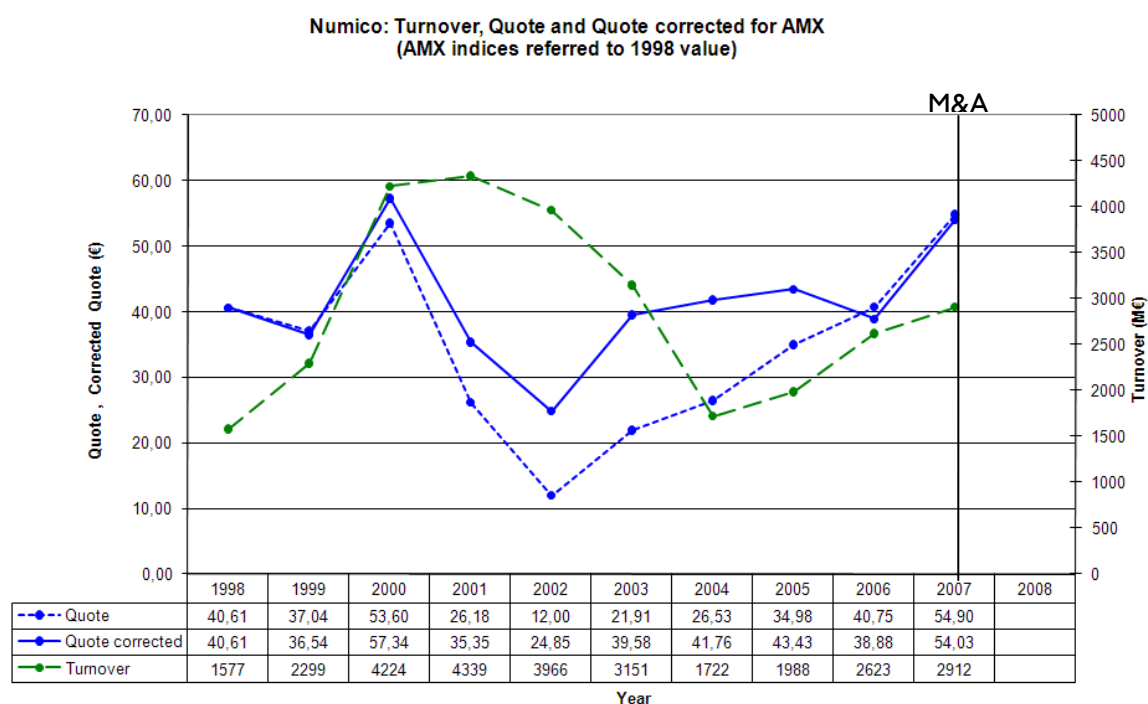




**Figure 15: Overview of Danone's turnover and CAC40 quotes and corrected quotes 1998-2008** (Danone, 2000-2009; Belegger.nl, 2009c; Financieele Dagblad: Beurzen, 2009b)

Numico's turnover, quotes, and corrected quotes can be seen in *Figure 16*. The increases in turnover after the 1999 and 2000 M&A's with GNC and Rexall Sundown can clearly be seen in the increases of the turnover values (the dashed green line with values on the right Y-axis). Afterwards, turnover plunged downwards until 2004, as the Dairy & Drinks division was sold and Numico started to focus exclusively on infant food and clinical nutrition products. The years 2005, 2006, and 2007 saw recoveries in turnover, with the 2006 M&A with Mellin contributing to the increase in turnover. The year 2007 was the last year in which Numico publicized its financial data independently.



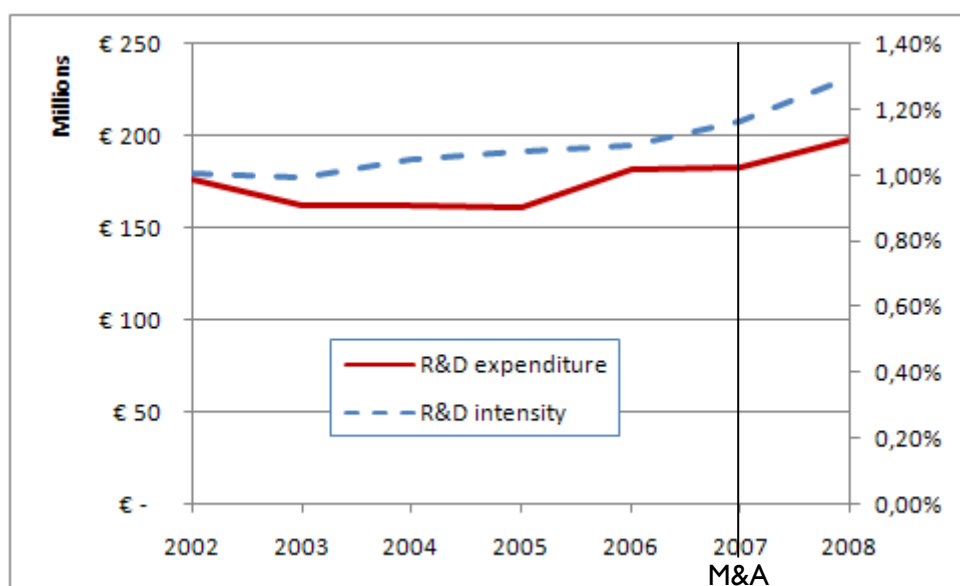


**Figure 16: Overview of Numico's turnover and AMX quotes and corrected quotes 1998-2007** (Numico, 1999-2007; Belegger.nl, 2009f)

Also in *Figure 16*, Numico's quote and corrected quote can be seen. From these, the fall in investor's trust can clearly be seen in the fall of quote and corrected quote from 2000 to 2002. Both recovered from 2002 to 2007 – two years before turnover started to rise. In 2007, Numico's corrected quote showed a sudden rise to the highest values since 1998.

As has been seen, the M&A between Danone and Numico resulted in a turbulent financial year of 2007 – as compared to both companies' records of previous years. This turbulence can also be seen in the indicators for innovation. In *Figure 17*, it can be seen that the combined R&D expenditure (the solid red line with values on the left Y-axis) of Danone and Numico was slightly raised in the first consolidated financial year 2007 – from € 182.0 million in 2006 to € 183.1 million in 2007. In 2008, R&D expenditure rose to € 198.0 million. R&D intensity, after years of steady growth from 1.00% in 2002 to 1.09% in 2006, suddenly increased to 1.17% in 2007 and then to 1.30% in 2008.





**Figure 17: Overview of R&D expenditure and R&D intensity of the combination of Numico and Danone 2002-2008** (Danone 2000-2009; Numico, 1999-2007; EU JRC, 2004-2008)

The sudden increase in R&D expenditure in 2006 of the combination of Danone and Numico can be explained by Numico's 2006 M&A with Mellin. In that year, Numico's turnover, R&D expenditure, and employee base rose substantially. This contributed to an increase in R&D expenditure, as reflected in the figure above. In the same year, however, R&D intensity does not show a significant change – it rose with 0.02%, the same percentage as the year before – because R&D expenditure increased with about the same amount as turnover. In 2007, in the year of the M&A between Danone and Numico, R&D expenditure rose again. This time, however, R&D intensity rose as well: from 1.09% to 1.17%. This may be an early effect of the M&A, or an effect of the decreased turnover after the selling of Danone's biscuits division, or both. In 2008, however, while turnover remained nearly stable and no further major divestments or M&A's were performed, both R&D expenditure and R&D intensity rose substantially – from € 183 million to € 198 million and from 1.17% to 1.30%, respectively.

Another indicator of a company's degree of innovation is the ratio between the number of employees carrying out R&D activities and the total amount of the company's employees. For the combination of Numico and Danone over the years 1998-2008, this ratio can be seen in *Figure 18*. In the years from 2003 to 2006, Danone's and Numico's total employee base and R&D employee base remained relatively stable – Danone employed around 88,000 people of which 800 were R&D employees, and Numico employed around 11,000 people of which 300 were R&D employees. In these years, both companies together employed some 100,000 people of which 1,100 were R&D employees in the same period.



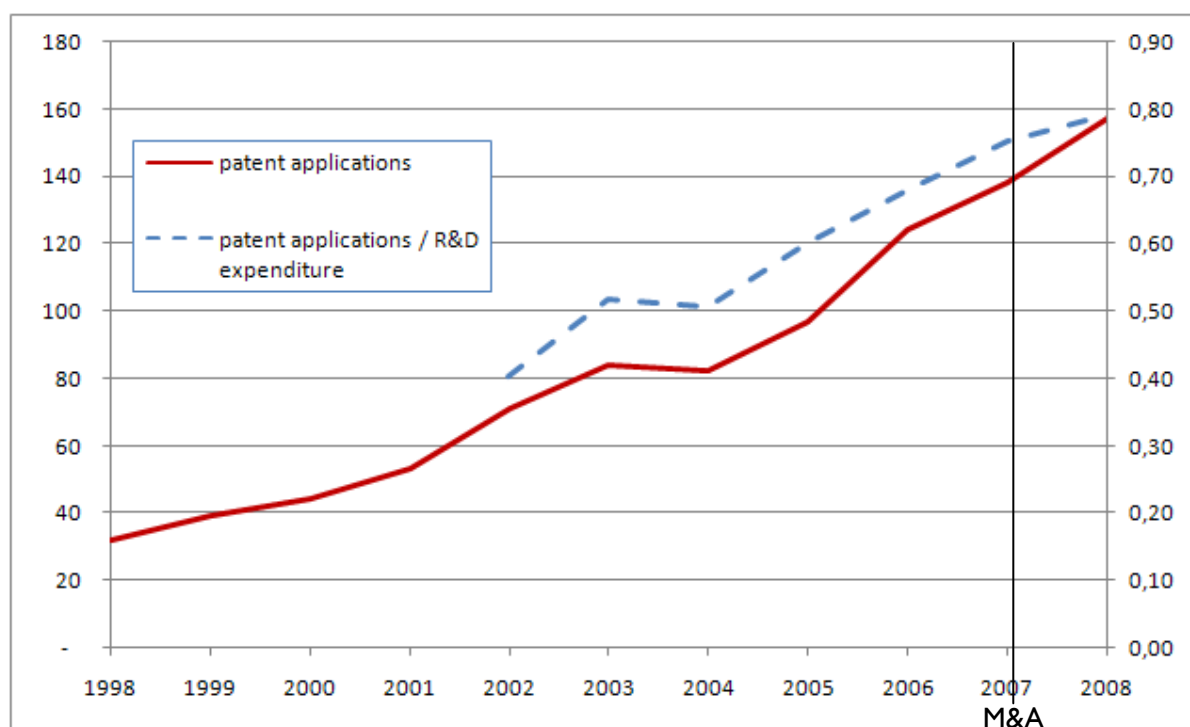


**Figure 18: Overview of the R&D employee ratio of the combination of Danone and Numico 1998-2008**  
(Danone, 2000-2009; Numico, 1999-2007)

The decrease in the figure from 1998-2001 is due to Danone reducing the amount of R&D employees from 1,250 to 833 in the same years while increasing the total amount of employees. However, this is years before the M&A with Numico. Looking at the years around the M&A, in 2007 – i.e. the year of the first consolidated financial report after the M&A took place –, the amount of R&D employees rose from 1,120 to 1,200, while at the same time the total amount of employees decreased after the sale of Danone's biscuits division. This can be seen in the rise in the ratio between R&D employees and all employees in *Figure 18*, where 2007 sees a sudden rise after the stability from 2003 to 2006. In 2008, the amount of R&D employees remained at 1,200, but the total amount of employees decreased further, which in turn led to another increase in the ratio in *Figure 18*. In the year of the M&A and the year thereafter, therefore, this indicator shows an increase.

Another way to measure a company's degree of innovation is to count the amount of patent that the company applies for. For the combination of Danone and Numico, the result of such a count can be seen in *Figure 19* (the solid red line with values on the left Y-axis): after a small decrease in the amount of patent applications in 2004, the amount of patent applications increased every single year until 2008. In 2006, values rose from 97 to 124, then in 2007 to 138, and finally, in 2008, to 157. The slope of the graph reflects the changes in growth; in 2006 the slope was steepest, in 2007 it became less steep, and in 2008 it became steeper again.





**Figure 19: Overview of the number of patent applications and the ratio between patent applications and R&D expenditure of the combination of Danone and Numico 1998-2008** (EPOrg, 1998-2008; Danone 2000-2009; Numico, 1999-2007; EU JRC, 2004-2008)

No external explanation has been found for the substantial increase of patent applications in 2006; it could be a recovery to growth figures as they were before the stagnation in 2003 – this stagnation after 2003 would be the effect of the decrease in R&D expenditure after 2002. Whatever the precise reason may have been, in the years 2003-2006, after this stagnation but before the M&A, values started to recover and culminated in the substantial increase of 2006. Throughout the years from 2003 to 2006, R&D employee base was relatively stable, and, although R&D expenditure was raised in 2006, it seems improbable that this increase in expenditure would have had such a substantial impact on the amount of patent applications, as a time lag would be expected. Besides, the rise started earlier, in 2005.

In the first data available after the M&A took place, the number of patent applications rose again – though the increase is less than in the previous year. This may be caused by the increase in R&D expenditure in the previous and same year and the increase in R&D employees in the same year. In 2008, the amount of patent applications rose further, with a somewhat increased rate of growth. This could be a consequence of the M&A, or of the increases in both the amount of R&D employees and the R&D expenditure in the previous and same year. In the year of the M&A and the year thereafter, therefore, the indicator for innovation of the number of patent applications increased,



although the growth of the indicator was lowered in the year of the M&A and slightly increased in the year thereafter.

Also in *Figure 19*, from the blue dashed line with values on the right Y-axis, it can be seen that the combination of Danone and Numico has been increasingly efficient in applying for patents per million euro of R&D expenditure. This ratio has increased every year since 2004, but has become somewhat less steep in 2008 after the M&A.

In this section, the M&A between Danone and Numico and the impact of this M&A on the indicators for innovation has been looked into. Schematically, the indicators for innovation in the year of the M&A and the year immediately following the M&A are shown here:

Danone and Numico	(in year of M&A)	(year after M&A)	(2/3 years after M&A)
R&D expenditure:	→	↑	n/a
R&D intensity:	↑	↑	n/a
R&D employees/all employees:	↑	↑	n/a
patent applications:	↑	↑	n/a

Both companies have seen the buying or selling of some of its subdivisions and both companies have seen a degree of internal restructuring – especially Numico. These effects are reflected in the indicators for innovation that have been examined, and appear to be important causes for the substantial variations of values on the indicators between the years. The M&A between Danone and Numico seems to have a positive effect on the indicators of R&D intensity and R&D employee ratio. Although in the years after the M&A, values on the number of patent applications and on the ratio between patent applications and R&D expenditure increased as well, these two indicators did not show an additional growth.

#### 4.3. Case III: The M&A between Friesland Foods and Campina

In this section, the M&A between Friesland Foods and Campina and its impact on the level of innovation is examined. First, the case and both firms that are involved are briefly introduced. Second, the history of both companies is examined, with a focus on their M&A history. Third, the influence of both companies being organised as a cooperative is briefly looked at. Fourth, the available indicators for innovation for the combination of both companies are examined.

On 17 December 2008, the Commission of the European Communities issued a declaration of their decision not to oppose a proposed concentration, declaring it compatible with the common market. The concentration concerned was the proposed M&A between the two Dutch-based cooperative dairy producers Friesland Foods and Campina (Case M.5046, 2008).



Dairy cooperative Campina has been gradually growing in size by a series of relatively small M&A's throughout the 1960s, 1970s, and 1980s. In 1989, this culminated in the M&A between DMV Campina and Melkunie Holland. Campina is a major producer of dairy products, based in the Netherlands. In 2007, in the last financial report published by the company prior to the M&A with Friesland Foods, it reported a turnover of € 4.03 billion, with 6,814 employees and some 7,000 cooperative members. In terms of turnover, in 2006, Campina was the EU's third-largest dairy cooperative firm, with Danish Arla Foods being the largest and Dutch Friesland Foods the second-largest (Campina, 2007-2008; Financieele Dagblad, 2007d).

The story of Royal Friesland Foods N.V. (Friesland Foods) is very similar to Campina's. Friesland Foods is also a cooperative dairy producer that has gradually been growing in size by a series of relatively small M&A's. In the case of Friesland Foods, the last previous major M&A took place in 1997, when four dairy cooperatives (Coberco, Friesland Foods, Twee Provinciën, and Zuid-Oost Hoek) combined their forces and formed Friesland Coberco Dairy Foods – the company was renamed to Royal Friesland Foods in 2005. Friesland Foods was one of the EU's largest dairy producers, operating internationally with famous brands as Friesche Vlag, Frico, Dutch Lady, and Noy-Noy. Apart from its dairy activities, Friesland Foods also produced fruit drinks and ingredients. In 2007, in the last financial report published by the company prior to the M&A with Campina, it reported a turnover of € 5.08 billion, with 14,582 employees and 14,305 cooperative members (Friesland Foods, 2007-2008).

In the Netherlands, after the M&A leading to the formation of Friesland Foods in 1997, things remained quiet with respect to M&A's in the dairy industry. Although Friesland Foods had about twice the number of employees and cooperative members, both firms' yearly turnover was comparable: over the years 2001-2007 Campina's turnover fluctuated between € 3.8 billion and € 4.0 billion and Friesland Foods' between € 4.3 billion and € 4.7 billion. This made both companies the third and second largest EU dairy cooperatives, respectively, in terms of turnover (Campina, 2007-2008; Friesland Foods, 2007-2008; Financieele Dagblad, 2004c). Abroad, however, the late-1990s and the early years of the first decade of the 21<sup>st</sup> century saw many consolidations in the dairy industry: US-based dairy producer Suiza Foods' turnover increased threefold from 1997-2000 due to M&A's, and Italian Parmalat's enjoyed the enviable success of a tenfold increase in turnover in just a few years – later this did indeed prove to be too good to be true. Campina and Friesland Foods did not take part in this M&A wave, citing their cooperative structure as an important reason to avoid risky ventures (Financieele Dagblad, 2000a).



In November 2004, Denmark-based dairy cooperative Arla Foods – the EU's number one dairy cooperative in terms of turnover – announced its desire to do an M&A with another company in the dairy sector. Of the five companies on Arla's list, two were Campina and Friesland Foods. In December 2004, the M&A between Campina and Arla Foods was announced (Financieele Dagblad, 2004c, 2004d). In March 2005, it was announced that differences in both companies' capital structure caused for doubt over the M&A between Arla's cooperative members, who feared to have to pay extra for the operation. The plans for the M&A were postponed and later cancelled (Financieele Dagblad, 2005a; Food&Drink Europe, 2005).

In March 2007, Friesland Foods stated publicly that it was ready for a large-scale M&A. Campina reacted ten days later by calling an M&A with Friesland Foods an attractive possibility, but it denied having conducted any negotiations on an M&A so far (Financieele Dagblad, 2007b). On 19 December 2007, the two companies publicly announced their M&A, destined to become the EU's largest dairy cooperative in terms of turnover (Financieele Dagblad, 2007d). Having received the blessings of their cooperative members in May 2008, the only obstacle that remained was the European Commission's antitrust authority. Friesland Foods and Campina notified the Commission of their M&A plans in June 2008, and the Commission started an investigation on the resulting company's market dominance. While the verdict on the case was pending, Neelie Kroes, the European Commission's Competition Commissioner, repeatedly issued statements in which she doubted her eventual non-opposition to the M&A. Finally, on 17 December 2008, the proposed M&A was conditionally cleared: Friesland Foods had to divest its entire fresh dairy business in the Netherlands, Campina had to divest a part of its cheese business and two brands for long life dairy drinks, and remedies had to be offered to ensure access to raw milk in the Netherlands (Case M.5046, 2008; European Commission, 2008; Financieele Dagblad, 2008).

The organization of both Friesland Foods and Campina as a cooperative has been seen to have had its effect on both companies' M&A history: it was a factor in not participating in the M&A wave in the final years of the 1990s, it was a factor in the failure of the M&A between Arla Foods and Campina, and probably would have been a factor in the match between Friesland Foods and Campina.

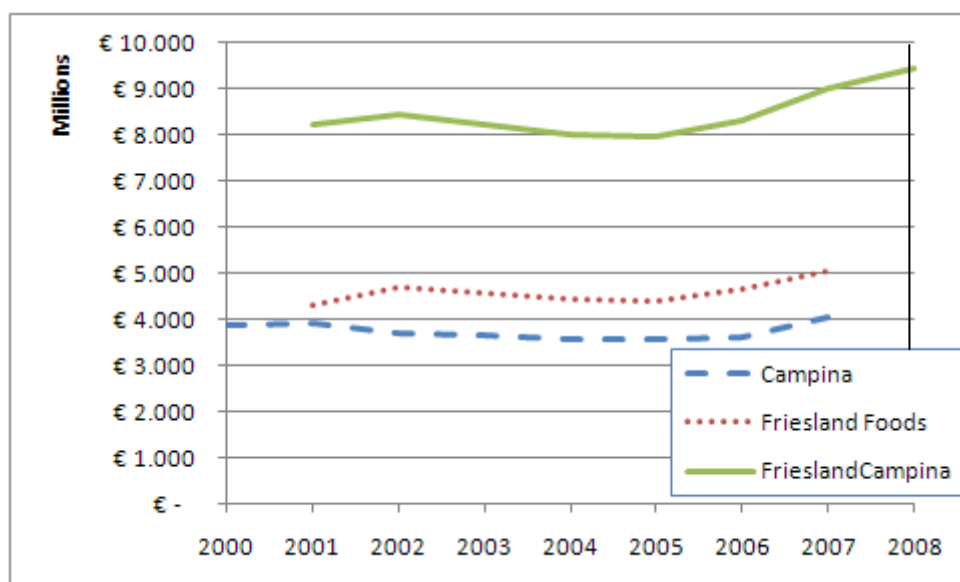
In *Figure 20*, changes in turnover of Friesland Foods (the dotted red line), Campina (the dashed blue line), and the combination of both (the solid green line \*) can be seen for the period from 2000 to

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\* The values shown for FrieslandCampina for 2007 and 2008 are given in FrieslandCampina's 2008 annual report. In the years prior to 2007, turnover of both companies has been added up.



2008. FrieslandCampina's first consolidated financial year 2008 saw an increase in turnover from € 9.01 billion in 2007 to € 9.45 billion in 2008. The company's financial results in the year from January to December 2008 cannot be taken as an indication for future results though, as the M&A was only approved on 17 December 2008, and the two entities were formally joined on 31 December 2008. Also, the required divestments did not yet take place.



**Figure 20: Overview of Campina's, Friesland Foods', and FrieslandCampina's turnover 2002-2008** (Friesland Foods 2007-2008c; Campina, 2007-2008; EU JRC, 2004-2008)

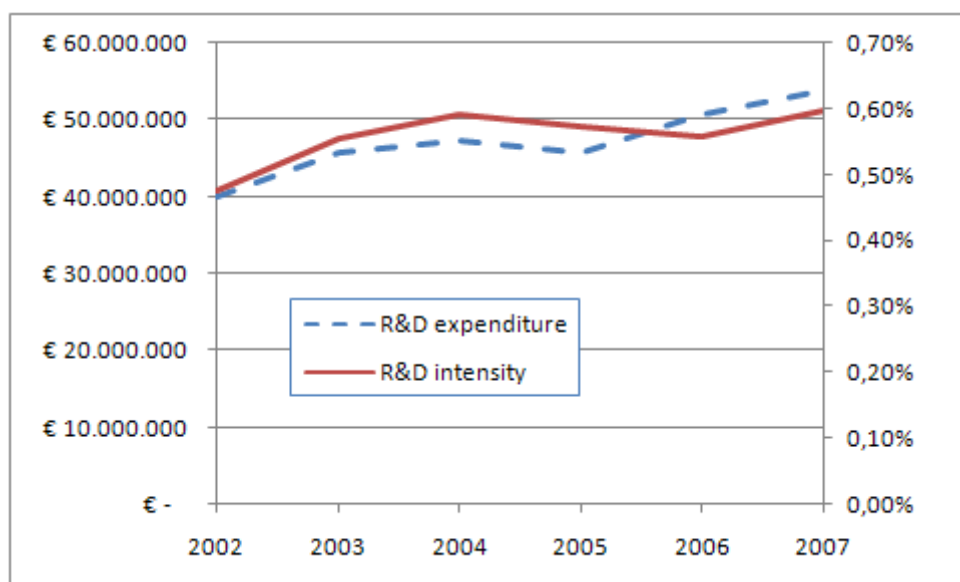
In 2007, Campina and Friesland Foods increased their milk prices, after years of overproduction and stiff price demands from retailers. Both companies were able to do so after world prices rose, with increasing demands in Asia, the Middle East, and Latin America, and world producers not being able to meet the increase in demand (Financieel Dagblad, 2007c). This can be seen in the increases of both companies' turnover in 2007 and 2008.

Because of the recent date of the M&A, not much information can yet be given on the amount of innovation of the consolidated firm. Furthermore, data on R&D expenditure are not given publicly by the company in annual reports. The data that is available on R&D expenditure have been derived from self-reported data – and therefore data that has not been checked by external accountants – collected by the European Union's Joint Research Centre (EU JRC). However, this institution has not yet released data for 2008. In Figure 21, R&D expenditure and R&D intensity for the combination of Friesland Foods and Campina has been shown for the years 2002-2007, based on these EU JRC data.

From this figure, Figure 21, it can be seen that R&D expenditure (the dashed blue line with values on the left Y-axis) has been steadily rising over the years 2002-2007, with one exception in 2005. This



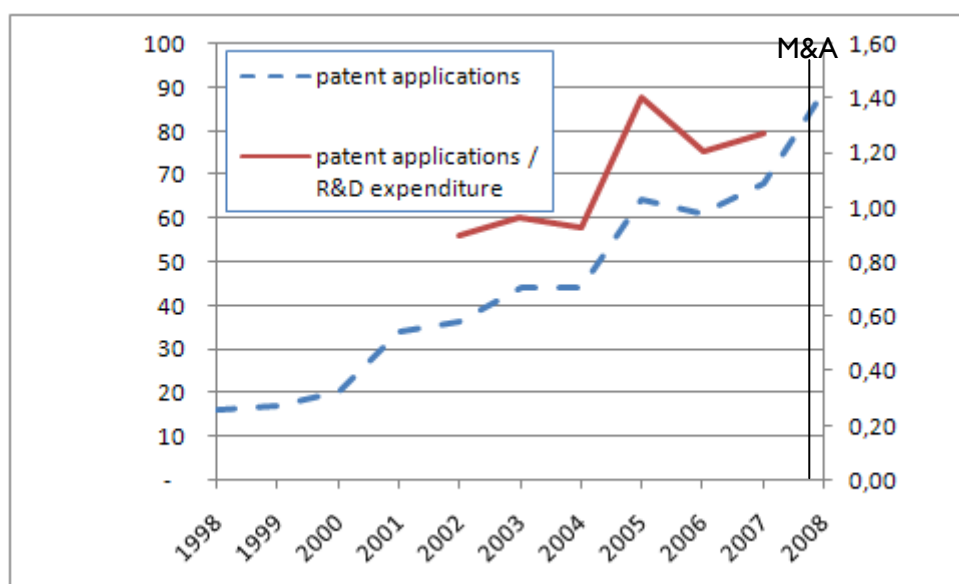
lower-than-expected value is not as pronounced in the R&D intensity line (the solid red line with values on the right Y-axis), as total turnover was also decreased in 2005. The year 2006 saw a rise in turnover (from € 7.99 billion in 2005 to € 9.11 billion in 2006), and therefore – though R&D expenditure was higher than ever before – R&D intensity was decreased. The year 2007 saw an increase in both R&D expenditure and R&D intensity.



**Figure 21: Overview of R&D expenditure and R&D intensity of the combination of Friesland Foods and Campina 2002-2007** (Friesland Foods 2007-2008c; Campina, 2007-2008; EU JRC, 2004-2008)

No other data on innovation was found for Campina and Friesland Foods with regard to R&D (such as the number of R&D employees or R&D employee costs). However, another indicator for innovation is the amount of patents that a company applies for, and for this indicator, the values are shown for the years 1998-2008 in *Figure 22* (the dashed blue line with values on the first Y-axis). Also, the ratio between patent applications and R&D expenditure is shown (the solid red line with values on the second Y-axis).





**Figure 22: Overview of the number of patent applications and the ratio between patent applications and R&D expenditure of the combination of Friesland Foods and Campina 2002-2007** (EPOrg, 1998-2008; EU JRC, 2004-2008)

From Figure 22, it can be seen that the amount of patents that Friesland Foods and Campina applied for has been substantially increased from 1998 to 2008. In 1998, 16 patents were applied for, and in 2008, this number had grown to 89 – more than five and a half times the amount of patent applications as in 1998. The sudden diminishing of R&D expenditure in 2005 leads to a peak in the ratio between patent applications and R&D expenditure in 2005.

If the rise in the number of patent applications is looked at for the pre-M&A years, one may expect the trend to be continued in the year 2009. For the first half of the calendar year of 2009, FrieslandCampina applied for 35 patents. Given the slightly higher rate of patent applications for Friesland Foods and Campina in the first half of the calendar year as compared to the second half of the calendar year when looking back at the previous years, one may expect some 60 patent applications in 2009. This would be considerably less than 2008 – or any year since 2005 –, which may indicate a decrease of innovation following the M&A. However, this can only be said with a degree of certainty when the year 2009 will have ended. Also, the recent financial crisis may be a reason for such a lowering of the number of patent applications, as costs are cut in cost-intensive activities.

In this subsection, the M&A between Friesland Foods and Campina and its impact on the level of innovation has been examined. Of the two parties involved, Friesland Foods was the largest of the two in terms of turnover, employees, and cooperative members. Both were Dutch cooperative dairy



producers, and both were formed after M&A's between smaller cooperatives, but they did not partake in the international consolidation wave of dairy producers of the late 1990s. In 2004 and 2005, an M&A between Danish dairy cooperative Arla Foods and Campina was cancelled at a late stage. In 2007, activities were started leading to the M&A between Friesland Foods and Campina. After the M&A was finally cleared in December 2008, the two companies formed one new company from 31 December 2008 onwards. Conditions and restrictions, including a number of forced divestments, were required of the new company before the M&A was approved.

Schematically, the indicators for innovation in the year of the M&A between Friesland Foods and Campina are shown here:

Friesland Foods and Campina	(in year of M&A)	(year after M&A)	(2/3 years after M&A)
R&D expenditure:	↑	n/a	n/a
R&D intensity:	↑	n/a	n/a
patent applications:	↑	n/a	n/a

Not much can yet be said on the level of innovation of the post-M&A company. This is both because not enough data on the indicators for innovation for the companies could be found and because of the recentness of the M&A. Both R&D expenditure and R&D intensity for the combination of both firms have increased in 2008. However, R&D expenditure would be expected to decrease as the company starts divesting the activities, as it was required to by the antitrust authorities. And such a decrease in R&D expenditure may well lead to a decrease in innovation. The third indicator for innovation that has been found for the combination of both firms is the number of patent applications. This indicator has seen a substantial increase since 1998. The expectation for 2009 is, however, that fewer patents will be applied for; although this is an indication for a lower level of post-M&A innovation, it is too early to tell for sure.

#### 4.4. Case IV: The M&A's of CSM

In this section, the series of M&A's and divestment activities that CSM has performed since 1998 is examined. First, the different M&A's are introduced. Second, the history of CSM and of the company's former and present divisions is described. Third, the available indicators for innovation of CSM's Bakery Supplies Europe division are examined. Fourth, the available indicators for innovation of CSM's Sugar Confectionery division are examined. Fifth, the available indicators for innovation of CSM's Sugar division are examined. Sixth, the available indicators for innovation of CSM as a whole are examined.



On 28 August 2000, the Commission of the European Communities issued a declaration of their decision not to oppose a proposed concentration, declaring it compatible with the common market. The concentration concerned was the proposed M&A between CSM – a Dutch producer of bakery, lactic acid, and sugar products – and the bakery division of the major Anglo-Dutch food producing company Unilever called European Bakery Supplies Business. Furthermore, two other non-opposition declarations that involved CSM were issued by the Commission in subsequent years. The first of these two was on 25 January 2001 and concerned the M&A between CSM's Food division and US-based food producer Heinz. The second of these two was on 17 January 2005 and concerned the M&A between CSM's Sugar Confectionery division and Luxembourg-based CVC Capital Partners, a major internationally operating private equity firm – or a venture capitalist as some would describe it (Case n° COMP/M.2084, 2000; Case n° COMP/M.2302, 2001; Case n° COMP/M.3702, 2005).

Furthermore, CSM was involved in three more cases of M&A's of sufficient size that they required notification to and approval of antitrust authorities. However, these three cases were treated by the Dutch national antitrust authority, the NMa, rather than by its European equivalent, as the criteria for an M&A to be considered of Community dimension rather than national dimension had not been surpassed. These three cases that were approved by the NMa were the M&A between CSM and Leaf – the sugar division of the Finnish Huhtamki food producing group – on 11 June 1999, the M&A between CSM and Continental Sweets Netherlands – a sugar, chocolate, biscuits, and drinks producer and former subsidiary of Dutch Gilde Buy-Out Fund – on 12 October 2000, and the M&A between the sugar division of CSM and Cosun – a large sugar cooperative based in the Netherlands – between 2006 and 2007 (Zaak 1333, 1999; Zaak 2103, 2000; Zaak 5703, 2006, 2007).

The major difference between the cases that were discussed in the previous sections – involving Unilever, Bestfoods, Danone, Numico, Friesland Foods, and Campina – and these M&A's is the level on which these M&A's take place. While the entire companies Bestfoods and Numico were integrated into new or existing divisions of Unilever and Danone, respectively, and while the M&A between Campina saw two more or less equivalent companies merging into one new entity, the mergers, acquisitions, and divestment activities which CSM performed over the year did not involve the whole of the company, but rather occurred on divisional levels. Therefore, to examine the impact of these M&A's on the level of innovativeness, it is useful to examine CSM's divisional structure separately.

As opposed to most other companies, CSM is very revealing regarding data on its divisions. Not only does CSM give data on R&D expenditure and share of new sales for most years in its annual reports on a company level, but even on a divisional level. This in itself could be seen as an indication of the

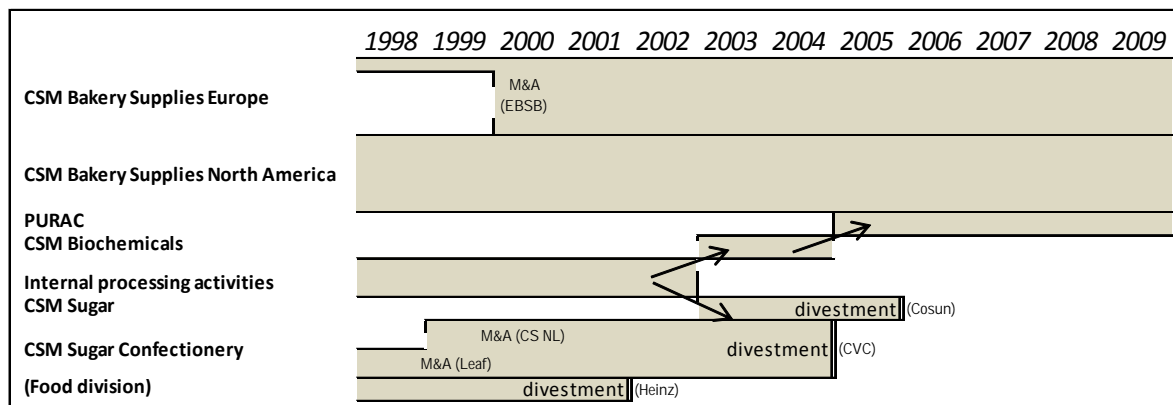


importance of innovation for the company, as annual reports of most other companies in the Dutch agri-food sector have been seen to be very sparing in providing these data – on company level, let alone on divisional level.

The history of the Centrale Suiker Maatschappij N.V. (CSM) can be traced back to an M&A in 1919 between three local sugar refining companies. Steadily over the years, and increasingly so from the 1970s onwards, the company has grown ever larger and has diversified its operations. Its sugar activities gradually gave way – shifting from being the primal focal point to a side activity – to the production of bakery supply products and lactic acid, as these grew in relative importance and turnover. In 2003, sugar processing activities accounted for only some 8% of total company turnover (€ 268.8 million out of a total of € 3.48 billion turnover). The company CSM is based in the Netherlands, and, in 2008, employed 8,472 people with a turnover of € 2.60 billion (CSM, 2001-2009).

In *Figure 23*, the history of CSM's former and current divisions is shown; the height of the bars is a rough indication of the division's share in total company turnover in a year. Currently, CSM's two most important divisions are CSM Bakery Supplies Europe and CSM Bakery Supplies North America, which – when added up – contributed to 87% of the company's total turnover in 2008. PURAC, the lactic acid division, contributed with the other 13%. PURAC was previously known as CSM Biochemicals (from 2003 until 2004), which was, in turn, split off from the Internal Processing Activities division. The other split of this division, CSM Sugar, was divested to Cosun after 2005. Another previously important division, CSM Sugar Confectionery, was divested to CVC in 2004, and yet another division, the Food division, to Heinz in 2001 (CSM, 2001-2009). Furthermore, the 1999 M&A with Leaf increased the Sugar Confectionery division's turnover, as did the 2000 M&A with Continental Sweets Netherlands. The M&A with Unilever's European Bakery Supplies Business (EBSB) in 2000 led to a substantial increase of divisional turnover of CSM Bakery Supplies Europe from € 163 million in the financial year 1999-2000 to € 1.04 billion in the subsequent financial year – hence the substantial increase in the height of the divisional bar in the figure in 2000. A number of additional divisional mergers, acquisitions, and divestments were managed by CSM over the same years, but these were not of sufficient size to notify the authorities and did not contribute as much to differences in total company turnover (CSM, 2001-2009).





**Figure 23: Overview of the different divisions of CSM, their history, and M&A (and divestment) activities 1998-2009** (CSM, 2001-2009)

The 2000 M&A with EBSB was the culmination in a long series of acquisitions of bakery ingredient suppliers that started in 1993. First, a number of such suppliers were acquired in North America, and in 2000 the European division was enlarged with this M&A with EBSB. All of these acquisitions were part of CSM's strategic effort to achieve a leading position in bakery ingredients and sugar confectionery (Financieele Dagblad, 2000b). In 2000 also, the company announced that it wanted to sell its food division, as that division did not fit in the strategy. It took till January 2001 before this divestment was effectuated, when Heinz – wishing to expand its European activities – performed an M&A with this division (Financieele Dagblad, 2000c, 2000d).

The Sugar Confectionery division was substantially increased in (turnover) size following the M&A with Leaf in 1999 and Continental Sweets Netherlands in 2000. The M&A with Leaf was CSM's largest M&A to date, and both fitted in the company's 1990s strategy to buy itself a high-ranking place in the bakery ingredients and sugar confectionery sectors (Financieele Dagblad, 1999a). By 2004, however, company policy was adjusted and the whole of the Sugar Confectionery division was divested and sold to CVC. At that point, CSM had decided to focus on bakery supplies and lactic acids only, and in the following year, in 2005, CSM Sugar – once the core activity of the “Central Sugar Society” CSM – was announced to be for sale as well. The latter, and possibly the whole change of strategy as well, was influenced by foreseen future difficulties after the EU announced a significant decrease in its guarantee price for sugar for 2006 (Financieele Dagblad, 2004e, 2005b).

After the M&A of the CSM Sugar division with Cosun – it took until April 2007 until Cosun was able to start the post-M&A integration process –, CSM announced its wish to use the € 245 million of cash that it received for the transfer to fund a new major M&A. Although no such major M&A took place so far, on 6 August 2009 CSM announced that it had a budget of € 200 to € 300 million

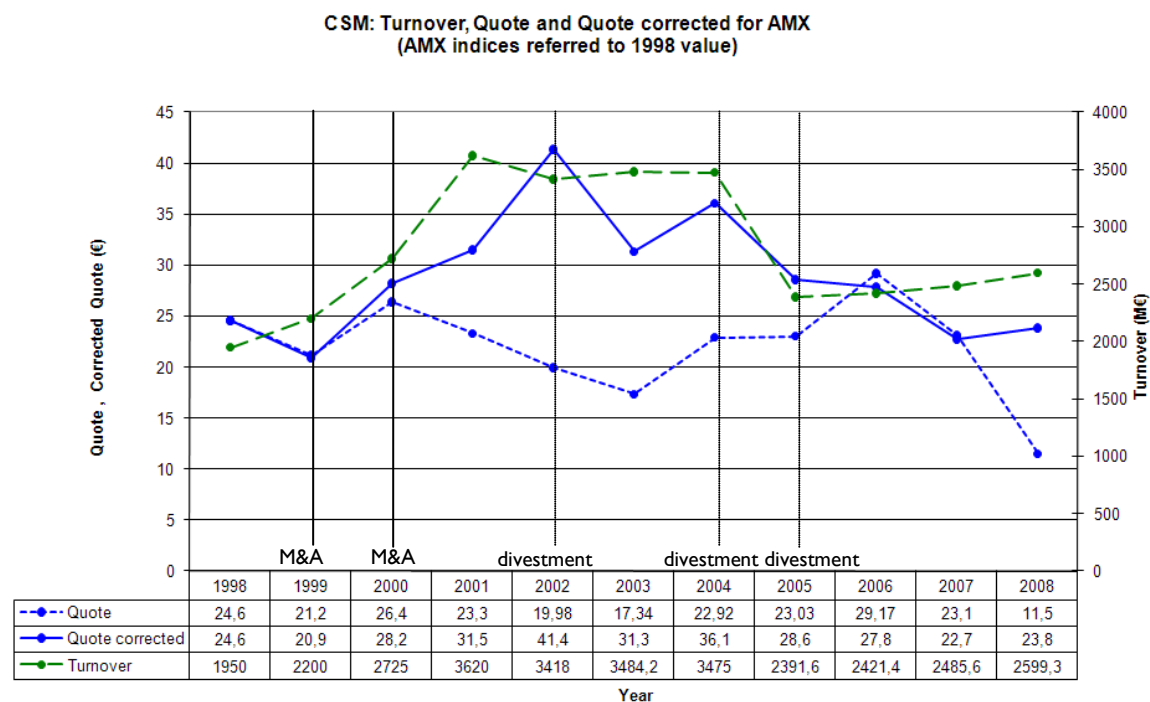


reserved for acquisitions to expand the company's bakery activities, and Starbuck's muffins division was mentioned as a possible candidate (Cosun, 2005-2009; Financieele Dagblad, 2007a, 2009b).

Many of the events that have been described can be seen reflected in the changes in yearly values of CSM's turnover, stock market quotes, and corrected stock market quotes, the values of which can be seen to fluctuate over the years in *Figure 24*. CSM's turnover (the dashed green line with values on the right Y-axis) has risen substantially in the years from 1998 to 2001, as the three important M&A's were experienced. The divestment of the Food division to Heinz led to a small decrease in turnover in 2002, and the sale of both the CSM Sugar and the CSM Sugar Confectionery divisions led to a further decrease from 2004 to 2005. Since 2005, turnover has gradually grown with an ever-increasing amount.

The solid and dotted blue lines in *Figure 24* (with values on the left Y-axis) show the company's quote and corrected quote on the AEX index. CSM's quote has been corrected in the same way to fluctuations of the index as has been done in the previous sections. From these values, it can be seen that both quotes fell in the year of the first M&A, in 1999, and then rose again in the year of the other two M&A's, in 2000. The increase of the corrected quote, which started in 1999, continued until 2002, while the uncorrected quote decreased in the same years. In 2003, after the divestment of the Food division, the corrected quote decreased and the uncorrected quote increased, which led to a decrease in the gap between the corrected and uncorrected quotes. After the divestments of 2004 and 2005, the uncorrected quote showed an inverse U shape, and the corrected quote decreased. In 2008, the corrected quote saw a little increase again, while the uncorrected quote plunged downwards – this would be the effect of the current global financial crisis.

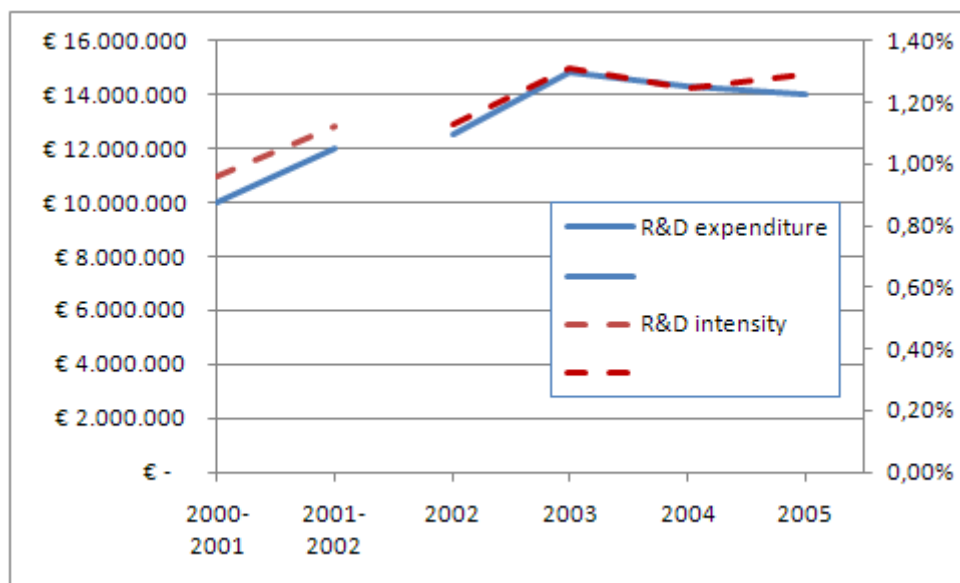




**Figure 24: Overview of CSM's turnover and AMX quotes and corrected quotes 1998-2008** (CSM, 2001-2009; Belegger.nl, 2009b, 2009e)

When looking at the indicators for innovation, in *Figure 25*, the R&D expenditure (the solid blue line with values on the left Y-axis) and R&D intensity (the dashed red line with values on the right Y-axis), of CSM's Bakery Supplies Europe division are shown after the 2000 M&A with EBSB. In 2002, the company changed its accounting policy, and after 2002 their financial years start in January (rather than September as previously). This caused the greater part of the calendar year 2002 to be counted twice in *Figure 25*, once in the year from September 2001 to September 2002 and once from January 2002 to December 2002. The three months' difference in timing lead to slightly different values between the values for the financial years 2001/2002 and 2002, but both values have been given in the figure to allow a better comparison with the year 2000/2001. No information on R&D expenditure for the division was given of the years prior to 2000/2001. A rough estimate can be given, though, as from the financial years 1999/2000 to 2000/2001, divisional turnover increased from € 163 million to € 1.04 billion, and R&D expenditure in 2000/2001 was € 10 million (i.e. 0.96% of divisional turnover). Therefore, R&D expenditure in 1999/2000 would probably not have exceeded € 1 million or € 2 million.





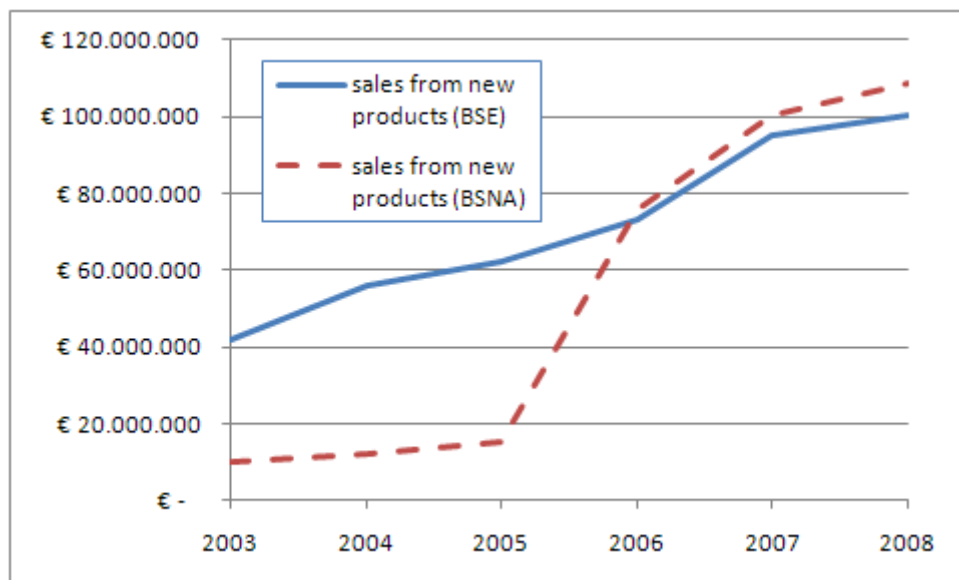
**Figure 25: Overview of R&D expenditure and R&D intensity of CSM Bakery Supplies Europe 2000-2005**  
(CSM, 2001-2009)

From *Figure 25*, therefore, the increases in both R&D expenditure and R&D intensity in the years before 2000/2001 cannot be seen. However, in the years after the M&A's – i.e. after 2000/2001 –, both R&D expenditure and R&D intensity were greatly increased: R&D expenditure rose from € 10 million in 2000/2001 to € 14.8 million in 2003, and R&D intensity from 0.96% in 2000/2001 to 1.31% in 2003. In the same period, divisional turnover also increased from € 1.04 billion to € 1.13 billion. Thereafter, in 2004 and 2005, R&D intensity (though with a little dip) stabilised, while divisional turnover and R&D expenditure decreased. Therefore, it can be seen that both indicators for innovation have been increased in the three years following the M&A, but stabilised or slightly decreased in the years thereafter.

Two other indicators for innovation are the number of sales of new products and the ratio between sales of new products and total sales – the share of new sales. New products have been defined by CSM as products developed within the previous past three years – prior to 2007 – or the previous two years – after 2007. In *Figure 26*, this ratio has been shown for CSM's Bakery Supplies Europe division, for the years 2003-2008. Prior to 2003, the sales of new products was reported to be "*still limited*" and then "*greatly increasing*" to € 42 million (3.72% of total sales) in 2003 (both quotes from CSM, 2004). The direct impact of the M&A on this indicator therefore cannot be verified on the basis of these data, however the indicators shows a great and relatively steady increase from 2003 (€ 42 million and 3.72% of total sales) to 2008 (€ 101 million and 9.2% of total sales). When comparing the sales from new products of CSM's Bakery Supplies Europe division (the solid blue line) with its North



American equivalent (the dashed red line), the rise of CSM's BS Europe in the years 2003-2005 is higher (the great increase in North America after 2005 has not been explained).



**Figure 26: Overview of sales from new products of CSM Bakery Supplies Europe and North America 2003-2008 (CSM, 2001-2009)**

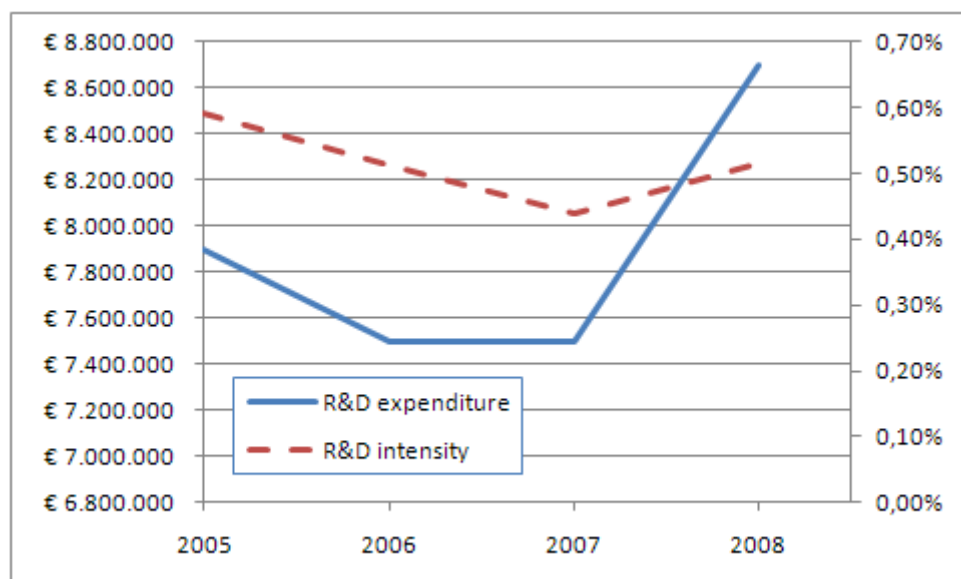
Regarding the CSM Sugar Confectionery division, for the two M&A's that took place within the division in 1999 and 2000, no data are available on any of the indicators for innovation for the years before 2002. After 2002, divisional R&D expenditure rose slightly from € 5.1 million in 2002 to € 5.4 million in 2004, and the sales of new products rose from less than € 700,000 (0.09% of total sales) in 2002 to € 15 million (2.02% of total sales) in 2004. However, as the M&A's took place in 1999 and 2000, other factors may have affected the data in the years after the M&A took place.

CSM's Sugar division, which was divested to Cosun after the 2005 financial year (though it was only officially integrated within Cosun's structure in April 2007), shows a different pattern when looking at the indicators for innovation. In the figures of the last full divisional financial year under CSM in 2005, the division reported a € 226 million turnover, € 1.9 million R&D expenditures, and 0.84% R&D intensity. Though stable in the years until 2004, R&D expenditure and R&D intensity suddenly dropped greatly in the year 2005 (R&D expenditure from € 2.8 million in 2004 to € 1.9 million in 2005, and R&D intensity followed from 1.06% in 2004 to 0.84% in 2005).

After the M&A of CSM's Sugar division with Cosun, Cosun does not provide separate divisional data, but – because the company performed no other M&A's around the same period – the whole company's data can be looked at. In *Figure 27*, Cosun's R&D expenditure (the solid blue line with values on the left Y-axis) and R&D intensity (the dashed red line with values on the right Y-axis) are



shown. In the year 2007, the former CSM Sugar division was consolidated into Cosun's sugar division. Cosun's R&D expenditure had been gradually dropping for years prior to its low point in 2006 and 2007: in 2004 R&D expenditure was € 11.6 million, in 2006 it was € 7.5 million. The rise in 2008 in R&D expenditure can be attributed to the M&A with CSM Sugar: while that former CSM division's turnover was added up to Cosun's consolidated 2007 financial statements, R&D expenditures for the year 2007 were not added to the company's total R&D expenditures yet. In 2008, however, Cosun's R&D expenditure increased with € 1.2 million from € 7.5 million to € 8.7 million. All this information suggests a picture of a decrease in divisional R&D expenditure from € 2.8 million in 2004 to € 1.9 million in 2005, to an unknown value in 2006 and 2007, and finally to € 1.2 million in 2008.



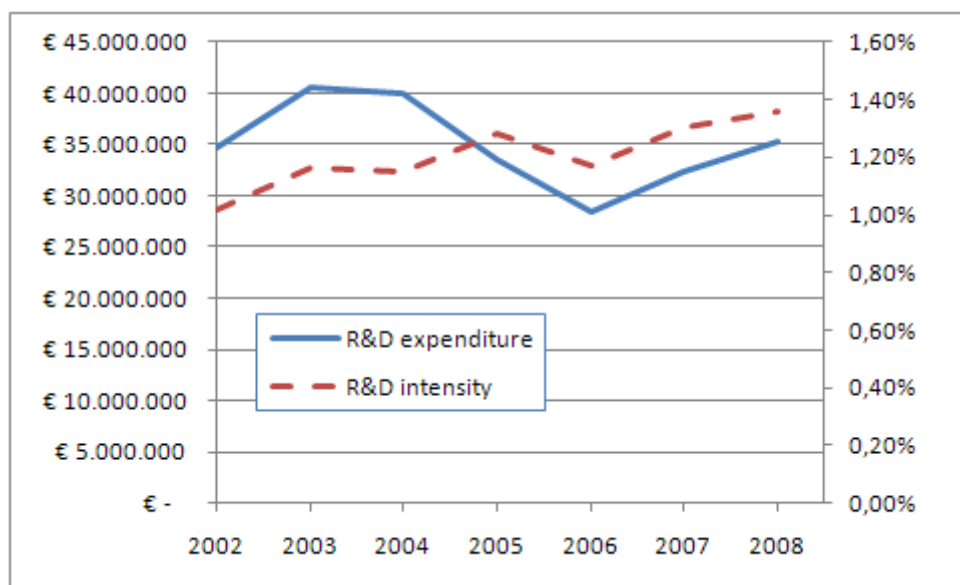
**Figure 27: Overview of R&D expenditure and R&D intensity of Cosun 2005-2008** (Cosun, 2005-2009)

A decrease in R&D expenditure for the division is therefore suggested from these data. For the acquiring company Cosun, however, the effect of the M&A is clearly an increase in both of the indicators of R&D expenditure and R&D intensity. This would suggest an increase in Cosun's level of innovation after the M&A. The amount of Cosun's patent applications does not shed more light on the level of innovation, as the company has not applied for more than 5 patents per year in recent years and any change in such a low number would not be highly significant. Still, the amount of patent applications dropped from 4 in 2006 to 0 in 2007 and then rose again to 2 in 2008.

For CSM as a whole, the divestment activities since 2004 have led to a reduced level of R&D expenditure since 2004. In the period from 2002 to 2004, R&D expenditure increased from € 35 million in 2002 to € 41 million in 2003 and to € 40 million in 2004. It then decreased to € 28 million



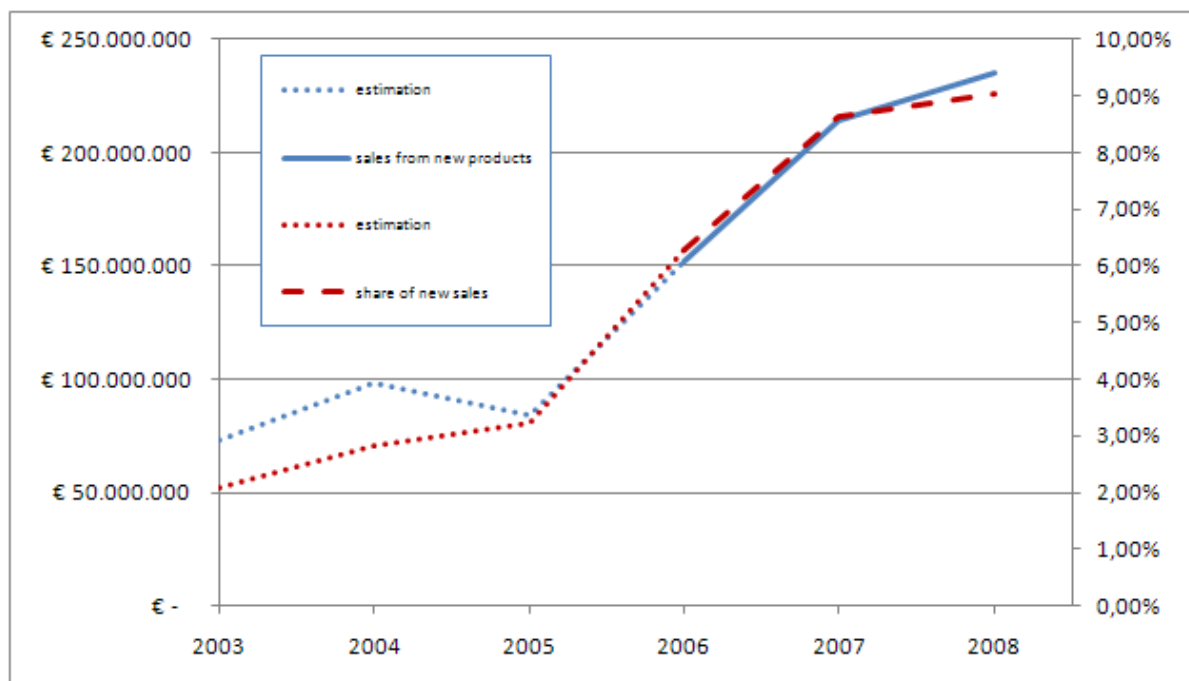
in 2006 and increased again to € 35 million in 2008. R&D intensity remained somewhat more stable over the years, increasing from 1.02% in 2002 to 1.36% in 2008. In 2005, the year of the divestment of CSM Sugar Confectionery – which scored relatively low on R&D intensity levels – the values peaked, were lowered again in 2006 following a low point in company turnover and R&D expenditure, and grew again after the divestment of CSM Sugar – which scored relatively low on R&D intensity levels as well.



**Figure 28: Overview of R&D expenditure and R&D intensity of CSM 2002-2008** (CSM, 2001-2009)

In *Figure 29*, sales from new products (the solid blue line with values on the left Y-axis) and share of new sales (the dashed red line with values on the right Y-axis) for the whole of CSM is shown. As seen before, new products have been defined by CSM as products developed within the previous past three years – prior to 2007 – or the previous two years – after 2007. For the years prior to 2006, only values have been given for some of the company's divisions, not for all. However, as the divisions for which these values have been given contribute to 84.5%, 84.6%, and 91.4% of the total company's turnover in these three years, an estimation has been made for the remaining divisions based on the average share of new sales by the known divisions. These estimated values for the total company's sales from new products and share of new sales have been shown in *Figure 29* as (red and blue) dotted lines.



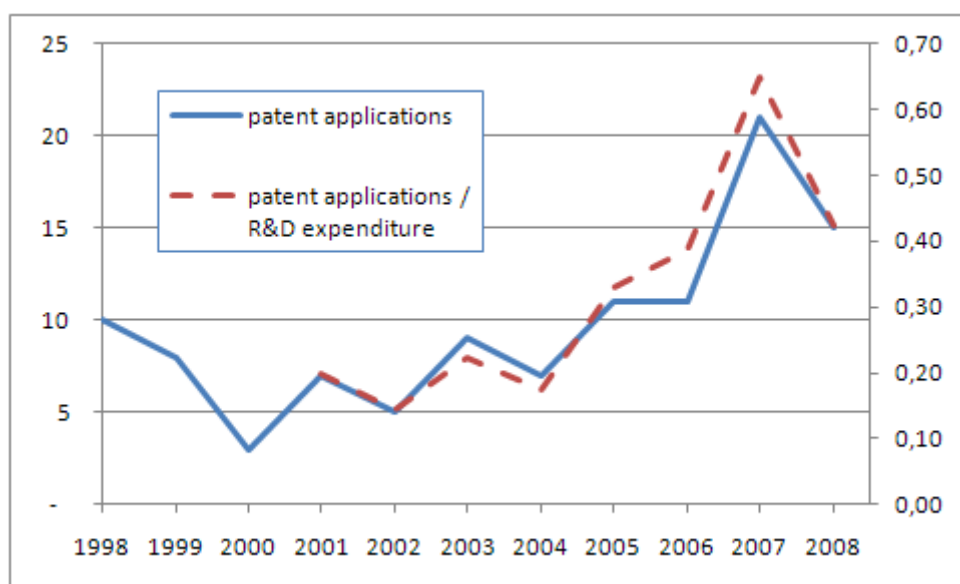


**Figure 29: Overview of estimated and given values for sales from new products and share of new sales for CSM 2003-2008 (CSM, 2001-2009)**

From *Figure 29*, a great increase in both indicators for innovation – sales from new products and share of new sales – can be seen: values rise from 2003 onwards and especially from 2005. The estimated value for sales from new products does, however, show a dip in 2005. This dip occurred after the divestment of CSM Sugar Confectionery, a division that significantly contributed to the total company's new product sales in 2004 with € 15 million.

In *Figure 30*, another indicator for innovation for the whole of the company CSM is shown: the number of patent applications (the solid blue line with values on the left Y-axis). Also, the ratio between the number of patent applications and R&D expenditure is shown (the dashed red line with values on the right Y-axis). The number of patent applications of CSM is relatively low (its peak in 2007 consisted of 21 patent applications), which explains the bumpiness of the graphs. However, a decrease in patent applications can be seen from 1998-2000, an steady increase from 2000 to 2006 for both indicators, a great increase from 2006 to 2007, and a relapse in 2008.





**Figure 30: Overview of the number of patent applications and the ratio between patent applications and R&D expenditure for CSM 1998-2008** (CSM, 2001-2009; EPOrg, 1998-2008)

The steady increase in the number of patent applications and the ratio with R&D expenditure since 2000 follow the 1999-2000 M&A's. The great increase in both indicators in 2007 follows the 2006 increase in sales from new products, which followed the divestments of CSM Sugar and CSM Sugar Confectionery. Furthermore, this output indicator for innovation follows the increase in R&D expenditure in 2007 and 2008.

In this section, the series of M&A's and divestment activities that CSM has performed since 1998 has been examined. The M&A's of sufficient size or impact for CSM to be required to file a notification to either the European or Dutch antitrust authorities have been listed. The first of the series of M&A's occurred in 1999 when Leaf – a Finnish sugar division – was acquired, and then, in 2000, European Bakery Supplies Business – an Anglo-Dutch bakery division – and Continental Sweets Netherlands – a Dutch sugar and sweets producer – were acquired. Afterwards, CSM's Food division was divested to Heinz – an American food producer –, CSM's Sugar Confectionery division to CVC – a Luxembourgian capital investor –, and CSM Sugar to Cosun – a Dutch sugar producing cooperative. By these and previous M&A's, CSM has gradually shifted from being a sugar producer to a bakery supplies and lactic acids producer.

Schematically, the indicators for innovation in the years of the M&A's between CSM's divisions with European Bakery Supplies Business, Leaf, and Continental Sweets Netherlands – the three taking place in the years 1999 and 2000 –, and the long term are shown here:



CSM's M&A's	(years of M&A)	(2/3 years after M&A)
R&D expenditure:	n/a	inverted U
R&D intensity:	n/a	↑
patent applications:	↑	↑
sales from new products:	n/a	↑ (estimated)
share of new sales:	n/a	↑ (estimated)

Data over the years were examined on divisional level. For CSM's Bakery Supplies Europe division, levels of R&D expenditure and R&D intensity increased in the three years following the M&A and stabilised or slightly decreased thereafter. Also, the indicators for innovation of sales from new products and share of new sales increased in the years after the M&A. For CSM's Sugar Confectionery division, all indicators for innovation increased two years after the M&A. However, no earlier data directly after the M&A were available, and other factors may affect the data years after the M&A. CSM's Sugar division, that was divested, performed an M&A with Cosun in 2006, and was finally absorbed within Cosun in 2007. The division's indicators for innovation showed great drops in the year directly before the M&A took place. Although the details are unclear, the decrease in innovation seems to have continued after the division's M&A with Cosun. For the acquiring firm Cosun, on the other hand, the indicators for innovation increased. For CSM as a whole, the M&A's and divestments can be seen to have had their effects in the indicators for innovation since 2002. In the years in which mergers and acquisitions took place the indicators showed increases, and in the years of disinvestments the indicators showed decreases.



## 5. Conclusions and discussion

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In the two sections in this chapter, first (in *section 5.1* and its subsections), the central research question is addressed and the three sub questions are re-addressed, by summarizing findings in the previous chapters and coming to conclusions. Second (in *section 5.2* and its subsections), a number of problems and limitations that have been faced during the writing of this research paper are described and some recommendations are given for further research on the topic.

### 5.1. Conclusions

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In this section, the central research question (CRQ) and the sub questions (SQ1, SQ2, and SQ3) that have been raised in *section 1.2* are addressed. First, SQ1 and SQ2 are addressed in *section 5.1.1*. Second, SQ3 is addressed in *section 5.1.2*. Third, conclusions of both subsections are summarized in *section 5.1.3*, in order to address the CRQ.

The central research question was :

CRQ To what extent may a company's innovative performance be improved following an M&A of agri-food companies ?

#### 5.1.1. Conclusions from literature

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In this subsection, the first and second sub questions (SQ1 and SQ2) that have been raised in *section 1.2* are addressed. In order to address these sub questions, first, an overview of the relevant information that has been extracted from scientific literature has been summarized. Second, the most important indicators to measure the innovative performance of companies have been listed.

First, the first sub question is addressed. This was :

SQ1 What relevant information can be extracted from scientific literature on M&A's, innovation management, and the link between the two concepts in all sectors ?

A company can choose to partner with other companies. Such partnering can take one of many forms. These forms can be visualised in a partnering continuum, with an increased level on the continuum leading to an increased level of complexity, intensity, or value added. Four broad forms that can be distinguished on this continuum – competition, cooperation, collaboration, and coalescence –, and more specific forms can be distinguished in the same way. The most extreme form on the partnering continuum is the M&A (or merger and acquisition), a form of coalescence



that is most complex and value adding, that requires the greatest investment of capital, that allows the greatest degree of control, and that has the greatest costs of reversal.

Mergers and acquisitions are very similar concepts and are therefore often grouped together. Differences do exist, however: mergers typically occur between two more or less equally sized firms and they tend to be friendly in nature. Mergers and acquisitions can both be defined as the process of integration of two or more previously independent companies to become one company with one corporate structure, while possible risk bearers of the combining entities share in the risks and rewards. M&A's can occur as horizontal, vertical, or conglomerate M&A's.

Companies may have different motives and reasons for conducting an M&A: they may wish to grow and realise synergies, they may strive at diversification, they may have financial or economical motives, or they may have a variety of other motives. Furthermore, they may be driven by reasons, such as ties of friendship, managerial hubris, or personal enrichment. Most M&A's fail to achieve their goals and many M&A's are divested later on. Still, M&A's do take place, perhaps because of differences between managerial and academic focus, the lack of perceived alternatives, or the lure of the (personal) benefits that are the potential results of an M&A. A company may increase the likelihood to succeed by setting their M&A goals in correspondence with known critical success factors.

The success of a company can be measured by four different methods. First, an M&A can be evaluated on its achievement of pre-M&A goals. Second, a clinical research method can be applied where company executives are interviewed or surveyed. Third, financial measuring methods can be applied where accountancy studies or market-based studies are used to evaluate the success. Fourth, one may strive at measuring the value of a company's post-M&A's intangible assets. The last method has the least disadvantages but is the most difficult to perform, and has been chosen in this research paper.

M&A's of the horizontal type dominate in the low-tech and agri-food sectors. The agri-food sector is a relatively important part of the low-tech sector and has witnessed relatively large amounts of M&A's over the years. This may be explained by the agri-food sector's characteristics, for instance the high occurrence of cooperatives. A company that is organised as a cooperative strives to maximise its users' welfare rather than maximise its profits alone.

M&A's can lead to monopolies and this has occurred in previous M&A waves. Monopolies have negative effects on society and specifically on consumers, because they cause consumer surplus to decrease and deadweight losses to occur. To prevent these negative effects, national and



supranational antitrust authorities have been set in place. Companies that wish to perform an M&A of sufficient size to affect the market are required to notify these authorities and seek their approval before starting the actual M&A process. However, such concentrations that occur when companies perform an M&A can also bring benefits to consumers, by causing efficiency gains, leading to lower prices, increased quantities offered, and other potential benefits. This may cause some M&A's to be considered acceptable to antitrust authorities, even though they lead to an increased market power. A company projecting an M&A can apply this argument – called efficiency defence –, and, if granted, can proceed with its M&A while it would have been forbidden on the grounds of the increase in market power alone.

One such other potential benefit that M&A's may or may not bring is an increase in the innovative performance of a company. Although innovation may be as old as mankind, its importance in business has been highlighted since Schumpeter's theories on the subject in the 1930's. In Schumpeterian theories, innovation is seen as a primary factor that explains why some firms prosper while others fail. In these theories, a company that achieves a high level of innovation may realise a higher productivity and turnover, and better chances at survival and growth.

In this research paper, innovation has been defined as involving the conversion of new knowledge into a new product, process, or service, and putting this new product, process, or service into use, either via the marketplace or by other processes of delivery. Innovation is a broad concept, and cannot be captured into a linear model. Every innovation is unique and multi-faceted. Innovation can be placed on a continuum from incremental innovation to radical innovation – or even revolutionary innovation. Furthermore, innovation can be classified into product innovation, process innovation, or systems innovation, each building on different manners in which the innovation takes place. There are many barriers to innovation, but all originate from the fundamental uncertainty of innovation, the necessity to act quickly, or the natural resistance to new ideas or new ways. These barriers can be overcome by showing leadership and vision, by being open to new ideas and solutions, or by other means.

In the low-tech sector, less research on innovative behaviour has been performed than in other sectors. Matters are complicated by issues with broad and overlapping categories, which make a comparison between sectors difficult. The size and economic significance of the low-tech sector, however, justify more research on innovation in this sector. Furthermore, innovation in the low-tech sector is at a relatively low level. A possible reason for this is the sector's relative limited dependence on modern technology and large capital investments, and the less volatile market conditions. Also, innovation in the low-tech sector is hindered by economic factors, difficulties in



understanding the consumer's wishes, and a lack of competencies. Nonetheless, the sector is catching up with regard to innovation.

Although it is difficult to measure an intangible concept as innovativeness, it is possible to find indicators that contribute to increased levels of innovation. Such indicators for innovation include input indicators – R&D expenditure, R&D intensity, the ratio between R&D employees and all employees –, and output indicators – number of patents granted, number of patent applications, rate of utilization of patents, number of new product announcements in the past year, number of new products developed in the past year, number of scientific publications, the citation impact of these publications, sales of new products, and percentage of sales from new products,.

A phenomenon that has been recently signalled is the acquisition of external knowledge by companies. This has been expanded into a paradigm of open innovation, where knowledge is seen as an asset and can be sold and acquired from outside the own company. Several strategies to acquire external knowledge are possible. The most extreme strategy to acquire external knowledge is no longer a form of open innovation, as it involves the M&A with another company in order to obtain their knowledge. If an M&A leads to increased levels of innovation, a company can apply for efficiency defence. In such a case, an M&A that would otherwise have been disallowed by antitrust authorities may be acceptable after all.

A clear link between conducting an M&A and a higher level of innovation, however, is difficult to prove. So far, studies that have looked at the impact of M&A's on innovation offer divergent conclusions. Reasons for these divergences may be the vast differences between industrial sectors, firm sizes, periods, and other situational dependencies of the subjects observed. Recent studies, however, cautiously indicate that a positive correlation does exist between an M&A and the level of innovation. More in-depth case studies on specific situations in this field are however recommended in order to gain more insights into this relationship.

An M&A could increase the level of innovation for four reasons, as (a) such an increase is sometimes the motive of the M&A, it would be logical that post-M&A levels would indeed increase, (b) economies of scale will allow the post-M&A company to increase its R&D budget which will lead to more innovations, (c) the complementary knowledge of the pre-M&A companies can be combined, and (d) codes of best practices regarding productivity in innovation can be exchanged. However, an M&A could also decrease the level of innovation for three reasons, as (a) an M&A is a demanding operation that may divert managerial and employee's attention away from innovation, (b) underperformance in other areas after the M&A could lead to decreased R&D budgets and decreased levels of innovation, and (c) the indigestibility of spill-over innovations. Most of the



positively influencing reasons are relevant for the period that follows directly after the M&A took place, while most of the negatively influencing reasons are relevant for a longer period.

*Chapter 2* not only addressed the first sub question but also the second sub questions (SQ2) that has been raised in *section 1.2*. This second sub question was :

SQ2 What are the most important indicators to measure the innovative performance of companies in all sectors ?

From the various literature sources and annual reports, a list of indicators for innovation has been formulated. The first three are input indicators for innovation, and the others are output indicators for innovation. Data on the scores on these indicators of innovation has been obtained for the analysis in the case studies. The indicators for innovation are :

- the R&D expenditure of the company;
- the R&D intensity of the company: the ratio of total R&D expenditures and the turnover ;
- the ratio between the amount of R&D employees and the total amount of employees of the company (as a percentage) ;
- the number of patents granted to the company ;
- the number of patent applications of the company ;
- the number of new product announcements by the company in the past year ;
- the number of new products developed by the company in the past year ;
- the company's percentage of sales from new products ;
- the company's share of new sales: the ratio between sales from new products and from all products ;
- the number of scientific publications produced by the company ;
- the citation impact of the scientific publications produced by the company.

### 5.1.2. Conclusions from the case studies

In this subsection, the third sub question (SQ3) that has been raised in *section 1.2* is addressed. This sub questions was :

SQ3 Do agri-food companies that have recently conducted an M&A have a relatively high score on the indicators that measure innovative performance ?



In order to address this sub question, first, the results of the case studies of agri-food companies that have been examined are given in this subsection. Second, some general conclusions on findings in these case studies are discussed.

The M&A between Unilever and Bestfoods resulted in a decrease in turnover that started in the year directly following the M&A. Both Unilever N.V.'s and Unilever PLC's corrected stock market quotes – the companies' quotes being corrected to variations of the index – followed the downward trend with a one-year's lag. In the year of the M&A, the input indicator for innovation R&D expenditure remained equal and R&D intensity decreased, but all output indicators increased. In the first year after the M&A, the input indicators for innovation R&D expenditure and R&D intensity remained equal, while turnover had already started its fall. The output indicators for innovation increased or stabilised – only the amount of scientific publications decreased slightly. In the years thereafter, however, as turnover continued to decrease, the input indicator for innovation of R&D expenditure started to decrease as well, and most output indicators for innovation decreased as well, some with a time lag.

Unilever and Bestfoods	(in year of M&A)	(year after M&A)	(2/3 years after M&A)
R&D expenditure:	→	→	↓
R&D intensity:	↓	↑	↓
R&D employees/all employees:	↓ (estimated)	↑ (estimated)	↑
patents granted:	→	→	↓
patent applications:	↑	↑	↓
scientific publications:	slight ↑	slight ↓	inverted U
citation impact:	↑	↑	U

Therefore, the indicators for innovation for Unilever after the M&A with Bestfoods show mixed results: R&D expenditure gradually decreased over the years after the M&A, but most other indicators show a rise in the first one or two years after the M&A, and only thereafter values decrease. The reason for the belated fall after the earlier rise of these indicators may be the reduction of R&D expenditure: a positive early effect of the M&A and a negative later effect have been observed.

For the M&A between Danone and Numico, no long-term effects could be observed as the M&A took place only recently. Turnover of the combined companies decreased in the year of the M&A and the year thereafter, but all indicators for innovation increased in the year of the M&A and the year thereafter. Only R&D expenditure remained nearly equal in the year of the M&A, but increased in the year thereafter. Therefore, the M&A between Danone and Numico seems to have a positive early effect on the innovative performance of the combined company. The later results of the M&A remain to be seen.



<u>Danone and Numico</u>	<u>(in year of M&amp;A)</u>	<u>(year after M&amp;A)</u>	<u>(2/3 years after M&amp;A)</u>
R&D expenditure:	→	↑	n/a
R&D intensity:	↑	↑	n/a
R&D employees/all employees:	↑	↑	n/a
patent applications:	↑	↑	n/a

For the M&A between Friesland Foods and Campina, the recency of the M&A and the lack of data made it hard to formulate conclusions on the innovative performance after the M&A. The fact that both companies were cooperatives seems to have the effect that both companies have been careful in the selection of a good M&A partner. All indicators for innovation increased in the year of the M&A. The forced divestments because of the M&A may lead to future decreases in the indicators. The amount of patent applications for 2009 is likely to decrease. Therefore, although the early effects appear positive, the long-term effects remain to be seen, but may be negative.

<u>Friesland Foods and Campina</u>	<u>(in year of M&amp;A)</u>	<u>(year after M&amp;A)</u>	<u>(2/3 years after M&amp;A)</u>
R&D expenditure:	↑	n/a	n/a
R&D intensity:	↑	n/a	n/a
patent applications:	↑	n/a	n/a

CSM conducted a series of M&A's and some of its divisions were divested. CSM Bakery Supplies Europe, which took part in one M&A saw immediate increases in its indicators for innovation and a long-term stabilisation or slight increase. For CSM Sugar Confectionery, which took part in two other M&A's, no immediate indicators for innovation are available, but the indicators for innovation were increasing two years after the M&A. It was then divested, and the indicators could no longer be tracked. The indicators for innovation of CSM Sugar, which was sold to Cosun, showed a great decrease in the years before its M&A with Cosun, and the indicators appear to have continued to decrease after the M&A. Cosun's indicators for innovation after the M&A increased, however. For the whole of CSM, the indicators for innovation increased in the years of M&A's and the years directly thereafter. The long-term effects are obscured by the simultaneous divestments of divisions, but, in those years, the indicators for innovation increased. Only R&D expenditure decreased – from 2003 to 2006.

<u>CSM's M&amp;A's</u>	<u>(years of M&amp;A)</u>	<u>(2/3 years after M&amp;A)</u>
R&D expenditure:	n/a	inverted U
R&D intensity:	n/a	↑
patent applications:	↑	↑
sales from new products:	n/a	↑ (estimated)
share of new sales:	n/a	↑ (estimated)

From these four cases, it is difficult to formulate general conclusions. Many different factors, only some of which have been identified, affect the indicators for innovation of the various companies.



One effect that has been observed is that, in some cases, – notably with Campina, Friesland Foods, and CSM's divisions, but also to a lesser extent with Numico and Unilever –, the company's indicators for innovation in the years before the M&A showed increases or decreases. This, in combination with increasing or decreasing turnover values and stock market quotes, may have contributed to the M&A. The M&A between Campina and Friesland Foods, for instance, came after turnover – and therewith R&D expenditure and other indicators – started to rise again after years of slow decline. And CSM's Sugar division showed a steady decline in its indicators for innovation up to the point of its M&A with Cosun.

In general, most indicators that have been examined showed increases in the year of the M&A and the years immediately following the M&A. The continued rise in the years immediately following the M&A is especially interesting. A possible explanation for these increases may be the economies of scale as a larger company is better able to innovate.

However, in some cases, a long-term negative effect of the M&A was observed. As turnover decreases after an M&A, input indicators for innovation such as R&D expenditure decrease as well, and finally output indicators for innovation follow suit, although with an time lag between the effects. This effect was most clearly seen in the case of the M&A between Unilever and Bestfoods. Many different reasons may affect the decrease in turnover after the M&A, but since most M&A's have been seen to be considered failures in the review of literature, such a decrease in turnover could be seen as an consequence of the M&A. An additional factor that may affect the decrease in turnover may be the sale of a part of the company in order to be able to buy the new company – as was the case with Unilever's sale of their biscuits division prior to the M&A with Bestfoods. Finally, another factor may be the forced divestment of a part of the company that is required from antitrust authorities, as was the case with Friesland Foods and Unilever. The cases of Campina and Friesland Foods, and Danone and Numico occurred too short ago to confirm these findings – the case of Campina and Friesland Foods hints at a similar effect though.

### 5.1.3. General conclusions

In this subsection, the central research question (CRQ) that has been raised in *section 1.2* is addressed. This questions was:

CRQ To what extent may a company's innovative performance be improved following an M&A of agri-food companies ?

From the review of literature, it has been seen that of the four methods to measure the success of an M&A, the method of attempting to measure the post-M&A's intangible assets has the least



disadvantages but is the most difficult to perform; one such intangible is innovation. In the agri-food sector, innovation has been seen to be on a low level, but many M&A's have taken place in the agri-food sector in recent years. For a company, a higher level of innovation is desirable, and if an (successful) M&A can lead to higher levels of innovation, it may plea for efficiency defence. Efficiency defence would allow an M&A to be acceptable to antitrust authorities that would otherwise have been disallowed.

A clear link between an M&A and a higher level of innovation, however, is difficult to prove. Recent studies indicate that a positive correlation does exist between the two. Four case studies on agri-food companies that have conducted an M&A in recent years have been described. Their levels of innovation have been measured by scanning public data on indicators for innovation. These indicators for innovation have been found by using literature sources.

From these four case studies, it is difficult to formulate general conclusions, as many different internal and external factors play their part, only some of which have been identified. Some observations have been made in these cases. One observation indicates that such a positive link between M&A's and innovation may exist, as most indicators for innovation showed increases in the year in which the M&A took place and the immediate year or years thereafter. Another observation is that the negative effects of the M&A on turnover – which may be due to the difficulties with the post-M&A processes, or to the forced or voluntary (sometimes in order to finance the other M&A) divestment of the parts of the company – can lead to a later negative effect on the indicators for innovation. The combination of this positive early effect and negative late effect leads to an inverted U shape of the indicators for innovation over the years following the M&A. This effect has been observed most clearly in the case of the M&A between Unilever and Bestfoods.

## 5.2. Discussion

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In the next three subsections, first, the process and the results of this research paper are examined in a general discussion. Second, a number of limitations that have been faced are discussed. Third, recommendations are given for further research. The purpose of these three subsections is to provide a critical analysis of the results, an indication of the risks that were involved related to the assumptions made, and to help further research on the topic.

### 5.2.1. General discussion

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In the writing of this research paper, many obstacles were encountered. In this section, some of the obstacles, the ways in which they were overcome, and the reasons why they were overcome in this



specific way are discussed. The purpose of the section is to give an evaluation of the process and result of this research paper. First, difficulties with writing the research proposal and first chapter are discussed. Second, some limitations that have been set to make the research more manageable are discussed. Third, the availability and reliability of data is commented on. Fourth, the use of the case study strategy to conduct this research is briefly commented on. Fifth, the implications of the limited time frame in which the research was required to be finished are briefly looked at.

Regarding the difficulties in the writing of the research proposal – which later evolved into the first chapter of this paper –, the explorative nature of the theory developing research led to many situations where a course of action had to be planned *a priori*, while the exact course of action could only reveal itself as work was progressing. For example, the availability of sufficient data was a crucial element for determining the direction of the research, but the question whether or not sufficient data was available could only be answered by analysing the data. This led to difficulties in planning a course of action that was uncertain and iterative in nature: this was the principal reason for a long delay in the completion of this first and critical phase.

Because a relatively large amount of information on the subsequent phases had therefore already been assembled in order to complete the first phase, much work had already been done for the subsequent phases. Still, in these subsequent phases obstacles were encountered as well. In contrast with the first concept that was investigated (the concept of M&A's), the second concept (the concept of innovation) was perceived to be vast and intangible. This made it especially difficult to measure the concept, to limit research to a manageable amount, and to contribute to knowledge on the field in a meaningful way.

In order to limit this research paper to a manageable amount of work, the extent of the research was limited in a number of ways. Firstly, the low-tech sector was chosen, as literature sources indicated that not much research had been done into this area. While this did prove true, the low-tech sector presented additional difficulties: measuring innovation in a sector that has been defined as the least-R&D intensive sector proved difficult. Only few companies published quantities of data on innovation that were large enough to build a case on. A possible reason may be the lack of attention for innovation of companies in the low-tech sector. Secondly, the restriction to look at agri-food companies exclusively further limited the choice of companies to examine. This choice allowed a better comparison between the companies that were left. Beverage producing companies were left out, as it was feared that it would become hard to compare beverage producing companies with food producing companies. This limitation might not have been necessary, retrospectively, but the non-



exclusion of beverage producing company would have added only one M&A to the population of twenty-one.

Finding sources of literature and data proved difficult as well. Although literature sources on M&A's were available abundantly, the modern approach on innovation management is relatively new and therefore one is necessarily limited to the use of fewer sources to work with. It would be unwise but tempting – especially relevant in such a broad area as innovation – to follow a now-current majority opinion that would prove incorrect in the end. This is especially the case for open innovation, which is a recent new paradigm. In order to prevent falling into this pitfall, it was necessary to look further back into the history and the historical development of innovation management. This problem was also relevant when looking at literature on the link between M&A's and innovation, for which only few literature sources were available.

Most of the necessary data was derived from the companies' own annual reports. As these data are thoroughly checked by accountants, they may be assumed to be relatively accurate (although even these data can prove to be shockingly wrong as the Parmalat case, for instance, has proven). However, not all companies that were examined published their data for the indicators for innovation in their annual reports – and those that did publish them usually only did so in recent years. Explanations for not publishing data on innovation may either be that information on innovation is sensitive information to be kept internal, or it may be that such data are not measured at all, or otherwise it may be that the values on innovation are so low (e.g. for FloraHolland) that they are negligible.

From a private communication with Dr. G. de Vries, coordinator of the VRR group that advises the Dutch government on innovation, it has become clear that hardly any public database currently exists that offers company-specific information – rather than sector-specific information – on innovation. Only two such public databases were found – the European Union Joint Research Centre's (EU JRC) database and the UK R&D Scoreboard on innovation database. These, however, provided data only for the most innovative European companies, and therefore did not provide data for many agri-food companies – especially not for those for which most data were required, *i.e.* those that did not publish any data on innovation in their annual reports. Furthermore, the latter of these two databases proved unreliable upon being checked with other data and this information from this database, unless double-checked, was therefore not used in this research paper. The former database, however, proved reliable upon being checked and was used frequently in this report. From this database, much more valuable data on non-Dutch agri-food companies were derived and this information was supplemented with information from esp@cenet, the European Patent Office's



(EPOrg, 1998-2008). However, this information was left out from this report, as it was not possible to analyse and describe them thoroughly within the time frame of the research. The data would be highly relevant, however, for further research.

In finding reliable data for the indicators for innovation, the companies' annual reports and the EU JRC database were very helpful. However, both contain only information that has been publicised by the companies themselves. An independent database that proved very helpful was the EPOrg's patent application database, esp@cenet, in which company's patent applications worldwide can easily be found. Some skills were required in learning to use this database, though, and especially high numbers of patent applications required a careful analysis in order to find the exact number, not to count values twice, and to include all the company's divisions in the whole number. Search results estimations were inaccurate, and all patent applications had to be counted by hand. This proved highly time-consuming in especially the case of Unilever, where search results had to be counted individually on months' intervals for a ten years' period, with some 2000 patent applications per year.

Furthermore, historical newspaper articles were used in order to find out some of the motives behind the M&A's that were discussed in the cases. Unfortunately, many of the more informative financial newspapers required subscriptions, and therefore, newspaper sources were necessarily derived from free information or the limited amount of newspapers to which access was granted. The result of this is a relatively high amount of articles from the Dutch newspaper 'Het Financieele Dagblad'.

The choice for case studies as the method to help answering the central research question and sub questions was partly inspired by Batterink's recommendations for further research, partly from similar suggestions in other literature sources, and partly because of the limited number of companies that were left over following the deduction process from all companies, to only companies that performed an M&A in recent years, to the same in the low-tech sector, to the same in the agri-food sector. By looking deeper at a limited number of cases, it would be possible to provide additional more in-depth information to earlier literature findings on the subject. In this, the results from the cases appear to be successful: earlier findings of a positive relation between M&A's and innovation seem to apply to these cases as well – or at least cannot be disproven –, and some additional specific effects have been observed and described. These could be further investigated in further research.

Finally, as it was necessary to finish work on this research within a specific time frame, some activities that were planned in an earlier phase could not be realised. It was intended to examine more M&A's



in case studies, and it was intended to further investigate the reasons behind some of the effects in the case studies in interview sessions. Both were not realised.

### 5.2.2. Research Limitations

Results have been greatly obscured by having been forced to look at the overall data on large companies, rather than looking at more specific values. Only CSM provided detailed data at divisional level. By relying on data on the whole of the company as a major source of information, and with many factors influencing these data that have not been examined in the case studies, it is difficult to claim with any degree of certainty that a certain observed event is the effect of another event. Furthermore, the amount of internal re-shuffling over the years and the series of smaller M&A's and divestitures that have not been further looked into contribute to obscure the data.

The low level of innovation in the agri-food sector limited the information that could be derived from this research. Innovation in agri-food companies is simply not as much a strategic goal as it is to some high-tech companies, and an increase in the level of innovation would not as soon be one of the main motives for an M&A between agri-food companies. If similar cases would have been performed on companies in the high-tech sector, more specific information would probably have been found, and more specific conclusions might have been formulated.

### 5.2.3. Recommendations for further research

This research paper was meant to contribute to current knowledge on the subject. Many gaps in knowledge remain to be filled and a number of such gaps that have been observed specifically during this research are discussed in this section.

Most importantly, the cautious positive early effect of M&A's and the indicators for innovation that has been observed in the case studies and in other recent research papers could be further investigated in a number of additional case studies. For the agri-food sector, other non-Dutch agri-food companies are interesting and likely candidates for such case studies, but in order to be able to find sufficient information, the companies need to be of sufficient size. The database on European top innovating companies in all sectors could be used to select a number of top agri-food companies. Findings from such a research could be compared to the findings of this research paper. Dutch agri-food companies that have conducted an M&A and that have not been further investigated in this research paper could be further looked at as well, although data acquisition would probably be difficult for these cases.



Some of the cases that have been looked at in this research paper – i.e. the M&A between Friesland Foods and Campina and between Danone and Numico – occurred very recently. The long-term effects of these M&A's on the level of innovation remain to be seen. Further research is recommended to check these long-term effects on innovation for these two M&A cases.

If possible, checking data on a lower organisational level than company level would be advisable. The case of CSM illustrates the deepening of information if data is given on a divisional level rather than company level. If data for a case study on innovation could be acquired for all divisions of a given company, these divisions can be tracked individually, also after their M&A with another company. This would lead to a much more informative picture of the innovative capabilities of a company and their developments over the years.

Furthermore, in order to check the results of these case studies, interview sessions could be held with representatives from the companies involved. This could shed light on additional reasons for increases or decreases of the indicators. However, it should be noted that this may prove a difficult thing to accomplish, as trying to find reasons for data – that is only available from the largest companies – can lead to sensitivities from the part of these companies. More revealing information might be found in M&A's between smaller sized companies, but here the acquisition of data would prove more difficult.



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## Appendix A: NACE codes of industries in the agri-food sector

In this research, M&A's in the agri-food sector have been defined as falling under one of the following NACE categories or their subcategories. This list enumerates the selected relevant categories from the revised 2006 list issued by the European Parliament (selected from EC Regulation No. 1893/2006 (Rev. 2)). NACE stands for *Nomenclature statistique des activités économiques dans la Communauté européenne*.

### Agriculture (A)

- 01.1** Growing of non-perennial crops
- 01.2** Growing of perennial crops
- 01.3** Plant propagation
- 01.4** Animal production
- 01.5** Mixed farming
- 01.6** Support activities to agriculture and post-harvest crop activities

### Manufacture (C)

- 10.1** Processing and preserving of meat and production of meat products
- 10.2** Processing and preserving of fish, crustaceans, and molluscs
- 10.3** Processing and preserving of fruit and vegetables
- 10.4** Manufacture of vegetable and animal oils and fats
- 10.5** Manufacture of dairy products
- 10.7** Manufacture of bakery and farinaceous products
- 10.8** Manufacture of other food products
- 10.9** Manufacture of prepared animal feeds

### Wholesale (G)

- 46.1.1** Agents involved in the sale of agricultural raw materials, live animals, textile raw materials, and semi-finished goods
- 46.2** Wholesale of agricultural raw materials and live animals (excluding 46.23 and 46.24)
- 46.3** Wholesale of food, and tobacco (excluding 46.34)



## Appendix B: Tables of data used in Case I

Year	Unilever N.V. Year close	Unilever PLC Year close	Year close AEX	Year close FTSE100	Quote / (AEX * AEX in 1998)	Quote / (FTSE100 * FTSE100 in 1998)
Unilever	quote (AEX)	quote (FTSE100)				
1998	€ 17,34	£ 1.488	538,36	5.883	17,34	1.488
1999	€ 18,28	£ 1.012	671,41	6.836	14,66	871
2000	€ 22,46	£ 1.273	637,60	6.223	18,96	1.203
2001	€ 21,95	£ 1.253	506,78	5.242	23,32	1.406
2002	€ 19,03	£ 1.312	322,73	3.901	31,74	1.979
2003	€ 16,78	£ 1.149	338,00	4.470	26,73	1.512
2004	€ 16,44	£ 1.139	348,00	4.820	25,43	1.390
2005	€ 19,28	£ 1.281	437,00	5.619	23,75	1.341
2006	€ 20,70	£ 1.428	495,00	6.221	22,51	1.350
2007	€ 25,28	£ 1.890	516,00	6.497	26,38	1.711
2008	€ 17,34	£ 1.579	249,00	4.393	37,49	2.115

**Table 3: Unilever N.V.'s and Unilever PLC's yearly closing quotes, AEX and FTSE100 yearly closing quotes and corrected quotes 1998/-2008** (Belegger.nl, 2009b, 2009d, 2009g; Financieele Dagblad: Beurzen, 2009a)

Year	Turnover	R&D expenditure	R&D intensity	Number of Employees	Number of R&D Employees	Ratio between employees and R&D employees
Unilever						
1998	€ 40.639.000.000	€ 830.000.000	2,04%	267.000		
1999	€ 41.262.000.000	€ 935.000.000	2,27%	255.000		
2000	€ 48.066.000.000	€ 1.187.000.000	2,47%	261.000		
2001	€ 52.206.000.000	€ 1.178.000.000	2,26%	279.000		
2002	€ 48.760.000.000	€ 1.166.000.000	2,39%	258.000		
2003	€ 42.942.000.000	€ 1.065.000.000	2,48%	240.000		
2004	€ 39.108.000.000	€ 991.000.000	2,53%	227.000	6500	2,86%
2005	€ 39.672.000.000	€ 953.000.000	2,40%	212.000	6500	3,07%
2006	€ 39.642.000.000	€ 906.000.000	2,29%	189.000	6500	3,44%
2007	€ 40.187.000.000	€ 868.000.000	2,16%	175.000	6520	3,73%
2008	€ 40.523.000.000	€ 927.000.000	2,29%	174.000	6520	3,75%
BestFoods						
1998	€ 7.577.648.153	€ 60.347.370	0,80%	42.000	780	1,86%
1999	€ 8.108.019.611	€ 65.712.791	0,81%	44.000	815	1,85%

**Table 4: Unilever's and Bestfoods' turnover, R&D expenditure, R&D intensity, number of employees, number of R&D employees, and the ratio between employees and R&D employees 1998-2008** (Bestfoods, 1999-2000; Unilever, 1999-2009)



Year	Number of patents granted	Number of patent applications	number of patent applications / R&D expenditure	number of scientific publications	citation impact
<b>Unilever</b>					
1998		1.763	2,12	95	1,20
1999		1.846	1,97	87	1,25
2000	423	2.098	1,77	80	1,39
2001	450	2.320	1,97	82	1,47
2002	447	2.386	2,05	79	1,52
2003	393	2.519	2,37	101	1,58
2004	370	2.335	2,36	68	1,36
2005		2.029	2,13	79	1,54
2006		1.951	2,15	71	1,67
2007		1.672	1,93		
2008		1.319	1,42		
<b>BestFoods</b>					
1998		12	0,20		
1999		29	0,44		

**Table 5: Unilever's and Bestfoods' numbers of patents granted, patent applications, ratio between patent applications and R&D expenditure, number of scientific publications, and citation impact 1998-2008** (EPorg, 1998-2008; Unilever, 1999-2009; CWTS, 2009)



## Appendix C: Tables of data used in Case II

Year	Year Close Quote (CAC40)	Year Close CAC40	Quote / (CAC40 * CAC40 in 1998)	Turnover
<b>DANONE</b>				
1998	€ 30,49	3943	30,49	€ 12.935.000.000
1999	€ 29,25	5958	19,36	€ 13.293.000.000
2000	€ 40,15	5926	26,71	€ 14.287.000.000
2001	€ 34,25	4625	29,20	€ 14.470.000.000
2002	€ 32,05	3064	41,24	€ 13.555.000.000
2003	€ 32,35	3558	35,85	€ 13.131.000.000
2004	€ 33,98	3821	35,06	€ 13.700.000.000
2005	€ 44,13	4715	36,90	€ 13.024.000.000
2006	€ 57,40	5542	40,84	€ 14.073.000.000
2007	€ 61,40	5614	43,12	€ 12.776.000.000
2008	€ 43,18	3218	52,91	€ 15.220.000.000

**Table 6: Danone's yearly closing quotes, CAC40 yearly closing quotes, corrected quotes, and turnover 1998-2008** (Danone, 2000-2009; Belegger.nl, 2009c; Financieel Dagblad: Beurzen, 2009b)

Year	R&D expenditure	R&D intensity	Number of Employees	Number of R&D employees	Ratio between employees and R&D employees	Number of Patent Applications	Patent Applications / R&D expenditure
<b>DANONE</b>							
1998	€ 120.000.000	0,93%	78.945	1250	1,58%	21	0,18
1999	€ 122.000.000	0,92%	75.965	1250	1,65%	21	0,17
2000	€ 125.000.000	0,87%	86.657	1000	1,15%	27	0,22
2001	€ 126.000.000	0,87%	100.560	833	0,83%	29	0,23
2002	€ 133.000.000	0,98%	92.209	833	0,90%	29	0,22
2003	€ 130.000.000	0,99%	88.607	833	0,94%	28	0,22
2004	€ 129.000.000	0,94%	89.449	800	0,89%	29	0,22
2005	€ 123.000.000	0,94%	88.184	800	0,91%	42	0,34
2006	€ 126.000.000	0,90%	88.124	800	0,91%	66	0,52
2007	€ 121.000.000	0,95%	76.044	880	1,16%	57	0,47
2008	€ 198.000.000	1,30%	80.143	1200	1,50%	157	0,79

**Table 7: Danone's R&D expenditure, R&D intensity, number of employees, number of R&D employees, ratio between employees and R&D employees, number of patent applications, and the ratio between patent applications and R&D expenditure 1999-2008** (EPOrg, 1998-2008; Danone, 2000-2009; EU JRC, 2004-2008)



Year	Year Close Quote (AMX)	Year Close AMX	Quote / (AMX * AMX in 1998)	Turnover
<b>NUMICO</b>				
1998	€ 40,61	646,60	40,61	€ 1.577.000.000
1999	€ 37,04	655,47	36,54	€ 2.299.000.000
2000	€ 53,60	604,41	57,34	€ 4.224.000.000
2001	€ 26,18	478,82	35,35	€ 4.339.000.000
2002	€ 12,00	312,20	24,85	€ 3.966.000.000
2003	€ 21,91	357,89	39,58	€ 3.151.000.000
2004	€ 26,53	410,77	41,76	€ 1.722.000.000
2005	€ 34,98	520,74	43,43	€ 1.988.000.000
2006	€ 40,75	677,71	38,88	€ 2.623.000.000
2007	€ 54,90	657,04	54,03	€ 2.911.530.000

**Table 8: Numico's yearly closing quotes, AMX yearly closing quotes, corrected quotes, and turnover 1998/-2008** (Numico, 1999-2007; Belegger.nl, 2009e, 2009f)

Year	R&D expenditure	R&D intensity	Number of Employees	Number of R&D employees	Ratio between employees and	Number of Patent	Patent Applications /
<b>NUMICO</b>							
1998			10.577	300	2,84%	11	
1999			18.853	300	1,59%	18	
2000			31.523	300	0,95%	17	
2001			29.606	300	1,01%	24	
2002	€ 43.000.000	1,08%	28.559	300	1,05%	42	0,98
2003	€ 32.000.000	1,02%	10.889	300	2,76%	56	1,75
2004	€ 33.000.000	1,92%	11.229	300	2,67%	53	1,61
2005	€ 38.000.000	1,91%	10.516	320	3,04%	55	1,45
2006	€ 56.000.000	2,13%	12.888	320	2,48%	58	1,04
2007	€ 62.160.000	2,13%	12.888	320	2,48%	81	1,30

**Table 9: Numico's R&D expenditure, R&D intensity, number of employees, number of R&D employees, ratio between employees and R&D employees, number of patent applications, and the ratio between patent applications and R&D expenditure 1999-2007** (EPOrg, 1998-2008; Numico, 1999-2007; EU JRC, 2004-2008)



## Appendix D: Tables of data used in Case III

Year	Turnover	R&D expenditure	R&D intensity	Number of Employees	Number of Patent Applications	Patent Applications / R&D expenditure
<b>Campina</b>						
1998				7.015	7	
1999				6.939	9	
2000	€ 3.894.000.000	€ 24.000.000	0,62%	7.615	14	0,58
2001	€ 3.909.000.000	€ 24.500.000	0,63%	7.114	21	0,86
2002	€ 3.707.000.000	€ 24.000.000	0,65%	6.872	29	1,21
2003	€ 3.655.000.000	€ 26.600.000	0,73%	6.940	33	1,24
2004	€ 3.559.000.000	€ 26.200.000	0,74%	7.099	30	1,15
2005	€ 3.569.100.000	€ 24.700.000	0,69%	6.359	46	1,86
2006	€ 3.623.600.000	€ 26.600.000	0,73%	6.302	29	1,09
2007	€ 4.032.200.000	€ 24.700.000	0,61%	6.814	31	1,26
2008					28	

**Table 10: Campina's turnover, R&D expenditure, R&D intensity, number of employees, number of patent applications, and ratio between patent applications, and R&D expenditure 1998-2008** (EPOrg, 1998-2008; EU JRC, 2004-2008; Campina, 2007-2008)

Year	Turnover	R&D expenditure	R&D intensity	Number of Employees	Number of Patent Applications	Patent Applications / R&D expenditure
<b>FrieslandFoods</b>						
1998				11.843	9	
1999				12.095	8	
2000				11.970	6	
2001	€ 4.300.000.000			12.165	13	
2002	€ 4.723.000.000	€ 16.000.000	0,34%	16.774	7	0,44
2003	€ 4.575.000.000	€ 19.000.000	0,42%	18.005	11	0,58
2004	€ 4.449.000.000	€ 21.000.000	0,47%	17.580	14	0,67
2005	€ 4.419.000.000	€ 21.000.000	0,48%	16.438	18	0,86
2006	€ 4.675.000.000	€ 24.000.000	0,51%	15.312	32	1,33
2007	€ 5.075.000.000	€ 29.000.000	0,57%	14.582	37	1,28
2008					61	

**Table 11: Friesland Foods' turnover, R&D expenditure, R&D intensity, number of employees, number of patent applications, and ratio between patent applications, and R&D expenditure 1998-2008** (EPOrg, 1998-2008; CPB, 2003; EU JRC, 2004-2008; Friesland Foods, 2007-2008)



## Appendix E: Tables of data used in Case IV

Year CSM	Turnover	Year Close Quote (AMX)	Year Close AMX	Quote / (AMX*AMX in 1998)
1998/1999	€ 2.199.000.000	24,60	646,60	24,60
1999/2000	€ 2.725.000.000	21,20	655,47	20,91
2000/2001	€ 3.619.900.000	26,40	604,41	28,24
2001/2002	€ 3.418.300.000	23,30	478,82	31,46
2002	€ 3.421.100.000	19,98	312,20	41,38
2003	€ 3.484.200.000	17,34	357,89	31,33
2004	€ 3.475.000.000	22,92	410,77	36,08
2005	€ 2.618.000.000	23,03	520,74	28,60
2006	€ 2.421.400.000	29,17	677,71	27,83
2007	€ 2.485.600.000	23,10	657,04	22,73
2008	€ 2.599.300.000	11,50	312,16	23,82

**Table 12: CSM's turnover, yearly closing quote, AMX yearly closing quote and corrected quote 1998/1999-2008** (CSM, 2001-2009; Belegger.nl, 2009a, 2009e)

Year CSM	R&D expenditure	R&D intensity	New Product Sales	Share of New Sales	Number of Employees	Number of Patent Applications
1998/1999						
1999/2000						10
2000/2001					10.539	8
2001/2002					13.759	3
2002	€ 34.700.000	1,01%			12.930	5
2003	€ 40.600.000	1,17%	€ 61.700.000 (*)	1,77 % (*)	13.850	9
2004	€ 40.000.000	1,15%	€ 83.000.000 (*)	2,39 % (*)	13.614	7
2005	€ 33.500.000	1,28%	€ 77.000.000 (*)	2,94 % (*)	8.889	11
2006	€ 28.400.000	1,17%	€ 151.774.000	6,27%	8.047	11
2007	€ 32.300.000	1,30%	€ 214.401.000	8,63%	8.389	21
2008	€ 35.300.000	1,36%	€ 235.228.400	9,05%	8.472	15

**Table 13: CSM's R&D expenditure, R&D intensity, new product sales, share of new sales, number of employees, and number of patent applications 1998/1999-2008 (\*)** (CSM, 2001-2009; EPOrg, 1998-2008)

\* Data for these only available for the divisions CSM Bakery Supplies North America and CSM Sugar Confectionery.



Year	Turnover	R&D expenditure	R&D intensity	Number of Employees	Number of Patent Applications
<b>COSUN</b>					
1998				4.847	7
1999				4.782	12
2000	€ 885.000.000			4.738	6
2001	€ 979.000.000	€ 8.800.000	0,90%	3.364	12
2002	€ 1.104.000.000	€ 8.800.000	0,80%	3.783	9
2003	€ 1.321.000.000	€ 9.200.000	0,70%	4.325	5
2004	€ 1.317.300.000	€ 11.600.000	0,88%	3.993	3
2005	€ 1.338.500.000	€ 7.900.000	0,59%	4.194	3
2006	€ 1.468.700.000	€ 7.500.000	0,51%	4.210	4
2007	€ 1.713.100.000	€ 7.500.000	0,44%	4.337	0
2008	€ 1.689.300.000	€ 8.700.000	0,52%	4.266	2

**Table 14: Cosun's turnover, R&D expenditure, R&D intensity, number of employees, and number of patent applications 1998-2008** (EPOrg, 1998-2008; EU JRC, 2004-2008; Cosun, 2005-2009)

CSM BS NA	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
1998-1999						
1999-2000	€ 1.114.400.000					2670
2000-2001	€ 1.162.300.000					2617
2001-2002	€ 1.053.800.000					2543
2002	€ 1.050.700.000	€ 4.500.000	0,43%			2542
2003	€ 1.066.200.000	€ 6.600.000	0,62%	€ 10.000.000	0,94%	3358
2004	€ 1.047.000.000	€ 5.800.000	0,55%	€ 12.000.000	1,15%	3342
2005	€ 1.025.000.000	€ 6.800.000	0,66%	€ 15.000.000	1,46%	3371
2006	€ 1.084.100.000			€ 75.887.000	7,00%	3235
2007	€ 1.116.100.000			€ 100.449.000	9,00%	3605
2008	€ 1.181.200.000			€ 108.670.400	9,20%	3433

**Table 15: CSM Bakery Supplies North America's divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees** (CSM, 2001-2009)

CSM BS Europe	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
1998-1999						
1999-2000	€ 163.100.000					732
2000-2001	€ 1.040.400.000	€ 10.000.000	0,96%			4354
2001-2002	€ 1.067.700.000	€ 12.000.000	1,12%			4474
2002	€ 1.104.500.000	€ 12.500.000	1,13%			4556
2003	€ 1.128.100.000	€ 14.800.000	1,31%	€ 42.000.000	3,72%	4647
2004	€ 1.148.800.000	€ 14.300.000	1,24%	€ 56.000.000	4,87%	4604
2005	€ 1.085.600.000	€ 14.000.000	1,29%	€ 62.000.000	5,71%	4137
2006	€ 1.041.900.000			€ 72.933.000	7,00%	3790
2007	€ 1.059.400.000			€ 95.346.000	9,00%	3742
2008	€ 1.092.500.000			€ 100.510.000	9,20%	4049

**Table 16: CSM Bakery Supplies Europe's divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees** (CSM, 2001-2009)



PURAC	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
2003	(← CSM Biochemicals)					
2004	€ 271.300.000	€ 11.700.000	4,31%			990
2005	€ 281.000.000	€ 10.800.000	3,84%			1028
2006	€ 295.400.000			€ 2.954.000	1,00%	1022
2007	€ 310.100.000			€ 18.606.000	6,00%	1042
2008	€ 325.600.000			€ 26.048.000	8,00%	990

**Table 17: PURAC's divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees (CSM, 2001-2009)**

CSM Sugar Confectionery	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
1998-1999						
1999-2000	€ 966.900.000					5770
2000-2001	€ 889.600.000					5330
2001-2002	€ 761.500.000					4569
2002	€ 742.200.000	€ 5.100.000	0,69%	€ 700.000	0,09%	4501
2003	€ 750.000.000	€ 5.100.000	0,68%	€ 9.700.000	1,29%	4330
2004	€ 743.300.000	€ 5.400.000	0,73%	€ 15.000.000	2,02%	4150
2005	(→ sold)					

**Table 18: CSM Sugar Confectionery's divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees (CSM, 2001-2009)**

CSM Biochemicals	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
2002	(← Industrial processing activities)					
2003	€ 271.100.000	€ 11.300.000	4,17%	€ 5.693.100	2,10%	964
2004	€ 271.300.000	€ 11.700.000	4,31%	€ 7.596.400	2,80%	990
2005	(→ PURAC)					

**Table 19: CSM Biochemicals' divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees (CSM, 2001-2009)**

CSM Sugar	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
2002	(← Industrial processing activities)					
2003	€ 268.800.000	€ 2.800.000	1,04%	€ 5.644.800	2,10%	489
2004	€ 264.600.000	€ 2.800.000	1,06%	€ 7.408.800	2,80%	468
2005	€ 226.400.000	€ 1.900.000	0,84%	€ 7.244.800	3,20%	353
2006	(SOLD)					

**Table 20: CSM Sugar's divisional turnover, R&D expenditure, R&D intensity, sales from new products, share of new sales, and number of employees (CSM, 2001-2009)**



Industrial processing activities	turnover	R&D expenditure	R&D intensity	new product sales	share of new sales	no of employees
1998-1999						
1999-2000	€ 480.600.000					1318
2000-2001	€ 527.600.000					1405
2001-2002	€ 535.300.000					1299
2002	€ 523.700.000	€ 12.600.000	2,41%			1331
2003	(→ CSM Biochemicals and CSM Sugar)					

**Table 21: CSM Industrial processes' divisional turnover, R&D expenditure, R&D intensity, and number of employees (CSM, 2001-2009)**