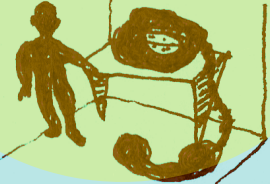


# Developing a Risk Maturity Model:



**a comprehensive risk maturity model for Dutch municipalities**

**Ignacio Cienfuegos**

# DEVELOPING A RISK MANAGEMENT MATURITY MODEL

A COMPREHENSIVE RISK MATURITY MODEL FOR DUTCH  
MUNICIPALITIES

**Ignacio Jose Cienfuegos Spikin**

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# DEVELOPING A RISK MANAGEMENT MATURITY MODEL

A COMPREHENSIVE RISK MATURITY MODEL FOR DUTCH  
MUNICIPALITIES

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on account of the decision of the graduation committee,  
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## CHAPTER 1: Introduction

*“We live only by knowing something about the future; while the problem of life, or conduct at least, arises from the fact that we know so little”* (Frank Knight, 1921, p. 199).

### 1.1. Motivations and research problem

This PhD research builds on the assumption that the discipline of risk management, especially the integrated perspective, would contribute to the economization of financial losses, the prevention of human life loss and in general, the accomplishment of strategic objectives by municipalities among other purposes (Boorsma, 2006). As a consequence, municipalities in the western world have also started to develop “risk awareness” mainly because of the incidents that they have experienced in the past and the pressure that they might be receiving from their environment. More severe flooding (resulting from climate change), school fires, unemployment, failures of public-private partnership projects, incidents related to IT safety and private information custody (Todd, 1970) could be some examples of the events that local governments are confronting and that require the implementation of a risk management approach. Additionally, municipalities have to respond to increased regulations and compliance standards established by auditors and the central government, as well as meet the expectations of their stakeholders and society in general.

Specialized associations such as the Public Risk Management Organization both in Europe (PRIMO) and in America (PRIMA) and also The Public Risk Management Association (ALARM) in the UK, have contributed to the process of risk management awareness in the public sector and specially by local governments. Such associations have developed studies and standards<sup>1</sup> and offer conferences where practitioners, scholars and policy makers can congregate and discuss risk management issues and their implications for the public sector. Nonetheless it seems that the level of implementation of risk management processes within public organization might be very heterogeneous and hard to measure.<sup>2</sup> Accordingly, difficulties are often reported considering the implementation of risk management by public entities. In that sense, the Dutch case—while innovative for the public context—might be an excellent example where the implementation of risk management practices have presented some limitations.

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<sup>1</sup> A Risk Management Standard AIRMIC, ALARM, IRM: 2002

<sup>2</sup> At the moment that this thesis was written there were limited reports available on the measurement of the implementation of risk management in municipalities (see for example Mohanlal, 2012; Schouten, 2010). However for the private sector we can mention for instance, the Enterprise Risk Management (ERM) Benchmarking Survey (2008) by PricewaterhouseCoopers which provided information on the maturity of the ERM process and functions in Finland Enterprises, conducted between January and March of 2008. This survey was conducted among 26 of the largest companies in Finland and showed that 69% of the companies had both an ERM process and function in place. However, another study by North Carolina State University involving over 700 entities during the fall of 2008 found that 44% of the organizations questioned do not perform a formal assessment of strategic, market or industry risk and 55% noted that they do not maintain any risk documented on a formal basis.

Municipalities in the Netherlands, since 1995, have a bylaw that establishes a paragraph on risk management and from 2004, a paragraph on financial resilience (Besluit Begroting en Verantwoording), the so called “resilience paragraph”. This bylaw creates analysis of the available financial capacity and scrutiny of the risks (the needed financial capacity). This regulation also requires that the municipality develops a policy on financial resilience. Moreover, this bylaw commands that local governments indicate the risk that they have identified and the measures taken to confront them (Boorsma, 2006). Nonetheless, as stated by Boorsma and Haisma, (2005), these entities might have difficulties implementing the aforementioned risk management rule and could be even more distant from the best practices of risk management prescribed in the literature. For example, as reported by these scholars, Dutch municipalities, generally, do not identify risk in a systematic and formal manner.

On the other hand, as stated by Ibbs and Kwak (2000) although there would be no accepted methodologies for impartially measuring management practices across different industries, we consider that maturity models could contribute to the discussion on how to measure and also gain control of risk management practices within Dutch municipalities. Maturity models are methods that were initially developed for judging the sophistication of a specific process of an organization and for identifying the key practices that would be required to increase the maturity of those processes. One of the best-known forms is the capability maturity model (CMM) for software development, established by the Software Engineering Institute (SEI) at Carnegie Mellon University<sup>3</sup>. In that perspective, by the means of these types of methods, we might be able to diagnose accurately the present state of risk management processes in Dutch municipalities, guiding them as well on the implementation of the best practices of risk management. Therefore, by focusing on a limited set of activities and working aggressively to achieve them, risk maturity models might steadily improve the organization-wide risk management processes and enable continuous and lasting gains in its risk management capabilities (SEI, 2009). However, a critical review of the existing literature on maturity models, and particularly on risk maturity models, has shown there to be some difficulties.

We claim that existing risk maturity models are very simplified, designed to quickly target the weaknesses of the implementation of risk management and therefore are very informal. Additionally, maturity models and risk maturity models found in the literature focus on practices related to specific industries, and therefore do not necessarily take into account the characteristics of local public entities such as Dutch municipalities. For instance, despite the efforts of Carnegie Mellon’s SEI, the CMM concentrates mainly on the software development processes, centering on techniques and practices related to that industry (Bach, 1994). The same problematic situation can be reported for other models such as the pioneer risk maturity model framework adapted by Hillson (1997), a method aimed at the improvement of risk management practices applicable essentially for construction projects (PMBOK

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<sup>3</sup> More information available concerning capability maturity models at <http://www.sei.cmu.edu/cmimi/>

Guide, 2002; Hillson, 1997). Moreover, we could say that these models would not respond necessarily to a modern or integrated perspective of risk management, focusing more on a project risk management approach. As mentioned by Wendler, (2012) theoretical reflections about the maturity concepts are scarce as are proper empirical validations of their structure and applicability. In that sense, maturity models would not have much theoretical neither empirical support, basing their construction mainly on the experience of risk management experts (Bach, 1994). It is especially recognizable on present risk maturity models, the lack of theoretical support that could explain the reasoning behind their logic. For instance, risk maturity models suggest that an organization would achieve a master performance of a discipline by following a sequence of steps, thus exhibiting risk management through a special framework of practices. Finally, we could mention that current risk maturity models are in general more concerned with adapting the principles of CMMs than being consistent with the principles of the theory of risk management. Consequently we state that another deficiency of the revised risk maturity models is related to the fact that they do not consider, in general, the so called risk management process or cycle. The latter criticism is found in the assumption that the risk management methodology is comprised of a risk management cycle with different stages and practices that need to be implemented by the organization in order to formally integrate the discipline. Accordingly we claim that any adaptation of the risk maturity model should consider the risk management cycle as the continuous and effective configuration of the stages of a proposed model.

Furthermore, we claim that the literature of organizational change and organizational learning could give us arguments to build a theoretical reasoning and bring formality to risk maturity models, which we claim are missing in current models. Accordingly, we state that the literature on staged models might provide us with explanations for the evolutionary and progressive perspective that risk maturity suggests (Damsgaard and Scheepers, 2000; Stubbart and Smalley, 1999), as well as to guide the construction of a novel risk maturity model. Additionally, as other researchers have also considered (Strutt, Sharp, Terry and Miles, 2006; MacGillivray, 2007) we state that the contributions of Argyris and Schön, (1978) on the theories of single and double loop learning might also assist us to develop a theoretical foundation to risk maturity models. The latter would be reasonable, taking into account that this approach explains the acquiring of knowledge by the means of incremental stages, a rationality that is also taken by risk maturity method. As a consequence, we argue that these concepts might assist us to especially develop the reasoning behind the transition from one level of maturity to the other.

## **1.2. Research objectives**

The general objective of this PhD research then is to measure the level of implementation of risk management practices by Dutch municipalities. Our goal is to evaluate if the risk management practices related to the “resilience paragraph” are being implemented correctly by these local governments, as well as to assess the presence of the best practices of risk management prescribed in the literature. Specially, we aim to consider in this measurement the practices related to the decision of risk management strategies by municipalities in the Netherlands.

Accordingly, we believe that the risk maturity method will be a pertinent instrument for the diagnosis of current risk management practices of Dutch municipalities and will also influence the correct implementation of these practices by these public entities. We will attempt to improve the risk maturity framework, adapting it to the requirements and characteristics of municipalities in the Netherlands. As a consequence, the proposed risk maturity model should include both the practices that characterize the modern perspective of risk management and the compliance of the “resilience paragraph” by Dutch municipalities, measuring the activities and processes that this policy assumes. Additionally, we should profoundly study the reasoning behind the risk maturity model, looking for arguments that might give theoretical support to our proposed model.

Additionally, the empirical part of the research will aim to apply the novel instrument constructed for measuring risk process on a select sample of Dutch municipalities. The applying of the improved risk maturity model will also deliver information about decisions made by municipalities in the Netherlands considering risk management strategies, contrasting rational and non-rational explanations of the decision theory.

Finally, although our attempt to develop a risk maturity model will be derived by abstracting from existing risk maturity models and research on the subject, it should not be an extension of these models, but rather a novel interpretation of risk maturity modeling for Dutch municipalities. Nonetheless, this research should be viewed as an explorative and pilot attempt to construct a suitable risk management maturity model for local public entities in the Netherlands, an effort that will need to be continued by further research.

### 1.3. Research questions

Developing on the established objectives, the following central question, research questions and sub-questions were identified:

**Central Research Question:** How are risk management practices being implemented in Dutch municipalities and how can we measure them?

1. What are the relevant elements in the theory of risk management that are applicable to municipalities?
  - a. How can we define risk and risk management?
  - b. What are the distinctions of the integrated perspective of risk management as opposed to the silo approach?
  - c. What are the special elements of risk and risk management for public organizations?
  - d. What are the fundamental practices of the integrated perspective of risk management prescribed in the literature?

The latter research question will allow us to study the risk management practices and processes established in the literature, elements that would be a relevant part of our normative instrument to measure the implementation of the discipline in Dutch municipalities. In that sense, we will study in a clear manner the evolution of the discipline of risk management, making a distinction between the traditional approach and its practices from the modern perspective of risk management. Additionally these research questions will permit us to investigate the applications of risk management concepts in the public setting, establishing clear differences with private risk management. The latter would be important as well, considering that our proposed risk maturity model should include the best risk management practices prescribed in the literature and standards.

2. Can the rational and descriptive perspective of decision theory categorize risk management decisions by Dutch municipalities?

This research question will let us identify possible descriptions of risk management strategies chosen by the municipality. By studying both the descriptive and positive perspective of decision theory, we might be able to discuss and categorized the decision-making process observed by considering risk management strategies in municipalities. The latter will be accomplished by incorporating the theoretical arguments described in the decision theory literature, into the proposed risk maturity model.

3. What is the economic, legal and political context in which municipalities in the Netherlands perform?
  - a. What are the specific elements and practices that the “resilience paragraph” prescribes for Dutch municipalities?

This research question and sub research question will allow us to understand the specific context of Dutch municipalities, identifying as well the risk management practices prescribed by the “resilience paragraph”. Accordingly, after we revise in detail the risk management practices assumed by this legal risk management requirement, we will incorporate them into the construction of the proposed risk maturity model.

4. Are existing risk maturity models applicable to evaluate the risk management practices of Dutch municipalities and guide them in the implementation of the best practices of risk management?
  - a. What are the main distinctions of maturity models and risk maturity models?
  - b. What would be the principal limitations of risk maturity models?

These research questions will aim to study and evaluate existing risk maturity models found in the literature as methods that might assist us to perform an accurate diagnosis of risk management practices implemented by municipalities in the Netherlands. However, a critical analysis of current risk maturity models will need to be done in order to identify the difficulties and gaps that we will have to fill in the construction of a special risk maturity model for Dutch municipalities.

5. What are the assumptions or reasoning behind risk maturity models?
  - a. Would the theory of organizational change and organizational learning support the assumptions and reasoning behind risk maturity models?

The above research question and sub-question are relevant since they will allow us to study in detail the assumptions of risk maturity models and maturity models in general, exploring for that matter the theory of organizational change and organizational learning. As mentioned, these theories might be pertinent to develop a theoretical foundation for our proposed model since they consider different perspectives for explaining how organizations modify their structures, practices, values and knowledge.

6. How could we operationalize the construction and empirical application of a proposed risk maturity model for Dutch municipalities?

By answering this question, we will be able to design the operationalization part of our research, as well as identify the pertinent methods for the construction and later empirical application of the maturity model proposed. The latter will be relevant since we will have to adapt the maturity model approach to the characteristics of Dutch municipalities, assuring the accuracy of the measurement of the construct under examination (the level of sophistication of risk management practices implemented).

7. Could an adapted instrument for measuring risk maturity give valuable data to analyze and measure risk management practices implemented by municipalities?

This research question relates to the empirical part of the research where the risk maturity model proposed should be implemented in a sample of municipalities in the Netherlands. By answering this question we will have to report on the characteristics of the sample as well as evaluate the reliability and consistency of the data collected. Specifically, this question will lead us to the main objective of our research, which is to measure the risk management practices implemented by municipalities in the Netherlands. Additionally while answering this research question, we will have to show evidence that our proposed risk maturity model could be an instrument for the diagnosis of risk management practices. Moreover, this research question will also assume that we indicate the limitations of the risk maturity proposal and also discuss the possible agenda for the refinement of the instrument in future research.

#### **1.4. Scientific and practical contributions**

The maturity model methodology has found increasing acceptance and interest by practitioners and scholars. This could be noticed by the number of research studies that are consciously using these types of frameworks in a large range of disciplines such as software development, project and product development, human resources and risk management, to name a few (Sarshar et al.,2000). We can mention for instance, the work of MacGillivray et al. (2006a, 2006b), who developed a prescriptive risk maturity model for assessing the level of implementation of risk management practices in water utilities in the UK. Moreover we could mention the

research of Ibbs and Kwak (2000) who determined the financial and organizational impacts of project management by the development of a project maturity model. Additionally, Yeo and Ren (2008) conceptualized and applied a multilevel framework for complex product systems (COPS), and Andersen and Jessen (2003) developed a study on project maturity, measuring the level of maturity of those types of entities. Furthermore Mayer and Fagundes (2009) proposed a method for the assessment of risk management practices in the information security area. We could also mention the research of Strutt et al. (2006) who constructed a safety capability model, identifying the key processes considered necessary for safety achievement, incorporating the compulsory legal requirements. Finally and specifically for the public sector, we have identified the initiative of ALARM, which has designed a model for measuring the maturity of risk management processes in public organizations.

However, despite the efforts considered above in the adaptation of maturity models, we state that current risk maturity models found in the literature do not provide sufficient theoretical explanations for their transitional proposition to a “desired state”; they do not consider the fundamental aspects of the theory of risk management such as the risk management cycle and they especially do not integrate in their framework the specific risk management requirements of Dutch municipalities. In that sense, we state that the construction and empirical application of an improved risk maturity model might answer the difficulties found and could be a significant contribution to the discipline of risk management, setting a starting point for future research in the area.

In addition to this scientific gap that we aim to fill, we consider that the adaptation and empirical application of a risk maturity model to municipalities in the Netherlands might have a practical contribution. We believe that this study might provide valuable information for decision-makers in municipalities by establishing specific organizational targets for the improvement of present risk management practices. Additionally, this PhD research might contribute to the evaluation of the “risk paragraph” by the Dutch central government, considering that the results of this research will provide data related to the current application of this risk management regulation by local governments in the Netherlands.

## **1.5. Research approach and methods**

The methodology and methods that are considered appropriate for this PhD research are presented here.

a) For the research questions 1 through 5 we will perform a literature review of risk theory, risk management, maturity models, risk maturity models, decision theory, organizational change and organizational learning theory. Additionally, and especially for research question number 3, we will collect pertinent documents and secondary information that could facilitate the study concerning the context in which Dutch municipalities perform. The latter should include relevant regulations, laws and bylaws applicable for municipalities in the Netherlands.

b) Considering the operationalization of our research (research question number 6), the study’s structure will be design oriented. (Becker, 2009; Wendler, 2012). This is

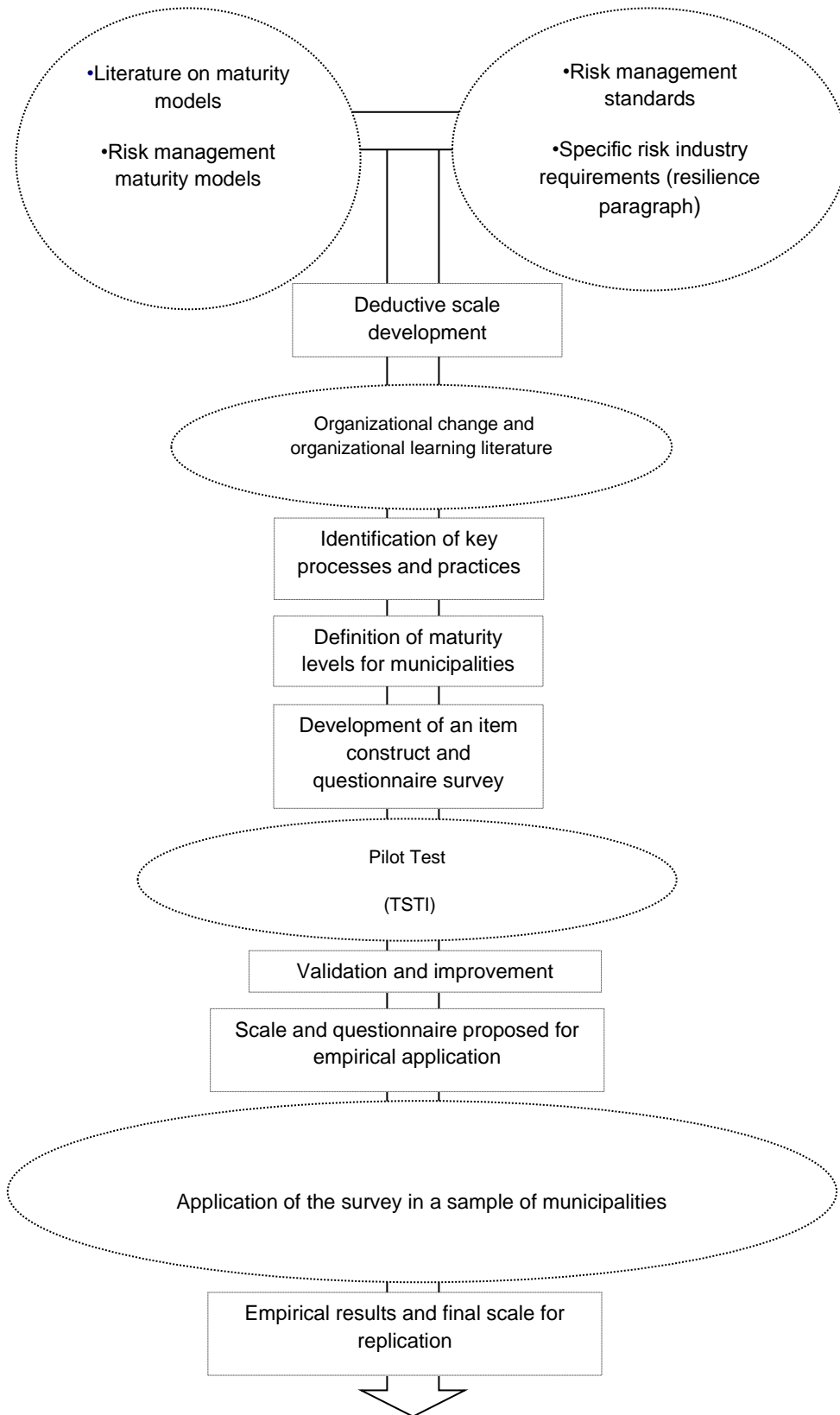
justified taking into account the shortage of research that is available in the field, especially the lack of reasonable measurement theory (Hox and De Jong-Gierveld, 1990) for risk maturity models. In this sense, the principal objective of this research would be to conceptually construct a novel risk maturity model, reflecting on its theoretical assumptions as well as validating its propositions via the assessment of risk management practices in Dutch municipalities. As a consequence we will have to first identify the main factors and variables that might be relevant for the construction of an improved risk management artifact (Wendler, 2012). This approach requires that the research defines in a clear manner the relevance of the designed framework as well as evaluates and proves the contribution of the proposed model. Applying rigorous research scientific methods will be then necessary condition for the construction of a novel risk maturity model. An empirical validation and assessment should be also indispensable in order to continue with a logical process for the development of a risk maturity model. Finally the publication of a proposed model ensures the communication of the results (Wendler, 2012).

c) For research question number 7 which will present the empirical part of the research, we will use a survey questionnaire. The survey will be designed first in a deductive manner, for which we will have to construct the theoretical definitions of the scaling method based on the literature review. The survey will use a five-point Likert scale and will be pre-tested through Hak's Three-Step Test-Interview method (TSTI) (2004). The latter method will help us detect possible survey difficulties and confirm the validity of the risk management practices selected. Moreover both descriptive and inferential statistical methods will be used in order to explain and interpret the results of the research. Inferential statistical analysis methods will be used not necessarily to obtain generalizations about the Dutch municipal sector, but to explore robust interpretation of the data set and evaluate the capability of the risk maturity model to differentiate between the levels of maturity defined. Specifically, we will rely on Cronbach's Alpha test to check on the questionnaire stability and its constructs developed.

In figure 1.1. we present an illustration of the design-oriented methodology for the construction of our improved risk maturity model.



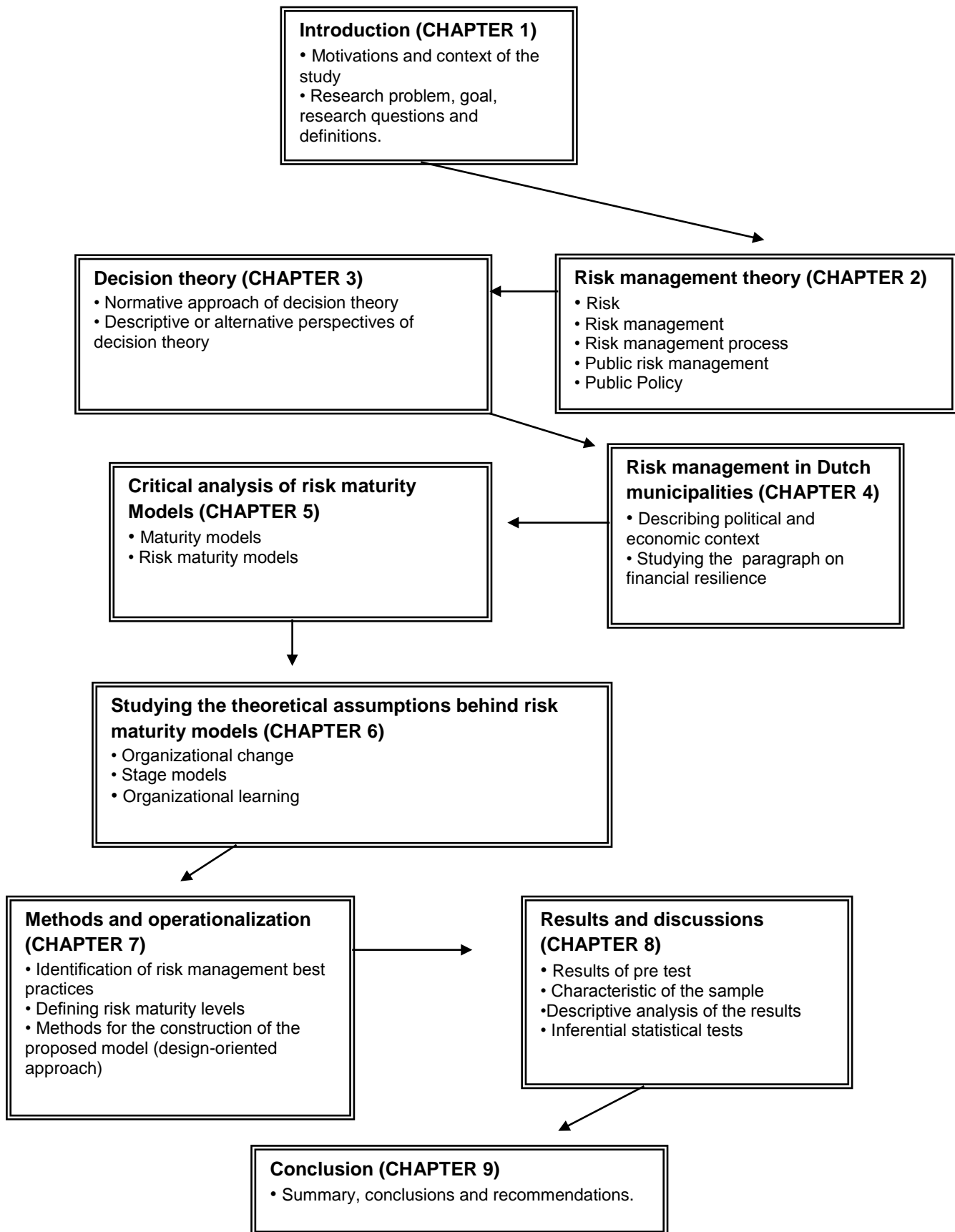
Figure 1.1. Design oriented methodology for the construction and validations of an improved risk maturity model for Dutch municipalities (personal elaboration).



## 1.6. Outline of the thesis

This thesis is separated into 9 chapters that cover in a theoretical and empirical manner the scope of the thesis. **Chapter 2** starts with research question number 1, presenting a literature review about risk management. It establishes the foundation/definition of risk management, setting up some of the particularities of the integrated perspective of risk management, its benefits and limitations, as well as describes the fundamental characteristics of risk management in the public sector. **Chapter 3** will answer research question number 2, focusing on the literature of decision theory, developing a critical and a positive analysis of the different approaches that could serve to describe, in a more complete and multidisciplinary manner, decisions made by municipalities concerning risk management choices. **Chapter 4** will answer research question number 3, examining the context in which municipalities in the Netherlands exist and in particular, describing the “resilience paragraph” for Dutch municipalities. **Chapter 5** will answer research question number 4. It will discuss existing maturity models as well as risk maturity models found in the literature as a method of measuring the level of awareness and process implementation in terms of risk management. A critical analysis of this method will be developed as well. **Chapter 6** will answer research question number 5, examining the literature of organizational change and organizational learning, theories that could give theoretical base to existing risk maturity models supporting the principles behind this method. **Chapter 7** will respond to research question number 6, presenting the operationalization and methodology for the construction of our proposed risk maturity model. **Chapter 8** will answer research question number 7, presenting the empirical application of our proposed risk maturity model, analyzing the data that will be collected through a web questionnaire survey. **Chapter 9** will present the reflections and the major conclusions of this PhD research. Figure 1.2 shows an illustration of the outline of the topics covered in this book.

Figure 1.2 Topics covered in the book.



## **CHAPTER 2: Theory of risk management<sup>4</sup>**

### **2.1. Introduction**

This chapter aims to answer research question number 1, describing the foundations of the theory of risk management, showing the evolution of the discipline and reviewing its main practices. After a quick description of the current context of organizations which makes risk management even more pertinent, we will develop a definition of risk. We will also describe the fundamental elements that have marked the transition from the “silo” or compartmental perspective of risk management to the modern risk management approach. Then we will discuss the application of risk management in the public sector, describing how it is different from private risk management. At the end of the chapter we will introduce a systematic view of the fundamental aspects of risk management and the practices prescribed by the specific literature.

### **2.2. Environmental complexity**

As we have previously described, the word “risk” has become a common and widely used part of today’s vocabulary, relating to personal circumstances (health, pensions, insurance, investments, etc.), society (terrorism, economic performance, food safety, etc.) and business (corporate governance, strategy, business continuity, etc.). Many of the institutions that humanity has built over the years could be viewed as ways to address risk, including politics, religion, philosophy, technology, laws, ethics and morality (Hillson, 2006). Therefore, it seems that humanity has been capable of identifying patterns to assess uncertainty and develop heuristics to confront it. As a result, not only is risk everywhere, but so is risk management. As the presence of risk is recognized and accepted as inevitable and unavoidable in every field of human endeavor, there is a matching drive to address the risk as far as possible (Hillson, 2006).

As mentioned by Padovani and Tugnoli (2005) there are particular elements that could explain the current importance of the discipline of risk management. First of all, the increasing volatility and competition which organizations have to face in this era, have forced them to implement at least some level of risk awareness. Related to some very notorious international scandals such as the Enron case, WorldCom and more recently Lehman Brothers, organizations in general are facing new legal requirements by the regulators that demand the implementation of risk management practices. Moreover, as technology has helped organizations to be more efficient, it has also exposed them to different kinds of new, significant risks. As claimed by Padovani and Tugnoli (2005), this context has created new risks and increased the impact and frequency of existing risks. Hence the modern recognition of risk management as a process that complements and integrates with other processes in the organization in a continuous and formalized manner is a very pertinent approach to the reality that entities currently face. In this sense, the process of risk

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<sup>4</sup> The chapter will appear by the name “Risk management theory: the integrated perspective and its application in the public sector” in Revista Estado y Gobierno. U. de Chile-INAP, 2013.

management becomes not only an instrument to prevent and manage the impact of damaging events on the organization, but a force to see opportunities (Padovani and Tugnoli, 2005).

### **2.3. The concept of risk**

Risk has been defined in a number of ways, which are almost never entirely true or false (Rosa, 1998 in Habegger, 2008). A dictionary definition states that risk is “the chance of injury, damage or loss” (Webster, 1983). Following that perspective, risk would not be predestined, but subject to human agency (Habegger, 2008). Additionally we might distinguish between the meaning of the concept in technical and non-technical contexts. Therefore, in technical contexts, the concept of “risk” could have specific meanings which are widely used across disciplines. They range from “the cause of, the probability of, or an unwanted event which may or may not occur,” to a decision that has been made under the condition of known probabilities. Although there would not be an agreed upon general definition of risk in the literature, there might be some common characteristics that we can mention:

1. Risk equals the expected loss (Willis, 2007)
2. Risk equals the expected disutility (Campbell, 2005)
3. Risk is the probability of an adverse outcome (Graham and Weiner, 1995)
4. Risk is a measure of the probability and severity of adverse effects (Lowrance, 1976).
5. Risk is the fact that a decision is made under conditions of known probabilities (Knight, 1921)
6. Risk is the combination of probability of an event and its consequences (ISO, 2002)
7. Risk is defined as a set of scenarios, each of which has a probability and a consequence (Kaplan and Garrick, 1981; Kaplan, 1991)
8. Risk is equal to the two-dimensional combination of events/consequences and associated uncertainties (will the events occur, what will be the consequences) (Aven, 2003)
9. Risk refers to uncertainty of outcome, of actions and events (Cabinet Office, 2002)
10. Risk is a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain (Rosa, 1998, 2003)
11. Risk is an uncertain consequence of an event or an activity with respect to something that humans value (IRGC, 2005).

By reviewing the literature of risk management, we also might find different classifications of risks. These types of classifications tend to highlight the properties of specific risks and their sources.

We can also distinguish between financial and nonfinancial risks. As mentioned by Vaughan (1997), financial risk are those risks that involve financial loss, consequences or impact. Therefore financial risk considers a relationship between the individual (or an organization) and an asset, expectation or even an income that could be lost or damaged. Financial risk, then, would involve three elements: (1) the individual or the organization who is exposed to loss, (2) the asset or income whose destruction or dispassion will cause financial loss, and (3) a peril that can cause the

loss. Furthermore, also a distinction is found between what is known as dynamic risks and static risks. The concept of dynamic risks then assumes that risk would be created by the dynamic change of the economic environment and would depend on both the evolution of external variables—the economy, competitors, industry membership and consumers—and the decisions taken internally by the organization (Forestieri, 2003). Thus according to Vaughan (1997) dynamic risks would normally benefit society over the long run, since they are the results of adjustment to misallocation of resources. Nonetheless, dynamic risk could affect a great number of persons and it would be less predictable than static risk, because it will not occur with any extent of regularity. On the other hand, static risks would be those risks that would not depend on the evaluation of the competitive environment in which the organization operates, but would rest merely on the internal factors of the entity (Padovani and Tugnoli, 2005).

Additionally, the literature also describes the concepts of systematic and diversified risks. Systematic risk would find its sources in macroeconomic variables such as GDP variation or the tendency of market interest. Diversified risk, on the other hand, would characterize those risks that are not tied to any sources of systematic risk or systematic risk factors. Moreover, we could find a distinction between pure and speculative risk. Speculative risk is often described as being related to situations that hold a possibility of either lost or gain. Speculative risk would not be insurable since it would involve a speculative process that might potentially rise to a profit, but that could also lead to a loss (Padovani and Tugnoli 2005). The concept of pure risk, in contrast, is used to designate those situations that involve only the chance of loss or no loss. One of the best examples of pure risk is the possibility of loss surrounding the ownership of property or any asset: the person who buys an automobile immediately faces the possibility that something may happen to damage or destroy it (Vaughan, 1997).

The literature differentiates between the concepts of fundamental and particular risks. As discussed by Culp (2001 in Padovani and Tugnoli, 2005), fundamental risks are considered to be risks that involve losses that are impersonal in origin and consequences (Vaughan, 1997). These types of risks are generally caused by economic, social and political phenomena, while they may also result from physical occurrences. Because fundamental risks are caused by conditions beyond the control of the individuals who suffer the loss and since the risks are not the fault of anyone in particular, it is held that society rather than the individual has a responsibility to deal with them (Vaughan, 1997).<sup>5</sup> Fundamental risks would affect a large segment of the population. Alternatively, particular risks would refer to losses that occur in individual events and are experienced by individuals rather than groups (Vaughan, 1997).

Finally, we find in the literature of risk management, the concepts of operational and strategic risks. This distinction is often made by authors that follow the modern or integrated perspective that we will discuss in the subsequent sections (Drennan and

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<sup>5</sup> A specific reference will be made regarding fundamental risks when addressing public risk management later in this chapter.

McConnell, 2007; Fone and Young, 2005; Lam, 2003; Olson and Desheng, 2008, to mention a few). In this perspective then, strategic risks are related to risks that affect the long term objectives of the organization. These types of risks should be managed at the executive board level and require strategic planning (Sadgrove, 2006). Moreover, accountability for strategic risks lie at the strategic level of the organization. In the case of local government, for instance, this is the responsibility of the elected officials (i.e., council members), who should ensure that the correct policies, procedures and delegations are in place and that risks are managed appropriately within the organization. On the other hand, operational risks are those kinds of risks that are present in the daily functions and services of the entity. Accordingly such risks might derive from the people, property or processes involved in delivering the services expected or needed by the organization (Sadgrove, 2006).

Concentrating now on public organizations, we might be able to make a general distinction between public and private risk. In order to do that, we should first rely on the reasoning of neoclassic economic theory, which assumes that efficient markets would somehow manage risks by absorbing their costs (Fone and Young, 2005). The latter implies that the “efficient market” would allocate the costs of responsibility for risks dependent on the products and/or services related with those risks. However, , some risks might not be suited to the “market”. Pollution is a popular example in terms of a risk that may have collateral damage which might affect surrounding communities and to which the market would not necessarily respond (market failure). When we observe that the impact of a risk goes beyond the individual, a public risk may emerge. From the same perspective, Fone and Young (2005) state that public risk could also be classified as social risk and organizational public risk. Social risks are those risks that affect society as a whole (epidemics, natural disasters and other catastrophes). They are also defined in this section as “fundamental risks” (Vaughan, 1997). Social risks are part of the responsibilities of public organizations, which establish public policies and institutions to confront those risks that would affect society. On the other hand, organizational risks are those risks that might affect the public entity as an institution (liabilities, lawsuits, fire, financial cuts, operational performance of its services, etc.).

The UK Prime Minister’s Strategy Unit (2002) recognizes three distinctions of the government’s role regarding risk which aligns with the perspective described earlier. This framework establishes that the public sector has first a “regulatory” function, considering the problematic situation when individuals or businesses impose risks on others. In this, the government’s role is mainly as regulator, setting the rules of that market. Additionally, the state has a stewardship responsibility in the case where risks cannot be attributed to any specific individual or body. In that situation governments might take on a stewardship role to provide protection to individuals in order to mitigate the consequences of those risks. Finally, risk management applies to public organizations as a management function. The latter is related to the business processes of the public sector, including the provision of services to citizens. This implies that governments are responsible for the identification and management of their own risks.

Considering these distinctions of public risk and the purpose of this PhD thesis, we will concentrate on the organizational or management perspective of risk within public

entities. Additionally we will select at this moment, a specific definition of risk, which should be coherent with the objectives of the thesis. The definition of risk that we will use for this research, which is considered more consistent with the modern perspective of risk management<sup>6</sup>, is: *the distribution of possible deviations from expected results and objectives due to events of uncertainty, which might be internal or external to the organization*. This definition implies that the influence of risk factors could have either positive or negative connotations and assumes the risk to be a generator of both potential losses and opportunities (COSO, 2004). Both elements together—the ambivalence of threat and opportunity as well as the chance to create the desired future—might explain why risk management has become so popular in business and politics (Cleary and Malleret, 2007).

#### **2.4. The concept of uncertainty**

As we have suggested in the previous subsection, there might be a clear distinction between the concept of risk and what is known in the specialized literature as uncertainty. Risk can be explained as “you don’t know for sure what will happen” (Knight, 1921), while uncertainty can refer to “you don’t even know the odds” (Adams, 2005 in Roeser et al., 2012). Therefore, uncertainty would be immeasurable, whereas risk would be measurable by using the formula:  $\text{risk} = \text{chance} \times \text{effect}$  (Adams, 2005 in Roeser et al., 2012).

Uncertainty can be viewed as well as the variability surrounding a risk, or the range of outcomes that may result from the occurrence of a risky event. Consequently, uncertainty is based on the lack of knowledge about what will or will not happen in the future (Drennan and McConnell, 2007). As mentioned by Binmore (2009), the archetypal case of uncertainty is betting at the race track, when there is no way to assign a probability to such a one-off occurrence. By reviewing the literature on risk management we could observe also different approaches of uncertainty. For example Frank (1999), in Van Staveren (2009), differentiates “aleatory uncertainty” from “epistemic uncertainty”. Aleatory uncertainty refers to the variation and change, while epistemic uncertainty addresses the lack of knowledge. Nonetheless the individual conviction or lack of knowledge (certain or uncertain) about a specific situation may or may not coincide with the conditions of the real world. As considered by Vaughan (1997) different attitudes would be possible for different individuals under identical conditions of the real world because uncertainty would be highly related to the perception of risk by individuals (Slovic, Monahan and MacGregor, 2000).

#### **2.5. An introduction to risk management**

It is relevant to mention that there is a controversy in the scientific community on whether the discipline of risk management is a science or not. Hillson (2009); Lam (2003); Olson (2008); Sadgrove, (1998); Vaughan (1997) and many others are of the opinion that risk management is a scientific approach to the problem of dealing with

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<sup>6</sup> As we will see further in this chapter, we mean to develop a modern perspective of risk management, a comprehensive, integrated and coordinated process within the organization to manage all kinds of risks that its faces.



risks, considering that it follows a general applications of techniques, procedures and structured process on a sequence of logical steps.

As we have mentioned already, risk management has developed enormous usability and popularity by scientists as well as by organizations and practitioners. Although risk management has always been part of human kind, it took time before the integrated or compressive approach was disseminated and the benefits of its method came to the view of managers and decision-makers.

We might say that the maximum evolution of “the art of risk management” as many authors refer to it,<sup>7</sup> would be the comprehensive approach of the discipline which is often referred to as Enterprise Risk Management (ERM), Organizational Risk Management (ORM) or Corporate Risk Management among other distinctions.<sup>8</sup> Under this perspective, organizations are supposed to proactively manage risk, monitoring in a continuous and conscious way the risks associated with its strategic objectives. The latter would indicate, then, a permanent measurement of the severity and evolution of risks within the organization, with the purpose of maintaining an overall risk profile aligned with the strategic objectives of the organizations (Van Staveren, 2009). The management of risk is, therefore, an integral part of the organization and its processes, with the understanding that both potential upside and downside factors can affect the organization. Accordingly, under this approach risk management would increase the possibility of success and reduce the probability of failure and the uncertainty of achieving the organization’s overall objectives (AIRMIC, ALARM, IRM, 2002). From this point of view, each strategic and operational decision taken at all levels of the organization would be supported by the process of risk management. The main objective of risk management according to this view would be to understand in advance the impact of each alternative on the future performance of the organization (Hopkin, 2002).

The comprehensive, or enterprise risk management approach is often matched to what is called by Lam (2003) the “silo” perspective of risk management. The latter is described in the literature as an approach where the responsibility of handling a particular risk would be only assigned to units “threatened” by the risk (Lam, 2003). This would be the case especially for functions such as property protection, information security and health and safety, and in departments such as human resources, finance, education and social services. Hence under the silo approach, there would be little sharing of information and even less sharing of techniques or methodologies with other functions or departments of the organization (Drennan and McConnell, 2007). Moreover, under this narrow perspective of risk management, entities would focus mainly on analyzing and treating “pure” risks. According to

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<sup>7</sup> Peter L Bernstein, “Against the Gods”, 1996; Emmett J. Vaughan, “Risk Management”, 1997; James Lam, “Enterprise Risk Management”, 2003; Martin Fone and Peter C. Young, “Managing Risks in Public Organizations, 2005; Lynn T. Drennan and Allan McConnell, “Risk and Crisis Management in the Public Sector”, 2007 and many others.

<sup>8</sup> There are other terms mentioned by Lam (2003) to describe this approach that include: “wide risk manager,” “global risk manager,” “integrated risk manager,” and “holistic risk manager.”

D'Arcy and Brogan (2001), this could be partly explained considering that pure risks—in many cases—represented the most serious short term threats to the financial position of an organization (Vaughan, 1997).

On the contrary, as we have mentioned, the comprehensive perspective of risk management is oriented to consider all types of risk that an organization might face. This would mean abandoning a purely defensive approach in favor of a proactive approach designed to increase organizational performance. As mentioned by DeLoach (2000), enterprise risk management is a structured approach that aligns strategy, processes, people, technology and knowledge with the objective of assessing and managing threats and opportunities that companies face in trying to create value (DeLoach, 2000). Under this perspective, the risk management function within the organization is responsible for the direct management of the risk management policy of the entity. The latter would consider the coordination and performance of a permanent monitoring procedure to the operational and business areas of the organization, which would be ultimately responsible for the implementation of risk management. Therefore this perspective of risk management assumes that whether at the planning stage, during the development of a new project or as a part of day to day operational management, risk needs to be managed in an integrated fashion, encompassing potential threats in each level of the organization (Drennan and McConnell, 2007).

Several factors have influenced the explosion of the holistic or integrated perspective of risk management (D'Arcy and Brogan, 2001). Recent advances in computer science provide powerful modeling tools that allow the application of sophisticated risk analysis. Also, the availability of extensive databases allow users to examine historical information to determine trends, correlations and other relationships among variables that might be essential to analyze risk (D'Arcy and Brogan, 2001). The integrated perspective of risk management started initially in the 1990's and was formalized in 2004 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO)<sup>9</sup>. As mentioned by Arena; Arnaboldi and Azzone (2010), COSO issued guidance for building effective ERM procedures/systems, aiming to support managers at all levels of decision-making, as well as providing a direction for the design and implementation of a risk management program. COSO defines ERM as a process requiring senior management involvement for its success, as well as focusing on risk analysis and control. COSO's framework also puts an emphasis on establishing risk appetite as a necessary component of organizational consciousness that would serve to apply ERM to the strategic level of the organization (Power, 2007).

Several authors have tried to outline in a structured way these differences between integrated risk management and the traditional approach. DeLoach (2000 in

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<sup>9</sup> The Committee of Sponsoring Organizations of the Treadway Commission (COSO) is a voluntary private-sector organization, established in the United States in 1985, dedicated to providing guidance to executive management and governance entities on critical aspects of organizational governance, business ethics, internal control, enterprise risk management, fraud and financial reporting. COSO has established a common internal control model against which companies and organizations may assess their control system.

Padovani and Tugnoli 2005), for example, has summarized these dissimilarities by asserting that the traditional approach of risk management is fragmented, reactive, focused on threats, discontinuous, functional and based on costs, while the comprehensive approach is integrated, proactive, focused on threats and opportunities, continuous and characterized by a logical process. These dissimilarities mentioned by DeLoach would provide a guidance on what might be the dimensions of analysis to be used to verify the differences from traditional to integrated risk management. These authors state that, for instance, the relationship between risk management and strategy is more effective in the integrated approach of risk management. The latter would be justified considering that the holistic perspective of risk management would require a top down approach with special and permanent support and direct participation of the head of the organization, as we have discussed. As Fone and Young (2005) also mention, strategic, operational, and modern risk management activities should not be mutually exclusive, since the risk management component consists of those decisions and actions that facilitate the most direct achievement of organization objectives via its operation (Fone and Young, 2005). Additionally, the assessment of risk under this approach would be a repeated and formal process, with aspects of proactivity to anticipate threats and opportunities for the organization (De Loach, 2000 in Padovani and Tugnoli 2005). Another specificity of ERM, would be the relevance of risk communication, process that would be carried out through the whole organization, vertically toward the top management and horizontally given the nature of the cross process of integrated risk management (De Loach, 2000 in Padovani and Tugnoli, 2005). In table 2.1 we present the main differences and key dimension of analysis of the integrated perspective of risk management.

As Drennan and McConnell (2007) stated, public organizations share much in common with both the private and nonprofit organizations. They face the same types of threats, to people, property and processes, so in that sense the principles of the modern perceptive of risk management would also be applicable to public sector organizations. Nonetheless, according to these authors, the differences lie in a) the range of stakeholders to which the organizations is accountable and b) the extent to which political and social dimensions impact the decisions taken (Drennan and McConnell, 2007).

Particularly in the public sector, we can find evidence of the implementation of formal risk management programs since the 1980's. As we might observe also in other industries and sectors, risk management practices in the public sector tended to focus, at the beginning, on the management of insurable risks (fires, thefts, liability exposures), the responsibility for the buying of insurance and, occasionally, for occupational health and safety (Fone and Young, 2005; Chicken, 1996). Nevertheless, as Fone and Young (2005) and Drennan and McConnell (2007) confirm, a number of aspects have contributed towards changing this narrow application of the risk management discipline. In the first place, the implementation of the wider approach to risk management demands that risk management move away from a constricted technical function to a broad and integrated management of all of an organization's risks, which might be more valuable and appreciated within the strategic decision-making process. On the other hand, the general acceptance of corporate governance principles in the public context has required that public

organizations formulate strategies to implement risk management into the organization culture (Cienfuegos, 2009). An example of this process is the adoption of national and international risk management standards by public organizations and the development of special risk management standards and norms within the public sector (AS/NZS 4360: 2004, UK 2002 standard).

As we have mentioned in the previous chapter, an innovative policy considering risk management in the public sector can be found in the Netherlands. Accordingly, since 1995 Dutch municipalities and provinces have a bylaw that establishes a paragraph on risk management and since 2004 a paragraph on financial resilience. This bylaw creates a scrutiny of the available financial capacity and of the risks (the needed financial capacity). It also mentions the obligation to develop policies on risk management and the identification of the risks and the measures taken within the local organizations. As considered in the introduction of our thesis, the main objective of this thesis is to measure the implementation of risk management practices by municipalities in the Netherlands, which should include the practices prescribed in this special regulation on risk management for Dutch municipalities. As a consequence, we will dedicate a separate chapter (chapter 4) to describe this risk management approach prescribed for Dutch municipalities and the contexts in which they perform.

Table 2.1. Key dimensions of analysis to confront the silo and integrated approaches of risk management (Padovani and Tugnoli, 2005, based on Spinardi, 2005)

<b>Key dimensions</b>	<b>Silo approach</b>	<b>Comprehensive or ERM approach</b>
Relationship between risk management and strategy	Limited influences of RM on strategic planning	Effective support of RM to strategic planning
Focus of the risk management	Focus only on the threats	Focus on the threats and the opportunities
Assessment of risk	Irregularly and reactively	Repeated frequently and with aspects of proactively
Risk management	“specialist” approach	Centralizes the management of the risk
Reporting of risk	Risk mapping unstructured and incomplete	Consolidation of the risks with clear and complete reports
Risk communication and organization	Related to the affected function on the particular exposure	Vertical coordination towards the top management and horizontal thought out the organization.
Liability risk	Definition of responsibility is often lacking certain types of risks	Clear responsibility for all the risks and reward system

## 2.6. The risk management process

As we have mentioned, the integrated perspective of risk management would be structured in a process that includes a sequence of logical steps which is referred to as “the risk management process” or the “risk management cycle”. The literature provides different approaches for this risk management process. According to Van Staveren (2009), the risk management process or cycle is to be composed of at least five stages: 1. determining the objectives, 2. identifying the risks, 3. evaluating the risks, 4. considering alternatives and selecting the risk treatment devices and 5. implementing and reviewing the risk management program.

As a consequence—and independent of the specific name—we can see in the literature that there is always a first step where the entity should establish a clear objective for its risk management program (Vaughan, 1997; Culp, 2001; Doherty,

2000). Therefore, in order to obtain maximum benefit from the discipline of risk management, a plan would be needed. In that sense, the possible objectives that the organizations might establish for the risk management program can vary. They often include maintaining the organization's survival or position in a specific sector, minimizing the cost associated with pure risks protecting employees from accidents that might cause serious injury (Vaughan, 1997; ISO 31000, 2009; COSO, 2004). The second step of a standard risk management process is related to the identification of risks that the organization might face. The identification stage is normally performed by using several instruments such as internal records of the organization, insurance policy checklists, risk analysis questionnaires, flow process charts, analyses of financial statements, inspection of the firm's operations and interviews, among others (Vaughan, 1997; Culp, 2001). Accordingly the evaluation step involves measuring the potential size of the loss and the probability that it would actually occur, providing some ranking that would classify the risks in order of priorities. As a consequence, the evaluation step would provide critical information that may determine the attention that the organization might give to certain risks. The fourth step in the risk management process has to do with the techniques or strategies that should be used to deal with each risk; this phase of the risk management process is primarily a problem of decision-making, during which the organization needs to decide among several types of risk management strategies (Chicken, 1996). In the next step, the implementing stage, decisions that were established in the previous phase have to be implemented and the organization should consider, as well, procedures to evaluate and review the risk management program applied (ISO 31000, 2009; COSO, 2004).

Regarding risk management in public organizations, we can mention the contribution of the "UK risk management professional bodies", ALARM, the Association of Insurance and Risk Managers (AIRMIC) and the Institute of Risk Management (IRM), the so called "UK standard". This standard also characterizes the risk management process in five steps. The first step of the risk management process under this approach would be to identify an organization's exposure to uncertainty. The latter requires an intimate knowledge of the organization, the market in which it operates, the legal, social, political and cultural environment in which exists, as well as the definition of a sound understanding of its strategic and operational objectives, including critical factors to its success and the threats and opportunities related to the achievement of these objectives (UK Standard, 2002). In the second step of the risk management process, by this standard, organizations need to analyze the risk identified. This should be done in a structured format. The organization should consider the consequence and probability of each risk. Then prioritize them, and analyze them in detail. Under this framework, the risk estimation is also to be considered a part of the analysis step. Also established in this standard, risk estimation can be quantitative, semi-quantitative or qualitative. Consequently, risk analysis ends by establishing a risk profile of the organization which gives a significance rating to each risk which provides a tool for prioritizing risk treatment efforts. This part of the process, then, would allow the risk to be mapped throughout the organization to all business areas affected, describing the primary control procedures in place and indicating units of the organization where the level of risk control investment might be increased, decreased or reapportioned (UK Standard, 2002). The next step in terms of this standard is the evaluation step, which aims to

make decisions about the significance of risks to the organizations and whether each specific risk should be accepted or treated. Additionally, this standard considers a risk reporting and communication stage, which establishes different levels of information that should be distributed within the organizations. The standard describes in a detailed manner the specific role of every level of the organization for the definition, implementation and evaluation of the risk management program (major, council, units, individuals, etc.). The framework also mentions that the organization needs to regularly prepare an external report to inform stakeholders about its risk management policies and their effectiveness in achieving their objectives. As a next step, the UK standard defines a risk treatment stage, which refers to the process of selecting and implementing measures to modify the risk found (UK Standard, 2002). This standard also highlights the necessity of prioritizing risk control actions in terms of their potential to benefit the organization. Risk treatment is sometimes also referred to as “strategies for responding to risk” (Drennan and McConnell, 2007), a topic that will have a specific place in this research because of its relevance in the risk management process. Finally, the UK Standard (2002) mentions the monitoring and reviewing step as the last stage of the risk management cycle. This step aims to assure that risks are effectively identified and assessed and the appropriate controls and responses are in place. Regular audits of policy and standards compliance should be carried out and standards performance should be reviewed in order to identify opportunities for improvement. Overall we can observe that the so called risk management cycle or process, follows a sort of “quality management approach”<sup>10</sup>, establishing an integrated management philosophy with a set of practices that emphasizes, among other things, continuous improvement, long-range thinking, increased employee involvement, team-based problem solving and constant measurement of results (Ross, 1993 in Powell, 1995). According to the literature and standards on risk management then, this would assure the effective implementation of the discipline in an organization (ISO, 3100, 2004).

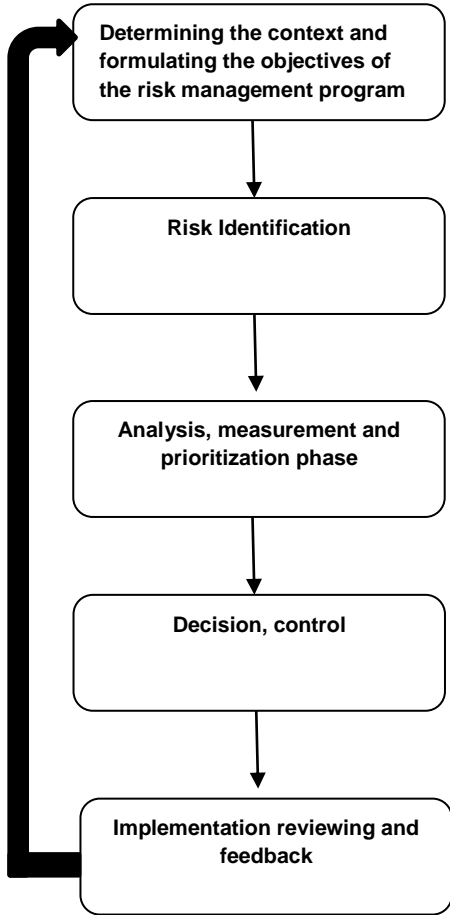
In figure 2.1, we present a simple reinterpretation of the risk management cycle, where the most common stages of the risk management process previously discussed in this section are present. There is a first stage where the organization has to analyze the context where it performs (economically, socially, politically, etc.) and define the purpose or aim of the risk management program to be implemented. The latter assumes that the organization defines both strategic and operational objectives as well as the principal threats related to the accomplishment of the defined objectives. Following, in most of the risk management processes found in the literature, there would be a risk identification stage, where all significant activities of the organization are identified and the risks that follow those activities are defined.

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<sup>10</sup> Quality management began to have serious attention in the 80' when policy observers argued that Japanese manufacturing quality had equalled or exceeded U.S. standards (Powell, 1995). Quality management could be defined as an integral approach to achieve and sustaining high quality output, focusing on the maintenance and continuous improvement of processes and defect prevention at all levels and in all functions of the organization, in order to meet or exceed customer expectations (Flynn, Schroederb and Sakakibara, 1994). Quality management features were heavily promoted by Deming, Juran and Crosby (Powell, 1995).

The next step that will summarize a standard risk management process is related to a risk analysis or measurement stage, where the risk that has been identified is measured to determine its consequences and its likelihood of occurrence, basic information that will contribute to prioritize the exposures and consider the appropriate responses. The next stage in our reconceptualization of the risk management cycle is the decision or control stage. In this phase of the risk management cycle, the organization should select all possible risk management responses based on the output from risk analysis. In this stage, the organization should decide what techniques or strategies to use for each specific risk measured, especially taking into account the likelihood and magnitude of those risks. Finally, in our reinterpretation of the risk management process, there would be an implementation, reviewing and feedback phase, where the organization implements the decisions taken in the previous stage and puts in place monitoring procedures for the permanent evaluation of the risk management program. The latter would assume, among other characteristics, that the organization defines the roles, responsibilities and timescale for the implementation of its risk management program and carries out internal and external audits to receive feedback and identify opportunities for improvement.

Figure 2.1. The risk management process (own elaboration).





## 2.7. The risk management strategies

We will concentrate specifically on this final section, on the most common risk management strategies described in the literature. The latter refers to the fourth stage of our reconceptualization of the risk management cycle, where the organization needs to implement permanent procedures that will minimize the occurrence of loss and/or the impact of the ones that would occur anyway (Vaughan, 1997). As Drennan and McConnell (2007) explain, once current and potential risks have been identified and evaluated, decisions can be taken on how to respond and what actions could be taken in order to improve future outcomes. So as we have seen, according to what the literature prescribes, a judgment is required to be made about the most appropriate response from a range of possible risk management options. The latter could be performed by taking into account the costs and benefits of each proposed action, as well as from evaluating the probable reaction concerning these measures by stakeholders and other interested parties (Drennan and McConnell, 2007; Chicken, 1996). As we have seen in this chapter, prior to the decision on what risk management strategies to implement, the organization has to first analyze and assess the risks that have been identified. Once that phase has been accomplished, organizations will generally have the option to *avoid* (risk avoidance), *reduce* (risk reduction), *transfer* (risk transfer), *retain* (risk retention) or *share* (risk sharing) the risks that have been assessed (Knight, 2005).

Vaughan (1997) identifies two broad ways of classifying these general strategies for dealing with risks previously measured: risk control and risk financing. Risk control techniques are those designed to minimize, at the least possible cost, those risks to which the organization is exposed. As a consequence, risk control methods should include *risk avoidance* and the various approaches to reduce risk through loss prevention and control efforts. Risk avoidance means that the organization refuses to accept any exposure to loss arising from a particular activity, recognizing that there are no risk management measures that will reduce the risk identified below the limit considered acceptable in economic terms. A strategy of risk reduction would aim to precisely limit the likelihood of an occurrence of a loss event and the severity of the impact for the organization of those losses that do occur. Risk reduction can be conducted through prevention, meaning those activities that have the objective of preventing losses from occurrence, and loss control, the efforts aimed at minimizing the severity of loss if it occurs (Vaughan, 1997, Chicken, 1996; Culp, 2001).

In contrast with the strategies that could be categorized as risk control, risk financing measures focus on guaranteeing the availability of funds to meet those losses that could occur. Risk financing takes the form of “retention” or “transfer.” According to the literature, risk retention strategies would consider risk maintenance within the company. As mentioned by Vaughan (1997), this strategy would be recommended when the risk is considered negligible or when the adoption of real measures to reduce it would not be considered affordable. As a consequence, the retention may be accompanied by specific budgeting or a fund to meet the deviation of expected losses (Vaughan, 1997, Chicken, 1996). Risk transfer strategy, on the other hand, is related to the transfer of risk to a support provider in exchange for a premium. Risk transfer implies contractual arrangements or the subcontracting of certain activities. Typically, this is exemplified by the purchase of insurance against certain risks.

However, we might observe strategies that can be situated between these two approaches (retention and transfer) related to the sharing of risk with other organizations through the establishment of some kind of agreement (e.g., public/private partnership).

When referring to authors who have researched specific risk strategies in public organizations we have to address again Drennan and McConnell (2007). They describe the concept of “tolerating risk”, which involves accepting and retaining the risk (Drennan and McConnell, 2007). In this case, a conscious decision to tolerate a risk requires regular monitoring, considering that circumstances may change and thereby shift the balance towards adopting a different strategy (Drennan and McConnell, 2007). According Drennan and McConnell (2007), in the context of public organization, there is little choice but to tolerate certain threats<sup>11</sup>. In relation to strategies to eliminate or avoid risk, these scholars consider the concept of “terminating risk”. The latter would involve eliminating or avoiding the risk completely. This decision could be taken to terminate a risk by ceasing to offer a particular aspect of the service that has proven to be problematic, or to deliver it in a completely different way. In terms of strategies to transfer the risk, Drennan and McConnell (2007) consider that the complete transfer of risk is unusual by public services, since in practical terms public organizations can just transfer part of the risks that they face. In table 2.2 we present a review of the strategies reviewed in this section.

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<sup>11</sup> For example, in the case of social welfare provisions, there are rare occasions in which a case worker is attacked and injured by a mentally disturbed person whom they are visiting at home. Despite this threat, such visits are likely to continue—and the risk tolerated—as there is both a need for the home care of such individuals and little in the way of alternatives (Drennan and McConnell, 2007)

Table 2.2. Summary of the risk management strategies found in the literature (personal elaboration)

<b>Strategies</b>		<b>Descriptions</b>
<b>Risk control</b>	Risk avoidance	Organization refuses to accept any exposure to loss arising from a particular activity
	Risk terminating	Eliminate the risk completely (referred by some scholars as risk avoidance)
	Risk prevention	Limit the possibility of undesirable outcomes being realized (referred by some scholars as risk reduction)
	Risk directive	Ensure that a particular outcome is achieved
	Risk detective	Identify undesirable outcomes experienced after the event
	Risk corrective	Correct undesirable outcomes that have happened, providing a route for recovery
<b>Risk financing</b>	Risk toleration	Accept and retain the risk or opportunity (financed for the running budget or an insurance)
	Risk sharing	Sharing the risk with other entities through the establishment of a contract or agreement
	Risk transfer	Transfer the risk to a subject that provides support in exchange of a premium

## 2.8. Exploring risk management best practices from the literature

In the previous section we discussed the difference between the traditional perspective of risk management and the integrated approach of the discipline. We have also argued that the risk management process or cycle is organized by a structured and logical sequence of steps that an organization should follow in order to successfully implement a risk management program. Although we have already mentioned some specific characteristics of the wider perspective of risk management, we are going to present in this section a systematized list of the best risk management practices and variables classified by each stage of the risk management cycle (see table 2.3). These best risk management practices are based on literature study and the main and most well-known standards of the comprehensive perspective of risk management. We have also included in this selection some insights from the work of MacGillivray (2007) and Lam (2003).

As previously discussed, the integrated perspective of the discipline puts great emphasis on the management of potential gains (positive risks) as well as potential losses (AS/NZS 4360: 2004). Furthermore, the modern approach of risk management, as we can see in table 2.3, stresses the necessity of continuous

improvement in the decision-making of the entity and its performance (UK standard, 2002). The establishment of an adequate infrastructure, application of a logical and systematic method for analyzing the context; measuring and evaluating risks; as well as monitoring and communicating those threats related to any activity or function of the organization (UK standard, 2002) are also very distinctive practices that are present in the literature and standards of the integrated perspective of risk management. The participation and leadership of senior management is also discussed at length, emphasizing the required support of all the phases of the risk management program within the entity, as well as assigning responsibility throughout the organization with each manager and employee responsible for the management of risk as part of their job description (AIRMIC, 2002). The requirements of a risk manager (an individual with the responsibility of integrating and coordinating the risk management effort) are frequently mentioned in the specialized literature and standards (ISO 3100, 2009). The necessity of developing, using and storing risk management information is also included in the best practices of this modern perspective. This would include both internal and external sources of information, identifying, capturing and communicating risk management information throughout the organization in a systematic manner (COSO, 2004). According to COSO (2004), information is needed at all levels of an organization to identify, assess and respond to risks, and to otherwise run the entity and achieve its objectives (see table 2.3 where we describe in detail each identified risk management practice classified by the risk management cycle).

Table 2.3. Process and practices selected from the literature research

Risk Management Process	Practices identified	Source
<b>1.Determining the context and formulating the objectives</b>	1.Establish mission, values and strategy for applying integrated risk management	MacGillivray, 2007, AS/NZS, 2004, ISO 31000 2009; COSO, 2004 and UK standard, 2002.
	2. The organization defines clear objectives for the development of the risk management program, which contains the criteria and recommendations of “wider” perspectives and standards of risk management.	AS/NZS, 2004, ISO 31000 2009; COSO, 2004 and UK standard, 2002.
	3. Full commitment of top management to risk, defines objectives, gives rewards and requires risk reporting	MacGillivray, 2007 and ISO 31000, 2009; COSO, 2004 .
	4. Establish a risk management framework setting out the core roles and responsibilities at strategic and operational level	MacGillivray, 2007; ISO 31000 2009; COSO, 2004 and UK standard, 2002.
	5. In an integrated risk management program all risk should be considered, independently of their nature, source or impact.	ISO 31000, 2009; UK standard, 2002.
<b>2.Identification</b>	6. Identify key risk and opportunity elements at the strategic level and incorporate them in the risk management program.	UK standard, 2002.
	7. The entity has a documented standard repeatable process for identifying risks and for the improvement of the process.	MacGillivray et al., 2006a and ISO 31000, 2009.
	8. The entity develops a list of risks based on those events that might create, enhance, prevent, degrade, accelerate or delay the achievement of objectives, whether they are found internally or externally, and whether they are positive or negative.	ISO 31000, 2009.
	9. Risk identification should be approached in a methodical way to ensure that all significant activities within the organization have been identified and all the risks following from these activities are defined	UK standard, 2002; ISO 31000, 2009.
	10. Identify risks in strategic and operational processes, as well as financial and non-financial risks using the range of techniques that are available for this purpose.	AS/NZS, 2004 and UK standard, 2002.
<b>3. Analysis, and measurement or prioritization phase.</b>	11. Risk identification should be informed by a risk register, which is continually updated	MacGillivray et al., 2006a and ISO 31000, 2009.
	12. Risk is analysed by determining consequences and their likelihood.	MacGillivray, 2007, ISO 31000 2009; COSO, 2004; UK standard, 2002.
	13. The entity establishes the level of risk which is tolerable or acceptable, according to a rational and known methods.	ISO 31000 2009; COSO, 2004.
	14. The interdependence of different risks is also considered.	ISO 31000, 2009 and UK standard, 2002.
	15. The organization carries out systematic risk analysis and uses the best practices and tools for measurement.	UK standard, 2002.
	16. The municipality has access to and uses external	MacGillivray et al.,2006a, ISO 31000

	support from experts to analyse the risk that they have detected.	2009; COSO, 2004; UK standard, 2002.
	17. The information (outputs) of risk analysis is collected, stored and processed in the municipality, in a qualitative and quantitative manner that supports decisions in terms of what strategies or responses are used.	ISO 31000, 2009 and UK standard, 2002.
	18. Select all possible risk strategies (e.g. avoid, retain, reduce or transfer)	MacGillivray et al., 2006b; COSO, 2004.
	19. Effectiveness of the controls are measured in terms of rational methods, with regard also to legal, regulatory and other requirements such as social responsibility and the protection of the natural environment	ISO 31000, 2009 and UK standard, 2002.
<b>Decision or control</b>	20. The organization adopts a combination of treatment options for the risk that has been identified, not just individual (single controls) strategies.	ISO 31000, 2009, UK standard, 2002 and COSO 31000, 2009.
	21. When selecting risk treatment, the organization considers the perceptions of stakeholders.	ISO 31000, 2009.
	22. Risk response strategies are implemented in light of risk analysis output	MacGillivray et al., 2006a; ISO 31000, 2009, UK standard, 2002.
	23. Define roles, responsibilities and timescales for implementing risk management	MacGillivray, 2007, ISO 31000 2009; and COSO, 2004.
	24. Allocate resources for the implementation of risk management.	MacGillivray et al., 2006a, ISO 31000 2009; and COSO, 2004; Lam, 2003.
	25. Define criteria for risk monitoring activities.	ISO 31000 2009; and COSO, 2004.
	26. Define and implement an organizational strategy for the management of change.	ISO 31000 2009; and COSO, 2004.
<b>5. Implementation reviewing or feedback.</b>	27. Define annual education and training requirements for risk management (i.e., competency requirements).	ISO 31000 2009; Lam, 2003 and COSO, 2004.
	28. The organization defines data and reporting requirements for effective risk management, which are used by decision-makers	ISO 31000 2009; Lam, 2003 and COSO, 2004.
	29. The organization implements risk management systems and infrastructure to capture, analyse and distribute the required data/information in accordance with the best practices and standards.	ISO 31000 2009; and COSO, 2004.
	30. Regular audits are carried out to receive feedback and identify opportunities for improvement.	ISO 31000 2009 and UK standard, 2002.

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## 2.9. Conclusions for this chapter

In this chapter we have tried to answer research question number 1, studying the theoretical fundamentals of the discipline of risk management and reviewing its development and best practices. We have also paid special attention to the application of risk management in the public sector, as well as the risk management process as the formal and logical method to implement management practices in any organization. Additionally, after a quick description of the current environment in which organizations struggle, which might have influenced the development and popularity of the discipline, we proceeded to identify a definition of risk and risk management.

By reviewing the literature, we have made a clear distinction between the traditional or narrow perspective of risk management from its maximal evolution, the comprehensive risk management approach. We have learned that the literature prescribes that under integrated risk management, organizations need to monitor their risk in a continuous and conscious way, especially the ones associated with its strategic objectives. We have described the traditional approach of risk management as the basic or initial perspective for the implementation of risk management versus the integrated or comprehensive perspective of risk management, which might be considered as the optimal application of the risk management discipline.

As a consequence, and despite some different labeling, we can observe a consensus in the literature of risk management considering the best practices or key factors for its implementation (i.e., AS/NZS 4360, 2004; COSO, 2004; ISO, 2002 and UK standard, 2002). For instance, we can see significant evidence in the literature related to the importance of reports, information systems, corporate governance and communication in the process of implementing a risk management program. Furthermore, the literature stresses the fact that risk management practices should exist and be disseminated throughout the whole organization. The literature on the integrated perspective addresses the necessity of considering both perils and opportunities when implementing a risk management program. Additionally, the literature on the comprehensive perspective gives importance to incorporating the role of risk manager in the organization as a person who might technically assist the board of directors, or council in the case of a local public entity. Also mentioned by the literature, the directors should be ultimately responsible and accountable for managing risk in the organization and ideally “everyone” in the organization should be a risk manager (Young, 2000). Finally, we could say that the literature and standards of risk management also give consideration to ensuring adequate resources are available for the implementation of risk management. The latter should require the development of skills for treating risks in the organization, the implementation of a documented process and the availability of risk management system information

## **CHAPTER 3: Decision theory and risk management in public organizations<sup>12</sup>.**

### **3.1. Introduction**

This chapter aims to describe the foundations of the decision theory, studying both the descriptive and positive perspective of this framework. Accordingly, we will answer research question number 2, that is: can the rational and descriptive perspective of decision theory categorize risk management decisions by Dutch municipalities?

Risk management decisions are concerned primarily with a specific step in the risk management process, which is accomplished through selecting techniques or strategies that will be used to mitigate the risks that have been identified and measured. Consequently, we state that decision theory is implicitly contained by the risk management process, since risk management depends on rules derived from general knowledge and the precepts of decision theory (Vaughan, 1997).

Modern decision theory has developed since the middle of the 20th century through contributions from several academic disciplines. Although it is now clearly an academic subject in its own right, decision theory is typically pursued by researchers who identify themselves as economists, statisticians, psychologists, political and social scientists or philosophers (March and Shapira, 1987). A political scientist, for example, would be interested in studying voting rules and other aspects of collective decision-making; a psychologist is likely to study the behaviour of individuals when making decisions; a philosopher would probably study the requirements for rationality in the decision process. However, as mentioned by Vaughan (1997), there is also a large overlap between these applications of decision theory and the subject has gained from the variety of methods that researchers with different backgrounds have used for the same or similar problems. Especially in recent years, we have seen how quantitative techniques of decision making have grown, although not neglecting the fact that the analysis of a problem of decision-making often requires some qualitative considerations (Vaughan, 1997).

Under the heading of the discipline, literature offers an account of the ways people actually make decisions and a discussion on the mechanisms underlying this behaviour. This is called a “descriptive” or “positive” perspective of decision theory. On the other hand, we can also find the approach of decision theory that considers rational decisions and prescribes a “normative” formula for the decision process.

Normative and rationalistic models for decision-making are based on the conceptions about how decisions are to be made. In this perspective, a decision-maker should first become aware of a problem, then posit a goal, carefully weigh alternative means, and finally choose among them according to his estimates of their respective merit. This rational approach of decision-making applied to risk management prescribes how to act when there is uncertainty and a lack of information. We could find several

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techniques both for the assessment (identification and evaluation of risks) and to determine the optimal response for a specific risk (e.g., cost benefit analysis). In the public arena, the standard literature of decision-making pays more attention to the rational and normative approach rather than the descriptive one. The tendency to prescribe public decisions even for complex problems by normative approaches has been influenced by the attention paid to operations research, the statistical decision theory, and systems analysis methods (Lindblom, 1959). As argued by Lindblom, (1959), the main characteristics of the normative and rational methods for decision-making are: clarity of objective, explicitness of evaluation, high degree of comprehensiveness of overview, and, wherever possible, quantification of values for mathematical analysis. Nevertheless, norms of rationality are by no means the only or even the most important approach that we can apply in decision-making.

Descriptive approaches of decision theory assume that the information that decision-makers have about the consequences of their choices is at best fractional. Therefore, they have neither the assets nor the time to collect the information required for a rational choice. As a result, alternative methods of decision theory state that an individual attempting to follow the view of a rationalistic model will become frustrated, exhaust his resources without reaching a clear decision and remain in the end without an effective decision-making model to guide him (Simon, 1957). Therefore, according to this line of research, individuals are said to be persistently irrational in their decision. Descriptive approaches that focus on evidence by experiments in economic psychology and behavioural economics have advanced dramatically in public profile and academic publications over the past two decades, having been developed to a large extent by economist Herbert Simon, (1959, 1978, 1987) and more recently, by psychologist Gerd Gigerenzer (2001, 2007; see also Gigerenzer and Todd, 1999), economist Vernon Smith, (2003) and previously, psychologists Daniel Kahneman and Amos Tversky (1979).

Since we plan to draw explanations about the risk management decision process in public entities, the goal of this chapter is a theoretical one, constructing a framework that could serve us for a further empirical research. Thus, from the existing literature of decision theory we will build a multidisciplinary approach that uses standard and non-rational decision methods. As a consequence, the standard models of rational decision, which are most commonly used for public decisions, will be analyzed first to explain risk management choices in public organizations. However, because of the apparent limitations in the literature concerning neo-classical theories, the deviations from such rational methods by public decision-makers might be better explained using elements of the descriptive approach. Consequently, an “eclectic approach,”<sup>13</sup> using different and competing concepts of the decision theory literature, will be considered in order to provide a complete explanation of risk management decisions made by public organizations.

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<sup>13</sup>The term *eclectic* denotes the use of some theoretical elements and concepts of decision theory. Eclecticism is a conceptual approach that does not hold rigidly to a single paradigm or set of assumptions, but instead draws upon multiple theories, styles or ideas to gain complementary insights into a subject. An eclectic thinker according to Mautner (2000) is one who selectively adopts ideas from different sources and combines them in order to explain a phenomenon.

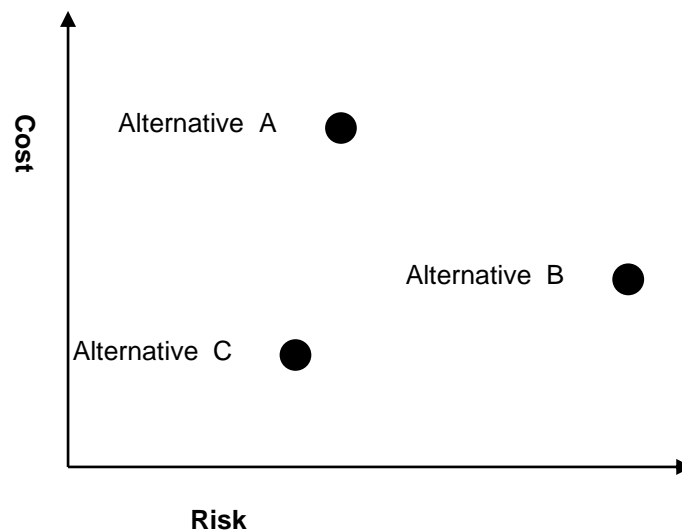
## **3.2. Normative perspective of decision theory**

### *3.2.1. Cost Benefit Analysis, a standard representation for rational decisions.*

One of the most well-known methods for rational decision-making is cost benefit analysis (CBA). According to Williams and Giardina (1993), every rational decision-maker faces the problem of seeking solutions which could enable him to maximize his net benefit. For this purpose, in order to determine whether or not it is advantageous to adopt a particular choice, a decision-maker would try to define and quantify its possible effects. We can trace the origins of CBA in economic theory, particularly in the theory of social welfare and resource allocation. These ideas could assist a decision-maker in the objectives of finding the best solution through adding up values of all of the good and bad consequences of a decision. As commented by Fischhoff, Lichtenstein, Slovic, Derby and Keeney (1981), these values are defined as individual preferences (or subjective valuations). Therefore, concepts of rational neoclassical economic theory are used in this method to assess preferences, particularly as they are revealed in market behavior. Thus, CBA seeks to value the expected impacts of an option in monetary terms. Consequently, the valuations should consider the willingness to pay of potential gainers for the benefits they will receive as a result of the option, and the willingness of potential losers to accept compensation for the losses they will incur.

CBA applied to the discipline of risk management seeks to measure the contribution that a risk technique or response makes to the risk management process by determining whether, and by how much, the technique benefits exceed the cost to implement it (Chicken, 1996). The greater the benefits for a given cost, or the lower the cost for a given level of benefits, the more cost effective the particular technique and response is thought to be (Vaughan, 1997). Consequently, risk managers might weigh several factors that include cost and risk. For example, as showed in figure 3.1, the analysis of three different alternatives could be presented. Alternative C might be the best choice because the levels of risk and cost are less than those of alternatives A and B. If the only alternatives would be A and B, the decision might be more difficult. Alternative A has a higher cost and lower risk than alternative B; alternative B has higher risk but lower cost than alternative A. Consequently, a local public manager would have to weigh the importance of risk and cost and the availability of resources to respond when applying CBA for decision-making. He would also make use of the risk information developed in the previous stage of the risk management process, where risks were identified and analysed in respect to their likelihood (frequency) and impact.

Figure 3.1. Risk Benefits for three alternatives (Ayyub, 2003)



Despite the contribution of CBA to the discipline of decision theory, some disapproval could be found in the literature following political, philosophical and even practical grounds. The most popular criticism has to do with the information needed to construct the analysis that this method requires. Some authors claim that in real life organizations may not have access to relevant data to conduct a CBA or it could be too expensive to collect the required information (Olson, 1995; Vaughan, 1997; Habegger, 2008; Bazerman and Watkins, 2004; Nye, 1994; Williams and Giardina 1993; among others). In addition, a more political and philosophical aspect frequently reported as a difficulty of CBA has to do with the number of impacts which cannot in reality be quantified against a scale of monetary values (Olson, 1995), such as establishing the monetary value of life or human health (Fischhoff, Lichtenstein, Slovic, Derby and Keeney, 1981; Ayyub, 2003).

Another view is the one presented by Habegger (2008), who states that the tragedy of applying risk management in public organizations might be that the costs for tackling identified risks occur in the present, while benefits will only be reaped in the future (Bazerman and Watkins, 2004; Meier and Slembeck, 1998). Therefore, in order to implement a risk management policy or strategy, scarce resources must be used now “to prevent an ambiguous potential harm from occurring in the future” (Bazerman and Watkins, 2004). In addition, for further emphasis, the benefits of risk treatment or response would in most cases only be “virtual” or “hypothetical” because of the difficulty proving that adverse outcomes would result from “risk management inaction.” As Nye (1994) expressed in response to the nature of risk management, “successes often remain hidden, while failures become public”. An extreme example of this might be the risk strategies to catastrophic exposition such as terrorism. Neither citizens nor (the vast majority of) decision-makers would recognize a tangible return from their investments in intelligence as a risk management strategy to deal with such risk if materialized. It is not surprising then, that political decision-makers are rarely committed to pushing for adequate risk programs and responses, in view of the difficulty to communicate the “optimal” respective strategy. They are reluctant to

allocate resources to issues or improbable events that may never occur or whose benefits will only be seen when they are out of office (Cleary and Malleret, 2007).

Although CBA is a good normative and rational technique for risk management decision-making—as mentioned by Vaughan (1997) —the nature of risk situations creates limitations to its use. Costs are generally measurable, benefits may not necessarily be. Therefore, in rational or normative decision-making there may be alternative instruments in decision theory where not only monetary consequences but also unpriced impacts of policy decisions may be taken into account (Williams and Giardina, 1993).

### *3.2.2. Multi-Criteria Analysis, a rational approach with non-monetary elements.*

Multi-criteria analysis (MCA) is a popular approach for decision-making in risk management to measure and evaluate strategies to be used through the incorporation of non-monetary elements into the risk decision process. MCA applications often involve combinations of some criteria which are valued in monetary terms and others for which monetary valuations do not exist.

MCA establishes preferences between options by reference to an explicit set of objectives that the decision-maker has identified and for which it has established measurable criteria. The process of identifying objectives and criteria may on its own provide enough information for decision-makers. Where a level of detail to CBA is required, MCA offers a number of ways of aggregating the data on individual criteria to provide indicators of the overall performance of options. MCA has had an increasingly important role in the decision theory literature in the last decades and we can identify several techniques that are explored. For the purpose of this research, we will only focus on some applications of this method.

All MCA approaches define options according to the different criteria and they all require the exercise of judgment (Williams and Giardina, 1993). They differ, however, in how they combine the data. Formal MCA techniques usually provide an explicit relative weighting system for the different criteria. MCA techniques can be used to identify a single most preferred “risk response”, to rank options, to short-list a limited number of strategies for subsequent detailed appraisal, or simply to distinguish acceptable from unacceptable possibilities (Yoon and Hwang, 1995).

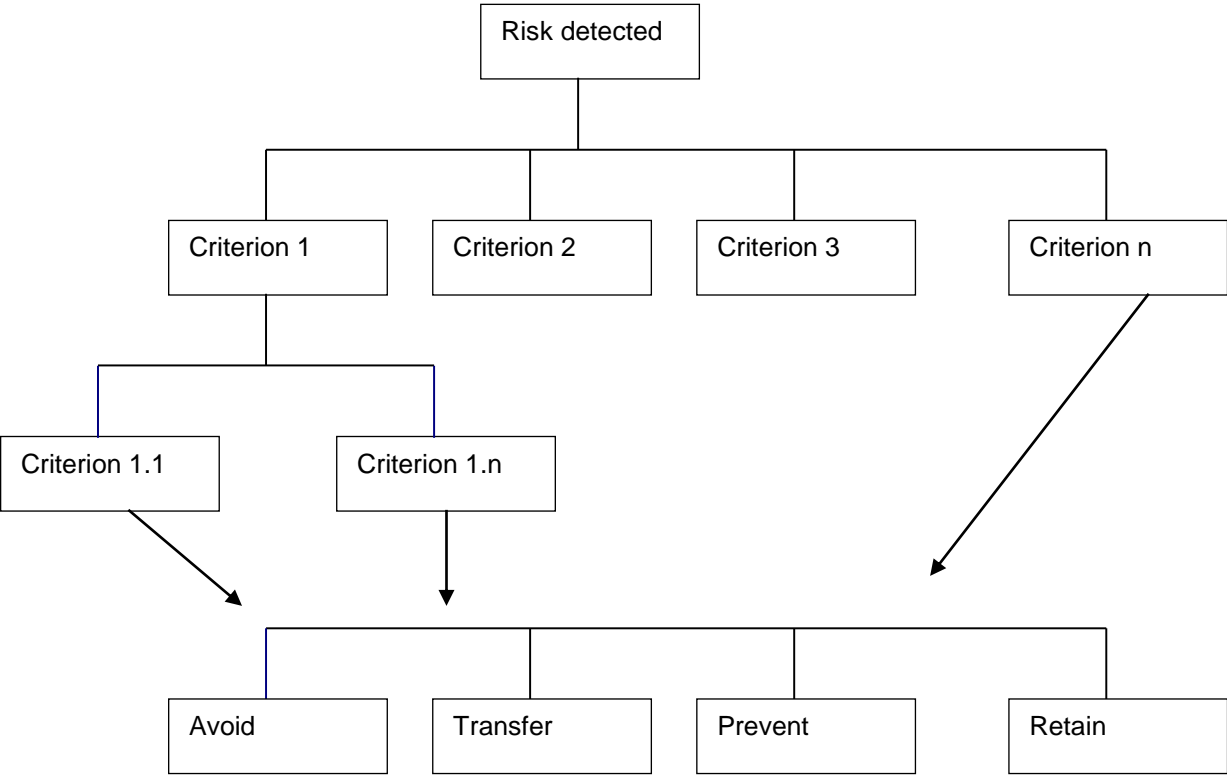
A standard technique of MCA reported in decision theory literature is the performance matrix, in which each row describes an option and each column defines the performance of the options against each criterion. The individual performance assessments are often numerical but may also be expressed as “bullet point” scores (Williams and Giardina, 1993). Table 3.1 shows a straightforward example of a performance matrix applied to risk management decisions, where various standard options to deal with risk are presented and assessed by the means of a performance matrix. In a basic form of MCA, this performance matrix might be the final product of the analysis. The decision-makers are then left with the task of assessing the extent to which their objectives are met by the entries in the matrix (Yoon and Hwang, 1995).

Table 3.1. A hypothetical performance matrix to weight different “risk strategies” (Own elaboration)

Options	Resources expend	Easy to implement	Internal required	capacity
Transfer	£18000			√
Retain	£0	√		√
Prevention	£22000			√
Reduce	£24000			√
Avoid	£0	√		

An additional common method for MCA is the analytic hierarchy process (AHP), which uses procedures for deriving the weights and the scores achieved by alternatives which are based, respectively, on pair comparisons between criteria and between options (Yoon and Hwang, 1995). Thus, in assessing weights, the decision-maker is asked a series of questions, each of which asks how important one particular criterion is in relation to another for the decision being addressed—a process which is usually also performed within a group or a team in an organization. According to Watson and Buede (1987), for example, to obtain the weights of attributes at one level in the hierarchy, a decision-maker is asked questions such as: “Consider a pair of attributes, are they of equal importance, or is one more than others? If one is more important, which one and to what extent? Is it: weakly more important, strongly or very strongly more important?” In this perspective, the decision-maker is allowed a number of different possible responses and has to choose one of them. Following this method, the verbal responses are then interpreted numerically (Watson and Bude, 1987). In figure 3.2 we have considered a simple interpretation of the AHP applied to risk management decisions whereby applying the criteria described previously, we might finally come out with a number of options to confront a specific risk detected within the organization.

Figure 3.2. Illustration of the Analytical Hierarchy Process (own elaboration)



The weaknesses of the AHP have been the subject of a substantial debate among specialists in literature (Olson, 1995; Williams and Giardina, 1993; Yoon, 1995; and others), where serious doubts have been raised about the theoretical foundations of the AHP and about some of its properties. According to its critics, there is a possibility that simply by adding another option to the list of options being evaluated, the ranking of two other options—not related in any way to the new one—could be reversed (Yoon and Hwang, 1995). This is seen by some scholars as inconsistent with rational evaluation of options and thus raises questions to the theoretical normative basis of the method (Williams and Giardina, 1993; Yoon and Hwang, 1995). Another limitation found in literature is that this rational method cannot show that an action adds more to welfare than another. Unlike CBA, there is no explicit rationale or necessity for a “Pareto” improvement rule that benefits should exceed costs. Thus in MCA, the “best” option can be inconsistent with improving welfare. Doing nothing might in principle be preferable (Department for Communities and Local Government, UK, 2009).

Consequently, the view taken by normative approaches in general is that reliable support for decision-making is usually best achieved using numerical weights and scores on a cardinal scale. It might be the case that decision-makers—especially in the context of a public entity—could be frequently faced with circumstances where the information in the performance matrix or regarding any other instrument for

decision analysis would need to consider subjective judgments. Descriptive methods used to explain social and public management decisions, which can also be found in decision theory literature, could be pertinent when considering the “subjectivities” that public decision-makers confront in reality, offering an alternative approach for the assessment of risk management options in public organizations.

### **3.3. The alternative descriptive approaches for public decision-making**

#### *3.3.1. Bounded rationality*

The theory of bounded rationality tries to explain why human beings faced with immense complexity and cognitive limitations deal with their decision-making tasks by constructing simple models of reality and employing heuristics (trial and error). The assumptions and propositions that underlie this theory of decision-making are attributed primarily to Herbert Simon (1957). Simon argues that the capacity of the human mind for formulating and solving complex problems is very small compared to the size of the problems whose solution is required for objectively rational behaviour in the “real world”. In this statement, Simon presents his fundamental thesis about human decision-making by contrasting it with the more classical notion of decision-making used in economics, which assumes that decision makers are rational in all situations.

Simon (1957) and March and Simon, (1958) emphasize the inherent cognitive limitations upon the outcomes of decision-making processes. March and Simon, (1958) argue that the rational neoclassical approach is limited in practice since the cognitive shortcomings of decision-makers constrain their search for alternatives, obstructing their facility for ranking preferred utilities and restraining their ability to calculate costs and benefits. In the opinion of Simon (1957), the rationality of decision-makers is bounded, where the exploration for solutions is truncated before optimal alternatives can be identified, resulting in “satisfying” but not “optimal” decisions (March and Simon, 1958).

#### *3.3.2. Rules of thumb*

The concept of rules of thumb has been examined thoroughly in psychological and economic literature (Lettau and Uhlig, 1989 in Vossensteyn, 2005). Discussed by Hutchinson and Gigerenzer (2005)—who studied the cognitive mechanisms by which humans make decisions—rules of thumb are what behavioural biologists and psychologists associate to simple “heuristics”. Rules of thumb can be defined as heuristics that are used to simplify a complex decision situation by comparing similar cases. Following the principles of the descriptive non-rational approach of “bounded rationality” that we have reviewed, this approach considers that individuals focus on specific aspects of relevant information when making a decision. Therefore, since the preference of many people is imprecise, rules of thumb would allow them to make quicker and more consistent decisions (Loomes, 1998). Rules of thumb would indicate what actions should be taken in a given situation and are thus very much based on learning how to handle routine situations (Vossensteyn, 2005).

This type of method has its roots in the work of Simon's (1957) satisfying and bounded rationality, but also in later models of heuristics for preferences such as the work of Tversky (1972). According to Ellison and Fudenberg (1993), rules of thumb are essentially subjective and intuitive guidelines developed from knowledge of the organization and tempered by "common sense". It can be used across the whole range of activities and may be seen typically as the "art" of locational decision-making (Ellison and Fudenberg, 1993).

As March and Simon (1958) have mentioned, individuals have a limited capacity to process existing information. In order to reduce this informational complexity they resort to "rules of thumb" or empirical rules. As a consequence, the organization depends upon a hierarchy and the capacity of individuals to organize and distribute tasks within the organization. Simon (1959) fully assumes that every decision—from mere routine to the most innovative—depends on programmed, and therefore, potentially reproducible decisions. According to Lazaric (2000), from these hypotheses Simon and Newell (1958) then searched for the formal decision based on "rules of thumb" used by organization managers. As a result, Simon (1959) found empirical rules that oppose the rules of profit maximization. The game of chess is a perfect example that these authors often use to illustrate combined reasoning, heuristics and emerging strategies. The formal and simple logic of this game allows the emergence of routines to be seen with increasing informational complexity (Lazaric, 2000). Chess could demonstrate, according to Lazaric (2000), the routine processes in which the player, faced with a multiplicity of possible options, will follow procedures and set up routines.

In the same line, Lettau and Uhlig (1989) explain a rule of thumb to be a set of rules describing a decision procedure with the following characteristics: (a) the variables which are employed in the decision criteria are objectively measurable; (b) the decision criteria are objectively communicable and decisions do not depend on the judgment of individual decision-makers; (c) every logically possible configuration of variables corresponds to a (usually unique) determinate decision; (d) the calculation of the appropriate decision is simple, inexpensive and well suited for frequent repetition and for spot checking by management.

Lettau and Uhlig (1989) studied the learning process behind rules of thumb and analysed its behaviour. These authors discuss how decision-makers in organizations and agents in the market make decisions by using rules of thumb and learn about their quality. Following their ideas we could establish, for example, a rule of thumb that might say, "when the organization detected a risk type 1, use response 1; when the risk is 3, use response 3". These scholars suggest a list of these rules of thumb and strengths which they called a classifier system. They assume that the set of rules in the classifier system will be constant throughout the life of the decision-maker. They consider that the learning process takes place via updating the strengths. As consequently, rules of thumb that performed well in the past will have a high strength while rules that performed poorly will have a low strength.

The characteristics of the mapping form of the rules of thumb described in the previous paragraph facilitate an association with the practices of risk management, considering 'risk responses' or strategies followed by decision makers. By taking



Knight's (1921) standard frequency-severity principle<sup>14</sup> in the discipline of risk management, we could identify rules of thumb which suggest particular risk strategies according to the consequences (impacts) and likelihood (probability) of the risks detected. For instance, an accepted rule of thumb that practitioners use in order to establish the best response towards a risk considered to have high probability and low impact, is risk prevention. However, as considered in risk management literature, the measurement of risk often involves formal risk management techniques that use both quantitative and qualitative methods, especially the calculation of the likelihood, which should be determined by previous historical records of events and, if not found, by the "expert opinion". Consequently, even though we could say that the decision to implement a "risk prevention" strategy within an organization could be a decision based on a rule of thumb, the methods to develop the information (risk analysis) also incorporated in the decision process, should often be rational and normative.

### 3.3.3. *Incrementalism*

As discussed by Lindblom (1959), although in theory (ideally) rational comprehensive analysis leaves out nothing important, in practice it is impossible to take everything important into consideration unless "important" is so narrowly defined that analysis is in fact quite limited. He establishes that in reality no one can practice the rational method for complex problems, and every decision-maker faced with a sufficiently complex problem must find drastic ways to simplify. If policy-makers were operating according to a rational, comprehensive model, they would first define their goals rather clearly and set the levels of achievements of those goals that would satisfy them (setting risk objectives). They would then compare the alternatives systematically, establishing their cost and benefits (risk assessment) and would choose (risk decision) the alternatives (risk responses) that would allow them to achieve their goals at the least cost (Kingdon, 1984). However, as discussed by several authors (March and Simon, 1958; Lindblom, 1959; Wildavsky, 1979; Etzioni, 1967; among others), such rational models do not very accurately describe reality.

As we have mentioned earlier in this thesis, descriptive studies about decision-making primarily use a cognitive perspective, trying to prove that humans in general and decision-makers in particular, are unable to assess many alternatives, keep them simultaneously in their minds, and compare them systematically (Kingdon, 1984). In response to the rational and normative approach for public decisions, Lindblom (1959) and others<sup>15</sup> developed a description of an incremental approach that has had an enormous contribution especially for public decision-making. This approach stands more in the limitations and constraints of the political context than in the cognitive difficulties of decision-makers even though it recognizes the rational limits of human beings. However, incrementalism does not state that the decision process

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<sup>14</sup> The standard frequency-severity principle found in risk management literature follows, in practice, the contributions of Knight (1921), who considered that, in practical terms, after the identification of risk has been accomplished the organization should assess the probability, after which the possible loss is the probability, times the possible loss.

<sup>15</sup> See also Wildavsky (1979) and Etzioni (1967).

in public organizations will be irrational or a-rational (Dubnick and Bardes, 1983); on the contrary, there would be instances in which decisions are developed in a process as rational as possible, given the involved socio-political limitations of the situation and the public policy-maker.

Therefore, instead of developing considerations of each program or in our case each risk strategy, decision-makers take what they are currently doing as given and make small, incremental, marginal adjustments in that current (risk) policy (Kingdon, 1984). Following that principle, public decision-makers in public entities do not need to spend enormous time defining and communicating their goals (risk management objectives). They could just compare the current state of affairs (risk profile of an organization, for instance) and develop small adjustments that are completely manageable. Then, according to Kingdon (1984), the result is that the (risk) policy changes very gradually in small steps. In table 3.2, we have used the framework developed by Lindblom (1959) in order to present the main characteristics of the incrementalist approach in contrast with a rational model.

In the incrementalism method—also called “successive limited comparisons” by Lindblom (1959)—simplification is systematically achieved. The latter process is completed through the limitation of policy comparisons to those policies that differ in relatively small degree from policies presently in effect. As a consequence, this type of approach immediately reduces the number of alternatives to be investigated and also drastically simplifies the character of the investigation of each one. Therefore, it is not necessary to assume fundamental inquiry into an alternative and its consequences; as a result, it is only necessary to study those respects where the proposed alternative and its consequences differ from the status quo (Lindblom, 1959).

Table 3.2. Characteristics of the rational and incremental methods of risk analysis (based on Lindblom, 1959)

Rational-Comprehensive	Successive Limited Comparisons
√ Clarification of values or objectives are distinct and usually prerequisite to empirical analysis of alternative policies.	√ Selection of value goals and empirical analysis of the needed action are not distinct from one another but are closely intertwined.
√ Policy-formulation is therefore approached through means-end analysis: First the ends are isolated, then the means to achieve them are sought.	√ Since means and ends are not distinct, means-end analysis is often inappropriate or limited.
√ The test of a "good" policy is that it can be shown to be the most appropriate means to desired ends.	√ The test of a "good" policy is typically that various analysts find themselves directly agreeing on a policy (without them agreeing that it is the most appropriate means to an agreed objective).
√ Analysis is comprehensive; every important relevant factor is taken into account	√ Analysis is drastically limited: i) Important possible outcomes are neglected. ii) Important alternative potential policies are neglected. iii) Important affected values are neglected.
√ Theory is often heavily relied upon	√ A succession of comparisons greatly reduces or eliminates reliance on theory.

Past sequences of policy steps have given the decision-maker the knowledge about the probable consequences of further similar steps. Consequently, they do not need to attempt big jumps towards their goals which might require predictions beyond their knowledge because they never expect their policy to be a final resolution of a problem (Lindblom, 1957). When applying this principle to risk management, we could say that the public decision-maker would choose a risk management "response" which might deal with the most important risks that the organization faces. Therefore, their decision would only be one step; one step that, for the purpose of this article, could be responses connected to evident and catastrophic pure risks (e.g., fire), where the only technique or "incremental solution" could be to insure against them. If that solution proves to be successful in reality, it could be followed by another strategy such as "prevention".

Several criticisms can be found regarding the incrementalism approach for decision-making. One of the difficulties reported in the literature is that it tends to neglect basic societal and organizational innovations when focusing on the short run and seeking no more than limited variations from past policies and decisions. While an accumulation of small steps could lead to a significant change, there is nothing in this approach to guide the accumulation of knowledge (registration of risk events or

losses in our case); therefore, the steps may be circular, leading back to where they started, or dispersed, leading to the same negative consequences of previous decisions (Dubnick and Bardes, 1983).

In spite of the fact that in reality many organizations and public decision-makers follow this approach, it is hard to consider that this is the best option for making decisions in the public arena, especially in the field of risk management. As found by Boorsma and Haisma (2005), in the case of the implementation of the Dutch resilience paragraph for municipalities in the Netherlands<sup>16</sup>, most of these entities implemented risk management strategies taking into account mainly historical or previous decisions. Consequently, the fact that municipalities in the Netherlands might not identify risks in a systematic and formal way, making no distinction between events, policy fields and risk exposed objects, might partially be explained in terms of the incremental perspective that they are using considering risk management decisions.

#### 3.3.4. *Mixed Scanning*

The theory of mixed scanning, often referred to as a “third” approach to decision-making, was developed by Etzioni (1967). This approach was developed as a response to incrementalism. Etzioni (1967) founded his contribution on the difficulties of both rational and incremental approaches of decision-making, arguing that the rationalist approach appeared to be utopian because decision-makers cannot command the resources and capabilities required by rationalist decision-making. He also posited that incrementalism was shown to overlook opportunities for significant innovations and to ignore the empirical fact that incremental decisions are often, in reality, made within the context of fundamental decisions (Etzioni, 1967).

The term “scanning” is used to denote search, collection, processing and evaluation of information as well as the drawing of conclusions—all elements in the service of decision-making (Goldberg, 1975). Mixed scanning contains rules both for the allocation of resources among the levels of decision-making and for evaluation, leading to changes in the proportion of higher versus lower levels of scanning based on changes in the situation. Mixed scanning has often been presented in literature as a prescriptive theory, not merely a descriptive one (Etzioni, 1986).

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<sup>16</sup> In the early 1990's, the Netherlands prescribed a bylaw for municipalities and provinces to include a so-called “risk paragraph” in the annual budget and annual report, as an appendix. In the past years, this prescription has been changed into a wider approach, the “paragraph on financial resilience.” This is basically a sort of financial provision that every municipality in the Netherlands has to calculate, by identifying its financial capacity needed (FCN) versus the financial capacity available (FCA) in its budget. Although this is a very innovative public policy that has brought risk management awareness to the Dutch local government scene, there is still a lot of room for improvement, especially in the way that this approach is currently implemented by municipalities (Boorsma and Haisma, 2005). We will dedicate a specific chapter to the analysis of this risk management policy prescribed for provinces and municipalities of the Netherlands.

Mixed scanning provides both a realistic description of the strategy used by actors in a large variety of fields and the strategy for effective actors to follow. He demonstrates this approach in a simple situation: he assumes the setting up of a worldwide weather observation system using weather satellites (Etzioni, 1986). In that context, the rationalistic approach would seek an exhaustive scan of weather conditions by using cameras capable of detailed observations and by scheduling reviews of the entire sky as much as possible. In the view of Etzioni (1967), this would yield an avalanche of information and details, costly to analyse and likely to overwhelm the action capacities of a decision-maker. On the other hand, using an incrementalism approach by focusing on those areas where similar patterns developed in the recent past and, perhaps, on a few nearby regions, the decision-maker would ignore all formations which might deserve attention if they arose in unexpected areas. Nevertheless, a mixed scanning strategy would include elements of both approaches by employing two cameras: a broad angle camera that would cover all parts of the sky but not in great detail and a second one which would zero in on those areas revealed by the first camera to require a more in depth examination. While mixed scanning might miss areas in which only a detailed camera could reveal trouble, it is less likely than incrementalism to miss obvious trouble spots in unfamiliar areas (Etzioni, 1967).

The description of the mixed scanning approach mentioned above could be similar to the actual procedures that organizations follow when they try to identify a risk and find pertinent responses to confront it, not being able in reality to consider all the risks and risk areas that the organization is exposed to due to factors such as limitations of resources and time. In addition, this decision-making description is very similar to what the standards and best practices of risk management prescribe (e.g., COSO, 2004; AS/NZS 4360:2004; ISO 3100, 2009; and UK standard, 2002). Accordingly, risk management best practices recommend the selection of entity-level and activity-level objectives when implementing a risk management program. Therefore, even though the integrated or comprehensive standards of risk management establish that all the major risks—regardless their nature or consequences—should be systematically managed in a coordinated policy, the “best practices” tend to recognize a “prioritization system” such as the one described by mixed scanning, allowing decision makers to focus on specific areas of interest of the organization.

Stated by Etzioni (1986), the decision on how the investment of assets, efforts and time should be allocated among other levels of scanning is, in fact, part of the strategy of this approach. From a risk management perspective, effective decision-making through mixed scanning would require that investment in high-coverage scanning be increased to move beyond the analysis and decision about obvious threats and traditional risk responses to an integrated approach that could consider wider analysis of risk and strategies available.

Consequently, the perspective of continuous evaluations considered in the mixed scanning approach could be coherent with the principles of modern risk management. The systematic review and evaluation that the organizations and decision-makers in a municipality should make in theory also provides a good application of Etzioni’s method. Thus, a modification in the risk responses to expositions detected earlier is adequate when the decision-maker realizes that the

environment has radically changed or when he sees that previous risk decisions taken from past experiences bring no improvement to the risk profile of the organization. If, at this point, the decision-maker decides to avoid or eliminate the activity that generates those particular risks, the effectiveness of his decision-making could improve, given that through some high coverage scanning he may discover that another risk response such as a risk transfer could lead to a better solution.

### **3.4. Conclusion for this chapter**

We have described in this chapter the principal approaches of decision theory, in order to explore theoretical explanations about the risk management decision-making in the context of public organizations. The standard economic tool such as CBA aims to contribute to good policy-making through systematic analysis of the costs and the effects of various policy approaches. Ideally, effects are measured in terms of benefits, so that costs and benefits can be compared and net benefits calculated. Clearly, the presence of uncertainty poses difficulties for quantifying the benefits of risk management strategies, as it makes the impact of those strategies on probabilities extremely hard to determine (Williams and Giardina, 1993). In addition, the lack of data related to risk issues, especially in public organizations, establishes a difficulty for the pertinence of CBA as a method to explain and measure risk management decisions. On the other hand, MCA could attempt to give additional explanations in terms of risk management choices through measures based on numerical scales or by including qualitative descriptions. Considering the limitations of the MCA approach, especially the “intuitive” processing of data and the use of “unjustified assumptions” (Yoon and Hwang, 1995), descriptive methods such as “bounded rationality”, “rules of thumb”, “incrementalism” and “mixed scanning” could be relevant in the task of shaping a further explanation of risk management decisions by public entities.

Despite the proliferation of literature regarding decision theory, no agreed and integrated theory of decision-making exists (Altman, 2008). Many of the theoretical standpoints—both of the descriptive and normative approaches—mainly remain mutually exclusive. Therefore, one either examines (a) the process of decision-making itself, (b) the outcomes which are the culmination of such processes, (c) the bounded rationality of individuals in processing information, or (d) the institutionalized rules of thumb by which those procedures are enacted. We believe that a complete attempt to study risk management decisions in public entities should consider both the rational and descriptive models (Altman, 2008).

Our contribution in this theoretical chapter does not lie in producing a new brand of decision theory, but in developing a more complete and interdisciplinary explanation framework of decision-making considering risk management choices. We do not neglect that elements such as the dynamic of the public agenda setting, the legitimacy of public servants under the pressure to quickly deliver concrete results, short-term thinking at the cost of ignoring strategically important issues- concepts that are part of the Public Policy literature- might give additional explanations for decisions made by public organization. We believe though that those theoretical considerations are beyond the scope of this thesis. Nonetheless, in the empirical study of the thesis we will collect data of risk decisions made by municipalities in the

Netherlands. We will try to apply both rational and descriptive frameworks as part of our risk maturity model studied in this part of the thesis to develop explanations of how risk strategy decisions are performing in Dutch municipalities.

## **CHAPTER 4: Risk management policy in Dutch municipalities: understanding the process, identifying strengths and visualizing possible improvements<sup>17</sup>**

### **4.1. Introduction**

As pointed out by Korthals Altes (2002), the position of the nation-state has changed in the last decades. The hollowing-out of the nation-state and the rise of supranational regimes having regional and local governance (Jessop, 1994 in Korthals Altes, 2002) was in some dimension a response to the more complex environment that public entities had to deal with. This has resulted in greater demand for quality and effective services (King and Pierre, 1990), which has forced local governments to implement the best available managerial instruments and to modify their organizational structures and scope of action. We believe that in this context of greater uncertainty, risk management would especially assist local public entities in meeting the more complex challenges that they currently face.

In this chapter, we will answer research question number 3, describing the legal, financial and administrative environment in which municipalities in the Netherlands perform. Their main functions, restrictions and difficulties will be analyzed in order to visualize the particular threats they are currently exposed to. In addition, we will review the process of public reform in the Dutch local government, period which is linked to the new public management development (Hood, 1995), concept that is characterized by incorporating private sector practices in the public management scene. In the last section of the chapter, we will describe and discuss the practices of the special bylaw for risk management prescribed for Dutch municipalities. As we have mentioned before, this public policy might be considered innovative for the public context (Boorsma, 2006), although there can be some difficulties when implemented by local governments (e.g. Boorsma and Haisma, 2005; Mohanlal, 2012; Schouten, 2010 ).

### **4.2. Describing the administrative and economic environment of municipalities in the Netherlands**

The Netherlands is a decentralized unitary state where municipalities are characterized as semi-autonomous and co-governmental public institutions (Van Helden and Ter Bogt, 2001). Although the Dutch governmental system is hierarchical, municipalities do have a certain degree of autonomy, thus local government organizations have the leeway to initiate and conduct their business within the constraints imposed by national (and provincial) regulation. According to Korthals Altes (2002), this situation has its roots in the Dutch constitution of 1848, which made municipalities autonomous. Additionally, there might be a strong preference in Dutch public policies in general, and in local government in particular, to seek consensus and to consult as many stakeholders as possible before making any policy decisions (Hoetjes, 2009). The latter could be attributable among other factors to the fact that the Netherlands has never been governed by clear-cut

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<sup>17</sup> Published in *Revista Enfoques, Ciencia Política y Administración Pública*, Universidad Central de Chile, (2011), Vol. VIII N° 14., 155-176.



majorities, having a tradition of forming coalitions and consulting and accommodating minority views as much as possible. Several scholars venture the opinion that this may be the underlying reason not only for a slow decision-making process and a predilection for watered-down compromise policies, but also for the broad acceptance and long term legitimacy that these government decisions enjoy (Lijphart, 1975 in Hoetjes, 2009).

The playing field of Dutch municipalities is not limited by an *ultra vires* rule, as in Britain, or by a Dillon's Rule, as in the United States, which prohibits local authorities from providing services unless specially authorized to do so (Pacione, 2001 in Korthals Altes, 2002). Municipalities in the Netherlands are competent in the regulation and administration of their internal affairs and are only limited by statutory rules adopted at the provincial or central government levels (Schouten, 1999 in Korthals Altes, 2002). As seen in the work of Van Helden and Ter Bogt (2001), Dutch municipalities are active in many policy fields ranging from education and culture to city planning and economic affairs, including social services and employment programming.

Municipalities in the Netherlands are governed by a municipal council, which is composed of elected members and is politically accountable for their actions (Van Helden and Ter Bogt, 2001). The mayor is the chairman of the local council and he is appointed by the national government after consultations with the local council (De Rooij, 2002). The aldermen are elected by the council and together with the mayor constitute the executive committee, which is jointly accountable to the council (Korthals Altes, 2002). The local council makes the final decisions on most policy proposals, but prior to full local council meetings, council commission meetings are held. Managers within a local government organization are not appointed on the basis of their political ideas, but because of their professional background (Van Helden and Ter Bogt, 2001) and they are accountable for the day-to-day processes in their organization or organizational unit (see figure 4.1 for the municipal structure composition).

In spite of the apparent autonomy that Dutch municipalities seem to have, they are financially strongly dependent on central government, reflecting the unitary structure of the country (Van Helden and Ter Bogt, 2001). Ever since the Allocation of Finances Act in 1929, local government has had access to three sources of income: (1) a general grant from the Municipal Fund which the municipality is free to decide how to spend; (2) special grants, which have to be spent on specific objectives as defined by the central government; and (3) own incomes received mainly through taxes collected (Boogaard and Huigslood, 1998). Taxes represent only 10% of municipal local income, while the rest is assigned by the central government in the form of general and special grants.

The general grant assigned by the central government is distributed out according to "objective criteria" related to the financial position of each municipality and is "policy-free", meaning that central government does not use policy goals as criteria in its assignation. As discussed by Korthals Altes in his work in 2002, this can be seen as a paradox since in his opinion the way in which municipalities have access to these general grants makes Dutch municipalities relatively independent, since they do not

have to develop any particular policies for generating a local tax-base. They are free to make decisions they consider relevant and effective for the community as well as for their own political interest. If a municipality were to overspend, it will be placed in a financial deficit (the so called “article 12 regime”), meaning its finances fall under central government control for financial reconstruction. Once finances are reorganized, the municipality may return to its previous autonomous status (Korthals Altes, 2002). This system prevents the municipality from becoming insolvent and provides financial sustainability for the municipal sector in the Netherlands, ensuring that local public entities continue providing the services the community requires. Yet, it may also encourage irresponsible financial decision-making or increase the risk appetite of decision-makers.

Although the Dutch system defines municipalities as equals in legal terms, and having uniform power structures, responsibilities and decision-making systems, it appears that this is not the case in practice (Hoetjes, 2009). Hoetjes (2009) mentions that the main cities in the Netherlands, such as Amsterdam, Rotterdam, The Hague and Utrecht, have a special financial status and are political heavyweights operating in most public policy fields. These municipalities can exert a considerable lobby in national politics. Formally, they do not have a special legal status, but differ from the other municipalities in several aspects. Due to their population size and their issues associated with metropolitan areas, they are entitled to a larger budget from the central government. In addition and associated with their physical, economic and human resources (such as the number of private companies, universities, voters, etc.) they have a political weight which not only surpasses that of smaller municipalities, but also several provinces. It has been argued that they are regions unto their own and, in fact, quasi-provincial structures have been established to deal with their own particular interests (urban regions such as Rotterdam–Rijnmond, Haaglanden have been created) (Hoetjes, 2009). Their elected representatives are often, well-known political leaders who have developed their own policy strategies in many areas without waiting for a provincial or a national consensus on the issues.

While municipalities in the Netherlands are financially dependent on the central government, there are some items that are increasingly relevant in their income structure. This is the case with real estate, given the responsibilities that they hold in the policies of territory development within their regions. They are allowed to form agencies which buy land and sell it to developers, housing associations and other users of real estate (Needham, 1992 in Korthals Altes, 2002). These municipal land agencies are managed as if it were a business entity. When an opportunity arises to buy-up more real estate in an urban renewal area, the land agency would resort to a loan and pay interest on the credit, reporting its financial results in an annual account (Korthals Altes, 2002). Financial results are not necessarily transferred to a central municipality. Usually they are maintained within the land agency, which may reinvest assets on further regeneration policies as it sees fit. A salient issue in this practice is the lack of financial transparency, exposing the municipality to corruption risks. Municipal land agencies have often been referred to as black boxes (Kolpron, 2001 in Korthals Altes, 2002). As discussed by Kolpron (2001), several municipalities have a substantial financial dependence on land development. In Houten, a rapidly growing suburban area near Utrecht, 50% of all municipal income is derived from land sales. In Amersfoort, a medium-sized city in the province of Utrecht, the

percentage of income derived from the land market is around 30%. In both cases, land development costs take up a large share of the municipal budget (Korthals Altes, 2002). As we can see, the strong bias Dutch municipalities have towards investing in land development exposes them to market risk and reputation loss if the decision-making process related to these activities is lacking in transparency and the outcomes of these financial decisions are detrimental to the community.

Safety issues are also a responsibility of municipalities in the Dutch context, as they play a relevant role in the public agenda, especially in the largest cities of the country. For example, the city of Rotterdam even has a special alderman for safety issues (Van Swaaningen, 2008). This is a matter of great public concern and debate in the Netherlands.

In 2010 there were 12 provinces and 431 municipalities in the Netherlands. (See table 4.1). The central government had strongly favored and pushed the merging process that the municipal sector experienced in this era. With the appearance of private management practices in the developed countries, the merging process advanced even faster (Denters and Rose, 2005). Arguments such as increasing efficiency, the reduction of cost in state spending, and increasing administrative capacity were the major driving forces to accomplish this process. However, as we will see in the next section, this process has had consequences for the municipal organizations, changing the risk profile of these entities in the Netherlands and exposing them to new risks. On the other hand, Van Helden and Ter Bogt (2001) mention that even though Dutch municipalities seem to have adopted and used an important range of business-like management instruments, it does not mean they implemented and incorporated the actual practices promoted in this period.

Figure 4.1. Structure of the Dutch municipality (Own elaboration)

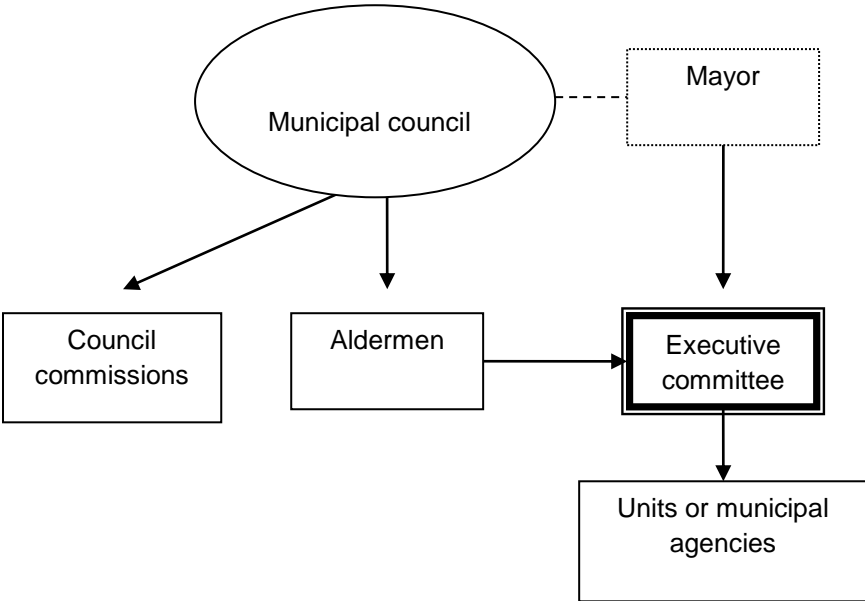


Table 4.1. Distribution of Dutch municipalities by size of municipality, 1950-2010 (Own elaboration, based on Korthals Altes, (2002)).

Population size	Number of municipalities in the Netherlands			
	1950	1980	1990	2010
Less than 5.000	624	246	105	6
5.000 to 20.000	314	407	384	165
20.000 to 50.000	53	114	130	192
50.000 to 100.000	13	27	36	42
Over 100.000	11	17	17	26
<b>Total</b>	<b>1.015</b>	<b>811</b>	<b>672</b>	<b>431</b>
Average population size	9.879	17.375	22.162	38.327

### 4.3. The implementation of modern managerial practices in the Dutch local public sector

Since the end of the 1980's, most governmental organizations from western countries have adopted several instruments and practices from the private sector. This process has been labeled as "New Public Management" (NPM) in the specialized literature. The principles behind NPM lie in reducing or removing the differences between the public and private sector and shifting the emphasis from process accountability towards greater accountability in terms of results (Hood, 1995).

According to Boorsma and Mol (1995), we can trace the origins of the introduction of business ideas in the public sector in the Netherlands, before the whole NPM movement. Therefore in the first half of the 80', financial management was profusely introduced both in central and local Dutch public sector, period that was referred to as the "financial revolution" (Boorsma, 1993). The implementation of private sector control mechanism in the Netherlands had two particular sources: problems in the control of government expenditure emerging at the end of the 1970's and the introduction of public administration as a distinctive faculty or department by Dutch Universities with a special interest on public finance (Boorsma and Mol, 1995).

Other visible effects of the inclusion of private sector ideas in the Netherlands was the transfer of many responsibilities from the central government to municipalities that occurred during the early 1990s. De Vries (2008), mentions that policy areas like welfare, social and cultural affairs, sports, recreation, the elderly, social insurance policies, juvenile delinquency, social housing, city renewal, health sector prevention policies, regional economic policies, the care of monuments and policies for the disabled, all became the responsibility of municipalities. Many smaller municipalities were forced to merge, as previously mentioned. The latter can be explained by the

central government's belief that efficiency and quality of service was a function of scale (De Vries, 2008).

Overall we can trace the origins of the implementation of what we can call NPM practices in Dutch municipalities to the 1980's when some of the larger entities took the initiative to change their control system (Van Helden and Jansen, 2003). The most important features of these changes were the transition from input to output controls and the replacement of traditional centralized organizational structures by decentralized organizational devices. This process was extended later when in 1990, the Dutch Ministry of Home Affairs started to stimulate municipalities—irrespective of their scale—to apply businesslike tools, such as output budgeting, responsibility accounting, variance analysis and cost allocation (Van Helden and Jansen, 2003). This initiative of the central government in terms of control instruments, was known as BBI (in Dutch: “Beleids-en Beheers Instrumentarium”), which could be translated as Policy and Management Instruments (PMI). The process was formalized and documented through special instructions and recommendations.

When analyzing in detail the consequences of this process by Dutch municipalities, the South Holland banking scandal becomes an interesting example. As discussed by Yesilkagit and De Vries (2002), the near bankruptcy of a private Dutch company trading in Latin America led to one of the biggest crises in central–local government relationships in the Netherlands, when a newspaper found out this company had received two loans from the province of South Holland. Further investigations revealed that over a four year period, the province had made excessive loans at high rates of interest (1.7 billion guilders) particularly to financial institutions, but also to commercial businesses and semi-public agencies (such as housing corporations) (Van Dijk Commission, 1999 in Yesilkagit and De Vries, 2002). This scandal revealed that other provinces were also pursuing such bank practices (Yesilkagit and De Vries, 2002).

The Dutch constitutional reform of 1983 established that decisions made by local authorities (provinces and municipalities) can be subjected to ex post control only in circumstances specified by law and subject to reversal by council order when decisions are in defiance of the public interest (Yesilkagit and De Vries, 2002). Regarding financial management however, the constitutionally guaranteed autonomy of the provinces implies that provincial authorities can initiate any kind of financial activity as long as the Provincial Council deems such activity necessary (Minister of Interior Affairs and Kingdom Affairs, 29 September 1999). The Central government however, maintains an ex post supervision of the (provincial) budget. The same situation applies to the municipalities, where the provinces are the ones performing that ex post supervision towards entities in their jurisdiction. The main objective of the budgetary supervision is to prevent local entities, due to poor financial management, from falling back on financial support from the central government. The central criterion in this supervision is only related to the extent to which the budget is in balance (Yesilkagit and De Vries, 2002). Ex ante control might also be possible in the case of provinces and municipalities that have shown poor financial performance. Another criterion that a municipality has to determine is the extent of potential financial risks to pursue, since municipalities and provinces need to include in the annual budget and annual report as an appendix a so-called Risk Paragraph

(Boorsma, 2006). We will discuss this special in more detail in the next section of this chapter.

Despite this control system, the Ministry of Interior Affairs was unable to detect these banking activities carried out by the province of South Holland. The fact that the Ministry of the Interior finally found out through information received by the association of municipalities (VNG), was a clear indication that this supervision system did not have a risk management element that may have provided an early warning. A warning could have triggered intervention, thus protecting community assets and the public interest. Indeed, probably due to structural limitations of the paragraph dealing with risk and the lack of knowledge by decision-makers within municipal levels when dealing with risk management methodologies and concepts—an aspect that we will deal with in the next section—banking activities were not considered in the risk management paragraph. In relation to best practices in maintaining a solid and stable financial system in any country, the situation described confirms that financial intermediation activities require special risk management supervision. When liquidity risks, credit risks and operational risk become increasingly relevant in terms of controlling the systemic threats, they are beyond the capacity and scope of municipalities as well as the Ministry of Interior as a supervisory entity. This justifies the existence of special institutions (banks) and regulations within the financial industry and at the same time, the consensus among experts and governments that the provision of financial services has to be made by institutions that have as a unique business and operational scope, the provision of such financial services.

The case of the province of South Holland may serve as an example in how the incorporation of private management practices in Dutch provinces and municipalities did not actually lead to the desired result of achieving more certainty through planning, and control, exposing instead these types of entities to a new kind of risk. In fact, this crisis did not only evidence the emergence of new financial risks materializing in the local government scene, but political consequences for elected and appointed officials as well.

An additional consequence of this process, where Dutch municipalities adopted private sector practices, is the proliferation of quasi-autonomous organizations (called “quangos”) (Van Helden and Jansen, 2003). Quangos are organizations which are charged with policy implementation and funded by local government, but operate with a measure of independence from that local government, without an immediate hierarchical relationship, making them difficult to control and may lead to financial and non-financial risks if things go wrong. Moreover, public–private partnerships follow a businesslike approach which is now standard practice in local public organizations in the Netherlands, an instrument that should deliver efficiency, transferring part of the financial risk associated to a public project. Taking into account the nature of public organizations, these risk management techniques or responses might not eliminate the risks to which municipalities are exposed. Residual risk such as risk to the reputation and trust levels remain within public organizations, taking into account that as far as the community and the public is concerned, the municipality is still responsible for the activities (Drennan and MacConnell, 2007).

These new risks that municipalities faced are certainly connected to a more complex and demanding environment. Therefore, it is not possible to infer that the rise of private management instruments in the public sector would be the cause for failure or the reason why risk in the context where municipalities perform has increased. On the contrary, the fact that these best managerial practices and methods had not been implemented correctly or extensively by public entities, could be the reason why public organizations have had troubles confronting these new difficulties. For instance, Van Helden and Ter Bogt (2001) found that the negative attitude of municipal decision-makers towards the implementation and use of best managerial practices was associated mainly with short term political thinking and resistance to accountability.

#### **4.4. Risk management in Dutch municipalities, the special regulation on financial resilience**

As mentioned before, since the early nineties the State has prescribed in a Bylaw for Dutch municipalities and provinces to include and annual report as an appendix, a so called “risk paragraph” (Boorsma, 2006). Since 2004, the BBV (Besluit begroting en verantwoording)<sup>18</sup> determined the budget and annual account should include a special paragraph on financial resilience. This financial resilience is defined as a ratio between the financial capacity available divided by the financial capacity required (“weerstandvermogen”)<sup>19</sup>. The regulation states in detail that the paragraph should include at least, (a) an examination of the available financial capacity, (b) a scrutiny of the risks (required financial capacity), and (c) the policy on financial resilience with risks and measures taken into account.

As discussed by Boorsma (2006), this approach assumes a series of steps in order to achieve its purpose. The first step should attempt to summarize uncovered risks, these being the risks that are not covered by a budgetary reserve nor transferred through an insurance mechanism. BBV also defines important risk management concepts and help in guiding the implementation of the paragraph. For example, it defines the notion of “regular risks” as risks which occur frequently and can for that reason be easily assessed. Hence, the bylaw determines that these types of threats can be covered by insurance, which is the main reason why this norm does not consider regular risks in the paragraph. Boorsma (2006), also mentions that by leaving regular risks outside the scope of financially covered risks, organizations have no incentive to develop a full-scale risk management; neither is there an incentive to include weighing-up all policy alternatives nor to respond through a CBA. In addition, a specific insurance policy may not give full coverage, or it may be too expensive, which seems consistent with evidence suggesting that Dutch people and organizations in general have a tendency to over-insure. Therefore, even transferring a risk that has a high frequency and a low impact could be a pertinent risk strategy, it is not the only response for this kind of risk (Lam, 2003). Risk strategies such as risk prevention and other risk reduction mechanisms such as education and enforcement

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<sup>18</sup> In English: Act on Budget Accountability

<sup>19</sup> In English: Resilience

could also be applicable by themselves or in combination with a risk financing or insurance strategy which would have a positive impact on the cost of the premium.

This regulation also discriminates between “positive risks” and “pure risks” (Boorsma, 2006). According to this bylaw, positive risks are those which may have a positive outcome. For example, the decreasing interest on short term loans, which in the literature of risk management, and especially so by scholars who apply an integrated perspective, are considered an “upside risk” (see for example Vaughan, 1997). Pure risk, on the other hand, is defined in this public policy as the probability an event will happen bearing negative consequences for the party involved. Also considered are “general risks” and “specific risks”. According to the legal text, general risks should impact and have consequences for all municipalities, such as an increase in loan interest, while specific risks are those risks that apply only to the original characteristics or risk profile of the particular municipality. Subcategories are also defined by the bylaw: (1) financial risks, (2) risk to property and (3) risks related with internal organization. Although the definitions do not include just pure, i.e., negative risks, but also risks that may have a positive outcome -which is a modern and a proactive approach to risk management- the classification of “general risks” is not sufficient nor clear enough. This could suggest that the Ministry of Interior Affairs may have to push municipalities to clarify possible financial consequences related to certain risks, thus neglecting other (non) financial or reputational risks (Boorsma, 2006).

After these uncovered risks are summarized (step one), this regulation establishes a second step, where the municipality calculates the financial loss due to these uncovered risks. The sum of this calculation is the financial capacity needed (CN) (Boorsma, 2006). As a third step, the bylaw defines the financial capacity available (FCA) as the sum of the available free budgetary reserves (Afbr) plus the available room for extra tax income (Arei), plus the hidden reserves (Hr), which can also be viewed as follows:

$$FCA = Afbr + Arei + Hr$$

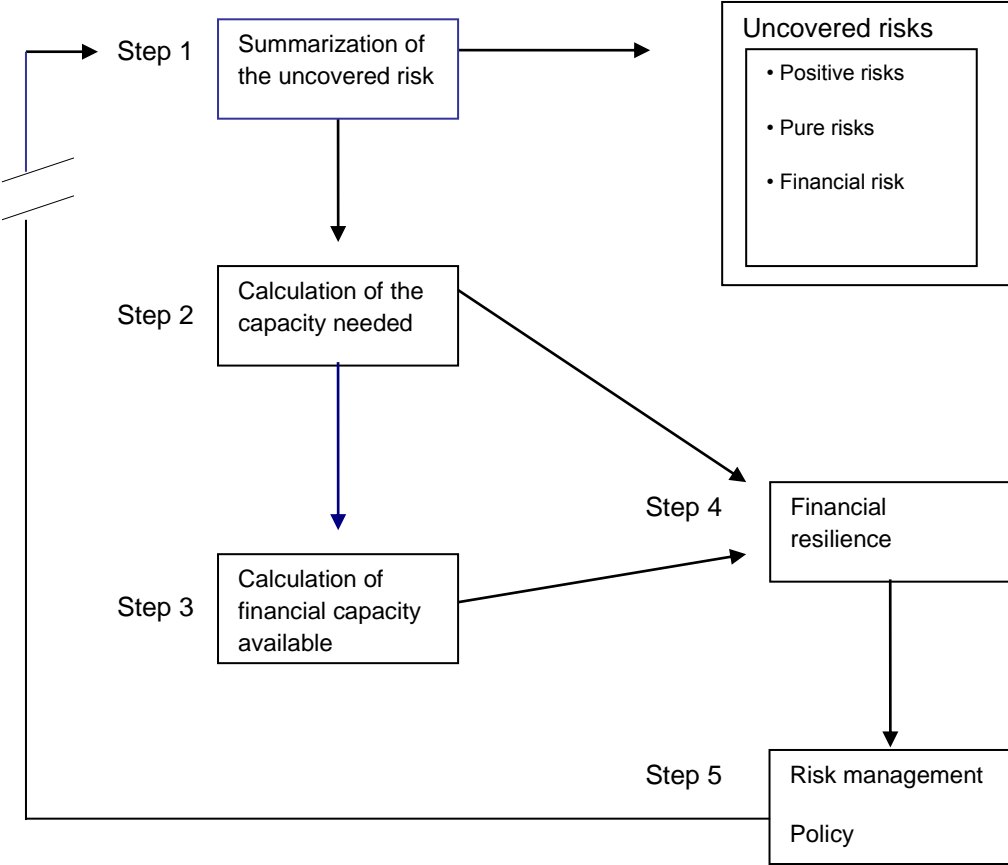
As stated by Boorsma (2006), all municipalities have silent or hidden reserves, which are not evident from the capital statement. These hidden reserves could be found when assets are valued at the balance or book price, using the historical value as the initial position. However, because of inflation factors and other causes the actual value may be much higher. This is said to be the case in public utility companies that municipalities used to own (such as energy companies, cable networks). The largest Dutch housing company, which was previously owned by over 200 municipalities (Korthals Altes, 2001) and was sold at a very high price, made an enormous book profit, thus making clear the existence of former hidden reserves. There may be other hidden reserves in the book value of the buildings, or land, or machinery, etc. Therefore, by definition the assessment of hidden reserves would be difficult (Boorsma, 2006).

The fourth step considered in this bylaw is the actual calculation of financial resilience, which is the ratio between FCA and CN. The municipalities that have a positive result in this calculation, where the ratio is more than 1, are in a safe zone in



terms of financial resilience or capacity to confront undesirable events. As a final and fifth step, this regulation for budgetary control and especially its paragraphs relating to risk, defines that the municipality should develop an explicit and official risk management policy. Although this objective is adequate and consistent with a modern approach of risk management, Boorsma (2006) considers that the Ministry of Internal Affairs has failed to give precise guidelines, particularly when considering the wide spectrum of literature on risk management research and standards for different industries, sectors and types of risks. A particular framework developed by the central government and the association of municipalities for applying risk management in municipalities may be needed. This framework could include guidelines that should determine, for example, the period for reviewing and evaluating the risk management policy and the participation and involvement requirements of the citizens during the risk management process, as well as the roles, responsibilities and competencies (see figure 4.2 for an illustration of the risk paragraph).

Figure 4.2. Steps for the risk management paragraph in Dutch municipalities (Own elaboration from Boorsma, 2006)



#### *4.4.1. Room for improvement and risk management immaturity in Dutch Municipalities.*

Boorsma and Haisma (2005) undertook specific research on the application of articles on resilience as set out in Provincial Law 2004<sup>20</sup>. They used data from 130 municipalities to determine how this risk management approach for local public organization in the Netherlands may actually be implemented. Study findings indicate an inconsistency between actual municipal practices with the recommendations as established in the bylaw and also with best practices of risk management seen in the literature.

Regarding the risk identification steps, considered both in the bylaw (uncovered risk) and also in every version of the risk management cycle, Boorsma and Haisma, (2005) found that municipalities do not identify risks in any systematic manner<sup>21</sup>. They conclude that municipalities merely provide a list of risks, not distinguishing between events (such as burglary or fire), policy fields subject to risk (such as environmental policy, treasury, municipal ambulance transport), and those exposed to risk (such as buildings, computers, employees, citizens, etc.). This finding, in their opinion, may be related to a previously mentioned aspect, which is that Dutch municipalities only summarize and identify “unfunded” risks. Another possible explanation discussed by the authors may be attributable to a lack of experience by municipalities in the implementation of risk management, something which can be viewed as a “deficient risk management process” within organizations.

Boorsma and Haisma (2005) found that pure and catastrophic risks such as fire, storm, flooding, and theft, are not often mentioned by municipalities (even if they are covered by insurance), while internal or operational risks (see Fone and Young, 2005 and Drennan and McConnell, 2007), such as fraud, internal procedures, and internal management are also ignored. The latter could be explained, in their opinion, by the fact that public organizations find it hard to critically scrutinize their own performance. On the other hand it is indeed surprising that risks related to European subsidies are hardly ever mentioned by municipalities in the paragraph (Boorsma and Haisma, 2005), considering not just the economic effects of this policy especially for border municipalities, but also the political and social impacts that it now has in several communities in the Netherlands (De Rooij, 2002).

Due mostly to the structural and conceptual difficulties of the paragraph (in particular the calculation of uncovered risks), immaterial or reputational risks were never found by the authors in their research (Boorsma and Haisma, 2005). Risks related to the damage inflicted on a third party were also scarcely mentioned, unless it was the cause of legal liability procedures (for which the city is insured against). Furthermore,

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<sup>20</sup> See also Mohanlal, D., (2012); and Schouten, P., (2010) for other systematic researches of the use of risk management in Dutch municipalities.

<sup>21</sup> Since 2005, the practice may have improved substantially. We will use the findings of Boorsma and Haisma however, to hypothesized that the implementation of risk management in municipalities could have some limitations.

only 50% of the municipalities mention the expected liability damage. In terms of distinguishing positive and negative risks, Boorsma and Haisma, (2005) found that most municipalities only mention pure or negative risks. Only a few mention positive risk, such as the probability to sell-off their energy's company share (Boorsma and Haisma, 2005), which in reality is more a hope than a positive risk. Although this situation may also be explained by the structural difficulties of the paragraph mentioned earlier, we could also consider the lack of risk management knowledge or the lack of clear guidelines as possible reasons for not mentioning positive risks in the municipal risk management policy.

The distinction between general and specific risks established in the paragraph is not strictly adhered to. Even if municipalities use this risk classification in practice, they would mention several different types of risks (Boorsma and Haisma, 2005). As also mentioned by Boorsma and Haisma (2005), general risks to which all the Dutch municipal sector are exposed to, such as the reduction of general grants, which, as we have seen, represents the biggest source of income for municipalities, are not even mentioned in the resilience paragraph. However, without clear guidelines, pertinent training of municipal decision-makers and a better design of current policy (the paragraph), it would be unlikely to find more sophisticated and mature risk management practices.

The assessment step defined in the paragraph (the calculation of CN) should assume that once risks are identified, the municipality needs to determine the possible loss (the probability that the identified risk will actually materialize) and its impacts. The study by Boorsma and Haisma (2005) however, showed that just a few cities (5 out of 130) and in particular, larger cities, use this standard approach<sup>22</sup>. It is interesting to also note that the cities that follow this approach such as Groningen and Tilburg, are cities judged as being international leaders in the implementation of NPM, pioneering business practices such as management at arm's-length and performance budgeting (Boorsma and Haisma, 2005). The latter is an interesting finding since we could hypothesize that larger municipalities would have a more sophisticated or "mature" approach of risk management. We should come back to this point then in our empirical study, where we could investigate if this is also the case for our sample.

Other relevant findings in Boorsma and Haisma's empirical research are related to the particular practices that municipalities use in the calculation of possible risk. They mention that many cities consider very unorthodox methods that may be appropriate in the distribution of specific public services to citizens, but not in measuring risks within an organization. Thus, in many cases the municipality will merely state that they need a financial capacity of x amount per citizen, times the number of citizens,

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<sup>22</sup> Knight argued that many risks are characterized either by uncertainty or by objective uncertainty. He points out that a major direction in organization development is the prediction, analysis, and containment of risk, so that, over time, risks are converted into certainties (Knight, 1921). Thus, the standard frequency (severity index found in the literature of risk management) follows in practice the contributions of Knight, which means that after the identification of risk has been accomplished the organization should assess the probability of occurrence of that risk.

or even worse, as a result of y% of the total budget of the municipality. Once again, this finding might illustrate difficulties in the implementation of the 'resilience paragraph' within Dutch municipalities as well as some limitations on its design<sup>23</sup>.

Finally, the research conducted by Boorsma and Haisma (2005) revealed that most municipalities were actually able to calculate in a consistent manner with the paragraph, the FCA mentioned as a third step in the bylaw. Thus, 124 out of 130 entities measured the available financial capacity. When considering step four, meaning the calculation of the actual finance resilience (the ratio between capacity available and capacity needed), the authors found—as expected—that the municipalities did not calculate the FCN for uncovered risks, this being the ratio denominator. A mere 13 out of 130 municipalities calculated the needed financial capacity. As for step five, which is the requirement of a formal risk management policy, most municipalities failed to mention which responses were for each specific risk identified. The municipalities studied also failed to discuss, as mentioned in the paragraph, that policy objectives and scope be consistent with a wider approach to risk management as described in modern literature. Most municipalities did not show a clearly formulated policy. Only 7 out of 130 presented an explicit risk management policy and only 6 out of 7 entities defined targets, responsibilities and specific instruments for conducting assessments and control (see table 4.2 for the comparison of a standard risk management process and the steps defined in the risk paragraph).

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23 This might partly explain for instance, why the paragraph did not serve its purpose in the catastrophic event of the province of South Holland commented on in the previous section.

Table 4.2. Comparison of the risk management process with the resilience paragraph, which evidences some gaps of this public policy (Own elaboration)

Standard Risk Management processes	Resilience Paragraph steps
1. Determining objectives	1. Not defined
2. Identifying all risks	2. Identifying or summary of only uncovered risk, not systematically.
3. Evaluating risk according to a criterion defined	3. Evaluating risk or financial resilience calculation (ratio between capacity available/capacity needed)
4. Considering alternatives and selecting the risk treatment device (Decision and Control)	4. The paragraph should mention the measures taken for the unfunded risks identified.
5. Implementation and reviewing	5. Establishes the necessity of a policy, however it does not consider specific roles, instruments and the necessity of continued improvement and feedback

#### **4.5. Conclusion for this chapter**

As a conclusion, we can say that municipalities in the Netherlands have legal, economic and political conditions and characteristics that expose them to several types of risks and which compromise the fulfillment of their objectives and, therefore, to some extent the welfare of their citizens. Some of the elements that describe the context on which municipalities perform drive back to the roots and values of Dutch society and others are more related to the new challenges and expectation of a complex and competitive new world.

Assuming that there are plenty of good reasons for a public organization, and a municipality in particular, for implementing best practices in risk management, methods and instruments for expanding knowledge on the subject should be sought so as to gain the full benefits of the discipline. Although in the Netherlands there is a wide array of public policies that have risk management at their core and municipalities are forced to have a measure of risk awareness, there is some room for improvement. This improvement should be seen at both the structural level (the actual design, concepts defined in the paragraph which may have incentives and disincentives in the development of risk management practices) and at the implementation level (the risk management practices that actually occur).

We will explore in the next chapter, the maturity model literature, a methodology which may facilitate the integration of risk management best practices into the business processes of organizations, in order to objectively measure the risk management process of municipalities in the Netherlands. Research by Boorsma and Haisma (2005) showed that larger cities had more 'mature' risk management practices. As a consequence, the study of best management practices for municipalities and the empirical application of an improved risk maturity model for these organizations may shed light not only on assessing and improving risk practices of these entities but also, with further research, suggest some improvements in the current special public policy (the risk paragraph).

## **CHAPTER 5: Critical analysis of available risk maturity models**

### **5.1. Introduction**

As we have stated previously in this thesis, public risk management is becoming increasingly accepted and promoted in the public sector. Risk management techniques and methods, traditionally applied to pure risks and safety areas by public institutions, are now seeing relevance at the strategic level by public entities (Fone and Young, 2005; Drennan and McConnell, 2007).

However, despite its positive evolution and recognition, public entities face difficulties in the implementation of risk management particularly in the comprehensive approach because of its complexity and novelty (MacGillivray, 2006a). This might be the case of the Dutch municipalities taking into account the evidence presented by Boorsma and Haisma (2005). In this research, they show that not even the basic approach of risk management legally prescribed for these organizations (the resilience paragraph) has been satisfactorily implemented. As a consequence, we claim that maturity models used mainly in the software industry could assist us in establishing a clear diagnosis of the current processes of risk management in municipalities of the Netherlands, as well as influencing the correct implementation of the discipline by these local public entities.

The development of the risk maturity model methodology can be traced back to the literature on quality management (see e.g., Crosby, 1979; Hoyle, 2001; Paulk, Curtis, Chrissis and Weber, 1993; SEI, 2009; Hillson, 1997; RMRP, 2002). We will, however, refine and adapt these types of frameworks to fit the context of municipalities and their risk-based decision-making process and responds as well to the difficulties discovered in these types of models. Thus, this chapter will answer research question number 4, describing the state of art of maturity models and existing risk maturity models found in the literature, identifying their limitations and difficulties.

### **5.2. Overview of maturity models**

Different industries and disciplines have used maturity models with the objective of measuring the level of sophistication of their organizational processes and facilitating the implementation of best practices. As discussed by MacGillivray (2006b), the maturity methodology has found increasing acceptance and interest by practitioners and scholars. The former is verifiable by the large amount of research, studies, theses and surveys that use the concept for a large range of disciplines. These include risk management, quality management, software development, supplier relationships, R&D effectiveness, product development, innovation, product design, product development collaboration, product reliability, human resources and project management to name a few (Sarshar, Haigh, Finnemore, Aouad, Barrett, Baldry and Sexton, 2000; and MacGillivray, 2006a, 2006b). As mentioned by Wendler (2012), in 2009 and 2010 alone, 62 academic articles were published, which included 34 new maturity models developments.

Maturity models offer organizations a simple but effective method to measure the quality of their process (Wendler, 2012). According to Andersen (2003, in Pazderka

2008), the concept of “maturity” applied to organizations refers to a state where the entity is in perfect condition to achieve its objectives. As discussed by Maier, Eckert, and Clarkson (2006), this idea also means “ripeness”, related to the notion of development from an initial point to a more advanced state. Following that idea, the unit under study would go through a number of intermediate stages to reach the label of “maturity”. Specifically, process maturity refers to the degree to which a process or activity is institutionalized and effective (Chiesa, Coughlan and Voss, 1996; Dooley, Subra, and Anderson, 2001; Paulk, et al, 1993). Hence, applying this notion to a municipality, it refers to a state where processes of the local public organization are in the perfect condition to achieve its objectives (Andersen and Jessen, 2003). Specifically, a mature municipality considering risk management would be an organization that is perfectly conditioned to deal with the risks that it faces. Stated by Andersen and Jessen (2003), in reality it will be quite difficult to find a fully or completely mature organization, however it would make sense to define degrees of maturity by measuring the complexity of organizational process according to a particular discipline.

Under a historical perspective, we could say that the idea of a “maturity model” was developed initially within the quality management field by Humphrey (1989) and his colleagues at IBM for software production. Humphrey’s observations made him notice that the quality of a software product was directly related to the quality of the process used to develop it. Having observed the success of total quality management in other industries, Humphrey (1989) wanted to install a sort of Shewhart-Deming improvement cycle (Plan-Do Check-Act)<sup>24</sup> into software organizations, as a way to continually improve the development of processes (SEI, PCMM, 2009). Nevertheless, at the end, the structure of the maturity framework on which Humphrey (1989) based his effort, was actually based in the work of Crosby (1979), who developed a quality maturity grid in the 1980’s during the so-called “quality revolution”<sup>25</sup>. Crosby’s quality management maturity grid (QMMG) defined quality management at five levels of maturity: uncertainty, awakening, enlightenment, wisdom and certainty” (Fraser, Moultrie and Gregory, 2002 in Maier, Eckert, and Clarkson, 2006). This framework was then adapted to the software process by Humphrey (1989), elaborating an original formulation for the adoption of new practices in organizations, a process that would occur also in five stages. The logic behind this sequence of five stages was that the organization would become aware of a new practice, incrementally *learning*

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<sup>24</sup> The concept of the Plan-Do Check-Cycle was originally developed by Walter Shewhart (1930), the pioneering statistician who developed statistical process control in the Bell Laboratories in the US during the 1930's. It is often referred to as the Shewhart Cycle. It was taken up and promoted very effectively from the 1950's on by the famous quality management authority, W. Edwards Deming (1966), and is consequently known by some as the Deming Wheel. Plan-Do Check-Cycle was implemented by organizations in order to coordinate the continuous improvement efforts. These authors emphasized and demonstrated that improvement programs must start with careful planning, must result in effective action, and must move on again to careful planning in a continuous cycle.

<sup>25</sup> The quality revolution constitutes the major peak in history of the development and application of quality principals. This period has a great influence of two Americans, Edward Deming and J. Juran who developed the concept of total quality management.



more about a particular discipline through the guiding of this special framework until achieving a master performance of that discipline (SEI, PCMM, 2009). Consequently, Humphrey (1989) designed this maturity framework to enable an organization to develop a state of continuous improvement based on the sophistication of their engineering and management practices.

According to Maier, Eckert and Clarkson (2006), a maturity approach like the one adapted by Humphrey (1989), could capture both the “current” and the “desired” state of implementation of a specific discipline. A typical assessment of the level of sophistication of practices implemented by organization applying a maturity model, would be illustrated around a matrix, which creates a series of cells by allocating levels of maturity against several key activities that are normally measured by the means of a self-assessment instrument in an organization (Austin et.al, 2001).

In the 1990’s this idea of process assessment via a maturity model was adopted in the software domain under the name of capability maturity model (CMM) by the Software Engineering Institute (SEI) at the Carnegie Mellon University. The CMM combined process assessment and capability evaluation to guide the control and improvement of software design (Paulk et al., 1993 in Maier, Eckert and Clarkson, 2006). The Version 1 of the CMM was released after extensive review in 1991, and the Version 1.1 (Paulk et al., 1993) was released in 1993. A more recent version that integrates the different approaches of CMM for improving both software and systems engineering processes is the CMM Integrated (CMMI), which was first released in the late 2000’s (SEI, PCMM, 2009). CMMI is a framework that contains best practices for developing products and services.

According to Pazderka (2008), traditional project management maturity models such as the CMM help organizations reach the optimal state of a discipline, breaking the structure of project management down into specific processes, and even further, all the way down to the “best practice” (Pazderka, 2008). Mentioned by the SEI (2009), a maturity level consists of related practices for a predefined set of process areas that should improve the organization’s overall performance. As stated by MacGillivray (2006a), an organization achieves a new level of maturity when a system of practices has been established or “transformed” to provide results that the organization did not have at the previous level. The method of transformation is different at each level and requires capabilities established at earlier levels. Consequently, each maturity level provides a foundation of practices on which procedures at subsequent maturity levels can be built. Maturity models may be used for benchmarking purposes, enabling organizations to compare themselves against other entities in their sector. The latter could also be done internally, at the corporate, functional or business unit level in the organization (MacGillivray, 2006a). As discussed by SEI (2009), a maturity level is a well-defined evolutionary plateau toward achieving a mature process (in the case of CMM, primarily software process). Each maturity level provides a layer in the foundation for continuous process improvement. This well-known maturity framework for the software industry has five levels of maturity: the initial level (1), the repeatable level (2), the defined level (3), the managed level (4) and the optimizing level (5). (See figure 5.1).

The structure of CMM is mainly composed of “key process areas” and “practices”. When collectively addressed, the specific practices accomplish the goals of the key process area and can be used to determine whether an organization or project has effectively implemented the key process area (SEI, 2009). The CMM framework, which prescribes a standard process for the software development industry, also has introductory notes and a statement that defines the level of maturity, and finally, a survey to self-assess these defined processes and practices. The CMM has 22 process areas that are consistent with the activities of this specific sector, such as: causal analysis and resolution process, configuration management and product integration to name just a few. In contrast to Crosby’s simpler “quality grid”, the CMM adapted by SEI is a particularly complex framework (Fraser, Moultrie & Gregory 2002). See figure 5.2 for an illustration of the structure of the CMM.

As Paulk et al. commented (1993), at the initial level of the CMM, the organization is defined as not having a system for the implementation of a particular discipline; it lacks adequate management practices and the benefits of that discipline are undermined by ineffective planning and reaction driven behavior. In this level, performance varies according to isolated capabilities of individuals, their innate skills, knowledge and motivations. At level 2 of this model, policies and procedures are established. In the case of the development of software, for example, the CMM mentions that planning and managing new projects is based mostly on experience with similar projects. The main objective of this stage would be to “institutionalize”<sup>26</sup> effective processes, which allow organizations to repeat successful practices developed earlier. At level 3 of the CMM, the standard processes are documented and integrated into the organization (SEI, 2009). This level is characterized by an organization with a wide understanding of activities, roles and responsibilities in a defined process. At level 4, the organization sets quantitative and quality goals. In the case of the development of software, productivity and quality are measured for important software process activities across all projects as part of an organizational measurement program (SEI, 2009). Finally, in level 5 of the CMM, the entire organization is focused on continuous process improvement. According to the SEI (2009), at this point the organization would have the means to identify weakness and strengthen the process proactively, with the goal of preventing the occurrence of defects. Innovations available in the particular discipline (software development in this case) are encouraged and transferred through the organization (Paulk et al., 1993). (See again figure 5.1 for a schematic example of this description).

Although the last development of the SEI, the CMMI contains a risk management process area. The main difficulty of this approach—despite the efforts of Carnegie Mellon University—is that it is largely concentrated on software development

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<sup>26</sup> As mentioned by the SEI (CMMI, 2009) the concept of institutionalization is an important concept in process improvement. When mentioned in the goals and practices descriptions, institutionalization implies that the process is ingrained in the way the work is performed and there is commitment and consistency to performing the process. Furthermore as stated by Hammer (1996 in Lockamy and McCormack, 2004) in organizational terms, institutionalization would take place via policies, standards and organizational structures.

organizations, describing the processes, practices and using a complex technical language of that industry. As commented by Hillson (1997), the complexity and specialization of the CMM establishes constraints and barriers that are hard to avoid by entities that are not in the software industry. An additional problem is the lack of theoretical basis of the model, which is based entirely on the experience of the experts of quality management of the SEI. For instance, by reviewing the content of each level and the idea of transition from one stage of maturity to another, we could recognize an organizational process. However, this process of transition described, moving from one state of maturity to another, is not theoretically discussed in the CMM.

Figure 5.1. The five maturity levels of CMM. (Adapted from Humphrey, 1989 in Carnegie Mellon University, 1995)

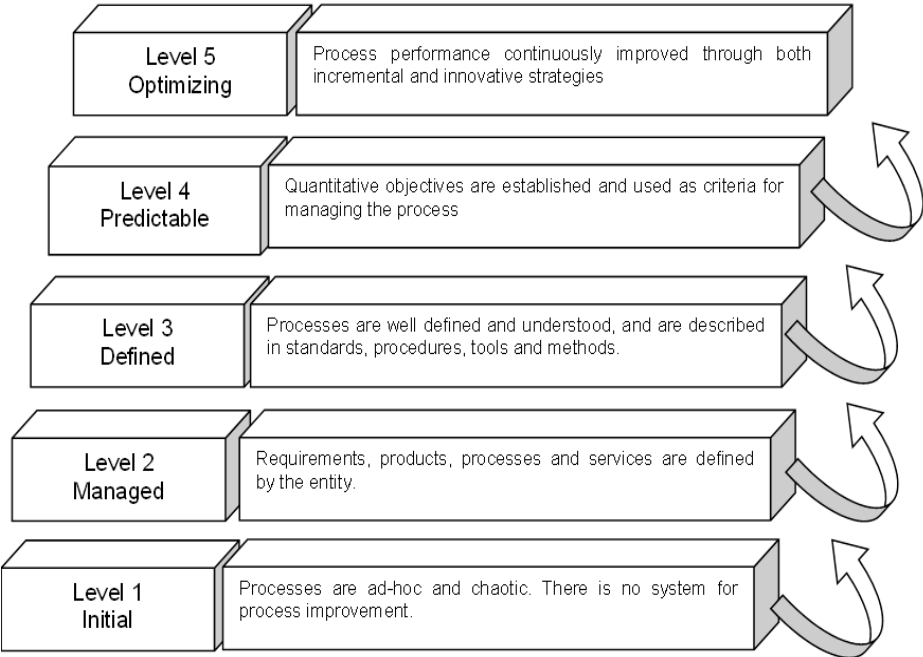
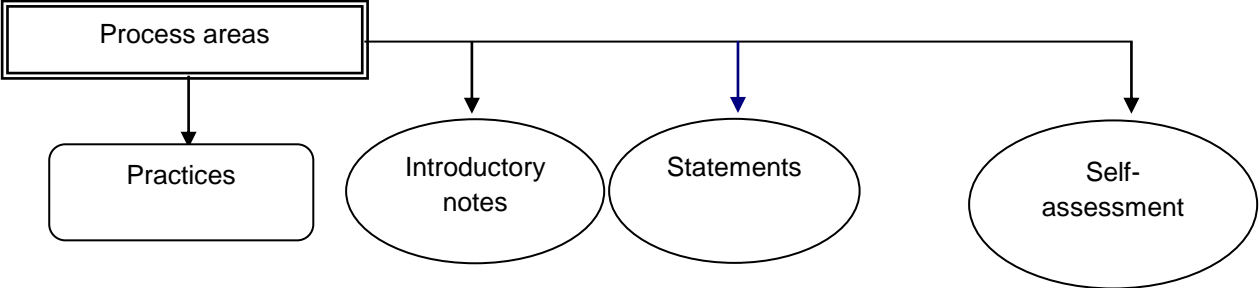


Figure 5.2. Structure of the CMM (adapted from CMM V 1.1, 1993)



### 5.3. Exploring risk management maturity models

As we have mentioned before in this study, implementing risk management is not a straightforward process. Organizations that have tried to integrate risk management practices into their business processes as the integrated perspective of the discipline suggests, have reported different degrees of success, not often achieving the potential benefits of the discipline (RMRP, 2002). As claimed by Shah, Siadat and Vernadat (2009), to benefit from risk management it is necessary to have a clear view of the organization's current approach toward managing risks and also the goals of the best practices of the discipline. As we have seen previously in this research, although municipalities in the Netherlands have a specific regulation for risk management, there is evidence showing important gaps between the practices that this bylaw prescribes and the actual processes that municipalities complete (Boorsma, 2006). This distance might be even superior if we compare current risk management activities of municipalities with the best practices found in the literature and standards (Boorsma and Haisma, 2005). The objective of evaluating the presented risk management approach of Dutch municipalities in a systematic way to determine specific goals for improvement, could be a relevant one. Existing risk maturity models (RMM) have followed in general terms the principles of Crosby (1979) and Humphrey (1989) that we discussed in the earlier section, defining standard levels of maturity and outlining the activities necessary to move to the next level of risk maturity. The concept of maturity applied to risk management should also suggest the notion of development from an initial stage of risk management to a more advanced position (Chiesa, Coughlan and Voss, 1996; Dooley, Subra and Anderson, 2001; Paulk et al., 1993).

The simplest risk maturity model found in the literature is the "risk exposure calculator" presented by Simons (2008). This model claims to assess the internal risk process within an organization, following defined zones: safety zone, cautious zone and dangerous zone (Shah, Siadat and Vernadat, 2009). However, the primary framework that applied the method of maturity to risk management was proposed by Hillson (1997). Hillson's (1997) model has four maturity levels (naive, novice, normalized, natural), which are measured in terms of four attributes (culture, process, experience and application) (Ren and Yeo, 2004). We have also found a risk maturity model constructed by the Risk Management Research and Development Program Collaboration (RMRP) which was originated from the model proposed by Hillson (1997). This framework is widely recognized among the risk management project sector. The RMRP (2002) has also four levels of maturity: ad hoc, initial, repeatable and managed (see table 5.1).

We could find, as well, several risk maturity models developed by different sectors and disciplines that all followed the contributions of Hillson (1997). That is the case of the business excellence models from the European Foundation for Quality Management (EFQM) (in Nabitz et al., 2000), and the Risk Management Specific Interest Group, PMI (RiskSIG), (Hitachi, 2007).

We should also mention a model developed by the Project Management Solutions, the project management maturity model (PMMM) which is intended for diagnosing the maturity of the project management processes of organizations. According to

Ongel (2009), the emphasis of this model on the process or cycle of risk management constitutes the main difference from other models. As discussed by Crawford (2002 in Ongel, 2009), this model defines five levels of maturity: level 1: initial process; level 2: structured process and standards; level 3: organizational standards and institutionalized process; level 4: managed process and level 5: optimizing process (see table 5.2 for a schematic description of this model).

A specific risk maturity model for public entities found is the one developed by the public risk management association ALARM, the Alarm National Performance Model for Risk Management in the Public Services (ALARM, 2009). ALARM's model defines five levels of maturity as the CMM (2006) and Hillson (1997) do: the engaging (level 1), happening (level 2), working (level 3), embedded and working (level 4) and driving (level 5). This model focuses on 'attributes' and 'enablers' for measuring the maturity of risk processes in public organizations. The 'enablers' consider leadership, management, strategy and policy, people, partnership, shared risks and resources and processes and tools as the main variables to measure. It also considers the variable 'results' which includes risk handling and outcomes and delivery as key process of the model. The ALARM's method has as a reference the EFQM Excellence Model, following its assessment framework for mapping risk management maturity.

### *5.3.1. Limitations of existing risk management maturity models*

Most of the methods mentioned in the previous section could be sufficient for establishing a broad course for organizations willing to introduce themselves to the discipline of risk management. They have been successful in adapting maturity models from the original perspective of software developing, towards risk management practices for each sector and industry where they have been applied. Nevertheless, some specific criticisms may be considered.

We state that current risk maturity models do not meet the requirements and specifications of local public entities. As discussed by MacGillivray (2007), most of the models claim to assist organizations in implementing a formal approach to risk management or to improve their existing approach. Most of the time these models would be intended as diagnostic tools instead of prescriptive instruments for implementation (MacGillivray, 2007). These frameworks (except for ALARM's) would often be representative of the large project and IT-oriented firms. Finally, we could mention that in our view the frameworks reviewed do not follow the risk management cycle in their framework. The latter, in our opinion, is a major difficulty since as we have previously shown in this research, the literature prescribes that risk management should be implemented in this structured and scientific process that includes a sequence of logical steps (risk objectives, risk identification, risk analysis, decision or control and implementing and reviewing).

Although we can find some efforts in the literature considering the improvement of risk maturity models, there is a lack of risk maturity research specifically carried out for public organizations. MacGillivray (2007), for example, developed a prescriptive risk maturity model for assessing the level of implementation of risk management practices within water utility entities in the UK and applied it to this sector via case

study and benchmarking survey. Ibbs and Kwak (2000) determined the financial and organizational impacts of project management through the development of a project management maturity model, assessing the maturity of project management processes. Yeo and Ren (2008) conceptualized and developed a multilevel framework, specifically for complex product systems (CoPS) projects. Andersen and Jessen (2003) also developed a study on project maturity, investigating the level of maturity in those types of organizations. Mayer and Fagundes (2009) proposed a model for the assessment of the maturity level of the risk management process in the area of information security. Finally, Strutt, Sharp, Terry and Miles (2006) designed a safety CMM, outlining the key processes considered necessary to safety achievement, discussing how such a model could integrate regulatory mechanisms and risk-based decision-making.

As we have stated, risk maturity models were conceived—following the contribution of Hillson (1997)—for the discipline of project management, focusing their effort to facilitate the implementation of risk management processes within organizations in that sector. As we have seen, RMM offer frameworks allowing organizations to benchmark their approach to risk management against “standard” levels of maturity, and outline the activities necessary to move to the next level. However, the practices in current RMM are mainly concentrated on a sector’s perspective rather than a risk management approach. The latter criticism refers to the issue that these models consider standardized practices describing the fundamentals process of a particular industry rather than standards practices of the risk management discipline (e.g., CMM considered in its maturity framework mainly software process and practices; RMRP and Hillson’s model are based on project management process). Consequently this would establish additional difficulties for applying existing maturity frameworks to other types of organizations or sectors. We propose that this is an important cause of deficiency. One of our main contributions might be to develop a balance between universal applicability of the integrated perspective of risk management practices and specific suitability to the characteristics of municipalities, which previous researches did not accomplish (Maier, Eckert and Clarkson, 2006). In table 5.3, we develop a critical comparison of the risk management maturity model studied in this thesis.

In addition we have observed that current risk maturity models are more concerned on adapting the principles of the Capability Maturity Model (CMM) by the SEI (2009), than being consistent with the principles of the risk management discipline (see again table 5.3), not considering explicitly in their frameworks the risk management process or cycle. Consequently, we state that the inclusion of risk management cycle is essential, as it might constitute the backbone (Ongel, 2009) of the discipline of risk management. As stated by the literature, in order to effectively implement risk management in an entity, the organization should follow a logical; process that should be continually repeated throughout the organization (ISO, 3100, 2004; UK Standard, 2002; COSO, 2004; Vaughan, 1997; Culp, 2001). Therefore it is surprising that although the risk management cycle would be considered as playing an essential role in the implementation of risk management, it was not present in the construction of most of the models reviewed (with the exception of the PMMM).

As suggested previously in the review of maturity models in general, we also observe a lack of theoretical and empirical support for the construction of RMMs that are only based on the experience of experts and practitioners. Especially recognizable is the nonexistence of a theoretical fundament that could explain the reasoning behind this sequence of steps that an organization would have to follow. It would necessitate becoming aware of a new practice and learning about risk management through the guiding of this special framework until achieving a master performance. Consequently, we claim that this is another relevant limitation of the RMMs studied. It is a difficulty we will also have to consider in the attempt to develop a special RMM for the Dutch municipal sector.

Wendler (2012), who made a systematic summary of maturity model research, confirms the latter appreciation. As considered by this author, theoretical reflections of the maturity concept are mostly missing in current research in the field. Wendler also developed a scheme for structuring and analyzing articles and research on maturity models. According to this scheme there would be seven classifications of maturity models research according to the content of those articles: (1) *concept construction* (maturity model is developed or constructed conceptually); (2) *description* (maturity models are described for presentation purpose); (3) *mapping or comparison* (existent maturity models are compared and mapped) (4) *assessment* (organizations or industries are assessed by a particular maturity model); (5) *transfer* (existing maturity models are applied to another domain); (6) *empirical study* (where an empirical study is conducted to develop, apply or validate maturity models via assessment or other purposes); (7) *theoretical reflection* (where theoretical implications of maturity models are discussed). As a result of his research, Wendler (2012) argues that most of the available research on maturity models shows a conceptual research, however they do not conduct any empirical validation of their structure and applicability.

In our study, we did concentrate our effort on the *construction* of a pertinent risk maturity model, a process that must include the essentials of the CMM, the risk management practices mentioned in the literature and standards, and also consider the industry requirements of risk management for Dutch municipalities. This *conceptual* RMM should also integrate in its structure, the risk management cycle as being the systematic *description* of the discipline. Therefore, although our attempt to develop a RMM will be derived by the abstraction from existing RMMs and research on the subject, it should not be a *transfer* of these models, but rather a novel adaptation of risk maturity modeling to Dutch municipalities. We also consider that *theoretical reflection* and *empirical validation* of a proposed RMM in a sample of Dutch municipalities is essential in order to fulfill the gaps found in the literature. The latter should be accomplished by assessing the risk management practices implemented in municipalities in the Netherlands, which is the main objective of this PhD research.

Table 5.1. Risk management maturity model by the risk management research and development program collaboration (RMRP, 2002).

	Level 1 – Naïve	Level 2 – Novice	Level 3 – Normalized	Level 4 – Natural
Definition	<p>Unaware of the need for management of uncertainties (risk).</p> <p>No structured approach to dealing with uncertainty.</p> <p>Repetitive and reactive management processes.</p> <p>Little or no attempt to learn from past projects or prepare for future projects.</p>	<p>Experimenting with risk management through a small number of individuals.</p> <p>No structured approach in place.</p> <p>Aware of potential benefits of managing risk, but ineffective implementation.</p>	<p>Management of uncertainty built into all organizational processes.</p> <p>Risk management implemented on most or all projects.</p> <p>Formalized generic risk process.</p> <p>Benefits understood at all organizational levels, although not always consistently achieved.</p>	<p>Risk-aware culture with proactive approach to risk management in all aspects of the organization.</p> <p>Active use of risk information to improve organizational processes and gain competitive advantage.</p>
Culture	<p>No risk awareness.</p> <p>No upper management involvement.</p> <p>Resistant/reluctance to change.</p> <p>Tendency to continue with existing processes even in the face of project failures.</p> <p>Shoot the messenger.</p>	<p>Risk process may be viewed as additional overhead with variable benefits.</p> <p>Upper management encourages, but does not require, use of Risk Management.</p> <p>Risk management used only on selected projects.</p>	<p>Accepted policy for risk management.</p> <p>Benefits recognized and expected.</p> <p>Upper Management requires risk reporting.</p> <p>Dedicated resources for risk management.</p> <p>"Bad news" risk information is accepted.</p>	<p>Top-down commitment to risk management, with leadership by example.</p> <p>Upper management uses risk information in decision-making.</p> <p>Proactive risk management encouraged and rewarded</p> <p>Organizational philosophy accepts idea that people make mistakes.</p>
Process	<p>No formal process.</p> <p>No Risk Management Plan or documented process exists.</p> <p>None or sporadic attempts to apply Risk Management principles.</p> <p>Attempts to apply Risk Management process only when required by customer.</p>	<p>No generic formal processes, although some specific formal methods may be in use.</p> <p>Process effectiveness depends heavily on the skills of the project risk team and the availability of external support.</p> <p>All risk personnel located under project</p>	<p>Generic processes applied to most projects.</p> <p>Formal processes incorporated into quality system.</p> <p>Active allocation and management of risk budgets at all levels.</p> <p>Limited need for external support.</p> <p>Risk metrics collected.</p> <p>Key suppliers participate in Risk Management process.</p> <p>Informal communication channel to organization management.</p>	<p>Risk-based organizational processes.</p> <p>Risk Management culture permeating the entire organization.</p> <p>Regular evaluation and refining of process.</p> <p>Routine risk metrics used with consistent feedback for improvement.</p> <p>Key suppliers and customers participate in the Risk Management process.</p> <p>Direct formal communication channel to organization management.</p>
Experience	<p>No understanding of risk principles or language.</p> <p>No understanding or experience in accomplishing risk procedures.</p>	<p>Limited to individuals who may have had little or no formal training.</p>	<p>In-house core of expertise, formally trained in basic risk management skills.</p> <p>Development and use of specific processes and tools.</p>	<p>All staff risk aware and capable of using basic risk skills.</p> <p>Learning from experience as part of the process.</p> <p>Regular training for personnel to enhance skills.</p>
Application	<p>No structured application.</p> <p>No dedicated resources.</p> <p>No risk management tools in use.</p> <p>No risk analysis performed.</p>	<p>Inconsistent application of resources.</p> <p>Qualitative risk analysis methodology used exclusively</p>	<p>Routine and consistent application to all projects.</p> <p>Dedicated project resources.</p> <p>Integrated set of tools and methods.</p> <p>Both qualitative and quantitative risk analysis methodologies used.</p>	<p>Risk ideas applied to all activities.</p> <p>Risk-based reporting and decision-making.</p> <p>State-of-the-art tools and methods.</p> <p>Both qualitative and quantitative risk analysis methodologies used with great stress on having valid and reliable historical data sources.</p> <p>Dedicated organizational resources.</p>



Table 5.2. Risk management maturity model by the risk management research and development program collaboration (RMRP, 2002).

<b>Project risk management</b>		
<b>Risk identification</b>	Level 1	<ul style="list-style-type: none"> <li>- Risks are not identified as a standard activity</li> <li>- There is reaction to risks when the risk is already a current problem versus a future possibility</li> </ul>
	Level 2	<ul style="list-style-type: none"> <li>- Organization has a documented process for identifying project risks, but it is used only for large, highly visible projects</li> <li>- A conscious effort to identify total project risks</li> <li>- Input from key stakeholders is also considered in discussions</li> <li>- To help identify the risks, a scope statement, a more detailed project schedule and cost estimate are used</li> <li>- Procurement and staff management plans are also examined</li> <li>- Top-level risks are included in project plan</li> <li>- Expert judgment and known industry lessons are used</li> </ul>
	Level 3	<ul style="list-style-type: none"> <li>- A documented, repeatable process exists</li> <li>- Documentation exists on all processes and standards</li> <li>- Expanded with checklists, automated forms, etc.</li> <li>- Risk triggers are also identified</li> <li>- Interrelationships among related projects are also considered</li> <li>- Input from past, similar projects, lessons learned, key stakeholders are all consolidated and integrated</li> </ul>
	Level 4	<ul style="list-style-type: none"> <li>- Integrated with the cost management and time management processes and the project office</li> <li>- Made within individual project, within programs and between projects and programs</li> </ul>
	Level 5	<ul style="list-style-type: none"> <li>- An improvement process is in place</li> <li>- Lessons learned are being captured</li> <li>- Includes a method to identify an organizational priority for the project</li> </ul>
<b>Risk quantification</b>	Level 1	<ul style="list-style-type: none"> <li>- The impact of the identified risks on the project is speculated without any analysis, forethought, standard approach/process</li> </ul>
	Level 2	<ul style="list-style-type: none"> <li>- A more structured approach to quantifying risks</li> <li>- A standard methodology to consistently assess the risk items</li> <li>- May include low-medium-high ratings or expected monetary value of risks using simple probability and value calculations</li> <li>- Employs more objective approaches to quantify the probability and impact of the risks</li> <li>- Evaluation still on a project-by-project basis</li> <li>- Risks are prioritized based on a single factor</li> </ul>
	Level 3	<ul style="list-style-type: none"> <li>- More advanced procedures to quantify risks</li> <li>- Multiple criteria to prioritize risk items</li> <li>- The entire process is fully documented and repeatable</li> <li>- Range predictions, optimal calculations using simulation tools and decision trees, weighted average calculations</li> <li>- Risks are prioritized based on multiple factors like criticality, timing, and risk type.</li> </ul>
	Level 4	<ul style="list-style-type: none"> <li>- Integrated with cost management, time management, finance/accounting, strategic planning processes and project office</li> <li>- The risks on other projects and other parts of the organization are also considered</li> <li>- Risks are evaluated on an organizational basis</li> </ul>

		<ul style="list-style-type: none"> <li>- Performance indices can be used (to calculate the impact of risk on a project)</li> </ul>
	Level 5	<ul style="list-style-type: none"> <li>- An improvement process is in place</li> <li>- Cost and schedule impacts are adequately captured</li> <li>- Lessons learned are being captured</li> <li>- Management uses the quantified risks to make decisions regarding the project</li> </ul>
Risk response development	Level 1	<ul style="list-style-type: none"> <li>- Risks are considered as they arise</li> <li>- Determination of mitigation strategies or contingency plans for future is seldom</li> </ul>
	Level 2	<ul style="list-style-type: none"> <li>- Informal gatherings on the strategies to deal with the risk events</li> <li>- A risk management plan that documents the procedures to manage risk</li> <li>- Contingency plans for near-term risks and mitigation strategies for large projects</li> </ul>
	Level 3	<ul style="list-style-type: none"> <li>- Templates are used</li> <li>- Contingency plans and mitigation strategies are identified for each risk item</li> </ul>
	Level 4	<ul style="list-style-type: none"> <li>- Integrated with cost management, time management, finance/accounting, strategic planning processes and project office</li> </ul>
	Level 5	<ul style="list-style-type: none"> <li>- Lessons learned are being captured</li> <li>- A process for tracking the use of project reserves is in place</li> </ul>
Risk control	Level 1	<ul style="list-style-type: none"> <li>- Day-to-day problem solving if a new risk event arises</li> <li>- No RM plan or additional risk response strategies</li> </ul>
	Level 2	<ul style="list-style-type: none"> <li>- Apply their own approach to manage and control risks</li> <li>- Assign responsibility for each risk item as it occurs</li> <li>- Discussion of the risks in staff meetings</li> <li>- Risk status of large projects is tracked</li> <li>- There is a process to report risk status to key stakeholders</li> <li>- A risk log, periodic meetings</li> <li>- Tracking changes and incorporating them into the project schedule</li> </ul>
	Level 3	<ul style="list-style-type: none"> <li>- Fully developed process, project risks are actively, routinely tracked</li> <li>- Corrective actions are taken, RM plan is updated and metrics are used</li> </ul>
	Level 4	<ul style="list-style-type: none"> <li>- Integrated with organization's control systems, monitoring programs, cost and time management</li> </ul>
	Level 5	<ul style="list-style-type: none"> <li>- Risk assessments and the current risk status are utilized for management decisions</li> </ul>
Risk documentation	Level 1	<ul style="list-style-type: none"> <li>- No historical database on typical risks encountered and related experiences</li> <li>- Individuals rely upon their own past experiences and discussions with other team members</li> </ul>
	Level 2	<ul style="list-style-type: none"> <li>- Some historical information about general risk tendencies may have been collected</li> <li>- No typical and centralized method to collect historical information</li> </ul>
	Level 3	<ul style="list-style-type: none"> <li>- A historical database of information such as common risk items and risk triggers</li> </ul>
	Level 4	<ul style="list-style-type: none"> <li>- Historical database is expanded to include inter-dependency risks between projects</li> </ul>
	Level 5	<ul style="list-style-type: none"> <li>- An improvement process is in place</li> <li>- Post-project assessments</li> <li>- Lessons learned are being captured</li> </ul>

Table 5.3. Comparison of maturity models found (Adapted from RMRP, 2002 in Ongel, 2009).

Model	Maturity levels	Attributes centered in the risk management cycle	Content	Public sector or/and municipality specificity	Assessment system	Additional comments
<b>Risk Exposure Calculator</b>	3	X	Divided into three types of internal pressures-those due to growth, to culture, and to information management.	X	Assessment system developed by means of five basic questions.	Extremely simple. No formal and systematic assessment system. No theoretical or empirical support.
<b>RMMM</b>	4	X	The model is composed of brief descriptions of the levels according to the defined attributes related with project management.	X	No defined assessment System	No empirical or theoretical support. Related mainly with project risk management. As also claimed by Hillson (1997), its diagnostic elements should be enhanced and a self-assessment questionnaire is needed.
<b>CMM</b>	5	X	Composed of “maturity levels”, “key process areas”, “goals” and “practices”. Considers also ‘common features’ as attributes that indicate whether the implementation and institutionalization of a key process area is effective, repeatable, and lasting.	X	Defined and formal assessment through a self-assessment questionnaire survey.	Difficult applicability to other sectors considering its nomenclature and distinctions. No theoretical or empirical support.

<b>ALARM</b>	5	X	This model focuses on two principles for measuring the maturity of risk processes in public organizations, 'enablers' (that consider leadership and management, strategy and policy, people, partnership, shared risks and resources and processes and tools) and 'results' (that includes risk handling and assurance and outcomes and delivery)	√	Defined and formal assessment using the EFQM Excellence Model as a self-assessment questionnaire.	No theoretical or empirical support. Does not apply the principles of Capability Maturity Model (CMM)
<b>PMMM</b>	5	√	The model focuses on the RM processes of the project. Therefore, its effectiveness is restricted with the process attribute, when the aim is to measure the RM maturity of an organization. Being effective only on a specific part, the model provides detailed characteristics of the processes at each maturity level.	X	Assessments are carried out via benchmarking against brief descriptions of practices.	This model does not provide a systematic assessment approach. In a similar vein, it is solely composed of descriptions for each attribute at each maturity level, which does not provide sufficient usability as a diagnostic tool

#### **5.4. Conclusions for this chapter**

Important benefits may be obtained from the construction and application of an improved and pertinent RMM for Dutch municipalities. To begin with, it might become a motivational driver for the management of an organization considering the improvement of its maturity level by assessing what separates it from higher or lower performance of risk management (Strutt et al., 2006). Considered by several scholars as another practical benefit of RMM (Paulk et al., 1993, SEI, 2009; Sharp, Strutt, Busby and Terry, 2002; Strutt et al., 2006; Sarshar et al., 2000 and MacGillivray, 2006a, 2006b), is the possibility of utilizing benchmark practices and scores within the same industry or sector. Besides these possible benefits and contributions, in our specific case, the application of an improved and pertinent RMM for Dutch municipalities should permit us to measure the level of implementation of risk management systems by these entities, as well as an opportunity for a critical analysis of their risk public policy prescribed. The latter is relevant, while the “resilience paragraph” is innovative in the context of the public sector as a potential mitigator of major financial catastrophes, there might still be some room for improvement.

Finally, the objective of this chapter was to gain insight of maturity models and RMM in general. Therefore, the efforts of this part of the study were intended to critically discuss the RMM and identify the gaps that we will need to fill in order to adapt this type of methodology for risk management practices implemented by Dutch municipalities. Consequently, we principally state that current RMMs have a lack of theoretical foundation, are not applicable for local governments since they were designed for the implementation of software development companies and project organizations, and also do not follow the risk management cycle in order to structure the risk management practices prescribed. Our next step will be to respond to the difficulties discovered, by clearly identifying the theoretical reasoning behind RMM and constructing a specialized model suitable for the characteristics of municipalities in the Netherlands, as well as being consistent with the integrated approach of risk management.

## **CHAPTER 6: Change in organizations, a process view perspective**

### **6.1. Introduction**

As we showed in the previous chapter, risk maturity models (RMMs) suggest that organizations could progress in the implementation of risk management practices through stages sequentially followed. This assumes a process of development, wherein the entity experiences a transformation from an immature application of a discipline to an optimal application in the organization. Consequently, with the objective of constructing a theoretical base for existing risk maturity models, we have searched for theories that could support these principles. The assumptions of maturity models are traced to the theories on organizational change, which consider different perspectives for explaining how organizations modify their structures, practices, values and knowledge. Organizational change concepts assume organizations as institutions that have a history, culture, a set of values, traditions, habits, routines and interests (Jaffe, 2001). With this perspective, organizational changes occur when an organization decouples itself from the institutional context and reformulates its internal interpretive scheme (Paauwe, 1998) revising its responses, rules and structures (Meyer and Rowan, 1977). Considered by De Schryver (2009), the two well-known and classical perspectives of change are the content and the process perspectives. As suggested by Rajagopalan and Spreitzer (1996), researchers in the first school have focused on the antecedents and consequences of change (e.g., Gibbs, 1993; Ginsberg and Buchholtz, 1990; Oster, 1982 in by Rajagopalan and Spreitzer, 1996). Alternatively, studies on the process school have focused on how entities react to organizational change, explaining and describing the process of changing and examining the sequence of events as change unfolds in the organization (Van de Ven and Poole, 2005).

We will focus our analysis on the process perspective of the theory of change, especially the approach that suggests the use of a stage model for the description and explanation of change within organizations. Consequently, this chapter will answer research question number 5, searching and studying theoretical elements that we consider could give sufficient reasoning to existing RMMs.

## 6.2. Motors of organizational change

First of all, we will use the framework proposed by Van de Ven and Poole (1995) as a device that will help us with the theoretical classification of the process of change, an approach that might guide us further in the task of identifying the theoretical assumptions of RMMs. These scholars have defined four motors that would explain change and that would operate at different organizational levels: *life cycle*, *teleology*, *dialectics* and *evolutions*. This illustrates a process that unfolds these changes as well as propose a description of organizational change. From that perspective, we can identify concepts borrowed from other disciplines such as stages of growth, processes of decay and death, population ecology and development. The authors state that all specific theories of organizational change can be built from one or more of these four basic types of change mentioned (life cycle, teleology, dialectics and evolutions) serving as theoretical bases that could facilitate the integration of related explanations (Van de Ven and Poole, 1995).

Stated by Van de Ven and Poole (1995), the *life cycle* motor would be a heuristic device that management has used in order to explain the development of organizations from an initial phase to their termination. It is common to distinguish this metaphor in the literature when referring to products, ventures or organizations. The life cycle approach aligns partially with the logic of risk maturity and maturity models in general, considering that this approach explains changes as progressions to a final state, transformations that would be prefigured and would require a specific sequence of events (Van de Ven and Poole, 1995). The *teleological* approach, identified by Van de Ven and Poole (1995), suggests that the persistence of goals is another motor that guides change in an entity. From this perspective, the development or progression of an organization would proceed towards a specific goal. According to the authors that follow this approach (March and Simon, 1958; Etzioni, 1963; March and Olsen, 1976 in Van de Ven and Poole, 1995), development in organizations takes part in a repetitive sequence of formulation, implementation, evaluation and modification of goals based on what was previously learned by the organization. This idea is also consistent with the strategic management perspective, which has been integrated into the discipline of risk management. As stated by Van de Ven and Poole (1995), in this approach however we would not find a prefigured rule or a logically necessary direction or even a set of sequences that an entity should follow in order to progress. This notion of change then would differ from the logic assumed by maturity models.

Under the *dialectical* heuristic for explaining organizational change, organizations are conceived as entities where colliding forces and values compete with each other for prevalence. From this perspective, change would occur when these opposing values or forces gain sufficient power to confront the status quo. So in a dialectic point of view, the power of an antithesis may mobilize an entity to a sufficient degree to challenge the current thesis and then produce a “synthesis” (Van de Ven and Poole, 1995). This dialectic process where a new thesis is constructed may suggest a sequential transformation of current paradigms, values and practices within the organizations. This might be consistent with the logic of maturity models, since it suggests that the

organization, in order to progress to a next level of risk maturity, should implement a more sophisticated and novel “thesis”.

Finally, the *evolutionary* perspective of change discussed considers change in organizations as being cumulative. In the same manner that change is explained in biological evolution, change in organizations according to this perspective progress through a continuous cycle of variation, selection and retention. The definition and description of an evolutionary process, where previous forms and practices are maintained by the means of retention (Weick, 1979 in Van de Ven and Poole, 1995), might also be coherent with the normative characteristic of maturity models. This assumes that cumulative changes are prescribed through the implementation of specific practices, thus retaining the knowledge and practices acquired in the previous level of maturity. From the perspective of maturity models, entities do not evolve randomly to the mastery of risk management, as changes in demographic or actuarial probabilities occurred; on the contrary, maturity models may be a method that suggest a deterministic path for the organizations to reach a more mature state. The dichotomist view of birth and death that the evolutionary perspective proposes would not align necessarily with the logic of maturity models, which aims to reach the optimal implementation of a specific discipline and not its decadency.

Although the authors of this framework for the classifications of theories of organizational change present the different motors in dimensions that might be mutually exclusive<sup>27</sup>, they also recognize potential combinations of the different approaches and even the possibility of developing an eclectic mechanism that could explain in a more complete way the theories of organizational change. We hold on to this last statement of Van de Ven and Poole (1995) to suggest that maturity models might be classified under the different motors of change reviewed in this section. The latter, in our case, is conceptually comprehensible since we argue that RMMs is a method to diagnosis and guide the implementation of risk management that assumes change in organizations is occurring through a process that could be partially *life cycling*, *teleological*, *dialectical*, and *evolutionary*. In table 6.1, we present a table that tries to summarize the characteristics of the basic types of process theories of change discussed.

We will focus now exclusively on stage models for explaining organizational change, with the confidence that this approach will give complementary elements for the development of the theoretical foundation for RMMs.

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<sup>27</sup> As claimed by Van de Ven and Poole (1995), these motors of change might be integrated considering the unit of change (different organizational levels, individual, group, etc.) and also the mode of change (whether the sequence of change events is prescribed a priori by deterministic laws or constructed).



Table 6.1. Specific characteristics of the four basic types of process theories that are present in maturity models (based on Van de Ven and Poole, 1995).

<b>Life Cycle</b>	<b>Evolution</b>	<b>Dialectic</b>	<b>Teleology</b>
- Changes as progressions to a final state occur	- Progression through a cycle of variation, selection and retention.	-Colliding forces and values compete with each other for prevalence	-The development would proceed toward a goal
-Organic growth	-Cumulative changes	-New thesis is constructed.	-Repetitive sequence of formulation, implementation, evaluation and modification of goals.

### 6.3. Stage models in the grounds of maturity frameworks

Damsgaard and Scheepers (2000) highlight the *evolutionary* perspective of change models by stating that stage models emphasize the direction of change (typically as a succession of stages in which each stage is a precursor for the next one) through which an entity increases its complexity or perfection over time, ultimately reaching an end state. From that perspective, stage models view the progressive stages as a necessary optimization of an entity's structures for survival. Thus, each new stage represent a set of features that are superior to the old features (Damsgaard and Scheepers, 2000). Researchers more interested in explaining how organizations grow (e.g., Phelps, Adams and Bessant, 2007; Kazanjian and Drazin, 1989; and Mintzberg, 1984) focus more on the *life cycle* perspective of stage models. The life cycle approach applied to stage models suggests that just like living creatures, organizations have life cycles, therefore they develop by following a necessary sequential and predetermined pattern of change and transformation (Lippitt and Schmidt, 1967 in Phelps, Adams and Bessant, 2007). Consequently, we state that maturity models in general and RMMs, in particular, might belong theoretically to what is known in the literature of organizational change as stage models.

Stubbart and Smalley (1999) claim that there are five principal assumptions behind stage models. First of all, stage models represent a *programmed process*, meaning that change within entities occur in only one direction as a consequence of a predetermined route. This assumption also considers that organizations move through this programed path to a final state of maturity by acquiring specific skills, knowledge, practices and beliefs (Huy, 2001). The second assumption has to do with the idea of stage models as devices that *specify transformational change*. This suggests that in order to work, stage models must be predictable but consider abrupt transformation between stages (Amis, Slack and Hinings, 2004). This radical transformation from previous stages, involves a significant alteration of many organizational elements such

as formal structures and work systems (Huy, 2001). In addition, stage models require a one-way movement along a designated linear path. This unidirectional pattern of movement is consistent with the “maturational” logic borrowed from biology. A logic of *progression* is also implicit in stage models (Stubbart and Smalley, 1999). In this perspective, *progress* is assimilated to the development to a higher and optimal state (blossoming or growing up), a situation that is acquired through the completion of stages. Probably the most controversial postulation of stage models is that these models are assumed to have the virtue of minimizing the effects of context and history. This is demonstrated by the fact that stage models take historical and environmental factors as having been fixed, in the same manner as physical growth proceeds largely independent from the person’s social and physical environment. As a consequence, the entities are viewed as largely isolated from environmental contingencies (Stubbart and Smalley, 1999).

As reported in the literature of stage models, this last assumption constitutes one of its main limitations. This criticism is developed mainly from a historical and institutional point of view applied to organizational change, which sustains that historic and contextual facts are essential elements for explaining any case of change-process description (e.g., Stubbart and Smalley, 1999; Barley and Tolbert, 1995 in Feldman, 2000). The maturational reasoning behind stage models, where no environmental forces would influence the organizational transformation, neglects the historical and environmental consideration.

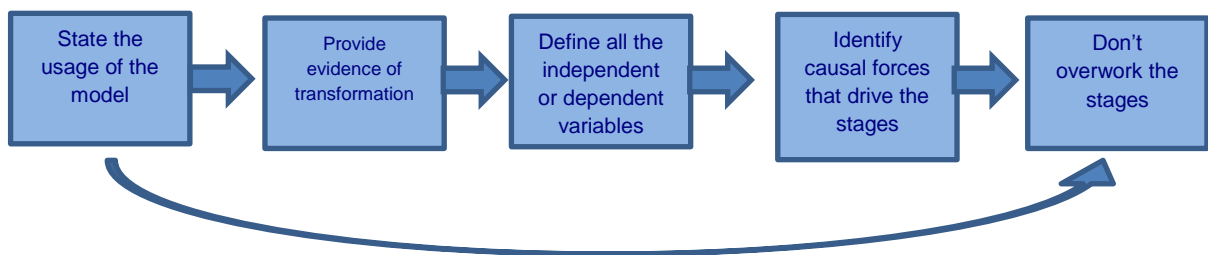
Stubbart and Smalley (1999) also offer a framework for the evaluation and construction of stage models. They first suggest that a stage model should mention the specific usage of stages in a particular research. According to the authors there would be three main varieties of stage models: metaphorical, descriptive and causal. Under the metaphorical perspective, stage models would be used mainly as devices to communicate or illustrate theory or concepts. The stages designed in such models could not be considered as variables, concepts or constructs, but more as provisional terms for a deductive construct. On the other hand, the descriptive usage of stage models according to these scholars, represents aggregate events, features, characteristics or behaviors that are correlated. Stage models considering this approach are emergent patterns, or composite independent variables that are based in empirical evidence. Finally, casual stage models develop stages as independent variables and connect those stages with causal significance. In that sense, causal stage models do not focus strictly on the detection of patterns of activity or behavior, but identify the existence of a specific sequence of stages that explain and govern the formation, growth, transformation or maturity of those stages (Stubbart and Smalley, 1999).

For the evaluation of stage models, Stubbart and Smalley (1999) suggest that a stage model should provide “evidence of the abrupt transformations” that it suggests. This means that such a model should distinguish between the transition from one stage to the next in a discontinuous and abrupt manner. Additional these authors mention the necessity to “fully define all independent or dependent variables” involved in the stages. This indicates that when constructing a stage model, the researcher should separate identification and

measurement of dependent and independent variables that would be used as explanatory factors of the different stages. Moreover for the evaluation of the stage model the authors suggest that the researcher should identify the “causal forces driving the stages”; it would only be applicable for causal stage models that define and measure the variables that produce the stage pattern. Finally, these authors propose that when constructing a stage model, researchers should not “overwork” the stages. This refers partly to the extension of the stage model, but more specifically to the idea that authors should not pass metaphorical or theoretical ideas as findings or even causal factors. This is also related to the first suggestion that prescribes a clear definition of the usage of stage models. An illustration of this framework for the evaluation of stage models is presented in figure 6.1.

Despite the underlying weakness of stage models mentioned previously (the fact that stage models take historical and environmental factors as being fixed), we argue that they are pertinent instruments that can be used in the conceptual discussion of maturational change within organizations (Stubbart and Smalley, 1999; Phelps, Adams and Bessant, 2007). Following Phelps, Adams and Bessant (2007) and Rajagopalan and Spreitzer (1996), we claim that by incorporating theories of organizational learning into maturity models, we might be able to solve, at least partially, the commented limitation. In this perspective, learning would be reflected in tangible and incremental actions (Argyris and Schön, 1978) that shape, and are shaped by, the environment (Rajagopalan and Spreitzer, 1996).

Figure 6.1. Criteria to guide evaluation of stage models (own elaboration, based on Stubbart and Smalley, 1999)



#### **6.4. An organizational learning perspective of change, single and double loop**

Taking into account the different interpretations of organizational learning, there does not exist at the moment a successful consensus on the concepts and terminology of the discipline (Visser, 2007). We will need to be very clear as to what specific line of the theory we will follow.

As mentioned by Easterby-Smith, Crossan and Nicolini (2000), one of the principal debates concerning organizational learning refers to the idea of whether organizational learning is simply the sum of what individuals learn, or whether there is something more to it. The debate is situated as to whether it is meaningful to think of organizations as having objectives, learning abilities, and memories, or if organizations only learn through their current, individual members. We rely on the second approach, considering learning in organizations as individual learning taking place, yet in a social context (Holmqvist, 2003).

Consequently, we concentrate on the way individuals learn within organizations by setting structures, mental maps, values, practices, routines and frameworks (e.g., Senge, 1990; Dixon, 1994 and Argyris and Schön, 1978 in Van der Bent, Paauwe and Williams, 1999). Following this approach, organizations are not only influenced by individual learning processes, but organizations influence the learning of individual members and conserve what has been learned (Romme and Dillen, 1997). Although this perspective recognizes the individual as the only entity capable of learning, he must be seen as being part of a larger learning arrangement in which individual knowledge is exchanged and transformed (Romme and Dillen, 1997). As discussed by Argyris (1991), organizations learn through individuals acting as agents for them. The individuals' learning activities are facilitated or inhibited by ecological or contextual factors that may be called an organizational learning system (Argyris, 1991).

We used the seminal work of Argyris and Schön (1978) to stress the cognitive aspects of learning new frames of reference in an evolutionary manner (Huber, 1991). In this perspective, one of the most important distinctions of the theory is the difference between "espoused theory" and "theory-in-use" (Argyris and Schön, 1978). As mentioned by the authors, espoused theory is the theory of action, meaning the theory that an individual, upon request, communicates to others. However, the theory that actually governs the actions of an individual is the theory-in-use. As clearly stated by Argyris (1978), people in organizations design and guide their behavior by the use of theories of action that they hold in their heads. Espoused theories of action, therefore, would be theories that individuals declare or report as governing their actions (Argyris, 1982).

As discussed by Dalrympe (2006), private images of the same organization might diverge from one another. When the organization is large and complex, most members are unable to use face to face contact in order to compare and adjust their different images of organizational theory-in-use. They might then require external reference, public representations of the organizational theory-

in-use to which they can refer. In the view of Argyris and Schön (1998), this is the function of “organizational maps”, instruments that constitute shared descriptions of the organization by individuals. These organizational maps might include: diagrams of work flow, routines, practices, statements of procedure, and also considering our case risk management policies or programs. They would then describe actual patterns of performance, as well as guides for future actions. These maps or guidelines would be the media of organizational learning (Strutt, Sharp, Terry and Miles, 2006).

As stated by Argyris and Schön (1978), members of the organization respond to changes in the internal and external environments of the organization by detecting errors and problems, which they correct in order to maintain the central features of organizational theory-in-use. Therefore, the organization’s ability to remain stable in a changing context might denote a basic learning. Following Bateson (1971), Argyris and Schön (1998) state then that there is a *single feed-back loop* which connects detected outcomes of action to organizational strategies and assumptions that are modified so as to keep organizational performance within the range set by organizational norms. As mentioned by Levitt and March (1998 in Van der Bent, Paauwe and Williams, 1999), routines and responsibilities defined in an organization (theories-in-use) will facilitate learning more than those where responsibility is vague.

An example of the *single loop* can be illustrated in the case of the risk management policy for municipalities in the Netherlands mentioned in the previous chapter. Applying the taxonomy of the “resilience paragraph” described in the bylaw, the municipality might identify a new “regular risk” that affects it and that has not yet been treated. According to the regulation, the municipality might decide to transfer this type of risk to a third party (insurance), approaching the problem according to the theory-in-use of risk management in the municipality, which recommends that only unfunded risk should be included in the policy. As expected, the municipality—or its members—do not question the norm, they just apply the regulation of risk management for Dutch municipalities and act accordingly. Even though this approach might be sufficient to comply with the resilience paragraph in the case of Dutch municipalities, it would not follow the integrated perspective of risk management, which considers a full-scale analysis of the present risk in order to detect the optimal risk management treatment for that municipality.

Consequently, *single-loop* learning may be sufficient where error correction can proceed within a constant framework of norms for performance. It is concerned primarily with effectiveness, meaning how to best achieve existing goals and objectives and how best to keep organizational performance within the range specified by existing norms. However as mentioned by Burke (1987), in some cases error correction requires an organizational learning cycle in which organizational norms themselves are modified. As discussed by Hong (1999), the single-loop approach where organizations learn from their own experiences, adjusting their actions to existing norms and frameworks, would be beneficial for the organization in short-run, configuring a problem of “myopia of learning” in the long-term (Levinthal and March, 1993 in Hong 1999). This phenomenon will

occur because organizations will be less willing to engage in novel actions to explore new techniques due to past relatively successful stories or from neglecting of the distant future (Hong, 1999). Insights might be necessary, in order to improve existing skills and routines, changing, therefore, the central norms and underlying assumptions (Argyris and Schön, 1978, 1996 in Hong, 1999).

As a result, the concept of *double-loop* learning is a response to the latter situation, where an inquiry is performed in order to redefine the organizational norms, and restructure the strategies and assumptions associated with those norms (Burke, 1987). Hence, coming back to our example of the resilience paragraph for municipalities in the Netherlands, this should imply that members of the organization explore and adopt new approaches for managing risks that go beyond what the resilience paragraph prescribes (as the theory in use). By questioning this narrow perspective of risk management and considering it just as a basic foundation stone for more sophisticated and integrated practices of the discipline, municipalities might encounter an opportunity for double-loop organizational learning. (See table 6.2 for an overview of the main characteristics of organizational learning).

We argue that this approach of organizational learning, and especially the perspective of Argyris and Schön (1978), makes a strong case for explaining the acquiring of knowledge and the process of learning through incremental stages as RMMs suggest. As other researchers have also considered (Strutt, Sharp, Terry and Miles, 2006 and MacGillivray, 2006), we also claim that this approach, particularly the concepts of single- and double-loop learning (Argyris and Schön, 1978), could assist us in responding to one of the main difficulties of RMMs discovered in the literature, which is the lack of theoretical explanations, particularly, the reasoning behind the transition between one level of maturity to another.

By studying and evaluating the theoretical assumptions that are implicitly proposed in this approach of organizational learning, we could recognize and make several links with other aspects of the theory of organizational change. For example, as claimed by Romme and Dillen (1997), single-loop learning would be the result of replication of routines that facilitate decision-making by means of specific rules, while double-loop learning might involve changes in the fundamental norms underlying actions and behaviors. Consequently, as discussed by Easterby-Smith, Crossan and Nicolini (2000), researchers have tended to use single- and double-loop learning as a shorthand expression to describe what they see as more routine learning, versus more radical learning.

This perspective of organizational learning conceives organizational change not as linear but as evolutionary process where the entity learns first from its experience (single loop) and then, as commented before, higher learning (double loop) would occur through significant breaks from past strategies, completing a radical change approach (Lant, Milliken, and Batra, 1992; Tushman, Virany, and Romanelli, 1985 in Rajagopalan and Spreitzer, 1996). These major modifications could be identified in the theory of learning of Argyris

and Schön (1978) by the transformation from single to double loop, where the entity shifts from an “archetypal”<sup>28</sup> configuration (Amis, Slack and Hinings, 2004) to a novel theory-in-use (Argyris and Schön, 1978).

Considering the four motors of organizational change of Van de Ven and Poole (1995), we could also claim that the approach of Argyris and Schön (1978) is not only evolutionary but also dialectical. We made this statement observing the Hegelian assumption (Van de Ven and Poole, 1995) of the double loop, considering that current values and beliefs (theory-in-use) have to be questioned and modified in order to develop a new thesis (novel responses, practices, beliefs, routines, etc.). This perspective of organizational learning might be classified also as teleological, since it is based in a “constructive mode of development”, in which the process is emergent as new goals are enacted in the organization (Van de Ven and Poole, 1995 in Feldman, 2000).

As commented before, it is also clear that under this approach of organizational learning, changes in the organization are assumed to take place through the transformation of routines, which is considered to be part of how organizations performed (Cyert and March, 1963; March and Simon, 1958 in Feldman, 2000). The relevance of routines is commented by Argyris (2009) himself, considering routines as an expression of the theory-in-use of the entity, which is manifested in what he called “actionable” knowledge. This highlights the suggestion by the author, in terms that are by the means of concrete actions expressed in practices and routines, that we could evaluate the modification of knowledge within an organization (Nonaka and Takeuchi, 1995 in Feldman, 2000).

We consider that it is also assumed in this perspective of the theory of organizational learning, a planned change process (Huy, 2001) where there is a necessity of intervention for the alteration of current practices and beliefs. This is easily identifiable in the typology of loop learning of Argyris and Schön (1978). As claimed by Huy (2001), the “theory of action” method aims to probe incongruence between espoused theories and theories-in-use, as well as map organizational structures in order to uncover vicious causal loops or erroneous “mental maps” (Senge, 1990) that are conceived as root causes for the change of behavior (e.g., the implementation of the best practices of risk management). In order to alter the theory-in-use and modify the organization’s beliefs and structures (double loop), external intervention (outside agents) might be required to help convert the tacit causes of ineffectiveness into explicit formulations, since the organization and its employees are often cognitively limited and trapped by their own assumptions (Huy, 2001). The latter assumption is also in line with what we discussed in chapter 2 of this thesis, where we identified the best practices of the wider perspective of risk management. Specifically, stressed in the mentioned literature is the necessity

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<sup>28</sup> As stated by Greenwood and Hinings (1993 in Amis, Slack and Hinings, 2004), an archetype is a set of structures and systems that reflect a single interpretive scheme, that can also be conceived of as a collection of values beliefs that are manifested through particular structural arrangement. This definition aligns perfectly with the conception of theory-in-use described by Argyris and Schön (1978).

of having “external support” for the analysis and implementation of risk management. The latter would contribute to convert the tacit causes of ineffectiveness into expected formulations, since organizations (and their members) might be trapped by their own assumption (Huy, 2001). External support in the implementation of risk management would then assist the organization in acquiring the new frame of references (theory-in-use) as a secondhand experience (Huber, 1991).

The risk management literature might be valid in prescribing a risk manager to an organization. From the organizational learning perspective on change, risk managers would attempt to understand the ambiguous environment in which an entity operates. This includes iterative actions (e.g., information gathering) and understanding the context (threats and opportunities) (Koberg, 1987; Lant and Mezias, 1992 in Rajagopalan and Spreitzer, 1997). As studied in chapter 2, strategic imperatives such as resources for the implementation of risk management and leadership, which are often discussed in the literature, and standards of risk management, are implicitly tied to change sequencing (as risk maturity assumed) because they inevitably affect the ways in which various parts of an organization will engage with the change process (Amis, Slack and Hinings, 2004). Leadership, especially, will affect the ways in which various parts of an organization engage with the process of change (Amis, Slack and Hinings, 2004), as well as actively influence the organizational theory-in-use (Argyris, 2009). Following the whole “monitoring process” established in the “implementing and reviewing” stage of risk management, we could consider a form of information acquisition where the organization would “learn from its errors” (Huber, 1991). As argued by Huber (1991), more organizational learning occurs when more of the organization’s components obtain this knowledge and recognize it as potentially useful. It is fundamental as well, to develop an “organizational memory” by which knowledge is stored in the form of procedures and routines as well as non-routine information (Huber, 1991).

Finally, we can also mention that the theory of organizational learning assumes that organizations have difficulties absorbing available knowledge (Cohen and Levinthal, 1990), thus by learning from other entities, organizations could let the available knowledge pass through them (Greve, 2005). In the case of municipalities in the Netherlands, we can mention PRIMO (Public Risk Management Organization) and the “expert circle” of the Ministry of Interior as associations that aim to develop risk management awareness and disseminate risk management best practices. The participation of municipalities in these peer organizations could be seen then as a source of “inter-organizational learning”, since according to this line of literature network ties would provide access to information and outflows of knowledge (Schulz, 2012) for organizations through the interaction with peers, promoting an adaptive change (Kraatz, 2012)



Table 6.2. Single- and double-loop learning (adapted from Fiol and Lyles, 1985 in Romme and Dillen, 1997)

<b>Single-loop learning</b>	<b>Double-loop learning</b>
- Based on repetition routine within existing structures	- Based on cognitive process and understanding routine
-Change of behavior or performance level	-Change of organizational framework
-Problem solving capacity	-Developments of new processes, routines and practices

## 6.5. Conclusions for this chapter

In this chapter we have answered research question number 5, studying the underlying theoretical structure of RMM and maturity models in general. This provided us with better explanations in terms of the logic and assumptions of RMM method, and they set a clear agenda for the development of novel RMM for municipalities in the Netherlands. As a consequence, we will draw from the theoretical elements of organizational change and organizational learning considered here in order to explain and give reasoning to our proposed risk maturity framework. We will especially take advantage of the framework elaborated by Stubbart and Smalley (1999) in order to guide the construction and give reasoning to our revised risk maturity model, considering that we state that RMMs belong to the category of stages models. In addition, we will strongly rely on the propositions of Argyris and Schön (1978) about single and double loop theories of organizational learning in order to explain the transitions between one level of risk maturity to another. This approach of organizational learning will help us respond to one of the main limitations of RMMs as stage models, which is the assumption that changes within the organization will proceed largely independent from the person's social and physical environment (Stubbart and Smalley, 1999). As discussed, this learning perspective establishes that the organization changes through a process of steps of learning designed to respond to both the environment and the organization (Rajagopalan and Spreitzer, 1996)

We do not neglect, however, the limitations of risk maturity models as theoretically belonging to stage models. We mention this considering some of the propositions of maturity models and stage models in general, such as the inexorable positive progression through stages to a point of arrival that is implicit in these normative frameworks (Phelps, Adams and Bessant, 2007). In fact, we assume that there is little positive evidence that organizational change

will occur in reality as we can observe in living organisms, as stage models consider (Stubbart and Smalley 1992 in Phelps Adams and Bessant, 2007). As stated by Amis, Slack and Hinings (2004), there appears to be a disjuncture between the normative conceptualization of change as developing in a predominantly linear manner and the evidence that suggests that radical change is instead characterized by delays and oscillations. We cannot disregard the fact that a deterministic approach, such as the one risk maturity methodology proposes, could be also be explained with alternatives theories. Therefore, as mentioned by Stubbart and Smalley (1999), system dynamics, contingency theory, historical accounts, game theory, chaos theory and complexity theory, among others, could also be consistent with the dramatic change that stage models such as risk maturity models suggest.

## **CHAPTER 7: Methods and operationalization for the construction of the revised risk maturity model**

### **7.1. Introduction**

This chapter aims to present the operationalization and methods used in our study, answering research question number 6. Our structure is that of exploratory research and is justified by taking into account the scarce research available in the field, especially regarding measurement theory for risk maturity models (Hox and De Jong-Gierveld, 1990). In our case, the principal objective of exploratory research is to identify the main factors and variables that might be relevant for the construction of a risk maturity model for Dutch municipalities. In that sense, we will explore the risk management best practices studied in chapter 2, where we discussed the risk management theory, as the variables that could serve us in developing a pertinent construct for the measurement of risk maturity in local governments in the Netherlands. Based in the revised theory of organizational learning and organizational change, we will explore a suitable theoretical reasoning for the maturity model proposed. As mentioned by Blalock (1982), in exploratory research such as this, the researcher needs to clearly consider definitions, assumptions and propositions that could form a completely deductive system. This approach requires an understanding of the phenomena to be investigated, developing the theoretical definition of the construct under examination (Schwab, 1980 in Swanson and Holton, 2005). After we develop a deductive classification or typology we will then consider an empirical application of the proposed model. Consequently, the construction of an improved risk maturity model suitable for Dutch municipalities will follow a design-oriented approach, following the suggestions of Becker, Knackstedt and Pöppelbuß (2009) and Wendler (2012).

### **7.2 Specific methods for a risk maturity construct**

As stated by Schoenfeldt (1984 in Hinkin 1998), the construction of the measuring devices is perhaps the most important segment of any empirical study. In the same line as mentioned by Hinkin (1998), the greatest difficulty in conducting research in organizations is assuring the accuracy of measurement of the construct under examination. A construct in this sense would be a representation of something that would not exist as an observable dimension of behavior. In our case we will have to develop a construct that will permit us to observe risk management practices implemented in the municipalities in the Netherlands. In order to accomplish this objective in a structured and scientific manner, we have to follow the principles of the design research science, a logical procedure for the construction and evaluation of artifacts (Wendler, 2012). As mentioned by Becker, Knackstedt and Pöppelbuß (2009, in Wendler, 2012), maturity models have to be evaluated to demonstrate their suitability and the evaluation must be conducted via rigorous research methods<sup>29</sup>. In that

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<sup>29</sup> According to Wendler (2012), the design science paradigm delivers a useful contribution to the development of maturity models. In that sense while new models are developed they form an artifact which ideally solves a relevant problem when used. The empirical application of the models might

perspective following the classification of research on maturity models made by this author we will concentrate our effort on the concept *construction* of a pertinent risk maturity model, the *description* of the proposed model, the *assessment* of risk management practices of Dutch municipalities, the *empirical* application of the model and the development of *theoretical reflections* of our model<sup>30</sup>. For the construction and evaluation of the proposed model, we will also take into account the framework suggested by Stubbart and Smalley (1999) which was studied in the previous chapter. As mentioned by these authors, stage models should provide arguments for the abrupt transformations that they suggest; make distinctions between stage or levels; mention the variables included in the different stages; identify the casual forces driving the stages and define a clear definition of the usage of stage models.

Following previous research that has used the maturity methodology for different industries and disciplines (see for example, MacGillivray et.al, 2006a, 2006b; Sarshar, 2000; Mayer and Fagundes, 2009), we will also use a survey-type design, which is recognized as the most frequently used data collection method in organizational research (Gall, Gall and Borg 2003; Schneider, Ashworth, Higgs and Carr, 1996; Smith and Dainty, 1991 in Swanson and Holton, 2005). According to Dillman (2000), the purpose of survey research is to collect information from people in an organizational setting through a relevant construct<sup>31</sup>. The election of a survey-type research is also consistent with some of the assumptions of risk maturity models, which consider practices performed by individuals within the organizations as evidence of maturity. Taking into account this methodological choice as an instrument for the collection of the data, we will have to pay serious attention to the selection of our informants or respondents within the organization, ensuring an accurate and comparable representation of organizational characteristics across our units of analysis (Enticott, Boyne and Walker, 2008). Consequently, the respondents for our survey will be senior managers or authorities of the municipality (alderman, concern controller, risk manager, senior project planner, etc.) who we assume will have extensive knowledge of the risk management practices implemented in the municipality. In that sense, although this perspective might be considered an “elite survey” (Hambrick, 1981; Cusumano and Takeishi, 1991 in Enticott Boyne and Walker, 2008), we will use a range of organizational informants

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validate the design of the model and prove the potential contributions. Research rigor might be assured by applying scientific methods during the construction of the model. Finally, publication of the research and dissemination of the results is necessary to further improve the model (Wendler, 2012).

<sup>30</sup> For more details of the classification of researches proposed by Wendler (2012) see again chapter 5, section 5.3.

<sup>31</sup> A construct is a conceptual term used to describe a phenomenon of theoretical interest that cannot be observed directly (Edwards, 2003).

instead of just one “most reliable informant” (Phillips, 1981 in Enticott, Boyne and Walker, 2008), which should provide us with more accurate information<sup>32</sup>.

Survey research contains many complexities and challenges and involves a multistep approach. Numerous frameworks and descriptions of the steps and methods in doing survey research exist in the literature, however all share similarities (Swanson and Holton, 2005). We will use and combine elements from different sources in order to design and conduct our survey research. Considering that we have chosen to perform an electronic survey because of its efficiency and effectiveness in terms of rate responses (Dunn-Rankin, Knezek, Wallace and Zhang, 2004), we will follow the tailored design method (Dillman, 2000). As mentioned by Schriesheim and Power (1993), there are two basic approaches to item development. The first is deductive, sometimes called “logical portioning”, or “classification from above”. The second method is inductive, known also as “grouping” or “classification from below” (Hunt, 1991 in Hinkin, 1995). In the case of this PhD research, we will use both methods at different stages of the research in order to develop our item generation or construction of a risk maturity scale.

Similar to other research, that has constructed risk maturity models for different industries,(MacGillivray, 2007; Mayer and Fagundes, 2009) the questionnaire survey will also use a scaling method. In particular, we will use a summated rating scale such as the Likert scale<sup>33</sup>. This technique is widely used across the social sciences to measure opinions and descriptions of individuals (Spector, 1992). The use of the term “summated” implies that multiple items could be combined or summed to have a final score. As mentioned by Spector (1992), one of the vital steps in the development of a scale is the conceptual task of defining the construct. The scale cannot be developed to measure a construct unless the nature of that construct is clearly delineated and defined.

The design of our “deductively constructed”, risk maturity model will be based on the literature of maturity models, risk maturity models and their application in different fields and sectors (especially the previous research of MacGillivray et al., 2006a, 2006b; Sarshar et al., 2000; Mayer and Fagundes, 2009, Strutt, Sharp, Terry and Miles, 2006; Shah, Siadat and Vernadat, 2009; Ren and Yeo,

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<sup>32</sup> In appendix 1, we present the distribution of respondents considering their function in the municipality, their level of education and their work experience. As we show in appendix 1 the majority of the respondents in our sample are Alderman (16%) Manager or Controller 34% and Professional staff (26%). On the other hand 60% of the respondents have a master degree. Finally 45% of the respondents have a work experience on finance, 12% on management in general and 7,3% on risk management.

<sup>33</sup> A Likert scale is a psychometric scale commonly used in questionnaires, a widely used scale in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement. The scale is named after its inventor, psychologist Rensis Likert. Likert (1932) scaling is a bipolar scaling method, measuring either positive or negative response to a statement. Sometimes a four-point scale is used; this is a forced choice method. The format of a typical five-level Likert item is: 1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree and 5. Strongly agree.

2004; Ongel, 2009 and Pazderka, 2008). Consequently, the risk management practices identified in chapter 2 will be translated into a scale, constituting the items of a pilot questionnaire survey. In addition to the use of a deductive approach for the development of the scaling instrument, we will utilize a sample of respondents to provide critical incidents to the provisory items deductively constructed. Possible difficulties in the items constructed theoretically will be solved *inductively* by asking similar respondents to provide descriptions of risk management practices. As mentioned by Hinkin (1995), combining deductive and inductive methods to generate items may then allow us to avoid as much conceptual inconsistency (content validity) as possible.

After building a pilot survey, we will conduct a pre-tested stage, which will deliver empirical inputs to further develop our scale. Our pre-tested stage will be accomplished by using Hak's Three-Step Test-Interview method (TSTI) (Hak, 2004). This method is an observational instrument for pretesting self-completion questionnaires. TSTI helps identify problems in questionnaires, which often lead to modification of the survey in a further stage and often the deleting some questions and items of the questionnaire if necessary. According to Hak, Van der Veer and Ommundsen (2005), TSTI might be particularly good at identifying difficulties that originate from a mismatch between the theory underlying the questions in a survey and the features of a respondent's actual behavior and biography. In practical terms, the TSTI consists of three steps (Hak, Van der Veer and Ommundsen, 2005):

1. Thinking aloud aimed at collecting observational data.
2. Focused interview aimed at remedying gaps in observational data.
3. Semi-structured interview aimed at eliciting experiences and opinions.

Mentioned by Hak, Van der Veer and Ommundsen (2005), TSTI is a pre-tested instrument that follows a sequence of (a) observation, (b) follow-up probing and (c) validation. These types of procedures, where problem comprehensions associated to the wording of the survey are detected by the means of thinking aloud while answering, reduce the number of respondents needed for pre-testing, rendering pre-tested more cost efficient Lyberg, Biemer, Collins, Leeuw, Dippo, Schwarz and Trewin (1997). This pre-tested method aims to discover "problems" in the items developed, including as many respondents until "saturation"<sup>34</sup> could be achieved (Hak, 2004). We expect that by using TSTI as a pilot testing instrument in the study, we could give enough consistency to our survey, avoiding, for instance, the "social desirability phenomenon"<sup>35</sup> (see for

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<sup>34</sup> Meaning the moment when we will not receive new feed-back from additional respondents. In the case of the pilot study developed by Jansen and Hak (2004) on alcohol consumption for example, "saturation" was achieved after sixteen interviews.

<sup>35</sup> According to De Vaus (2002), many people tend to answer survey questions so that they look in their own eyes and in the eyes of interviewers. As a consequence socially "desirable" behaviors (e.g., amount

example, Dillman 2000; Swanson and Holton, 2005; De Vaus, 2002) reported in the literature of survey research, as well as the “acquiescence”<sup>36</sup> problem mentioned especially in the case of Likert scales (Foddy, 1993 in De Vaus, 2002).

Finally, the model needs to be applied in a representative sample of the municipality sector in the Netherlands. This application will provide relevant data for both municipalities and practitioners, as well as for the academic community. Statistical analysis will also be used to give reliability<sup>37</sup> to our scaling design by measuring the correlation of responses in the empirical application of our proposed risk maturity model. In particular, we will calculate the classical coefficient alpha (Cronbach, 1951), a technique used for internal consistency that considers both the number of the items and their magnitude of inter-correlation. This statistical procedure is important in order to check the questionnaire stability for all the components of the scale. Once the data have been collected we will perform exploratory factor analysis in order to refine and reduce the set of variables observed to a smaller set of variables (Hinkin, 1998). The aim of statistical analysis when creating the final scale will be to examine whether we can identify smaller or more general factors that underline individual questions (De Vaus, 2002).

Although the aim of this study is to construct a new and improved risk maturity framework for municipalities, we will take full advantage of the existing models in the development of our pilot instrument, especially the previous research that used summative scales in order to construct maturity models. As a consequence, this pilot questionnaire survey will use the structure of existing questionnaires on risk maturity. We will take into account the contribution of the SEI Maturity Questionnaire (1994), project management maturity model by the Project Management Solutions and the work developed by Ongel (2009) on construction companies. As we have stated, this questionnaire and its scaling instrument should be a novel instrument especially adapted for the context of Dutch municipalities, founding its logic and reasoning in the theory of risk management, maturity models and organizational learning, a subject that will be discussed in the next section. A representation of our whole final design-oriented research model is presented in figure 7.1.

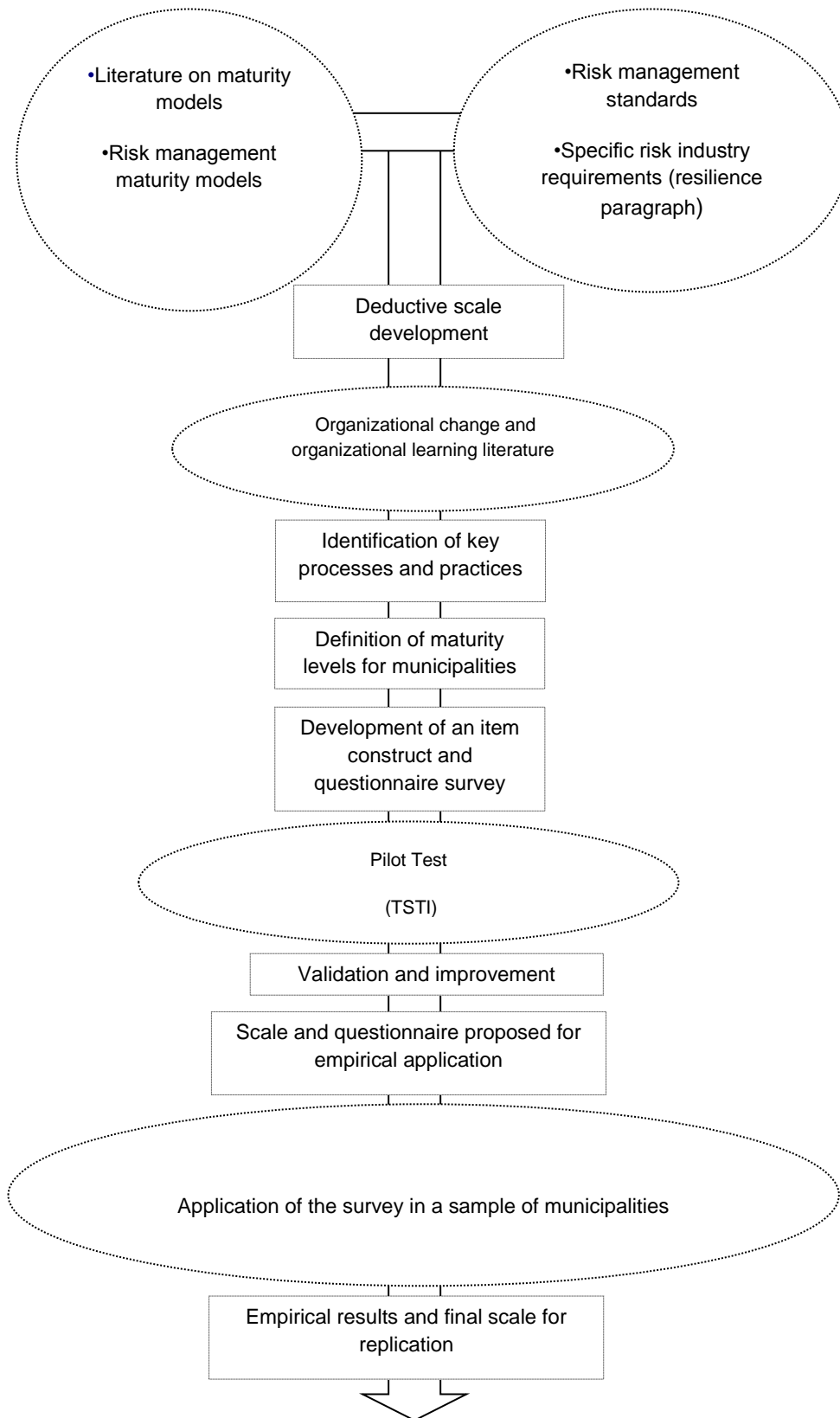
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of exercise) are over-reported while socially “undesirable” behaviors and attitudes (e.g., alcohol consumption, sexist and racist attitudes) are under-reported (Bradburn and Sudman, 1978; Sudman and Bradburn, 1982; Foddy, 1993 in De Vaus, 2002)

<sup>36</sup> The problem of “acquiescence” in survey designs is related to the tendency to agree with statements regardless of its content. As reported by De Vaus (2002) this phenomenon is present in respondents with low education or personas that don’t have a formed opinion on the subject.

<sup>37</sup> According to De Vaus (2002), Dillman (2000) and Swanson and Holton, among others, a reliable measurement is one where we obtain the same result on repeated occasions. As a consequence, if people answer a question the same way on repeated occasions then it is reliable.

Figure 7.1. Methodology for our design-oriented construction of an improved risk maturity model for municipalities (personal elaboration).



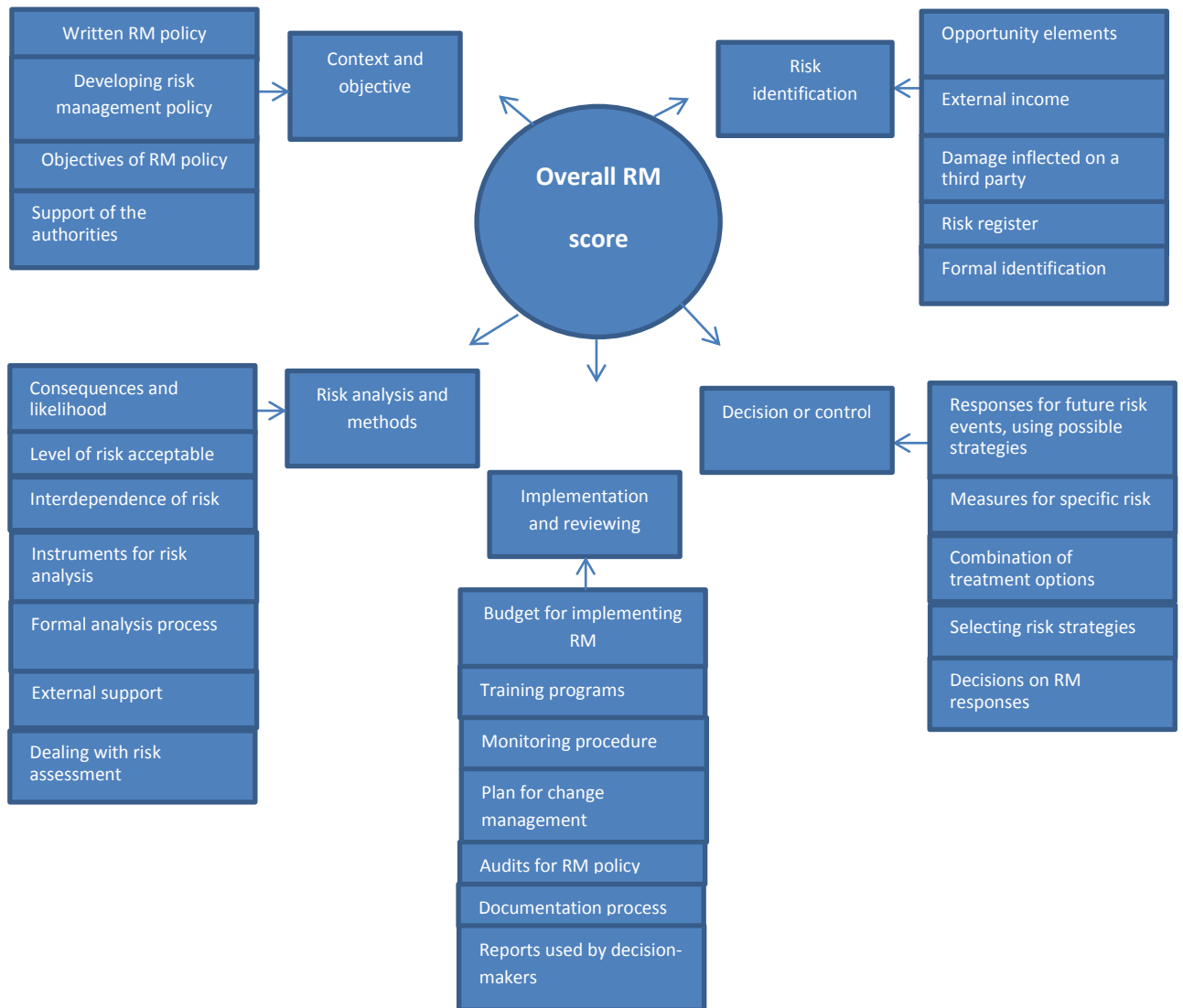


### **7.3. Inclusion of the best practices of risk management and the reasoning behind the proposed model**

Following Maier, Eckert, and Clarkson (2006), we believe that the construction of an improved risk maturity model should establish the rationale behind the selection of processes and practices that drives a risk management program. Therefore, after having studied previous research on risk maturity models that adapted this method to particular sectors, we concluded that the items that must be decided upon to construct a specialized risk maturity model for municipalities in the Netherlands, are the best practices of the discipline studied in chapter 2 of this thesis. This is not only consistent with the literature on risk maturity models and maturity models, in general, that we have evaluated in in this research (e.g., SEI, 2009; Fraser, Moultrie & Gregory, 2002; MacGillivray et al., 2006a), but it also aligns with what organizational learning theory suggests. In that sense we could say that organizational learning and, more specifically, knowledge, is organized and acquired within the organization by standards, procedures and practices that make sure that an individual organization obtains the particular “view point” of the discipline and learns to speak its language (Holmqvist, 2003). In the same way, as stated by Fraser, Moultrie and Gregory (2002), maturity models suggest that the processes are well understood within the organization as well as supported by documentation and training which should be consistently applied and continually monitored and improved by its users. As claimed by Siqueira (2005), by following this approach the entity should ensure a successive repetition of standardized processes aimed at a good result. This formalization of processes and practices—following the principles of organizational learning discussed previously—would facilitate the learning process by an organization (Argyris and Schön, 1978).

Consequently, we have used the best risk management practices identified in chapter 2 of this thesis as the main variables for the construction of our risk maturity model. We have also included some of the practices, described in chapter 4, where we discussed the specific requirements of Dutch municipalities according to its specialized regulation (the “resilience paragraph”). We have translated those best practices selected from the literature into a risk maturity scale. These variables represent risk management best practices and would be classified in the five dimensions that represent the stages of the risk management process or cycle. We believe that the inclusion of the risk management cycle in our proposed risk maturity is essential, as it is prescribed in the literature on risk management for the effective implementation of the discipline in an organization (e.g. ISO, 3100, 2004; UK Standard, 2002; . COSO, 2004; Vaughan, 1997; Culp, 2001).The variables or best practices extracted from the literature can be seen in figure 7.2 of this section. Moreover, we should state that any modification in the risk management process and practices selected in this part of our research will be further evaluated after the empirical stage of the study; methodology that will be presented later in this chapter. However, the sources of the preliminary processes and practices selected are presented at this point.

Figure 7.2. Illustration of the variables (best risk management practices) considered for measuring risk maturity in Dutch municipalities.



We have chosen a five-point scale (from 1 to 5) for the construction of the risk maturity scale that will later be translated into a pilot survey questionnaire. Each item (practices) constructed in the Likert scale has the form of a statement. In table 7.1, we present in detail how the different risk management practices included are positioned in the scale. As we can see in the same table, in the first dimension or risk management stage (risk management objective) we considered six items. The first item of this dimension “*the existence of a written risk management policy*” was included with the intention of observing the presence of this mandatory practice prescribed in the commented Dutch bylaw. This practice was not mentioned in the classification of risk management best practices established in chapter 2, however, it was explicitly considered in our chapter 4, where we discussed the characteristics and specific practices of the “risk paragraph” as an industry standard that local governments in the Netherlands need to follow. The existence of this practice will be measured in the survey with a “yes or no” question. Secondly, we include a 1 to 5 scale to observe the “*developing of a risk management policy*” thus measuring how the risk management policy was constructed (levels of roles and responsibilities as discussed in chapter 2). Further on we will also include a 1 to 5 scale to observe “*the objective of the risk management policy*” in the municipality as an essential practice discussed in the theoretical part of this thesis. These items include the possibility of not having an objective for risk management to the most sophisticated practices, where the risk management program considers the wider perspective of the discipline (including all potential risks). For the same dimension, we include three additional 1 to 5 items in order to observe “*the support of the authorities*” of the municipality towards risk management, an element we have mentioned before, which is very distinctive of the wider perspective of the discipline.

In table 7.1, we show how the second dimension of our scale (the risk identification stage) is measured through five items. First, we include a “yes or no” item to observe the existence of “*identification of opportunity elements*” in the organization as a practice also described in the risk management standards and mentioned in chapter 2. Following, we establish an item to observe if the organization considered “*external incomes*” in their risk identification process, an item also designed in a “yes or no” format. Subsequently, by the means of a “yes or no” item, we evaluate if the organization identifies risk considering “*damages inflicted on a third party*”, which is a very basic practice that we discusses in the literature review for the risk identification stage. Moreover, we included an item to observe whether the municipalities “*register risks that have been materialized and threats that have prevented*” as another practice considered in the theoretical part of our research. This question is also designed in a “yes or no” mode. Finally, for this dimension, we incorporate a 1 to 5 item to identify “*the formality of the risk management process*”, which ranged from a very informal and intuitive process of risk identification, to a systematic method based on risk that could affect the accomplishment of objectives by the entity, which is in line with the wider perspective of risk management.

The next dimension or risk management stage (risk analysis and measurement) considers seven items, five 1 to 5 item format and two “yes or no” questions (see table 7.1). Therefore, the first item was included to observe a very elementary practice, if the municipality “*measured risk by determining its consequences and likelihood*”. This item is presented in a “yes or no” method. Also, in a “yes or no” format, the intention of the subsequent item is to observe if the municipality considers “*the level of risk tolerance based on the calculation of the financial ratio*” as the method prescribed by the resilience paragraph in the case of Dutch municipalities. Then we include an item to evaluate if the municipality takes into account the “*interdependence of different risks and their sources in the measurement of risk*”, a practice also described in the literature of risk management which was observed through a “yes or no” item. To observe if the municipality “*mentions in its policy what instruments it uses for the analysis and measurement of risk*”, we also utilize a “yes or no” item. In order to observe the “*formality of the risk analysis process*” within the entity, we use a 1 to 5 scale ranging from a least formal risk analysis process to the most formal risk assessment process. Then, by the means of a “yes or no” scale, we designed an item to observe if the municipality “*had access and uses external support for risk analysis*”. Finally, we include an item to observe who was “*dealing with the assessment of risk*” in the municipality, considering in-house options as well as external assistance.

In the same table 7.1, we can notice that the decision or control dimension was measured with five items. The first item was designed to observe how the organizations “*determine responses for future risk events*”, a practice that is measured with a 1 to 5 scale ranging from an intuitive and informal procedure to a formal system where all possible responses are taken into consideration. Secondly, by the means of a “yes or no” item, we observe if the municipality “*mentioned which measures are taken for each specific risk detected*”, which is also a basic risk management practice that was reported as frequently absent in the study conducted by Boorsma and Haisma (2006). These practices were also mentioned in chapter 4 of our thesis, where the specific characteristics of risk management in the Dutch municipal context were discussed. Following, we included an item in order to observe if the entity “*adopted a combination of treatment options*”, a best risk management practice that was measured by a “yes or no” item. Afterwards, we incorporated a “yes or no” item to observe if the municipality considered “*the perception of stakeholders and citizens*”. Finally, we also used a 1 to 5 item to observe how the organization “*decides on what risk management solution to implement*”. For this item, we combined the different approaches of decision theory studied in chapter 3 of this book. The option fluctuated between the most basic approach of decision theory (rule of thumb) to the most sophisticated method, according to our view (mixed scanning).

As observed in table 7.1, for the measurement of the implementation and reviewing dimension, we include seven items. We first designed an item to recognize if the municipality had a “*dedicated budget for the implementation of risk management*”, a practice also described in chapter 2 and prescribed by the risk management standards. This practice is designed as a 1 to 5 item.

Afterward, by the means of a 1 to 5 item, we try to determine if the entity has in place a *“training program on risk management”* practice mentioned in the theoretical discussion of risk management. As we can see in the same table, we include an item to observe if the organization has a *“monitoring procedure for the risk management program defined”*, a practice also considered in our review of the literature of the integrated or modern perspective of risk management. We designed this item in a “yes or no” manner. Subsequently, in table 7.1 we include a “yes or no” item to observe if the municipality *“implements an organizational plan for change management”*. This practice was included assuming that it would contribute to the process of questioning the current risk management approach in the entity as well as absorb new practices by the municipality. Following, we incorporated a “yes or no” item to observe if the organization carried out *“a regular risk management auditing”*. Additionally, we designed a 1 to 5 item to determine if the municipality had a *“documentation process for risk management”*. And finally, as we show in table 7.1, we consider a 1 to 5 item in order to observe if *“risk management reports”* were used by decision-makers within the organization.

We have also included in our questionnaire some context variables that will be further explored in the empirical part of our research. These context variables are not going to be used for the calculation of risk maturity but to investigate possible associations with the content variables previously described. We will also ask in the survey for the “function” of the respondent in the municipality, the “level of education” that the respondent holds and the “work experience” of the respondent and also the number of inhabitants (size) of the municipality. We want to observe if the municipality is a member of the “expert circle” on risk management of the Ministry of Interior and PRIMO Nederland. The justification to especially include these two variables is related to the fact that these expert organizations could be seen as a source of risk management knowledge. This is the case because these types of network ties may provide access to specialized information on risk management, distributing the knowledge of the discipline through their members. This is what was mentioned in chapter 6 as “inter-organizational” learning, where entities may learn new frames of reference through interaction with peers and promoting an adaptive change (Kraatz, 2012). On the other hand, we have incorporated an item in the survey as a context variable where we investigate the existence of a “risk manager” in the organization. This is also discussed in the literature of risk management, arguing that a specialist in the field would be a necessary component for the implementation of the discipline, placing the risk management program responsibility on the strategic level of the entity (COSO, 2004). We could say that through a learning perspective of change, managers attempt to understand an ambiguous environment through a series of iterative actions (e.g., information gathering) that would contribute to the understanding of the context that an entity faces (threats and opportunities) (Koberg, 1987; Lant and Mezias, 1992 in Rajagopalan and Spreitzer, 1997). Finally, we included an item where we plan to observe “to whom does the risk manager or similar function report”. In order to do this we mention in the survey six options that involve a range from the Municipal Council to the Director of Finance of the municipality. The

intention is to have additional information regarding the relative importance of the risk management function in Dutch municipalities.

The items of this proposed scale are assumed to have the same weight. This is justified following the arguments of De Vaus (2002), that items in Likert scales should be equally weighted when the researcher states that the items contribute in the same manner to the final scale score (De Vaus, 2002). In our case and being consistent with the literature on risk management, every item of our survey—which represents the stages of the risk management cycle—are believed to have the importance (e.g., defining the context and objectives of risk management with the same equivalence as the identification stage of the risk management cycle).

This scale translated into a questionnaire survey is presented in appendix 2 of this thesis. The main body of the survey consists of six sections. The initial section is comprised of general questions which form the context variables that were already explained (the “function” of the respondent; its level of education; the work experience of the respondent; number of inhabitants of the municipality, membership of the “expert circle”; membership of PRIMO Nederland and if the municipality has or not a risk manager or a special unit of risk management). The rest represents of the items of the survey will be used to calculate the actual risk management maturity of municipalities that take part in this study. Respondents will be asked to give ratings about each statement considering risk management practices presented in their organizations. This involves asking subjects to indicate which of the several statements best reflects their response. The 1 to 5 items reviewed will have the form of multiple choice items where the respondents will be asked to choose between the statements that best suits the situation in their municipality. The “yes or no” items will also be converted into to 1 to 5 scale, where a “yes” will score a “5” and a “no” will be “1”. Finally, we have also included in our pilot scale, open questions and space for comments in the questionnaire that will provide us with descriptive data outside the boundaries of our theoretical design. In total, the pilot survey will consist of 38 questions or statements (see again the appendix 2 for a complete version of the pilot survey). As claimed by De Vaus (2002), multiple indicators increase the reliability of the survey, diminishing the effect of question wording.

Table 7.1. The risk management maturity scale deductively constructed.

<b>Dimensions and practices</b>	<b>Type of item</b>	<b>N° of items</b>
<b>Context and objectives</b>		<b>6</b>
- "Existence of a written risk management policy"	"yes or no"	
- "Developing of a risk management policy"	1 to 5	
- "Objective of the risk management policy"	1 to 5	
- "Support of the Municipal Council"	1 to 5	
- "Support of the College of B&W"	1 to 5	
- "Support of the Mayor"	1 to 5	
<b>Risk identification</b>		<b>5</b>
- "Identification of opportunity elements"	"yes or no"	
- "External incomes"	"yes or no"	
- "Damages inflicted on a third party"	"yes or no"	
- "Register risks that have been materialized and threats that have prevented"	"yes or no"	
- "The formality of the risk management process"	1 to 5	
<b>Risk analysis and measurements</b>		<b>7</b>
- "Measured risk by determining its consequences and likelihood"	"yes or no"	
- "Risk tolerance based on the calculation of the financial ratio"	"yes or no"	
- "Interdependence of different risks and their sources in the measurement of risk"	"yes or no"	
- "Instruments for the analysis and measurement of risk"	"yes or no"	
- "Formality of the risk analysis process"	1 to 5	
- "Access of external support for risk analysis"	"yes or no"	
- "Dealing with the assessment of risk"	1 to 5	
<b>Risk decision and control</b>		<b>5</b>
- "Determine responses for future risk events"	1 to 5	
- "Measures for each specific risk"	"yes or no"	
- "Combination of treatment options"	"yes or no"	
- "The perception of stakeholders and citizens"	"yes or no"	
- "Decides on what risk management solution to implement"	1 to 5	

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**Risk implementation and reviewing**

7

- "Budget for the implementation of risk management"	1 to 5
- "Training program on risk management"	1 to 5
- "Monitoring procedure"	"yes or no"
- "Plan for change management"	"yes or no"
- "Regular auditing process"	"yes or no"
- "Documentation process for risk management"	1 to 5
- "Risk management reports"	1 to 5

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#### 7.4. Defining the different risk maturity levels

As mentioned by Paulk (1993, in MacGillivray, 2007) maturity models should establish clear differences between mature and immature organizations. In the same line, as suggested by Stubbart and Smalley (1999), for these models to make sense, the stages must be distinct between the transition from one stage to the next. For the structure of our proposed risk maturity model, the different levels of it were derived by abstractions from existing CMMs and RMMs in several disciplines and industries (Paulk et al., 1993, Software Engineering Institute, 2007; Sharp et al., 2002; Strutt et al., 2006; Sarshar et al., 2000; MacGillivray et al., 2006a, 2006b; Pollard, 2004; Hamilton, et al., 2006). Following the pioneer definition of Humphrey (1989) and later adapted by the SEI (1999), the levels of risk maturity in our pilot instrument can be defined as incomplete, performed, managed, defined and optimizing (see figure 7.3). As we will see shortly in this section, we have developed descriptions of these maturity levels that might characterize organizational behaviors in risk management. Therefore, we have not innovated in terms of the format of our proposed risk maturity model, but we are standing "on the shoulders"<sup>38</sup> of previous researchers for this matter.

Following the logic of maturity models, our proposed model explicitly considers completeness of process execution as one aspect that characterizes process maturity (Paulk et al., 1993). The premise of our risk maturity model is that the identified practices are prerequisites to reach a higher level of maturity (MacGillivray et al., 2006a). Specifically, we rely on the research of Strutt et al. (2006), who adapted the ideas of the theory of action and the single and double loop of Argyris and Schön (1978) in order to discriminate from the highest level of maturity in our proposed model. As we have stated before, single-loop learning will occur when errors are detected and corrected, permitting the

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<sup>38</sup> This is a metaphor meaning "One who develops future intellectual pursuits by understanding the research and works created by notable thinkers of the past". This metaphor was first recorded in the XII century and attributed to Bernard of Chartres. It was famously uttered by the XVII century scientist Isaac Newton.



organization to continue with its present risk management policy or risk management approach. On the other hand, double-loop learning will occur when errors are detected and corrected by modifying the organization's underlying norms or policies (Strutt et al., 2006). In that perspective, organizations at the highest level of risk maturity in our model (level 5), would be an adaptive entity, learning continually and improving their risk management process as the integrated perspective of the discipline suggests, permanently questioning and reviewing their current risk management approach (double loop). Municipalities at level 4 would follow a single-loop perspective, focusing on making the existing risk management approach more effective, correcting errors within the same "theory-in-use". As proposed for the reasoning of the different levels in our model, the learning perspective of municipalities between levels 3 and 1 would be an open loop. This means that municipalities at those levels would have a vulnerable knowledge of risk management; when mistakes are made and the organization does not learn, failures are repeated as well as successes. A complete review of the different levels of our proposed risk maturity model is presented in the next section.

Additionally for this exploratory design, we identified the best practices of risk management—which in our model are part of the highest level of maturity (level 5)—abstracting those practices to the rest of the levels defined in our proposed risk maturity model. The latter has been accomplished, logically applying the characteristics of every level defined to the specifications of municipalities. For instance, as explained in detail in the next subsection, the main attribute of the first level (level 1) is that the application or implementation of risk management within a municipality would be *incomplete*, "possessing no formal risk management processes and often exhibiting limited knowledge of relevant standards or regulatory guidelines (resilience paragraph)".

We have also included in our proposed risk maturity model the normative and descriptive approaches of decision theory studied in the third chapter of this thesis. As claimed in the mentioned chapter, decision theory is implicitly contained in the risk management process, since risk management depends on rules derived from general knowledge and precepts of decision theory (Vaughan, 1997). Therefore, we will also study how municipalities make decisions in reality, including some hypothetical suggestions in our framework. We have incorporated the studied normative and descriptive elements of decision theory. For the moment, this categorization has also been made deductively, contrasting the principles of risk management theory with the basics of the studied approaches of decision theory (cost benefit analysis, multi-criteria analysis, rules of thumb, incrementalism and mixed scanning). Our hypothetical proposition is that decisions related with the treatment of risk that consider a more rational perspective (CBA, multi-criteria analysis and mixed scanning) will be found in mature organizations, where less mature municipalities would use a non-rational approach such as rules of thumb or incrementalism.

## 7.5. Explaining risk management maturity levels in practice

In level 1 (L1) of our pilot model, municipalities would perform largely based on ad hoc approaches to risk management. Organizations in this level have no formal risk management processes and often exhibit limited knowledge of the resilience paragraph. Thus, entities in this level do not even follow in a complete and adequate form the risk paragraph prescribed. These types of local public entities, for example, would be organizations described in the research of Boorsma and Haisma (2005), as not being able to distinguish between positive and negative risk and not capable of calculating their financial capacity. In addition, this category of municipalities do not differentiate between “funded” and “unfunded” risk as the resilience paragraph suggests. L1 organizations would likely be small municipalities where resource constraints and little knowledge on risk management might prevent the staffing of these entities to pay attention systematically to risk management. Municipalities in this level also do not have a formal risk management policy as the risk paragraph recommends, sustaining their reactive risk management’s activities upon individual decisions (RMRP, 2002). In terms of decision-making, these types of municipalities would base their risk decisions on past experience with similar cases, a decision-process approach that we could associate in the literature as rules of thumb (Lettau and Uhlig, 1999).

In our proposed risk maturity model, level 2 (L2) organizations understand that they have risks that require formal management, and have established basic risk management processes for this purpose (SEI, 2007). However, the scope of risk management in this level of maturity is narrow, generally restricted to addressing critical and pure risks. Municipalities in this level observe the resilience paragraph but in a restricted manner. They summarize the uncovered risks as the bylaw prescribes, identifying “regular risks” and establishing insurance as the unique strategy, distinguishing between “positive” risks and “pure” risks, calculating the financial capacity needed (CN) as well as the financial capacity available (FCA) and determining also the financial resilience. Local entities in this level of maturity then have a written risk management policy following the basic elements that the risk paragraph considers. Nonetheless, at L2 the management of risk tends to be influenced less by formal risk management processes than by the repetition of activities and practices that have worked out for the organization before. Municipalities in this level do not give for instance a list of risks based on activities or events (e.g., burglary or fire) or policy fields (such as, environmental policy, treasury, municipal ambulance or transport), or exposed objects (buildings, computers, employees, citizens, etc.) (Boorsma, 2006). In addition, municipalities at L2 demonstrate an isolation of the risk management function, where the knowledge needed for the implementation of the risk paragraph resides only in the responsible unit of the municipality. The organization uses the same measures or risk responses that were used the period before. In the case of insurance policies to respond to “pure” risks, these policies would not be reviewed nor would the treated risks be evaluated, and risk would be considered a static phenomenon instead of a dynamic one. Therefore, the decision-process in municipalities at L2 could be characterized as “incrementalistic” (Lindblom,

1959), comparing between the current state of affairs and previous risk management strategies implemented, developing only small adjustments.

The main characteristic of the level 3 (L3) municipality is the defining and implementing of a formal risk management process. Policies and procedures that could guide risk management activities (i.e., who does what and when) (ALARM,2009), and the provision of adequate training, funding and tools in support of these activities are elements present in this level of maturity (Sharp et al., 2002.; Strutt et al., 2006; Sarshar et al., 2000). In essence, this level seeks to formalize the risk management function within the municipality and the organization has sufficient capabilities and resources to effectively complete the risk paragraph requirements. Thus, municipalities in this stage identify risks in a systematic manner, making a distinction between events (like burglary or fire), policy fields exposed to risk (like environmental policy, treasury, municipal ambulance transport), and risk exposed objects (e.g., buildings, computers, employees, citizens, etc.) (Louwman and Steens, 1994). In this stage of maturity, municipalities analyze risks considering their probability (frequency) and impacts and are willing to weigh more alternatives to finally consider risks “regular” or “unfunded”.

As a consequence for municipalities at L3, insurance is not the only response to risk. Risk strategies such as risk prevention and other risk reduction mechanisms such as education and enforcement, are also applicable in combination with financial risk strategies. Internal and operational risks such as fraud or internal procedures (Fone and Young, 2005 and Drennan and McConnell, 2007), are identified and included in the risk management policy. Local public organizations at L3 also consider immaterial or reputational risks as well as risks related to the damage inflicted on a third party (Boorsma, 2006). In terms of the formalization of a written policy required by the risk paragraph, municipalities in this level would mention explicitly which responses they have taken for each specific analyzed risk. Finally, entities in this level of maturity establish a clear objective for the risk management policy and determine a procedure for reviewing and evaluating the program, as well as establishing responsibilities and roles.

At L3, municipalities are still far from the best practices of risk management, especially the wider or integrated perspective due to the limitations in their feedback mechanisms (MacGillivray et al., 2006b). Consequently, at L3, municipalities rely on risk management processes and repetition of activities mainly related with the application of the resilience paragraph as their theory-in-use. Thus, as we mentioned before, when municipalities at L3 make mistakes, the organization partially learns (open loop) and looks for answers to respond to these errors or difficulties within the bylaw on risk management. Risk management decisions by L3 municipalities are made through cost benefit analysis (measuring how much the benefits of treatment exceed the costs).

In the case of level 4 (L4), the municipality not only facilitates the implementation of the risk management perspective associated with the resilience paragraph but also looks for the application of the wider perspective

of risk management. The goal of this type of municipality is that the risk management processes are extended throughout the organizational hierarchy and across all functional boundaries (AS/NZS, 2004; ISO 31000, 2009 and UK standard 2002). These types of entities have implemented a monitoring process in order to have a clear view of the effectiveness of the risk management program. The involvement of the top management in this stage is notorious, which is shown by their participation in the definition of the policy and requiring risk management reports. As a consequence, the manner in which L4 organizations learn could be defined as single-loop (Argyris and Schön, 1978). Learning is directed towards making existing risk management process more effective. In this perspective and following the principles of single-loop learning (Argyris and Schön, 1978), municipalities in L4 utilize the goals, strategies and practices of the best practices of risk management.

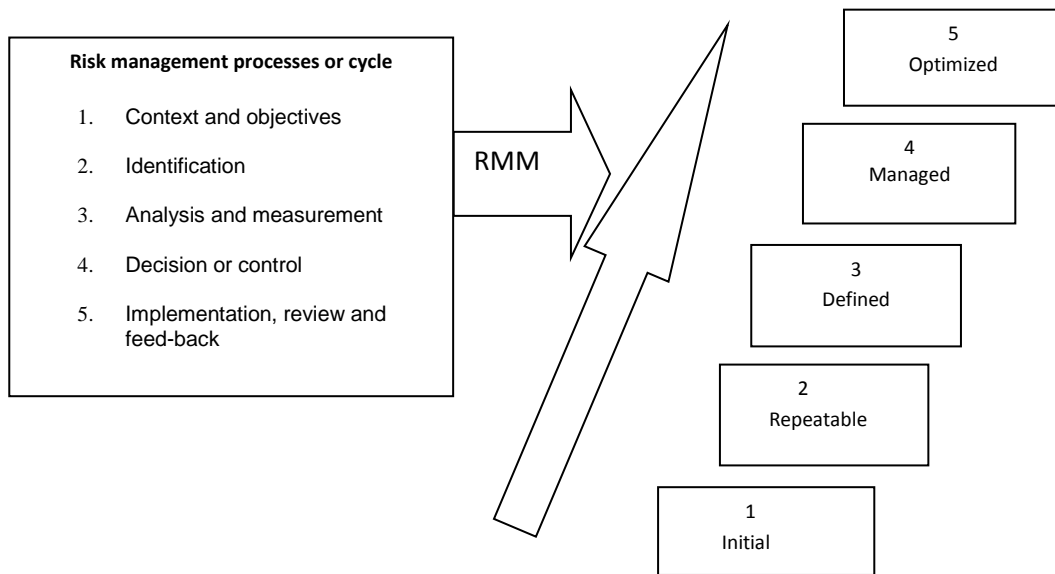
Although municipalities at L4 have correct knowledge of the wider perspective of risk management, they might have difficulties adapting to the challenges that the context imposes on them, because they are incapable of finding innovative and new forms to confront the appearance of new risk expositions. The L4 municipality is lacking in internal flexibility to adapt its risk management approach to the changes of the political and social environment. This lack of deeper learning could be illustrated as not having a systematic and formal process of inquiry (Argyris and Schön, 1978) implemented in the municipality which could help question the current norms and beliefs considering risk management practices (e.g., change management process). When choosing risk management strategies within the organization, the decision-makers of municipalities in this level of risk maturity perform an explicit weighing system with rank options (MCA), values or criteria defined by them, in order to distinguish acceptable from unacceptable possibilities (Strutt et al., 2003 and Sarshar et al., 2000).

In our proposed risk maturity model, the fundamental distinction of Level 5 (L5) is the adaptability and flexibility of municipalities considering risk management practices (MacGillivray, 2007; Sharp et al., 2002; Strutt et al., 2006 and Sarshar et al., 2000). As a consequence, the L5 municipality is an adaptive entity, learning continually and improving its risk management process as the integrated perspective of the discipline suggests. Municipalities at L5 have the capacity for double learning as commented before (Argyris and Schön, 1978). Double-loop learning (Argyris and Schön, 1978), as we have stated, involves persistently questioning the norms and assumptions underlying the risk management practices and routines. This aligns perfectly with the suggestion of the standards and literature on the best practices of risk management, in terms of continually looking for ways and instruments for identifying, analyzing and treating risk, as a response to the dynamic characteristic of the phenomenon (e.g., ISO 31000, 2009; AS/NZS, 2004; ISO 31000, 2009 and UK standard 2002). To facilitate this process of examining the current assumption of risk management practices, the risk management information has to be openly shared, communicated and used to publicly test these rules, routines and beliefs within the municipality (Argyris and Schön, 1978). Therefore L5 entities are organizations actively engaged in the development and piloting of new

ideas to optimize the risk management approach throughout the organization. From these efforts, best and new practices and information are regularly identified and transferred in the organization (AS/NZS, 2004; COSO, 2004; ISO 31000, 2009; UK standard 2002; Fone and Young, 2000; Drennan and McConnell, 2007; Lam, 2003; Hillson, 1997; RMRP, 2002 and ALARM's model, 2009). This is exemplified considering that the training programs at this stage are not related strictly to the discipline of risk management, but also with the implementation of soft managerial understanding. An external intervention could facilitate the exposition of hidden assumptions (Huy, 2001) as well as guide the integration of the new theory-in-use. The implementation of such practices gives the municipality the capacity to change its risk management knowledge according to the circumstances and requirements of a persistently shifting context. In addition, we state that municipalities at L5 use a "mixed scanning" (Etzioni, 1967) type of approach when deciding on risk management strategies. They analyze risk management responses in a rational and comprehensive way, focusing on specific and prioritized areas of interest for the organization.

Figure 7.3 presents a simple illustration of the logic of our proposed model, which is composed of the risk management cycle as "process areas" or different dimensions of our model. Figure 7.3 also shows how the model integrates both the best practices of the wider perspective of risk management and the practices promoted by the resilience paragraph as standards to assess the maturity of municipalities in the Netherlands. This figure also illustrates how the practices found are logically structured following the principles of organizational learning (Argyris and Schön, 1978), which gives the model a theoretical base, especially the reasoning behind the transition between every level. Finally, figure 7.3 shows our hypothetical consideration in terms of how every approach of decision theory studied in chapter 3 might be associated with a specific level of risk maturity.

Figure 7.3. Overview of the proposed risk maturity model design, considering the learning process described by Argyris and Schön (1978) (adapted from Strutt, Sharp, Terry and Miles, 2006).



N	Level	Characterized by	Decision theory approach
5	Optimized	Double-loop learning	Mixed scanning
4	Managed	Single-loop learning	Multi-criteria analysis
3	Defined	Open loop—not learning	Cost benefit analysis
2	Repeatable	Prescriptive	Incrementalism
1	Initial	Ad hoc	Rules of thumb

## 7.6. Conclusions for this chapter

As we have mentioned, the construction of a proposed risk maturity model for Dutch municipalities has been developed in an explorative manner, structured under a design- oriented method with a framework especially recommended for the production and evaluation of maturity models (Becker, Knackstedt and Pöppelbuß, 2009 and Wendler, 2012). Specifically, survey questionnaires and scales can be used to provide “perceptual” measures of managerial cognitions and actions (Rajagopalan and Spreitzer, 1997), which in our case, reflects the risk management practices studied in chapter 2 of this thesis. Organizational learning theory has been used to provide reasoning to the risk maturity model proposed and guide its construction. This is considering the assumptions behind the evolutionary perspective of risk maturity models, where cumulative changes are prescribed through the implementation of specific practices, thus retaining the knowledge and practices acquired in the previous level of maturity. Organizational change theory has assisted us in sustaining the assumption of these types of frameworks and the premise that changes in the organization

would occur in different stages, up to a final stage, by the acquiring of specific skills, knowledge, practices and beliefs (Huy, 2001). Additionally, following Stubbart and Smalley (1999), who developed a criterion for clearly evaluating stage models, we claim that our pilot risk maturity models is essentially descriptive and also causal. As a consequence, we consider that in the construction of this proposed model, we have provided theoretical and later (in the next phase of our research) empirical evidence of stage transformation, identifying the causal forces that define every stage.

Specifically, we argue, in agreement with risk maturity methodology, that the theory of organizational learning by Argyris and Schön (1978) helps explain the learning process by incremental stages. As other researchers have considered (Strutt, Sharp, Terry and Miles, 2006 and MacGillivray et al., 2006a, 2006b), we also use the concepts of single and double loop to differentiate between the levels of the proposed risk maturity model. We particularly rely on the propositions of Argyris and Schön (1978), to discriminate from the highest level of risk maturity in our model. Accordingly, L5 of our risk maturity model will be associated with a “double-loop” learning perspective while L4 will be related to a “single-loop” learning approach. Since this perspective of organizational learning assumes that the organization changes through a process of learning steps designed to react to both the environment and the organization, we might also be able to respond to one of the limitations of stage models. This is related to the fact that stage models take historical and environmental factors as being fixed, in the same manner as physical growth proceeds largely independent from a person’s social and physical environment (Stubbart and Smalley, 1999).

The cross-sectional approach selected for the upcoming empirical analysis will not permit us to identify changes (as practices implemented or knowledge acquired) occurring during different times within the organization, which would give us evidence about the transformation of risk management practices. This is justified bearing in mind the goal of our research, which is to assess the maturity or the level of implementation of risk management practices in Dutch municipalities, an objective that also implies responding to the limitations found in previous maturity models. We will not observe or study the learning process empirically as it develops over time. We will just focus on the evaluation of the risk management practices identified in the municipality, signing in normative way the path of risk management evolution.

In conclusion we can state that the objective of this chapter was to deductively construct a revised risk maturity model for municipalities in the Netherlands to measure the risk management practices of these entities. The specific task of this chapter was then to develop a pilot risk maturity model that could respond to the difficulties identified framework that needed to consider the desired risk management scenario for municipalities in the Netherlands. We could also claim that the construction of this pilot survey is not arbitrary, but it must be viewed as a theoretical construct that we will need to validate and inductively improve. Therefore, our final model will be completed empirically, receiving feedback considering the scaling method constructed.

## **CHAPTER 8: Results and discussion**

### **8.1. Introduction**

We present in this chapter the results of the empirical application of our proposed risk maturity model in a sample of Dutch municipalities, obtaining information concerning the implementation of risk management best practices in these entities. Consequently, this chapter will answer research question number 7, which aims to analyze and interpret the data collected during the empirical part of this PhD research. For the actual calculation of risk maturity, means values were used for both the “process score” and the “overall maturity scores”. The rankings were ordered from the least to the most, with respect to maturity levels 1 to 5. The scores were given in one decimal place, showing progress towards the next risk maturity level. The calculation of “process score” and “overall maturity” were not rounded to the nearest integer, with the purpose of indicating that municipalities lie between levels of maturity. Municipalities in our sample obtained an overall risk maturity score in the range of 1.7 to 4.5. Taking into account the explorative approach of this research, we have searched for different interpretations of the results and ways to further improve the risk maturity model deductively constructed. We found that the size of the communities seems to have an influence on their level of risk maturity, since larger municipalities in our sample have the tendency to have higher risk maturity scores. We found that the organizations that took part in our study, scored better in the first stages of the risk management process (“risk objective”, “risk identification” and “risk analysis and measurement”) while having lower scores in the last stages of the risk management cycle (“risk decision and control” and “risk implementation and reviewing”). We have also analyzed in detail two outliers in our data set, representing an “immature” and “mature” organization considering the implementation of risk management practices.

We have learned empirically as well, that the different stages of the risk management process included in our model as dimensions, had an evolutionary pattern, characteristic of the risk management cycle that is assumed in the specialized literature but not openly discussed. As well as size, we have observed that “organizational arrangements”, such as having in place a risk manager in the “expert circle” of the Ministry of Interior and member of PRIMO Nederland, would have also an effect on the overall score of the entities. We argue that these variables might contribute to the learning process of new practices by organizations and thus improve their risk management maturity.

We have paid special attention to the reliability and internal consistency of the scale constructed to measure the risk maturity of municipalities in the Netherlands. By means of not only statistical evaluations, but also theoretical arguments, we have further developed and refined the proposed risk maturity model.



## 8.2. Characteristic of the sample

The questionnaire survey, which included the best risk management practices, was distributed through a standard web platform (SurveyMonkey) to all the existing municipalities in the period that the data were collected (430 municipalities in 2010). The contact information of those entities and the potential respondents was provided by the company Nederlands Adviesbureau Risicomanagement (NAR) and complemented later by the Ministerie van Binnenlandse Zaken en Koninkrijksrelaties who distributed the survey among the members of its “expert circle” on risk management. We finally received 140 responses, and, as is common in the collection of data through a survey questionnaire such as this (Groves, et al., 2004), we had some missing or unobserved values. After discarding the cases with uncompleted information from our data set we ended up with a sample of 72 municipalities.

With the objective of comparing more homogeneous groups, the sample is presented in four different segments according to the number of Dutch municipality inhabitants. In table 8.1, we present the distribution of our sample and the actual distribution of the population. As we can see in table 8.1, some segments of our sample might be underrepresented (i.e., the segment of the smallest communities) while others are overrepresented (i.e., the segment with the largest municipalities). The latter however would not be a major difficulty since we have controlled for size when analyzing and interpreting the data set.

As established in the operational part of this thesis (chapter 7), we have performed a Three-Step Test-Interview method (Hak, 2004)<sup>39</sup> for the pre-testing of the questionnaire. In table 8.2, we present the characteristics of the similar respondents interviewed during this process. Although we cannot claim representativeness, these three interviews produced sufficient information for a first evaluation on the quality of the questions, identifying and diagnosing wording problems that were later improved.

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<sup>39</sup> These interviews were performed by the PhD candidate with the company of his supervisor Peter B. Boorsma.

Table 8.1. Distribution of the sample and its expected distribution according to the population.

<b>Number of inhabitants</b>	<b>Sample</b>	<b>Population</b>	<b>Expected N</b>
Less than 20.000	10	170	28
Between 20.000 to 50.000	29	192	32
Between 50.000 to 100.000	19	42	7
More than 100.000	14	26	5
Total N	72	430	72

Table 8.2. Characteristics of the similar respondents used in the pretesting.

<b>Municipality</b>	<b>Date of pretesting</b>	<b>Position at the municipality</b>
Hengelo	19-01-2011	Financial specialist
Hof van Twente	26-01-2011	Concern controller
Haaksbergen	28-01-2011	Director of finance

### **8.3. Measuring risk maturity**

As mentioned in the previous chapter, we used a rating Likert scale method in order to measure the risk management maturity of Dutch municipalities. We have combined in the design of the questionnaire 1 to 5 items (1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree and 5. Strongly agree) as well as dichotomous “yes or no” questions (1=no and 5=yes). As also considered in the operationalization part of this thesis, the items of the scale were derived from the theory of risk management, especially, the normative suggestions of the “best practices”. Accordingly, the scale was deductively constructed taking into account risk maturity models and their application in other industries. As we can remember from chapter 7, we made a distinction between the five dimensions or risk management stages of the risk management process (“context and objectives”, “risk identification”, “risk analysis and measurement”, “decision and control” and “implementations and reviewing”), considering them the “key process” of our proposed risk maturity model. We then included the best risk management practices identified in

chapter 2 in each of the stages of the risk management process defined. Also in chapter 7, we presented the risk management process and the selected practices transformed in a survey scale.

For the calculation of the actual risk maturity levels, means values were used for both the “process score” and the “overall maturity scores”. The rankings were ordered from the least to the most, with respect to maturity levels 1 to 5. The scores however were given in one decimal place, showing progress towards the next risk maturity level. The calculation “process score” and “overall maturity” were not rounded to the nearest integer, with the purpose of indicating that municipalities lie between levels of maturity.

In order to evaluate the reliability and internal consistency of the risk maturity scale, we have performed several analyses. We especially concentrate on the capability of the deductively constructed model to measure risk maturity, as well as to analyze its structure. We measured the reliability of each dimension or risk management stage using a Cronbach’s alpha test, investigating the relationship between the items of the scale and the stages defined.

1. Context and objectives. With the aim of improving this particular dimension of our scale that aims to measure the practices related to the purpose or aim of the risk management program to be implemented, we made several analyses. When performing a factor analysis test we determined that there were two different dimensions for this first stage which were composed by the scale that measured “*developing of a risk management policy*” and the three items that measured “*support of authorities*” (*council, college and mayor*). Although the correlation between these two dimensions was positive, indicating that the dimensions were not independent from each other, the correlation was relatively low ( $r=.26$ ,  $n72$ ,  $p=.03$ ).

Focusing exclusively on the content of these two dimensions found (“*developing of a risk management policy*” and “*support of authorities*”), we came to the conclusion that these two scales measured two different aspects of the “context and objective” stage of risk management. In that sense, the scale that observed the “*developing of a risk management policy*” measured specific practices related to the definition of the risk management policy, characterizing the approach of the municipality and roles of different parties when identifying the purpose of its risk management program (see table 8.3). On the contrary, following the best practices of risk management, the scale that measured the “*support of authorities*” concentrated especially on the process of defining the purpose or objective of the risk management program. Besides the technical reasons, we also considered at the end that they were two different dimensions that measured different aspects of the “context and objective” stage.

We also determined that neither the other two original items considered (“*written risk management policy*” and “*context and objectives*”) fit in either of those two dimensions discovered. In particular, the item designed to observe the presence of “*written risk management policy*” was the only “yes or no” item in this scale, which presented additional difficulties for possible combinations

with other items of the scale. Apart from these technical reasons, we considered that the existence of “*written risk management policy*” was a mandatory practice which the municipality must fulfill. This aspect differs from the rest of the practice considered in this scale. We can mention that almost 90% of the sample had implemented it (see appendix 3). Accordingly, we finally decided to delete the item that measured the existence of a “*written risk management policy*” (see table 7.1 in chapter 7, where we showed the original scale constructed).

The “*context and objectives*” item on the other hand—at least under a content perspective—belonged directly to the item that observed the “*developing of a risk management policy*”. In a similar way, the “*objective of risk management*” item aimed to observe the perspective assumed by the municipality in the definition of the risk management program or policy, ranging from a state where “there is no objective for risk management within an organization” to a position where “the risk management policy contains the recommendation of the risk paragraph but also pursues the wider perspective of risk management”. As a consequence, these two scales concentrated on the definition of the risk management program, measuring what type of approach the organization followed when indicating the purpose of its policy.

As we show in table 8.3, we finally choose for the dimension that observed the “*developing of a risk management policy*” (scale that had 4 items) and the item that measured the “*objective of risk management*” (with 1 item). In table 8.3 we present the structure of the new scale and its Cronbach’s alpha value. We also see in table 8.3, 67% of the respondents claimed that the risk management program in their entities had “*established roles and responsibilities for the strategic level of the municipality*” (e.g., council and alderman). Moreover, 85% of the cases stated that their risk management program had “*established roles and responsibilities for the operational level*”. As for municipalities that considered “*legal requirements*” in the definition of the risk management program, 57% of the cases stated this was the case. Additionally, 53% of the respondents mentioned that their risk management program or policy, considered “*socio-political threats*” (e.g., citizen opposition to a project, resignation of the alderman, etc.). On the other hand, 67% of the cases in our sample not only complied with the “risk paragraph” as the main objective of their risk management program, but also considered the wider perspective of risk management. We can also see in table 8.3 that the mean score for this stage in our sample was 3.65 and the final Cronbach’s alpha value for this scale was 0.63.

Table 8.3. Final scale for the context and objective stage.

Context and objective stage (5 items)	Positive responses
<b>Developing a risk management policy</b>	
Roles and resp. for the strategic level	67%
Roles and resp. for the operational level	85%
The policy considers legal requirements	57%
The policy considers socio political threats	53%
<b>Objective of the risk management policy</b>	67%
<b>Mean (S.D.)</b>	3.65 (0.53)
<b>Cronbach's alpha value</b>	0.63

**2. Risk identification.** When evaluating this second stage of our risk maturity model designed to measure if all significant activities of the organization are identified and the risks that follow those activities are defined, we decided to combine the “yes or no” items (“*identification of opportunity elements*”, “*external incomes*”, “*damages inflicted on a third party*” and “*register risks that have materialized and threats that have been prevented*”) forming just one scale. We kept the item of this risk management process which aimed to observe the formality of the risk identification stage (“*formal identification*”). Considering that this final scale had two items, it was not possible to perform a reliability test. Nonetheless we can state that these two items were not independent from each other, since they had a positive correlation ( $Cr=.22, p=0.03$ ).

In table 8.4 we present the final scale for this risk management stage, showing the items that were combined and the percentage of (positive) responses on those items. As we can see in table 8.4, more than 86% of respondents in our sample claimed to identify not only negative risks, but also “*opportunity elements*” in their risk management identification process (associated to projects, investment, etc.). Almost 82% of the cases in our sample considered “*external incomes*” and external subsidies when performing a risk identification process. Shown as well in table 8.4, 87% of municipalities identify possible “*damages inflicted on a third party*” caused by the organization in their risk identification approach. Moreover, 54% of the cases in our sample “*register risks*” that have materialized and threats that have been prevented. Finally, for the last item of this scale, we can see that almost 63% of the cases in our sample had in place a “*formal identification*” process, identifying external and specific risks related to catastrophes, developing a comprehensive list of the risks that would affect the achievements of strategic objectives. We also show in table 8.4, the resulting mean score for this stage (3.8).

Table 8.4. Final scale for the risk identification stage.

Risk identification stage (2 items)	Positive responses
Opportunity elements	86.1%
External incomes	81.9%
Damage inflicted on third party	87.5%
Risk register	54.2%
} Items combined	
Formal identification	62.5%
Mean (S.D.)	
	3.83 (0.78)

3. Risk analysis and measurement. This particular scale aimed mainly to measure if risks identified in the municipality are analyzed determining consequences and likelihood of occurrence. Being consistent with the same approach used for the previous risk management stage, we decided again to combine the “yes or no” items of this scale, recoding them in a 1 to 5 format. As seen in table 8.5, we merged the items that observed whether the municipality measured its risks : “*determining the consequences and likelihood*” of those risks; the item that aimed to observe if “*the level of risk acceptable*” was based in the calculation of the financial resilience; the item that was designed to observe if the municipality considered the “*interdependence of risks*” when measuring them; the item that observed if the municipality “*mentioned what instruments they use for the analysis of risks*” and the item that observed if the municipalities “*have access and use external support for risk analysis*”. We had two items with “1 to 5” questions (“formal risk analysis” and “dealing with risk assessment”) that remained with the same structure.

As we can see in table 8.5, almost 85% of cases in our sample measured risks by determining their “*consequences and likelihood*”. Moreover, 76% of respondents considered the “*level of risk acceptable*” based on the calculation of the financial ratio. When analyzing the risks that they confront, 73% of the municipalities considered the interdependence of those risks. Furthermore, 57% of the cases mentioned in their risk management policy what “*instruments they use for the analysis and measurement of risks*”. In addition, 58.% of the respondents stated that the municipality “*had access and used external support for risk analysis*”. On the other hand, 32% of the cases in our sample mentioned that “*they used statistical and advanced methods when measuring risk*”. Finally, 34% of municipalities stated that they “*had a department and a risk management team from people from different sectors for the analysis of risks*”.

As also seen in table 8.5, the mean score for this risk management stage was 3.27 and the final Cronbach's alpha value for the scale was 0.72.

Table 8.5. Final scale for the risk analysis and measurement stage.

Risk analysis and measurement (3 items)	Positive responses
Consequences and likelihood	84.7%
Level of risk acceptable	76.4%
Interdependence of risks	73.6%
Instruments for risks analysis	56.9%
External support	58.3%
} Items combined	
Formal risk analysis	32.0%
Dealing with risk assessment	34.70%
<b>Mean (S.D.)</b>	<b>3.27 (0.96)</b>
<b>Cronbach's alpha value</b>	<b>0.72</b>

4. Decision and control. This particular scale was designed to measure the process of selection of risk management responses based on the output from risk analysis. In this case we also followed the approach used in the two previous dimensions. As a consequence, we combined again the “yes or no” items into a single scale. These items aimed to observe if the municipality mentioned in its risk management policy which “*measures are taken for each specific risk*”; the item that observed if the municipality considered a “*combination of treatment options*” and the item that observed if the municipality “*considers the opinion of citizens and stakeholders when selecting risk management strategies*”. We also had for this risk management stage two “1 to 5” item questions that observed how municipalities “*responded for future risks events*” and determine how municipalities “*decided on risk management solutions*”. These two scales remained as they were originally constructed. (see table 8.6).

As we can see in table 8.6, 58% of the cases in our sample mention explicitly in their policies which “*measures are taken for each specific risk*”. Additionally, 68% of the municipalities adopt a “*combination of treatment option*” when deciding what type of risk management strategies implemented and 37% of cases consider the perception of stakeholders and citizens when “*selecting risk management strategies*”. Furthermore, 36.2% of municipalities in our sample stated that they consider “*financial and non-financial responses*” and base the selection of risk management strategies on the “*output of the risk analysis stage*”. On the other hand, 16% of the cases decide what risk management solutions to implement by developing a “*weighing system of the most relevant*

alternatives for them as well as consider an exhaustive and comprehensive analysis, prioritizing some area of the organization". As shown in table 8.6, the mean score of our sample for this risk management stage was 2.87 and the Cronbach's alpha value for the scale was 0.64. To be noticed, is the relatively lower score for this risk management stage in our sample, compared with the three previous stages ("context and objectives" (3.65), "risk identification" (3.83) and "analysis and measurement" (3.27) ).

Table 8.6. Final scale for the decision and control stage.

Decision and control (3 items)	Positive responses
Measures for specific risks	58.3%
Combination of treatment options	68.1%
Selecting risk strategies	37.5%
	Items combined
Responses for future risk events	36.2%
Decisions on risk management solutions	16.7%
Mean (S.D.)	2.87 (0.85)
Cronbach's alpha value	0.64

5. Implementation and reviewing. For the last stage of our risk maturity model aimed to measure if the organization implements the decisions taken in the previous stage and puts in place monitoring procedures for the permanent evaluation of the risk management program, we also combined the "yes or no" items of this scale. As a consequence, we merged in a single scale the item that observed if the organization had a "procedure to monitor" the risk management program with the item that observed the existence of "a regular audit for the risk management policy". In the original scale for this risk management stage (see again table 7.1 in chapter 7), we also had an item that aimed to observe if the municipality had in place a "plan for change management", a practice that was measured by the means of a "yes or no" item. Our argument for including this practice was related to the fact that we assumed that it could assist the entity in the process of risk management implementation. Therefore, we considered that a sort of "teaching intervention" (Huy, 2001) might bring to the surface the theory in action (Argyris, 1992) with respect to the organization practices, guiding the integration of a new frame of reference (the best practices of risk management). We finally concluded that it was not a risk management best practice, which was the main criterion we chose for the inclusion of practices in our proposed model. When analyzing the structure of the first designed scale for this dimension (see again table 7.1 on chapter 7), we realized that this item did not fit with the rest of the scale (see appendix 4 for the correlation matrix).



As a consequence, we had both technical and content related arguments for finally deleting this item.

Four items remained that conserved a “1 to 5” structure (*“budget for implementing risk management”, “training programs”, “documentation process” and “reports used by decision-makers”*). In table 8.7 we see the final scale where 55% of the cases had a *“monitor procedure”* defined for their risk management program. In addition, 51% of the respondents stated that regular *“audits for the risk management policy”* were carried out annually in the municipality. Moreover, 9.7% of the entities had *“a special budget allocated for the implementation of risk management controls, the purchasing of systems and the hiring of expert assistance”*. Additionally, 5.6% of the cases had an annual *“training program”* on risk management, defining specific risk requirements. Furthermore, as we can see in table 8.7, 32% of the respondents stated that risk information was stored, distributed and analyzed within the organization as their *“documentation process”*. Finally, 35% of the cases in our sample mentioned that *“risk management reports”* were used by *“the financial executive committee and the College of B&W, the municipal council and the mayor of the municipality”*. As seen in table 8.7, the mean score value of our sample for this stage was 2.72 and the Cronbach’s alpha value for the scale was 0.64. Notably, in the “decision and control” stage, the mean value score for this stage was considerable lower than previous risk management stages, a pattern that will be further analyzed in this chapter.

We have improved the risk maturity scale first constructed in a deductively way through its application in a sample of municipalities in the Netherlands. Therefore by the means of empirical inputs, we have inductively developed the scale. Accordingly, after the deletion of particular items that were considered no longer appropriated (with both statistical and theoretical reasons), as well as by combining specific items, we have increased the internal consistency of the risk maturity model and established a clear structure for the final scale. Although there still is some room for the improvement of our explorative risk maturity scale, we believe that the analyses performed suggest a general stable scale designed to measure the sophistication of risk management practices implemented in municipalities of the Netherlands. In table 8.8 we present the overall risk maturity score of the sample, where we calculated an average of the mean values of the risk management stages, taking each of this dimensions (stages) as a single item. As a consequence we have calculated the Cronbach’s alpha for the five risk management stages of our model combined, obtaining a value of 0.87. The latter suggest a general solid internal consistency of the scale. In addition in figure 8.1 we present a histogram with the distribution of this overall score. Based on this we conclude that the risk management practices selected and the items constructed might be adequate to assess the implementation of risk management in Dutch municipalities. To be noticed as well in this section is the fact the entities in our sample obtained better scores in the first risk management stages (e.g. “risk objective” (3.7), “risk identification” (3.9) and “risk analysis and measurement” (3.3) while had lower scores in the last stages of the risk management process (“decision and control” (2.9) and

“implementation and reviewing” (2.7). We should continue then by further analyzing this pattern and exploring possible explanations.

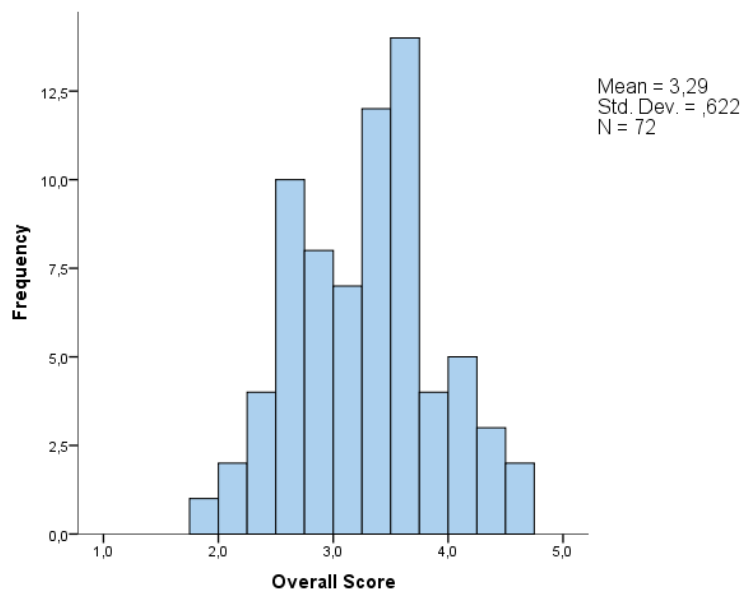
Table 8.7. Final scale for the implementation and reviewing stage.

<b>Implementation and reviewing (5 items)</b>	<b>Positive responses</b>
Monitor procedure	55.6%
Audits for risk management policy	51.4%
} Items combined	
Budget for implementing risk management	9.7%
Training programs	5.6%
Documentation process	31.9%
Reports used by decision makers	34.8%
<b>Mean (S.D.)</b>	<b>2.72 (0.83)</b>
<b>Cronbach's alpha value</b>	<b>0.64</b>

Table 8.8. Scale for the overall risk maturity score of the sample

<b>Overall score (5 items)</b>	<b>Mean</b>	<b>(S.D.)</b>
Context and objectives	3.7	(0.53)
Risk identification	3.9	(0.78)
Risk analysis and measurement	3.3	(0.96)
Decision and control	2.9	(0.85)
Implementation and reviewing	2.7	(0.83)
<b>Overall Score</b>	<b>3.3</b>	<b>(0.62)</b>
<b>Cronbach's alpha value</b>		<b>0.87</b>

Figure 8.1. Distribution for the overall risk maturity score of the sample.



#### 8.4. The risk management cycle and its progressive logic

Considering the possible pattern discovered in the previous section—our sample obtained better scores in the first risk management stages (“risk objective”, “risk identification” and “risk analysis and measurement”) and obtained lower scores in the last stages of the risk management process (“decision and control” and “implementation and reviewing”)—we explored possible associations between the different stages or process groups of the constructed risk maturity model.

Although not discussed explicitly in the literature, we might first assume that the last two stages of the risk management cycle (“risk decision and control” and the “implementation and reviewing” stages) are the most difficult to implement in reality. This is defensible considering that entities regularly define objectives for their risk management program, identify and later measure the risks that might be relevant for them. However, they might fail in the actual decision to implement pertinent measures according to those risks detected, as well as fail to monitor and evaluate those decisions. These last two stages of the risk management cycle are supposed to include some method to finally decide what type of risk management controls to implement and also to define their check and balance procedure, reporting systems and training programs, among other practices within the municipality. These practices would require more effort and even the investment of considerable resources by the entity. In the same line as stated by Van Staveren (2009), although managing risk would be a difficult task by itself, implementing risk management would be the most difficult part of the risk management process for an organization.

On the other hand, as we have mentioned, the specialized literature and most of the risk management standards state that risk management should be implemented following a logically defined sequence (i.e., risk objective, risk identification, risk assessment, risk control and risk implementation and reviewing), that we have followed for the construction of the proposed risk maturity model. Therefore, we might infer that each stage of the risk management process will be a prerequisite to complete the next stage. Following that reasoning, the first activities of the risk management process would be a precondition of the following stages of this cycle. For instance, the literature prescribes that an organization “should analyze and measure risks that were identified in the previous stage” (the risk identification stage) or consider possible risk management decisions (the decision and control stage) while taking into account the “likelihood and severity of risks previously investigated” (the risk analysis stage). We could consider that despite what the risk management literature establishes, in reality organizations might implement some activities of the risk management process without necessarily paying attention to a particular order or sequence.

The results of our research, however, might suggest that general entities in our sample will have a better risk management score in a particular risk management stage, if they had fulfilled (high score) the practices defined in the previous risk management stage. The latter empirical finding is in line with the progressive definition of the risk management process. In figure 8.2 we present a theoretical or expected association between the different stages in terms of the risk maturity scores obtained. Accordingly as we can see in figure 8.2, we would expect that the majority of cases of stage 1 would be below the 45° line in the scatterplot, having a higher score than the second stage.

As we can see in figure 8.3 we have identified patterns between the different dimensions or process scores, that could empirically confirm the mentioned theoretical claim. As we show in figure 8.3 the latter is strongly observed for the “risk identification” stage with the “risk analysis and measurement” stage that has a positive correlation of  $r=0.52$ . We can also observe that 76% of the scores (cumulative percentage) of first stage (“risk identification”) is higher than the following stage (“risk analysis and measurement”). We find also the same pattern for the “risk analysis and measurement” phase and the “risk decision and control” stage ( $r=0.55$  and 71% of practices implemented in the previous stage are higher than the following) and the “decision and control” process with the “implementation and reviewing” stage ( $r=0.59$  and 57% of practices implemented in the previous stage have a higher score than the following risk management stage). Accordingly we could infer that municipalities that had a high risk maturity score or completed most of the risk management practices defined in a previous risk management stage, would receive higher scores in the next risk management dimension. In appendix 5 we present the respective correlation matrix of the different risk management stages and also the scatterplots graph where we illustrate the described pattern in our data set.

Figure 8.2. Expected association between the stages of the risk management cycle.

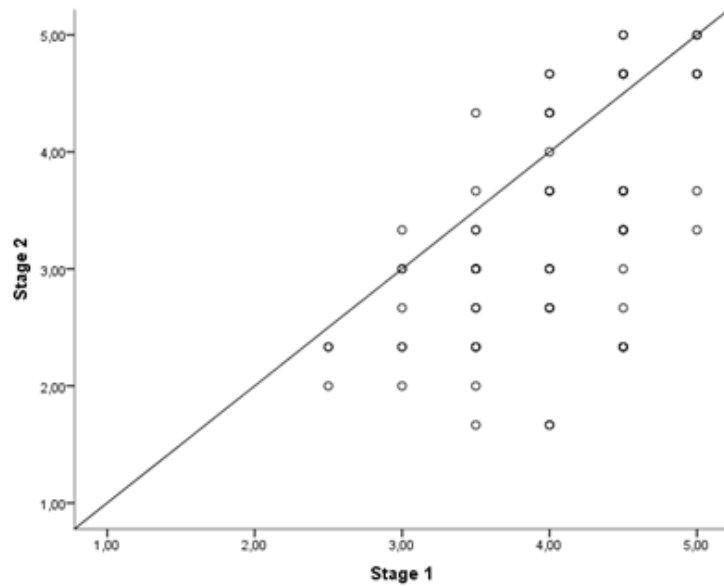
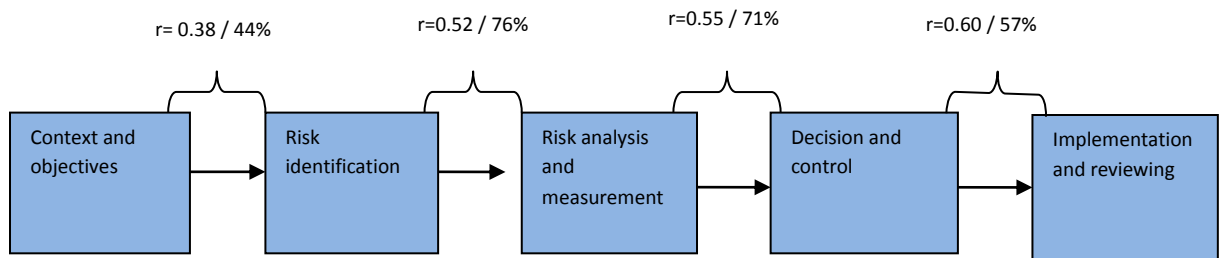


Figure 8.3. The progressive reasoning of the risk management cycle and the correlation between the different stages in our scale.



## 8.5. Risk maturity scores and size

Taking account previous research, particularly the one developed by Boorsma and Haisma (2005) that found a relationship between the size of municipalities and the sophistication of risk management practices implemented by those entities, we came also to explore if the size of the organizations that participated in our study is related to the level of risk maturity obtained by those entities.

As we show in table 8.9 and in figure 8.4 the group of the smallest communities received the lowest (2.9) overall risk maturity score, while the segment with the largest communities received the highest overall risk maturity score in our sample (3.4). The latter finding might suggest then that size would matter considering the implementation of more sophisticated risk management practices in municipalities in the Netherlands<sup>40</sup>, observing then a clear pattern indicating that large municipalities in our sample tend to have a higher overall risk maturity score.

In also table 8.9 and figure 8.5, we present the risk management maturity score of each “process group” classified by the size of the municipalities. As we can see from figure 8.4, although the overall score of the smallest group of communities in our sample is relatively low (2.9), they had a higher score in the process areas of “risk objectives” (3.4) and “risk identification” (3.4). By looking at table 8.9 and figure 8.5 we can observe that municipalities in the second segment (between 20.000 to 50.000 inhabitants) have a distinctive risk maturity score in the same risk management stage (“risk objectives” with 3.6 and “risk identification” with 3.8). We also see in table 8.9 and figure 8.5 that municipalities from the third segment (between 50.000 inhabitants to 100.000 inhabitants) also have a relatively higher score in the process groups “context and objectives” (3.8) “risk identification” (4.1) and “risk analysis and methods” (3.8). As we can observe from table 8.9 and figure 8.5, municipalities from the group of the largest entities (>100.000 inhabitants) also scored relatively better in the process group “context and objectives” (3.8), “risk identification” (4.0) and in “the risk analysis and measurement” (3.5) stages. As discovered earlier in this chapter, there is a clear pattern in our sample that might indicate that practices of the last stages of the risk management cycle (“decision and control” and “implementation and reviewing”) would be more difficult to implement for municipalities than the first stages of the risk management process included in our proposed risk maturity model (“context and objective”, “risk identification” and “analysis and measurement”). It is, however, surprising to realize that this pattern can still be noticeable when analyzing the different segment size, even in the case of large communities.

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<sup>40</sup> There might be contradictory arguments and inconsistent findings in the literature considering the importance of size as a predictor of organizational change or innovation. Some scholars argue that large organizations would innovate and successfully change while others tend to find negative influence related to size (ie. Haveman, 1993; Ettlie and Rubenstein, 1987).

When describing the general characteristic of municipalities that participated in our study, according to the risk maturity scores obtained, we claim that in general the entities have defined and implemented a formal risk management process, having procedures and clear descriptions of roles in the organization. We can see from our findings that municipalities in our sample—on average at least—can make a distinction between events (such as burglary or fire), policy fields exposed to risk (such as environmental policy, treasury, municipal ambulance transport), and risk exposed objects (e.g., buildings, computers, employees, citizens, etc.). Municipalities in our study might also consider immaterial or reputational risks as well as risks related to damage inflicted on a third party. Municipalities in our sample, in general, mention explicitly which responses they have taken for each specific risk analyzed.

As we have seen, there might be a pattern in our sample, considering that most of the entities studied had difficulties implementing the last two stages of the risk management process (“decision and control” and “implementation and reviewing”). In general, municipalities in our sample would use the same measures or risk responses that were used before. In the case of insurance policies, for instance, they would not be reviewed or evaluated regularly, thus risk would be considered as a static phenomenon by those municipalities instead of a dynamic one. Therefore, the decision process of municipalities that participated in our research, according to the proposed model, could be categorized as “incrementalistic”, comparing the current state of affairs or previous risk management strategies and performing only small adjustments. On the other hand, the entities studied do not generally have adequate training and funding to support the implementation of the wider and modern perspective of risk management. Therefore, organizations in our sample do not normally have a special budget allocated for the implementation of the discipline (training, advising, systems, etc.). These organizations do not carry out a systematic or regular auditing procedure for risk management and do not have a documentation process. The later process, as we have discussed, could be relevant for the municipality since more organizational learning might occur when more of the organization’s components obtain this knowledge and recognize it as potentially useful. It is fundamental to develop an “organizational memory” through which knowledge is stored in the form of procedures and routines as well as non-routine information (Huber, 1991).

Consequently, municipalities in our sample are still far away from the best practices of risk management, especially the wider or integrated perspective, due mainly to the limitations in their feedback mechanisms (MacGillivray et al., 2006). So, following organizational learning theory, we can say that these limitations might restrict organizations’ ability to correct errors using the wider perspective of risk management (Argyris and Schön, 1978). As a consequence, these municipalities would then rely on risk management processes and the repetition of activities mainly related to the application of the traditional perspective of risk management and especially the “resilience paragraph” as their theory-in-use. Thus, when these entities make mistakes, the organization partially learns (open loop), looking for answers to respond to these errors or difficulties within their narrow perspective of risk management. Therefore,

following Argyris and Schön (1978), we can say that municipalities in our sample have a vulnerable knowledge of risk management; when mistakes are made the organizations do not learn, thus failures are repeated as well as successes.

Table 8.9. The mean risk maturity scores for the different risk management stages and segments defined

<b>Risk management stages</b>	<20.000 (n=10)	Between 20.000 to 50.000 (n=29)	Between 50.000 to 100.000 (n=19)	>100.000 (n=14)	<b>Total</b> (n=72)
<b>Context and objectives</b>					
Mean S.D.	<b>3.4</b> (0.53)	<b>3.6</b> (0.56)	<b>3.8</b> (0.50)	<b>3.8</b> (0.51)	<b>3.7</b> (0.53)
<b>Risk identification</b>					
Mean S.D.	<b>3.4</b> (0.66)	<b>3.8</b> (0.81)	<b>4.1</b> (0.62)	<b>4.0</b> (0.85)	<b>3.9</b> (0.78)
<b>Risk analysis and measurement</b>					
Mean S.D.	<b>2.7</b> (0.85)	<b>3.0</b> (0.95)	<b>3.8</b> (0.86)	<b>3.5</b> (0.91)	<b>3.3</b> (0.96)
<b>Decision and control</b>					
Mean S.D.	<b>2.5</b> (1.02)	<b>2.6</b> (0.81)	<b>3.3</b> (0.77)	<b>3.0</b> (0.72)	<b>2.9</b> (0.85)
<b>Implementation and reviewing</b>					
Mean S.D.	<b>2.3</b> (0.78)	<b>2.6</b> (0.96)	<b>3.0</b> (0.59)	<b>2.9</b> (0.73)	<b>2.7</b> (0.83)
<b>Overall score</b>					
Mean S.D.	<b>2.9</b> (0.70)	<b>3.2</b> (0.70)	<b>3.6</b> (0.57)	<b>3.4</b> (0.65)	<b>3.3</b> (0.62)



Figure 8.4. The risk maturity overall score for the different size of municipalities

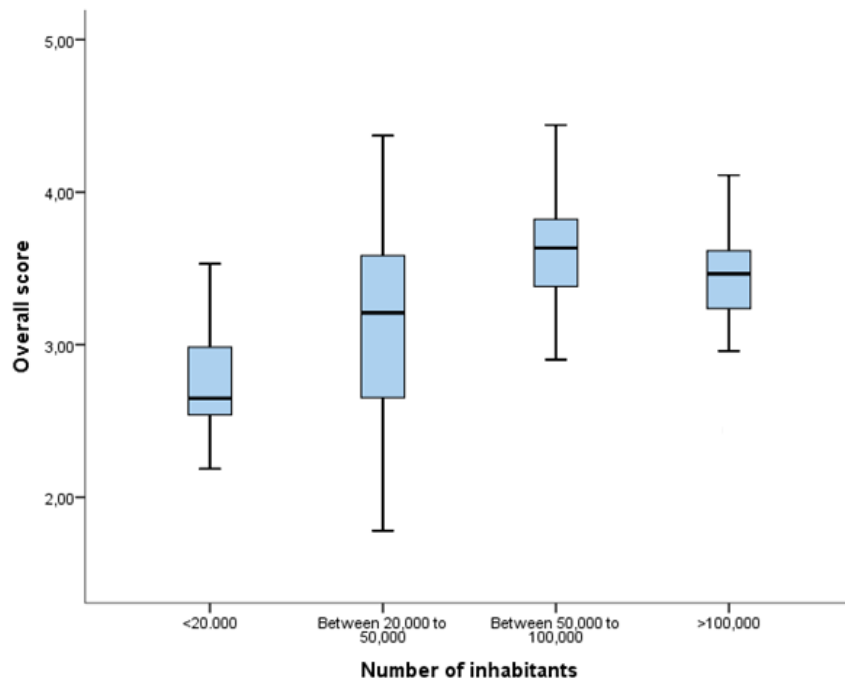
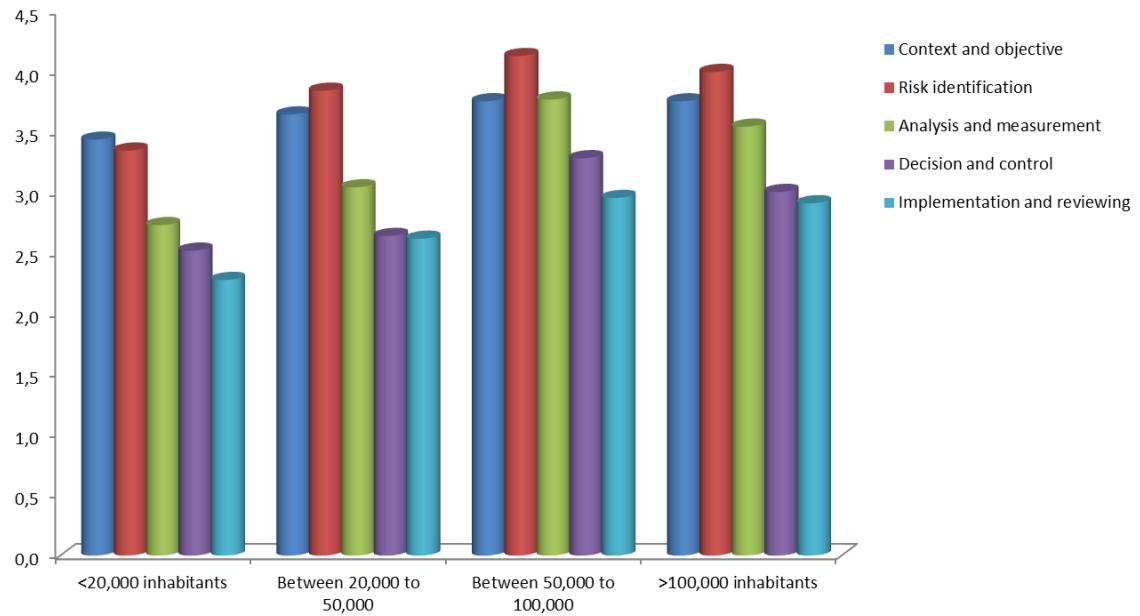


Figure 8.5. The risk maturity score for the different process groups and size



## 8.6. Mature and immature practices, analyzing two cases

Although as we have shown in previous sections, we obtained a mean overall score for the whole sample of 3.3, the distribution of cases are in the range of 1.7 to 4.5 (see again figure 8.1 in section 8.3). As a consequence, we are especially interested in analyzing in depth two extreme cases selected that are in both tails of our distribution, reviewing carefully their risk management practices implemented. The latter would permit us to characterize an immature entity (at level 1 according to our model) and an almost mature organization in our sample (at level 4).

The first case we evaluate is a municipality that we have nominated as entity **A**, which obtained the highest overall risk management score in our data set, with an average score of 4.5, rated at Level 4 maturity. Municipality **A** belongs to the group of the big local entities (between 50.000 to 100.000 inhabitants). The high risk maturity level obtained by this particular municipality, was due to the application of various risk management practices that we have considered in our proposed model. Accordingly this municipality had established roles and responsibilities for the implementation of risk management. Additionally when developing the objective of its risk management program this municipality follows the recommendation of the “resilience paragraph” (weerstandsparagraaf) but also pursues the “wider” perspective of risk management. Moreover municipality **A** registers risks that have been materialized (losses) and threats that have been prevented, a practice that was included in our definition of the “risk identification” process. As expected for a relatively mature entity, municipality **A** mentions in its policy which instrument it uses for the analysis and measurement of risk and also has access to and uses external support for risk analysis. Likewise in this municipality the assessment of risk is done by the financial unit of the municipality or the insurance department (Afdeling Financiën of Verzekeringen). Additionally, municipality **A** determines risk responses complying with the “resilience paragraph” (weerstandsparagraaf), thus reserving financial resources for future unfunded events. Although not entirely unexpected, to be noted here was the fact that municipality **A** mentions explicitly in its policy which measures are taken for each specific risk and also adopts a combination of risk treatment options. Considering its high level of maturity, it was surprising to realize that municipality **A** does not have a special budget allocated for the implementation of a specific risk management control or response and also for the improvement of risk management practices (training). The latter, according to Huber (1991), facilitates organizational learning by developing uniform comprehensions of the interpretation of risk management discipline (the organizational theory in use). In the same line, municipality **A** does not have an annual training on risk management. Nonetheless this entity has a risk management system to store, analyze and distribute risk management information. The latter concords also with what we have seen in the theoretical part of this thesis, more organizational learning occurs when more of the organization’s components obtain this knowledge and recognize it as potentially useful. Therefore it is fundamental to develop an “organizational memory” by which knowledge is deposited and

disseminated in the form of procedures and routines as well as non-routine information (Huber, 1991).

On other aspects that were not considered in the calculation of the actual risk maturity level but could be interesting variables for further analysis, we can mention that the respondent of the survey in the case of municipality **A** was the risk management coordinator, with a level of education of master degree. Furthermore, this municipality has implanted a special unit for risk management and is a member of both, the “expert circle” on Risk Management of the Ministry of Interior and PRIMO Nederland. The participation by this municipality in these two organizations could also suggest an important source of knowledge for entity **A**, explaining partially its high level of risk maturity, considering that we assumed as valid what the literature on inter-organizational learning suggests: that networks ties provide access to information and outflows of knowledge (Schulz, 2012) for organizations through the interaction with peers, promoting then adaptive change (Kraatz, 2012). As a consequence, external support in the implementation stage, might contribute to acquire the “new frame of references”, by intervening in the “theory in use” and the organization’s beliefs of the entity (double-loop). To be considered here is the fact that when asked if the entity was in position of a Risk Manager, the respondent of this municipality stated: “At the moment we have two, one in project and one at the finance/control department”. In figure 8.6 we show a representation of the scores in every risk management process or stage of this particular entity.

The other case analyzed, which we have labeled as municipality **B**, has its place in the segment of municipalities between 20.000 to 50.000 inhabitants. Municipality **B** was evaluated to have an overall maturity score of 1,7 and therefore it was classified in Level 1 according to our proposed risk maturity model. When developing its risk management policy as expected, municipality **B** does not establish roles and responsibilities at strategic or operational level. Additionally this entity does not have a defined objective for its risk management program. In the “risk identification” process, municipality **B** does not identify opportunity elements and does not identify possible damages inflicted on a third party caused by the entity, focusing only in the identification of regular risks. Moreover, in the section of the survey where the respondent can draw additional comments, this municipality stated the following: “In the long term policy making we identify opportunity elements, but not in the perspective of risk management”. We believe that the previous remark shows the low knowledge of risk management of the respondent, not considering the discipline of risk management as a powerful tool for decision making in any of the business processes of the local entity. Furthermore, municipality **B** does not measure risk by determining its consequences and its likelihood. Moreover, this municipality does not have a formal risk analysis process, performing the analysis of risk in an intuitively manner. Additionally, the respondent of this municipality stated the following considering the calculation of the risk paragraph; “At this moment only attention is giving to the size of reserves”. The latter could only demonstrate then little understanding about the specific bylaw and on the risk management discipline in general. As for the determination of responses for future risk events, entity **B** develops responses only to deal with

pure risks and also to comply with the “resilience paragraph”, reserving financial resources for future unfunded events. As being also predictable, municipality **B** takes decisions on risk treatment based on the past experiences with similar cases. This entity also has no budget allocated for the implementation of risk management (training, advising, systems, etc.). Therefore, municipality **B** has not a training program on risk management which could contribute to the learning process of the organization. As to another important part of the “implementation reviewing and feedback” process, entity **B** does not carry out regular audits in the municipality. On the other hand, unexpected by this municipality has a formal documentation process for risk management where risk management reports are used by both the Alderman of Finance (Wethouder Financien) and the members of the executive committee related with financial matters. The latter indicates a good level of “knowledge distribution”<sup>41</sup>, which is consistent with the literature of organizational learning. We have to state as well that the respondent of the questionnaire in the case of municipality **B**, was an insurance manager. Finally, this municipality does not have a special unit for risk management and is not a member of the “expert circle” on risk management of the Ministry of Interior or PRIMO Nederland, not having then the supposed benefits of obtaining firsthand knowledge (frame of reference) on risk management through these specialized organizations (see figure 8.7 where we present a graph with the mean scores of this municipality)

Especially related to the level of risk maturity of entities in our sample, we have learned first that it seems to be a pattern considering the scores obtained and the size of the entities. On the other hand, we have shown in these two cases described, that besides the particular implementation of practices defined in every level of the risk management cycle, there were additional activities in our questionnaire related to the participation of municipalities in the “expert circle” on risk management of the Ministry of Interior, the membership of PRIMO Nederland and having the role of a “risk manager” in place in the organizations, aspects that we considered valuable to measure in the design of our questionnaire, since they might have some influence in the learning process of the municipality. Although we cannot presume any generalization by observing cases **A** and **B**, we should further analyze these particular practices as additional possible explanation for the level of risk maturity obtained by the municipalities in our sample (in appendix 6 we show a scatterplot where we can see the two cases selected from the data set).

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<sup>41</sup> As we have seen in the previous Chapter, Huber (1991), explains the “knowledge distribution” process, as the process by which information from different sources is shared in the organization and thereby leads to a new information or understanding (the organization’s theory in use)

Figure 8.6. The risk maturity score of case **A** for the different process groups (CO stands for “Context and objectives”, ID for “risk identification”, AM for “analysis and measurement”, DC for “Decision and control” and IMR for “implementation and reviewing”)

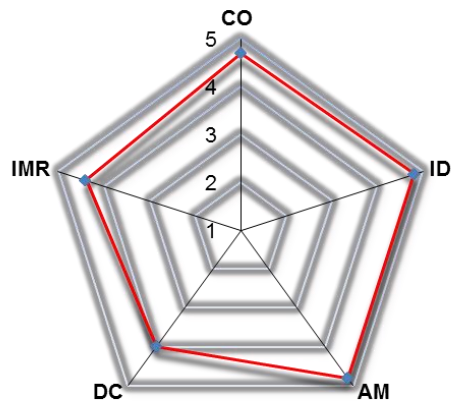
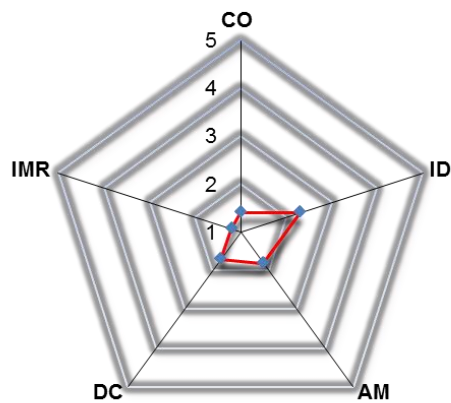


Figure 8.7. The risk maturity score for case **B** for the different process groups (CO stands for “Context and objectives”, ID for “risk identification”, AM for “analysis and measurement”, DC for “Decision and control” and IMR for “implementation and reviewing”)

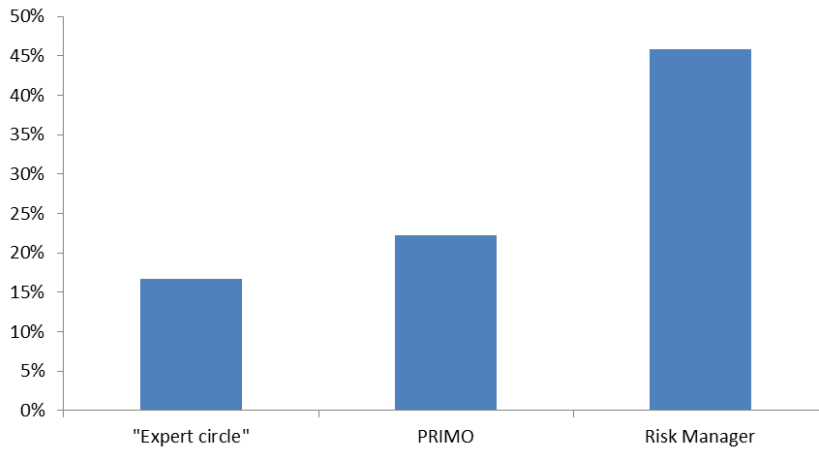


## **8.7. Organizational arrangements for the learning process of risk management practices**

As mentioned before, in the design of the survey we have included also an item with general or context information. Although the variables included in this part of the questionnaire were not used to calculate the risk maturity scores, we considered them as important “organizational arrangements” that would facilitate the learning process of risk management practices by municipalities.

In figure 8.8 we show the percentage of entities that are members of the local knowledge group on risk management in the Netherlands, the “expert circle” of the Ministry of Interior and the international expert organization PRIMO (Public Risk Management Organization). We see in figure 8.8, only 17% of the entities in our sample reported to be part of the “expert circle” and 22% mentioned that they were a member of PRIMO. As we can remember from earlier chapters, we considered that the participation of municipalities in these experts organizations could be seen as a source of risk management knowledge, since we assumed what the literature on organizational learning suggested was valid: network ties provide access to information and outflows of knowledge (Schulz, 2001) for organizations through the interaction with peers, promoting an adaptive change (Kraatz, 1998). In figure 8.8 we also show the results of municipalities that had a “risk manager” or a special unit for risk management in place. As we can see in figure 8.8, 46% of municipalities had a risk manager. As previously mentioned, we contended that the existence of an “in-house” specialist on risk management in the municipality might contribute to the development of uniform comprehensions of the risk management discipline (the organizational theory-in-use) (Huber, 1991). Therefore, we believed that expert support could assist the organization to acquire a “new frame of references”, by affecting the “theory-in-use” and the organization’s beliefs of the entity (double loop). We, therefore, stated that these sorts of “organizational arrangements” (being part of the “expert circle”, PRIMO, and having a risk manager) could be seen as “enablers” for the learning of best risk management practices in Dutch municipalities. The latter proposition is supported by the arguments stated before, assuming that the variables described might contribute to the transformation of routines and the modification of “theory-in-use” of the entity.

Figure 8.8. Municipalities in our sample that are member of the “expert circle” and PRIMO and that have a risk manager in place.



In order to evaluate if these “organizational arrangements” could have positively affected the risk management scores obtained by the municipalities that participated in our research (as we expected), we conducted an independent sample T-test for each of these variables. As we show in tables 8.10 to 8.12, there is a clear pattern in our data set that indicates a relationship between the mentioned variables and the risk maturity scores received by the municipalities. As we can see in table 8.10, the latter is especially the case for the variable “expert circle”, where we found significant differences (i.e., the overall score with a P-value of  $<0.1$ ). Less convincing but showing the same positive relationship, is the variable illustrating being a member of “PRIMO” Nederland with a P-value of 0.10 as the overall score (see table 8.11). In table 8.12 we show the variable related to having a “risk manager” or special unit in the municipality, where we also found a clear relationship with the overall score and the risk management stages defined (overall score with a P-value of  $<0.1$ ).

As a conclusion, we could state that there is a pattern indicating a relationship between the mentioned variables (“expert circle”, PRIMO and “risk manager”) and the risk management scores of municipalities. However, as we have observed earlier in this chapter, there is also a pattern in our data showing a relationship between the risk management scores of the different “process groups” or stages and the size of the municipalities. Accordingly, it might also be possible that the commented variables are related to the size of the municipalities. In order to investigate this, we combined these variables into a single variable called “organizational arrangements” which allowed us to for further analyses.

Table 8.10. "Expert circle" with the different mean scores of the risk management stages and overall scores.

<b>Member of "expert circle"</b>	<b>NO (n=60)</b>	<b>YES (n=12)</b>	<b>P-value</b>
<b>Overall score</b>			
Mean S.D.	3.2 (0.61)	3.8 (0.32)	P<.01
<b>Context and objectives</b>			
Mean S.D.	3.7 (0.56)	3.8 (0.38)	P=.21
<b>Risk identification</b>			
Mean S.D.	3.8 (0.77)	4.5 (0.49)	P=<0.1
<b>Risk analysis and measurement</b>			
Mean S.D.	3.1 (0.92)	4.1 (0.74)	P<.01
<b>Risk decision and control</b>			
Mean S.D.	2.8 (0.86)	3.5 (0.48)	P=<0.1
<b>Risk implementation and reviewing</b>			
Mean S.D.	2.6 (0.85)	3.2 (0.51)	P=.02



Table 8.11. "PRIMO" with the different mean scores of the risk management stages and overall scores.

<b>Member of PRIMO</b>	<b>NO (n=56)</b>	<b>YES (n=16)</b>	<b>P-value</b>
<b>Overall score</b>			
Mean S.D.	3.2 (0.63)	3.4 (0.54)	P=.10
<b>Context and objectives</b>			
Mean S.D.	3.7 (0.54)	3.6 (0.51)	P=.65
<b>Risk identification</b>			
Mean S.D.	3.9 (0.79)	4.0 (0.75)	P=.24
<b>Risk analysis and measurement</b>			
Mean S.D.	3.1 (0.94)	3.8 (0.90)	P=.005
<b>Risk decision and control</b>			
Mean S.D.	2.8 (0.86)	3.0 (0.84)	P=.17
<b>Risk implementation and reviewing</b>			
Mean S.D.	2.7 (0.88)	2.8 (0.64)	P=.43

Table 8.12. “Risk Manager” with the different mean scores of the risk management stages and overall scores.

<b>Risk Manager</b>	<b>NO</b> (n=39)	<b>YES</b> (n=33)	<b>P-value</b>
<b>Overall score</b>			
Mean S.D.	3.0 (0.55)	3.6 (0.58)	P<.01
<b>Context and objectives</b>			
Mean S.D.	3.6 (0.48)	3.8 (0.57)	P=.04
<b>Risk identification</b>			
Mean S.D.	3.7 (0.80)	4.1 (0.71)	P= .002
<b>Risk analysis and measurement</b>			
Mean S.D.	3.0 (0.87)	3.7 (0.93)	P<.01
<b>Risk decision and control</b>			
Mean S.D.	2.7 (0.82)	3.1 (0.83)	P=.08
<b>Risk implementation and reviewing</b>			
Mean S.D.	2.4 (0.72)	3.1 (0.77)	P<.01

In table 8.13 we present the percentages of municipalities, ordered by size, that do have an “organizational arrangement” (combined variable of “expert circle”, PRIMO and “risk manager”). As we can see in table 8.13, the entities from the largest communities are the ones who participate the most in PRIMO and the “expert circle”. Specifically, the largest group of municipalities concentrates the majority of memberships in the mentioned organizations. Moreover, in table 8.13 we show the results of municipalities that have a “risk manager” or a special unit for risk management in our sample. As expected again, the entities that do have a risk manager in place are concentrated also in the group of the largest municipalities. On the other hand, only 10% of municipalities of the smallest group had a risk manager or a specialized unit, 20% of that segment were member of PRIMO and no entities of that group were members of the “expert circle”. Accordingly we observed also a strong positive relationship between the size of the entities and these so called “organizational arrangements” (Kendall’s tau-b= .46, P<.01).

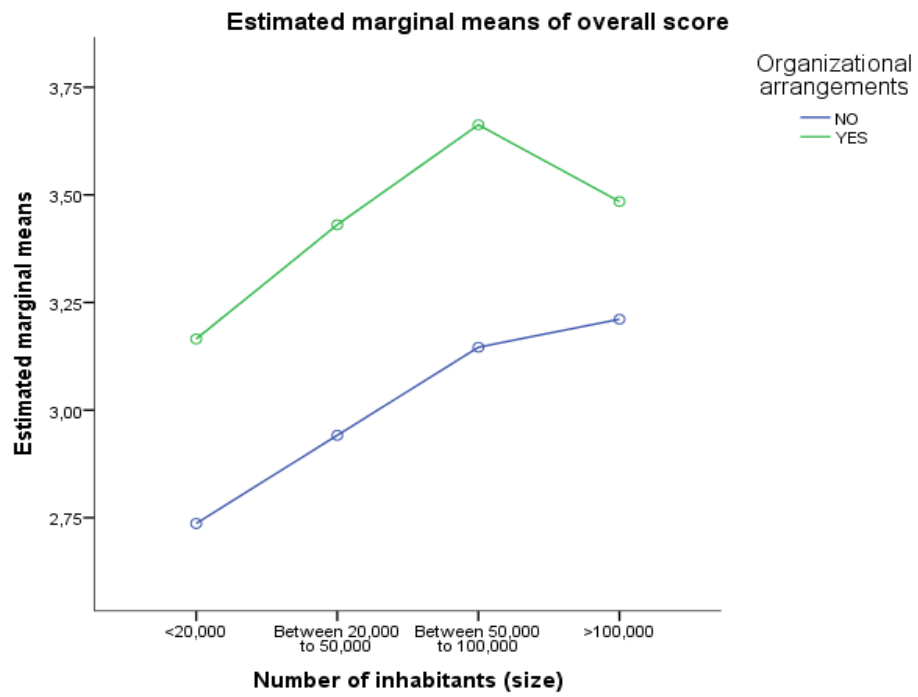
Having established this relationship between size and “organizational arrangements”, the question remains in order to determine which variable might be more dominant in the level of risk maturity of our sample; the size of the entities or these “organizational arrangements” discussed (“expert circle”,

PRIMO and “risk manager”). In order to elucidate this issue we have performed a multivariate analysis by using the ANOVA test (Analysis of Variance), taking the overall risk maturity score as our dependent variable and size and “organizational arrangements” as the independent variables. As we can see in figure 8.9, both “size” and “organizational arrangements” have a positive effect on the overall risk maturity scores of the entities in our sample. However although these two variables may have an influence in the overall level of risk maturity, we have to state that only the “organizational arrangement” variable is significance ( $F=5.766$  ,  $df=1$  ,  $71$ ,  $P=.02$ ) while the “size” variable is not ( $F=1.147$ ,  $df=3$ ,  $71$ ,  $P=.34$ ). In appendix 7 we show a table with all the mean values of the “organizational arrangements” variables, organized by size.

Table 8.13. Context variables and the “organizational arrangements” variable by the size of the municipality.

	< 20.000	20.000 to 50.000	50.000 to 100.000	>100.000	Total
<b>"Expert circle"</b>	(n=0) 0.0%	(n=0) 0.0%	(n=8) 42.1%	(n=4) 28.6%	<b>(n=12)</b> 16.7%
<b>PRIMO</b>	(n=2) 20.0%	(n=2) 6.9%	(n=7) 36.8%	(n=5) 35.7%	<b>(n=16)</b> 22.2%
<b>Risk Manager</b>	(n=1) 10.0%	(n=11) 37.9%	(n=12) 63.2%	(n=9) 64.3%	<b>(n=33)</b> 45.8%
<b>Organizational arrangements</b>	(n=3) 30.0%	(n=13) 44.8%	(n=16) 84.2%	(n=12) 85.7%	<b>(n=44)</b> 61.1%

Figure 8.9. Comparing “organizational arrangements” means with size.



## 8.8. Conclusions for this chapter

We have presented in this chapter the results of the PhD research. We first described the general characteristics of our sample and then evaluated the reliability of the risk maturity scale proposed. Furthermore, we have exhibited the overall risk maturity score of the sample, as well as the risk maturity score for each segment and risk management stage.

The Cronbach's alpha test obtained for the overall risk management score (0.87) might suggest a general internal consistency of the scale. By exploring different interpretations of our results, we have found a pattern in our sample suggesting that, in general, municipalities in our sample scored better in the first stages of the risk management process ("risk objective", "risk identification" and "risk analysis and measurement") while having a lower level of risk maturity in the last stages ("risk decision and control" and "risk implementation and reviewing"). This finding is interesting considering that there are no clear propositions in the literature that would differentiate the risk management stages of the risk management process according to their complexity or difficulty to implement. On the other hand, we have discovered another pattern in our data set that might suggest that the participating entities would have a better risk maturity score in a particular risk management stage defined, if they had fulfilled the practices defined in the previous stage. As we have mentioned, this finding would be in line with the logical and progressive assumption of the risk management cycle discussed in the literature.

When analyzing the actual risk maturity scores of the municipalities that participated in our research, we have observed that the group of smallest communities received the lowest overall risk maturity score (2.9) while the segment with the largest communities obtained the highest score in the sample (3.4). Although, because of the size of our sample, we cannot generalize for the whole population, we can claim that the size of the municipalities has an effect on the level of risk maturity of the entities since larger municipalities have more sophisticated risk management practices in place (higher risk maturity scores). We have also described the specific risk management practices implemented by two cases selected in our sample. The depth analysis of these two cases has allowed us to characterize a mature and immature organization considering the implementation of risk management.

Moreover we have analyzed possible associations between "organizational arrangements" (being member of the "expert circle", PRIMO and having a "risk manager" in place), the size of the municipalities and their level of risk maturity. Therefore we have concluded that the "organizational arrangements" have also an effect on the risk management overall score. The latter finding is interesting since we considered these variables as possible "enablers" for the learning of best risk management practices in Dutch municipalities, contributing to the transformation of routines and the modification of "theory in use" of the entity.

We have observed empirically the presence of risk management process and key practices, signing -in a normative way- the path for risk management

evolution. Although we have discussed organizational change and learning through routines and practices, our main goal was to construct an instrument for the correct implementation of risk management and not to describe necessarily how organizational change occurs in reality in the Dutch municipalities. However we did use the theory of organizational change and organizational learning to provide reasoning to our model and to particularly differentiate the levels proposed. We also assumed that the integrated perspective of risk management is a novel discipline that needs to be learned by the organization, thus explicitly involves a process of change (Van Staveren, 2009). In that sense, the lower scores obtained by municipalities in our sample, especially in the “implementation and reviewing” stage, might partially explain the overall maturity of these entities, not having implemented the specific routines that could facilitate the learning process of more comprehensive risk management practices (feedback activities). Additionally, following Stubbart and Smalley, (1999) ) who developed a criterion for clearly evaluating stage models, we claim that at this point we have provided empirical evidence of stage transformation, applying in reality the causal forces (risk management best practices) identified in the construction of the RMM proposed. Despite of the limitation of the risk maturity model offered in this research, we are convinced that this improved risk maturity framework, can be used by the municipalities in the Netherlands wishing to enhance their risk management approach. Established in the first part of our PhD research, our proposed risk maturity model could be seen as a method for the diagnosis of the current processes of risk management in the Dutch municipal sector, as well as to influence the correct implementation of the discipline by these local public entities. As a consequence, our main contribution takes place in the adaptation of risk maturity models to the characteristics of municipalities in the Netherlands and the development of a theoretical reasoning that was absent in previous research. In that sense following the framework of Wendler (2012) to classify maturity model research, we concentrated our effort on the *construction* of a pertinent risk maturity model, a process that has included the essentials of the CMM, the risk management practices mentioned in the literature and standards, and also considered the industry requirements of risk management for Dutch municipalities. This conceptual RMM has also integrated in its structure, the risk management cycle as being the systematic *description* of the discipline. Therefore, although our attempt to develop a RMM has been derived by the abstraction of existing RMMs and research on the subject, it is not a *transfer* of these models, but rather a novel adaptation of risk maturity modeling to Dutch municipalities. We have also focused our effort in the development of *theoretical reflection* and *empirical validation* of our proposed RMM in a sample of Dutch municipalities. The latter has been accomplished by *assessing* the risk management practices implemented in municipalities in the Netherlands. Finally, we have to say that considering the explorative design of this PhD research, the constructs developed for the risk maturity proposed need to be further refined in order to improve their reliability and external validity and pretend any generalization.

## CHAPTER 9: Conclusion and recommendations

*“Out of damp and gloomy days, out of solitude, out of loveless words directed at us, conclusions grow up in us like fungus: one morning they are there, we know not how, and they gaze upon us, morose and gray. Woe to the thinker who is not the gardener but only the soil of the plants that grow in him.”*  
(Friedrich Nietzsche, *Daybreak*, 1881, p.382.)

### 9.1. Introduction

After reporting the results of this PhD thesis, we will summarize the key findings of our research as well as reflect on our main contributions and recommendations. We first return to the beginning of this book, where we established the goals of the research and designed the research questions that needed to be answered.

As we discussed in chapter 1, we argue the assumption that risk management is a discipline that would positively contribute to the overall performance of an organization (through the economization of financial losses, the prevention of human life loss and in general, the accomplishment of strategic objectives, among others). As in the private sector, we can observe that risk management has also gained increasing popularity by public entities. Considering the great amount of threats that public organizations now face, as well as the necessity to respond to more demanding regulations and public liability, the public sector has started to develop risk management awareness.

We have made a clear distinction in this PhD research between the traditional or narrow perspective of risk management and the integrated or comprehensive approach. Based on the literature, we claim that the maximum evolution of risk management is the system entitled “enterprise risk management”, which is also known as “corporate risk management” and “organizational risk management”. This modern perspective characterizes itself by proactively managing risk within an entity. This implies a permanent and conscious monitoring of all types of risk that might affect the main objectives of an organization.

Despite the progressing interest in the public sector, the actual implementation of risk management in public entities (especially the integrated perspective) might be a difficult task to accomplish. The Dutch case is an interesting example to analyze, as we discussed in chapter 4 of our study, because municipalities in the Netherlands have a special bylaw for risk management which requires that local governments implement a policy on financial resilience, declaring the risks they have identified as well as measures to confront them. As innovative as this risk management public policy might seem, there might be some evidence of the difficulties that municipalities in the Netherlands face considering the implementation of this policy and risk management practices in general (Boorsma and Haisma, 2005).

As previously stated, our main objective has been to develop a method to impartially diagnose the implementation of risk management practices in Dutch municipalities and contribute to the correct application of the modern perspective of the discipline in these types of organizations. We believed that

risk maturity models could be a suitable technique for judging the implementation and quality of risk management in municipalities in the Netherlands. Taking into account the fundamental (lack of theoretical explanation) and also the practical (not suitable for Dutch municipalities) difficulties found in current risk maturity models, we made a significant effort to explain and also adapt this method to the characteristics of Dutch municipalities. Accordingly, we state that organizational change and organizational learning theory helps us explain the evolutionary logic assumed by risk maturity models and also shapes a reasoning for the different levels of a proposed model.

When applying the improved risk maturity model to a sample of municipalities, we found interesting findings and empirical support for the construct validity of our model. Although we still consider this proposed risk maturity model a developing method that needs additional enhancements, we strongly believe that it could be a pertinent instrument for the assessment of risk management process in Dutch municipalities, also influencing the implementation of best risk management practices by these organizations. In the next sections we will summarize the main findings of our research, describing what we believe are our main contributions and suggestions, the limitations of this PhD thesis, as well as set a clear research agenda for future research.

## **9.2. Main findings**

The general objective of this PhD research was to determine the level of implementation of risk management in Dutch municipalities through a revised and improved risk maturity model. Accordingly the central research question was: how are risk management practices being implemented in Dutch municipalities and how can we measure them? While trying to fulfill this objective, we have explored risk management theory, decision theory, literature on risk maturity and maturity models maturity models, organizational change theory and organizational learning theory. This task provided interesting theoretical findings which are added to the ones we obtained in the empirical application of the proposed model in a sample of Dutch municipalities.

### *9.2.1. Research question 1*

“What are the relevant elements in the theory of risk management that are applicable for municipalities?” In order to evaluate how risk management practices were implemented in Dutch municipalities, it was essential to first study in detail the theory of risk management. The latter considered a clear definition of the discipline as well as established a distinction between its traditional approach and its more modern perspective (integrated risk management). Additionally, the characteristic elements of risk management in public organizations needed to be studied in detail considering the unit of analysis of our research. Special attention in chapter 2 was given to the specific risk management practices and risk management process.



By reviewing the literature on risk management then, we have established a clear parallel between the so called “silo perspective” and the comprehensive approach of the discipline. While answering this research question, we learned that this modern version assumes that organizations would need to monitor their risk in a continuous manner, paying special attention to risks that would affect their strategic objectives. The integrated approach prescribes also that the organization should manage not only negative risks but also potential gains (positive risks), measuring the evolution and severity of the risks found. This perspective of risk management considers that the entity would define an overall risk management profile that would mention the level of “risk tolerance” or appetite that the organization is willing to take. According to the literature on risk management, this profile should be aligned with the strategic objectives of the entity. The comprehensive or integrated perspective of risk management as discussed in chapter 2, stresses the necessity of continuous improvement, which assumes the implementation of an adequate infrastructure and risk management systems. This is related to the fact that according to this approach, organizations should apply a logical and systematic method for analyzing the context in which they operate for measuring and evaluating the risks that have been detected, as well as for monitoring and communicating those threats related to specific activities or functions of the organizations. Senior management support and participation in the definition of the risk management program is also a practice that is often discussed by the specialized literature. Within the best practices of the integrated perspective, a risk manager, or specialized unit, has the responsibility to integrate the risk management activities and efforts within the organization. Assuming that, according to the modern perspective of risk management, every unit and employee should get involved in risk management, developing risk management awareness and “ownerships” of risks, the risk manager or specialized units become essentially an “in house expert or adviser”.

We also focused in this part of the thesis on the description of the risk management cycle. As mentioned in chapter 2, risk management should be planned in a process that includes a sequence of logical steps. The latter is quite essential for our research, since we believe that by following the different stages of the risk management cycle, an organization could rationally implement a structured risk management program. Although we described in that particular chapter the different versions of the risk management process, we presented our own interpretation. According to our view, the risk management process should contain at least the following steps: A “risk objective” step, a “risk identification” step, a “risk analysis or measurement” stage, a “decisions and control” stage and an “implementation and reviewing” stage.

The identification of risk management best practices from the literature and standards, as well as the definition of a suitable risk management process, were crucial for the construction of a novel risk maturity model. This was the case since we assumed that a pertinent risk maturity model should include the recognized and standardized practices of the discipline in order to evaluate its implementation. Additionally, the distinction of a risk management process with

stages clearly defined, has permitted us to evaluate its inclusion as the main “key process” of our model, where the best risk management selected practices are situated and classified.

### *9.2.2. Research question 2*

The second research question discussed was “Can the rational and descriptive perspective of decision theory describe risk management decisions by Dutch municipalities?” This question was derived from our particular interest in the decision process of risk management. As described in chapter 3 of our thesis, risk management decisions are concentrated mainly in the “decision or control” stage of the risk management process, where the entity (decision-makers) needs to select particular techniques or risk management strategies that would be pertinent for the risks that have been previously measured. We clearly observed that a decision-making process occurs within an organization while choosing how to confront those risks that have been detected.

We discussed in chapter 3, that by studying both the “descriptive” and “positive” perspectives of decision theory, we could classify and further evaluate risk management decisions made by municipalities. We have discussed the standard neoclassical approach of cost benefit analysis (CBA) as a tool that could measure the effects of risk management decisions and its benefits to the organization. From the point of view that the costs of a particular risk management strategy can be compared to its potential benefits, thereby obtaining a net benefit calculation of that decision. We have also described multi-criteria analysis (MCA), a rational method that measures risk management strategies according to numerical scales which normally include qualitative descriptions, a framework that could provide additional explanations of risk management choices. And considering the limitations of these rational methods, we have argued that descriptive methods such as “mixed scanning”, “incrementalism” and “rules of thumb” might be relevant in the task of shaping further descriptions and explanations of risk management decisions by municipalities in the Netherlands. Consequently, these theoretical propositions, that consider both rational and descriptive perspectives of how risk management decisions are taken, were then incorporated as a special item in our survey, where we aim to classify risk management choices made by local governments.

### *9.2.3. Research question 3*

“What is the economic, legal and political context in which municipalities in the Netherlands perform?” This question was answered in chapter 4 by studying the institutional context in which municipalities in the Netherlands operate. In particular, we critically evaluated the special and mandatory risk management policy for Dutch municipalities, the so called “resilience paragraph”. As previously discussed, this policy prescribes municipalities to have financial capacity (resilience capacity) for unfunded risks. This requires that municipalities first identify those risks that are not covered by insurances or other mechanisms. The entity would then need to calculate the potential

financial loss of the detected risks. The latter should be accomplished by using a ratio which considers the “financial capacity available” (FCA) in the municipality and the “financial capacity needed” (CN) according to those unfunded risks. The municipality is considered to have sufficient financial resilience, if this calculation has a positive value which is more than 1.

Based on the research completed by Boorsma and Haisma (2005), we discovered some of the possible limitations of the implementation of this risk management approach by municipalities in the Netherlands. First of all, as discussed in chapter 4, there might be some previous evidence showing that Dutch municipalities do not identify those “unfunded risks” in a systematic or rational manner, providing only a list of risks. Similarly, in the identification of “unfunded risks”, municipalities in the Netherlands would not distinguish between events (such as burglary or fire), policy fields subject to risk (such as environmental policy, treasury, municipal ambulance transport), and those exposed to risk (such as buildings, computers, employees, citizens). Considering more structural difficulties of the “resilience paragraph”, is the fact that this policy defines the concept of “regular risks” as risks that would occur frequently in the organizations. According to this bylaw, these types of risks—which are not considered unfunded risks—should be covered by insurance. By leaving regular risks outside the scope of financially covered risks, municipalities would have no incentive to perform a full risk management analysis when deciding to respond or treat those specific risks. Moreover, an insurance policy may not give full coverage, or it may be too expensive in a particular case. Therefore, even transferring a risk that has a high frequency and a low impact could be a pertinent “risk strategy”, but it is not the only response available. As mentioned in chapter 4, risk strategies such as risk prevention and other risk reduction mechanisms should also be applicable in combination with risk financing or insurance strategies, which would have a positive impact on the cost of the premium. Finally, we can mention that the research by Boorsma and Haisma showed that larger municipalities had implemented more sophisticated risk management practices and were not restricted to the limitations of the “resilience paragraph”.

The main finding of this chapter, is that it provided us with some evidence and arguments to consider that municipalities in the Netherlands—despite how innovative the “resilience paragraph” could be for the public context—might not be very mature, not having being able to implement basic and standard risk management practices. Not to be discarded as a reason for the difficulties that these entities face, is the “profile” of the resilience paragraph, which presents incentives for a very narrow and restrictive approach of risk management.

#### *9.2.4. Research question 4*

“Are existing risk maturity models applicable to evaluate the risk management practices in Dutch municipalities and guide them in the implementation of the best practices of risk management?” This research question was answered in chapter number 5 of this PhD research, where we aimed to study the risk maturity method and existing versions of this particular technique, as a framework that might assist us in the diagnosis of risk management practices in

Dutch municipalities as well as in the correct implementation of the discipline. As stated in chapter 5, by defining standardized practices and activities, risk maturity models classify organizations from an initial stage of risk management to a more advanced position. Consequently, the construction and application of a pertinent risk maturity model in a particular industry might become a motivational driver for the improvement of risk management practices. This is related to the fact that such methods place the organization in a particular level of maturity, indicating the distance from the optimal implementation of the discipline.

By reviewing current risk maturity models found in the literature, we concluded that most of them were appropriate for a broad diagnosis of risk management practices, assisting organizations looking to introduce themselves to the risk management discipline. In our opinion, they have several deficiencies. We primarily considered that the risk maturity models reviewed had a lack of theoretical foundations and were not capable of explaining the reasoning behind their evolutionary proposition. As mentioned in chapter 5, we have observed a lack of theoretical and empirical support for their construction (Wendler, 2012), relying mainly on the experience of experts and consultants. Especially recognizable is the absence of theoretical support to argue in favor of its primary assumption. That is, an organization should follow a sequence of steps in order to become aware of new practices and processes, “learning” about risk management through a very deterministic linear path, until it achieves a master performance of the discipline. We have also claimed that available risk maturity models are not suitable for judging the implementation of risk management practices in Dutch municipalities since they were intended mostly for software development companies or project development organizations. Finally, we state that current risk maturity models do not consider the risk management cycle or process as the motor for the proposed continuous improvement. We have argued that the inclusion of the risk management cycle is essential as it is considered the main pillar for organizations that want to implement a systematic and formal risk management program. In this part of the thesis, we concluded that any attempt to improve and adapt risk maturity models should consider at least the difficulties found.

#### *9.2.5. Research question 5*

“What are the assumptions or reasoning behind risk maturity models and how can we explain them?” This research question was answered in chapter 6 of the thesis. The mentioned question was considered relevant since it allowed us to study in detail, the assumptions of risk maturity models, making an effort to find some theoretical explanation for its logic. As previously mentioned, risk maturity models suggest that organizations could progress in the implementation of risk management following a sequence of stages. We concluded that this implies a process of development, where the entity suffers a transformation from an immature application of the discipline to an optimal application of risk management. We have traced these propositions of risk maturity models back to organizational change theory and organizational learning theory, frameworks that have supported us with explanations of how organizations modify their

structures, practices, values and knowledge. Following Van de Ven and Poole (1995), who establish a classification of theories of organizational change, we argue that—although not completely—risk maturity models are sustained mainly under an evolutionary perspective of change. This would be the case since the designated standpoint of risk maturity models assumes change as being cumulative and in a continuous cycle of variation, selection and retention of practices. In this perspective, change occurs in a cumulative manner by the implementation of prescribed best practices that are retained and acquired in order to continue to a next level of maturity (Stubbart and Smalley, 1999).

We have explored organizational learning theory to give additional explanations as to the reasoning behind risk maturity models. Especially, we have evaluated the seminal work of Argyris and Schön (1978), which makes a strong case of clarifying the acquiring of knowledge and the process of learning through incremental stages, as risk maturity models suggest. Along with other researchers (Strutt, Sharp, Terry and Miles, 2006 and MacGillivray, 2006a, 2006b), we also claim the concepts of single and double loops could give theoretical sustenance to the transition between one level of maturity to another. As we remember from chapter 6, single loop conceives the learning process within a set of organizational norms shared by the members of an organization. In the face of difficulties or confronting a decision process, the entity acts according to its institutionalized frame of reference. Double-loop learning occurs when an entity refines organizational norms, restructuring the strategies and assumptions associated with those norms (Burke, 1987), thus thinking “outside the box”. The role of routines and practices is also highlighted in this line of literature—which is also an assumption of risk maturity models—considering practices and activities as an expression of the “theory-in-use” of the entity, which is manifested in what Argyris (2009) called “actionable” knowledge. This proposition accepts that by the means of concrete actions expressed in practices and routines, we could evaluate the modification of knowledge within an organization (Nonaka and Takeuchi, 1995 in Feldman, 2000).

#### *9.2.6. Research question 6*

“How could we operationalize the construction and empirical application of a proposed risk maturity model for Dutch municipalities?” was the 6th research question of our thesis, which was answered in Chapter 7. By answering this question, we designed the operationalization part of our study, identifying pertinent methods for the improvement of a specialized risk maturity model and also its empirical application in a sample of Dutch municipalities.

Methodologically speaking, the design of this research has taken the shape of an explorative research, structured in a design-oriented manner (Becker, Knackstedt, and Pöppelbuß, 2009). We could justify this, by considering the absence of research available in the field (the construction of a special risk maturity model for Dutch municipalities) and the lack of theory that could explain the measurement propositions of risk maturity models. In that sense, we have made a great effort to explore and identify the main variables for the

construction of an improved risk maturity model. Accordingly we have, first, “deductively” constructed a proposed risk maturity model based on the theory of risk management, decision theory, organizational change and organizational learning. We have included the risk management best practices, studied in chapter 2, as the practices that form the path to the master application of the discipline. This is not only consistent with existent risk maturity models applied to other industries, but it is also in line with what organizational learning suggests: that knowledge is organized within the organization by standard procedures and practices that make sure that an individual organization obtains the particular “view point” of the discipline and learns to speak its language (Holmqvist, 2003). As a consequence, risk management practices discussed in chapter 2 were translated to a Likert scale, forming a questionnaire survey. We assumed that the empirical application of this scale may provide relevant data for practitioners and the scientific community as well as provide further inputs to inductively improve the proposed risk maturity model. In that sense, this second phase of the construction of our scale would permit us to refine the model, checking for the stability of all the components of the questionnaire. Absent in previous research, we have included in our proposed risk maturity models the reconceptualization of the risk management cycle established in chapter 2. The “key process” or dimensions of our maturity models were the five different stages of the risk management cycle discussed (“risk context and objectives”, “risk analysis and measurement”, “risk decision and control” and “risk implementation and reviewing”).

Organizational learning theory and the concepts of single and double-loop have been included in the risk maturity model proposed to distinguish between levels of maturity. Using the framework of Argyris and Schön (1978), we considered that the highest level of our model—which is level 5—would be characterized by a double-loop perspective (questioning the organization’s “theory-in-use”) while the level 4 of our model, would be associated to a single-loop approach (learning within the known and standardized frame of reference). As for the rest of the levels of our model—which are described in detail in chapter 6—they are to be considered as having an open-loop perspective. This means that municipalities in those levels have a vulnerable knowledge of risk management, thus, when mistakes are made the organization does not learn, repeating their failures as well as their successes, since they do not have a common and standardized “theory-in-use” of risk management.

We have also included in the preliminary construction of our risk maturity model the propositions of decision theory discussed in chapter 3. We assumed that decisions related to the treatment of risk that consider a more rational perspective (CBA, multi-criteria analysis and mixed scanning) will be found in mature organizations, where less mature municipalities would use a non-rational approach such as rules of thumb or incrementalism. These aspects have been measured by establishing a special item in our pilot survey, where we characterized different risk management decisions according to these theoretical frameworks discussed.

We have also claimed that the construction of this model is not arbitrary, but it must be viewed as a theoretical construct that was validated in a later stage of the thesis. Therefore, our final model was completed empirically, receiving feedback for the scaling method constructed.

#### *9.2.7. Research question 7*

“Could an adapted instrument for measuring risk maturity give valuable data to analyze and measure risk management practices implemented by municipalities?” was the 7th and final research question of our PhD thesis, which was answered in chapter 8 of our study. Accordingly, we have empirically applied in a sample of municipalities in the Netherlands, the risk maturity model proposed. We have not only tried to summarize the findings considering the level of implementation of risk management practices in this type of entity, but also showed evidence that the proposed model could be a reliable instrument for the diagnosis of those risk management practices identified in the literature. According to our model, municipalities obtained an overall risk maturity score between 1.7 and 4.5 (3.3, on average, for the whole sample). Considering the explorative design of this research, we looked for different interpretations of the results. We discovered in our sample a pattern that might indicate that larger municipalities tend to have a higher risk maturity score, thus they have implemented more sophisticated risk management practices. This is also consistent with the findings of Boorsma and Haisma (2005), mentioned in chapter 4. In addition, we found that the entities that participated in the empirical part of our study had higher scores in the first stages or dimensions of our model (“risk objective”, “risk identification” and “risk analysis and measurement”) while obtaining lower scores in the last dimensions (“risk decision and control” and “risk implementation and reviewing”). We consider this finding particularly interesting, since there is not a clear proposition or consensus in the literature suggesting that “risk decision and control” and “risk implementation and reviewing” processes would involve more difficult or complex activities. Nonetheless, we could argue that while trying to put together a risk management program, organizations might define objectives, identify risks and measure them with fewer problems than when they attempt to make actual decisions to confront those risks. Moreover, we consider that the “risk implementation and reviewing” stage, requires a great amount of effort and resources by the entity, since it assumes the implementation of training programs, reporting and information storage systems, external auditing activities and so on. Moreover we have analyzed in depth two extreme cases selected that are in both tails of our distribution, reviewing carefully their risk management practices implemented. This has allowed us to characterize an immature entity (at level 1 according to our model) and a mature organization in our sample (at level 4).

We learned, empirically, that the dimensions of our model had an evolutionary pattern that considers each of the different stages of this process as a prerequisite to the next phase. This finding is also interesting, since the literature states that risk management should be applied following a logically defined sequence (i.e., risk objective, risk identification, risk assessment, risk

control and risk implementation and reviewing), although there is not a straight forward proposition indicating that each stage of the risk management process would be a precondition to complete the next stage.

We have also found and reported, in chapter 8, associations between some of our context variables and the size of the municipalities. As a consequence we analyzed possible associations between “organizational arrangements” (being member of the “expert circle”, PRIMO and having a “risk manager” in place), the size of the municipalities and their level of risk maturity. We concluded that “organizational arrangements” as well as size of the entities will have a positive effect on the risk management overall score of our sample. Following organizational learning theory, we have argued that the participation of municipalities in these sorts of organizations could be seen as a source of risk management knowledge, since, as the “inter-organizational” literature suggests, network ties would provide access to information and outflows of knowledge (Schulz, 2001), promoting an adaptive change.

The existence of a risk manager, as it is prescribed also in the specialized literature and risk management standards, may also contribute to developing uniform comprehensions of the discipline (the organizational theory–in-use) (Huber, 1991). This might be the case considering that an internal expert’s support could assist the organization in the acquiring of “new frames of references”, by affecting the “theory-in-use” and the organization’s beliefs of the entity (double loop). In general, we believe that these context variables mentioned could be seen as “enablers” for the learning of best risk management practices in Dutch municipalities.

We have paid special attention to analyzing and improving the reliability and internal consistency of the constructed scale for measuring a risk management maturity model in Dutch municipalities. Accordingly, we have inductively refined, in this stage, our proposed model.

### **9.3. Implications and contributions**

We consider that our study has a number of scientific as well as practical contributions. These implications are derived from the literature review as well as from the findings of our empirical studies.

We could first mention that by establishing the goal of measuring the implementation of risk management practices, we have tried to adapt and improve risk maturity models. This has led us to investigate some theoretical propositions that could respond to the difficulties found in the literature. As discussed throughout this thesis, we claim that current risk maturity models do not provide theoretical explanations for their transitional proposition where an organization may evolve to a “desired” or optimal state of risk management. This could be explained by the fact that maturity models are based mainly in the experience of consultants, thus not showing a formal procedure for the construction of this type of framework. As mentioned by Wendler (2012), who developed a systematic literature review on maturity models, more than half of



the published articles in the field follow a conceptual research design (describing the maturity development) but fail in the theoretical reflection and empirical application of the proposed models. As mentioned before, we considered that the non-inclusion of the risk management cycle by the revised risk maturity models was also an important difficulty, since we support the idea that risk management should be implemented in a structured process that follows a sequence of logical steps (risk objectives, risk identification, risk analysis, decision and control and implementing and reviewing). Our principal scientific contribution has been to study and interpret the logic of risk maturity models, identifying theories that could explain their reasoning. We have traced down the normative suggestion of risk maturity model to the theories of organizational change that argue specifically that change in an organization could occur in a progressive perspective to a designated or optimal state. Although not completely innovative (used as well by Strutt et al. 2006), we have included the ideas of “single and double loops” of Argyris and Schön (1978) to differentiate from the highest level of maturity in our proposed model. We have also incorporated in our model the different stages of the risk management cycle as the main forces for this evolutionary learning process. Finally we have empirically validated our proposed RMM in a sample of Dutch municipalities, assessing the risk management practices implemented in municipalities in the Netherlands. As a result, we believe that we have fulfilled the gaps found in the literature, making a relevant contribution to the field.

In more practical terms, we believe that our proposed model could be a pertinent method for the diagnosis of risk management practices of Dutch municipalities, as well as to influence the correct implementation of the discipline by these local entities. Widely discussed in this thesis, we state that previous risk maturity models were suitable mainly for software developing companies and project organizations, focusing on practices related to those particular industries. We have responded to this limitation including both the “industry” perspective (related to the practices of the “risk paragraph”) and the discipline standpoint (practices related to the integrated risk management). We consider that the proposed risk maturity model and the data obtained due to its empirical application, have provided valuable information for decision-makers not only in Dutch municipalities, but also in provinces and water boards, which have also complied with the “resilience paragraph”. These organizations might find the results of our thesis relevant as a benchmarking mechanism (comparing themselves to similar segments and categories) as well as for the evaluation of the risk management public policy that regulates them. In that respect, the critical analysis of this risk policy and the findings of the research might have some policy implications. Accordingly, we claim that the restrictive perspective of the resilience paragraph (taking into account only unfunded risks) might be partially blamed for the—on average—relatively low overall risk maturity score of municipalities in the Netherlands. Thus, although this policy might be sufficient for the goal of preventing municipalities from having a major financial shortfall because of unforeseen events, it seems that there is little incentive for municipalities to implement a wider perspective of risk management. We consider that our findings present an opportunity for policy-makers to further evaluate the current approach of the “risk paragraph”.

#### **9.4. Limitations of the thesis**

As in any research, we acknowledge that our thesis has many limitations. The limitations are mainly derived from the choices made during the design and development of the study. First of all, we cannot deny the limitations of the reasoning of risk maturity models, proposing an inexorable progression of risk management through stages to an optimal implementation of the discipline. We recognize that there might be little evidence supporting the idea that changes in municipalities would occur following such a deterministic and linear path. So, in considering other authors (Phelps, Adams and Bessant, 2007), there would be an incongruity between the normative conceptualization of change that risk maturity models suggest and the evidence that radical change is often characterized by delays and oscillations. On the other hand, risk maturity models such as the one we proposed, considers a final stage (Level 5), where the municipality is characterized as an adaptive and flexible entity, always looking for innovative forms of dealing with their risks and being aware of the context in which it performs. As we have mentioned, we have considered the propositions of the double-loop of Argyris and Schön (1978), suitable to explain the transition to this mastering level of risk management. This could be also explained by using other theoretical frameworks such as game theory, chaos theory and complexity theory among others supporting a dramatic perspective of change.

We must also mention that the cross-sectional design chosen, will not allow us to evaluate changes (in the implementation of risk management practices) taking place in different periods in the organizations that participated in our research. The latter would have provided us with evidence of transformation within risk management practices. Despite the benefit of a longitudinal approach as the one described, we have to remember that the goal of our research was to measure the maturity of risk management practices in Dutch municipalities and not to necessarily observe the learning process as it develops through time. As repeatedly stated, we did use change management and organizational learning explanations to provide reasoning for our model and to particularly differentiate the levels of risk maturity.

Another clear limitation of our research is the size of our sample, which reduced dramatically after we discarded incomplete cases, a sample of 72 cases remained. This situation puts limits on considering any generalizations; nonetheless, it might be sufficient for the empirical validation and further improvement of the risk maturity model proposed. Although at the end we had reasonable internal consistency in our scale, we recognize that there is still room for refining the reliability and validity of the scale.

Finally we have to mention the characteristics of our respondents as another possible limitation of our research. This is related to the fact that we have chosen an “elite survey” type of approach for collecting the data, assuming that the senior managers and authorities (as respondents) would have an extensive knowledge of the risk management practices implemented in the municipality (Hambrick, 1981; Cusumano and Takeishi, 1991 in Enticott Boyne and Walker,

2008). Although this perspective is commonly used in survey research, we recognize that this approach could be seen as problematic. However most of the respondents had a high level of education and a work experience on the field (finance and risk management). The latter might indicate then that the respondents in our sample are a reliable source of information concerning risk management practices.

Regardless of the limitations described, we believe that this model, particularly the identification of relevant practices that are required to increase the sophistication of risk management processes, might be a pertinent system for judging the risk maturity of public organizations such as municipalities.

### **9.5. Future research agenda**

The elements of future research could be easily derived from the limitations of our research. A more drastic path could be to evaluate a totally different method of measuring risk management practices implemented in public organizations. This is related to the fact that there is not a single methodology accepted to impartially assess practices in organizations (Ibbs and Kwak, 2000). Additionally, we could consider the use of a case study to perform a more in depth qualitative comparison and the analysis of public financial data, which might give us further perspectives of how risk management is being implemented in municipalities in Netherlands.

The application of an improved version of this risk maturity survey, over several periods in the Dutch municipal sector, seems like an evident task to consider in future research. In addition, we believe that the inclusion of secondary information in combination with this risk maturity survey proposed, might give us extra quantitative data for further statistical analysis, which could also add more formality and validation to our model.

Of particular interest could be to evaluate more closely the design and impact of the “resilience paragraph” as a risk management device that could prevent or mitigate the occurrence of catastrophic unforeseen events. This would lead us to an in depth analysis of the concepts established in the BBV (Besluit begroting en verantwoording) as well as the analysis of empirical data related to the performance of the municipalities and their “resilience ratio”. Particularly, it might be relevant to explore the effects of the “resilience paragraph” in the insurance behavior, policies and premiums of Dutch local governments, observing, for instance, the possible tendency to over-insure.

Although we believe that the selection of respondents in our research should not be a source of major difficulties - taking into account that we did not really in just a single type of respondents but in a range of roles within the municipality- (alderman, manager or controller and professional staff) with a high level of education and a work experience in the field-, we should evaluate this approach for future research. Accordingly, a variety of organizational informants from different levels of the organization might provide us with more accurate

information on the risk management practices implemented by municipalities in the Netherlands.

Finally, as mentioned in chapter 8, even though we have reported a general internal consistency of our risk maturity scale, there is still room for its improvement into an even more reliable and valid instrument. As a consequence, a further research agenda, aiming to continue the line set out by this thesis, should concentrate on refining the scale and its theoretical constructs, especially if any generalization is intended.

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## SUMMARY

Following the trend of organizations from almost every sector now, public entities such as municipalities have also started to develop risk management awareness in the last decades. Related to the pressure of a more demanding environment and the incidents that these organizations have experienced, this process has led to the development special standards and the design of risk management policies by central governments.

Being an innovative case for the public context, Dutch municipalities have a distinctive bylaw on risk management. This regulation requires that municipalities consider in their budget, a financial resilience to confront possible unfunded risks. In order to comply with this bylaw, municipalities should at least have a method to identify unfunded risks as well as to mention the measures to be taken for those risk. Nonetheless, there might be some evidence indicating that municipalities in the Netherlands face some difficulties in the implementation of risk management practices (Boorsma and Haisma, 2005).

Although there is not an accepted singular methodology for impartially measure management practices (Ibbs and Kwak, 2000), we consider that risk maturity models could contribute to the task of objectively assessing the implementation of risk management practices in Dutch municipalities. However after an evaluation of current risk maturity models, we came to the conclusion that current models have some limitations. First of all, we estimate them as not being suitable for Dutch municipalities since most of them focus on a project risk management approach. Moreover, we state that in general risk maturity models do not respond to the comprehensive or integrated perspective of risk management. Additionally we argue that most of the existing risk maturity models do not consider the so called “risk management cycle” on their structure. Finally we believe that current risk maturity models lack on theoretical reflections about their maturity concepts and are not often validated (Wendler, 2012), basing their propositions mainly on the experiences of experts.

Accordingly, we have done significant efforts in this PhD research to respond to the limitations of risk maturity models, since we strongly believe that it could be a pertinent instrument for the assessment of risk management process in Dutch municipalities, influencing also the implementation of best risk management practices by these organizations. For the construction of a revised risk maturity model, we have used a design-oriented method, identifying first the main variables of the proposed model in a deductive manner. With the purposed of explaining the evolutionary logic assumed by risk maturity models and the measurement propositions of risk maturity models, we have used Organizational Change and Organizational Learning theory.

The application of the improved risk maturity model in a sample of 72 municipalities, delivered some interesting findings and empirical support for the construct validity of our model. From the five risk management stages included in the proposed model, separate scales were constructed which are based on a large number of different items. These items were measured using a survey

questionnaire. Overall scores were also calculated on this basis of 1 to 5 scale. The empirical research shows that there are large differences in risk maturity between municipalities, with a minimum of 1.7 and maximum of 4.5 (with an average score of 3.3). We confirmed that municipalities in our sample are still far away from the best practices of risk management, especially the wider or integrated perspective, due mainly to the limitations in their feedback mechanisms (Argyris and Schön, 1978).

Additionally we discovered in our sample a pattern indicating that larger municipalities have a higher risk maturity score, thus implemented more sophisticated risk management practices. In addition, we found that the entities that participated in the empirical part of our study, had higher scores in the first stages or dimensions of our model (“risk objective”, “risk identification” and “risk analysis and measurement”) while obtaining lower scores in the last dimensions (“risk decision and control” and “risk implementation and reviewing”). Additionally, we learned empirically that the dimensions or risk management processes in our model, had an evolutionary pattern that considers each of the different stages of this process as a prerequisite of the next phase. This finding is also interesting, since although the literature states that risk management should be applied following a sequence logically defined (i.e. risk objective, risk identification, risk assessment, risk control and risk implementation and reviewing) there would not be a clear proposition indicating that each stage of the risk management process would be a precondition to complete the next stage. We also analyzed possible associations between “organizational arrangements” (being member of the “expert circle” of the Ministry of Interior, the Public Risk Management Organization PRIMO and having a “risk manager” in the organization) and the risk maturity scores. We came to the conclusion that these variables would also have an effect on the overall score the municipalities in our sample. The latter finding is line with what we argued in the theoretical part of our research, where we assumed firsts that the participation of municipalities in both “the expert circle” and PRIMO could be seen as a source of risk management knowledge, since we followed what the literature on organizational learning suggested; that networks ties would provide access to information and outflows of knowledge (Schulz, 2001) for organizations through the interaction with peers, promoting an adaptive change (Kraatz, 1998). Additionally we have also argued that the existence of an “in-house” specialist on risk management in the municipality might contribute to the development of uniform comprehensions of the risk management discipline (the organizational theory-in-use) (Huber, 1991). We have also analyzed in detail two outliers in our data set, reviewing carefully their risk management practices implemented, characterizing an “immature” and “mature” organization considering the implementation of risk management practices.

We believe that our study has a number of scientific as well as practical contributions. By establishing the goal of measuring the implementation of risk management practices, we have tried to adapt and improve risk maturity models. This has led us to investigate some theoretical propositions that could respond to the difficulties found in the literature. As mentioned by Wendler (2012), who developed a systematic literature review on maturity models, more

than half of the published articles in the field follow a conceptual research design (describing the maturity development) but fail in the theoretical reflection and empirical application of the proposed models. Our principal scientific contribution has been to study and interpret the logic of risk maturity models, identifying theories that could explain their reasoning. We have also incorporated in our model the different stages of the risk management cycle as the main forces for this evolutionary learning process. Finally we have empirically validated our proposed risk maturity model in a sample of Dutch municipalities, assessing the risk management practices implemented in municipalities in the Netherlands. As a result, we believe that we have fulfilled the gaps found in the literature, making a relevant contribution to the field.

Even though we still considered this proposed risk maturity model a developing method that need additional enhancements, we also believe that our proposed model could be a pertinent method for the diagnosis of risk management practices of Dutch municipalities, as well as to influence the correct implementation of the discipline by these local entities. We consider that the risk maturity model and the data obtained due to its empirical application, could provide valuable information for decision-makers not only in Dutch municipalities, but also in provinces and water boards, which need to also implement risk management practices. These organizations might find the results of our thesis relevant as a benchmarking mechanism (comparing themselves to similar segments and categories) as well as for the evaluation of the risk management public policy that regulates them. Thus, our research could contribute in a further discussion on the approach of the “resilience paragraph”, since although this policy might be sufficient for the goal of preventing Dutch municipalities from having a major financial shortfall because of unforeseen events, it might not incentive the implementation of a wider perspective of risk management.

## SAMENVATTING

In navolging van de trend bij organisaties in bijna elke andere sector, zijn ook publieke organisaties als gemeenten de laatste decennia begonnen met de ontwikkeling van risicomanagementbewustzijn. Verbonden met de druk van een meer veeleisende omgeving en incidenten die deze organisaties hebben ervaren, heeft dit proces geleid tot de ontwikkeling van speciale standaarden en het ontwerp van soorten risicomanagementbeleid door centrale overheden.

Nederlandse gemeenten hebben een bijzonder Besluit over risicomanagement, wat een innovatieve case oplevert voor de publieke context. Deze regulering vereist dat gemeenten in hun begroting en jaarrekening een paragraaf opnemen over financiële weerstand om mogelijke ongedekte risico's op te vangen. Om te voldoen aan het Besluit moeten de gemeenten ten minste een methode hebben om ongedekte risico's te identificeren en moeten ze de maatregelen noemen om de risico's te beheersen. Niettemin, er is enig empirisch bewijs dat er op wijst dat de gemeenten in Nederland enkele problemen ondervinden bij de implementatie van de risicomanagementpraktijk (Boorsma en Haisma, 2005).

Hoewel er niet een algemeen aanvaarde methodologie is om management praktijken neutraal te meten (Ibbs and Kwak, 2000), stellen wij dat risk maturity modellen zouden kunnen bijdragen aan de taak om de invoering van risicomanagementpraktijken objectief te beoordelen. Echter, na een evaluatie van bestaande risk maturity modellen kwamen we tot de conclusie dat de bestaande modellen enkele beperkingen hebben. Ten eerste schatten wij dat ze niet geschikt zijn voor Nederlandse gemeenten omdat de meeste modellen focussen op projectrisicomanagement. Bovendien stellen wij dat in het algemeen de maturity modellen niet corresponderen met de integrale benadering van risicomanagement. Voorts stellen wij dat de meeste risk maturity modellen de zogenaamde "risk management cyclus" niet in hun structuur verwerken. Tot slot stellen wij dat de bestaande risk maturity modellen een gebrek aan theoretische reflectie op hun "maturity" concepten hebben en dikwijls niet gevalideerd zijn (Wendler, 2012), waarbij zij hun aanbevelingen voornamelijk baseren op ervaringen van deskundigen.

Derhalve hebben wij in dit PhD onderzoek aan de beperkingen van de risk maturity modellen gedaan, daar wij menen dat zo een model een geschikt instrument kan zijn voor de beoordeling van risicomanagementproces in Nederlandse gemeenten, waarbij ook de implementatie van de "best practices" in risicomanagement door deze organisaties kan worden beïnvloed.. Voor de constructie van een herzien risk maturity model hebben we de ontwerpgeoriënteerde methode gekozen, waarbij eerst de belangrijkste variabelen voor het voorgestelde model op deductieve wijze worden geïdentificeerd. Ten einde de evolutionaire logica voorondersteld in risk maturity modellen te verklaren en de beloften van deze modellen om te meten, hebben we de theorie gebruikt gemaakt van Organisatieverandering en Organizational Learning.

De toepassing van het verbeterde risk maturity model via een steekproef van 72 gemeenten leverde enkele interessante bevindingen en empirische steun voor de constructvaliditeit van ons model. Voor de vijf opeenvolgende fasen binnen ons model zijn afzonderlijke schalen geconstrueerd welke gebaseerd zijn op een groot aantal verschillende items, gemeten via een vragenlijst. Op basis hiervan is tevens een overallscore voor risk maturity geconstrueerd (op een schaal van 1 tot 5). Uit het empirisch onderzoek blijkt dat er tussen de gemeenten grote verschillen in risk maturity bestaan met een minimum van 1.7 en maximum van 4.5 (en een gemiddelde score van 3.3). Geconcludeerd is dat de onderzochte gemeenten nog ver verwijderd zijn van de best practices van risicomanagement, vooral wanneer het gaat om het ruimere integrale perspectief, wat voornamelijk veroorzaakt wordt door beperkingen in hun feedback mechanismen (Argyris and Schön, 1978). Voorts ontdekten we in ons sample een patroon dat er op wijst dat grotere gemeenten een hogere risk maturity score hebben, en dus meer geavanceerde risicomanagementpraktijken hebben geïmplementeerd. Tevens vonden we dat de deelnemers aan het empirisch onderzoek hogere scores hebben in de eerste fasen of dimensies van ons model (risicomanagement doel, risico identificatie, en risico analyse en meting) terwijl ze lagere scores laten zien bij de latere fasen (risico beslissing en beheersing, en implementatie en feedback). Voorts vonden we empirisch dat de dimensies of deelprocessen een evolutionair patroon vertonen dat elk van de fasen van het model als voorvereiste ziet voor de volgende fasen. Deze bevinding is daarom ook interessant omdat, hoewel in de literatuur wordt gesteld dat in risicomanagement een logisch gedefinieerde volgorde moeten worden gevolgd (doelformulering, identificatie, inschatting, beslissing en beheersing, implementatie en feedback), daar niet wordt gesteld dat elke fase van de risicomanagement cyclus een voorwaarde is voor de vervulling van de volgende fase. Ook analyseerden we mogelijke samenhangen tussen “organisatorische arrangementen (lidmaatschap van de “expert kring: van het ministerie voor Binnenlandse Zaken, van de Public Risk Management Organisatie PRIMO, en de aanwezigheid van een risicomanager in de organisatie) en de risk maturity score. We concludeerden dat die variabelen ook een (positieve) invloed hebben op de risk maturity score. Deze laatste bevinding spoort met wat gesteld wordt in het theoretische deel van het onderzoek; daar is allereerst verondersteld dat de deelneming van gemeenten in de Expert Kring en in PRIMO gezien zou kunnen worden als een bron van risk management kennis; we volgden hierbij wat de literatuur over organizational learning suggereert, nl dat netwerkverbindingen toegang kunnen verschaffen tot informatie en stromen van kennis (Schulz, 2001) door de interactie met peers, wat aanpassingsveranderingen bevordert (Kraatz, 1998). Daarbij hebben we beargumenteerd dat de aanwezigheid van een interne specialist in de gemeente op het gebied van risk management zou kunnen bijdragen aan de ontwikkeling van uniforme opvattingen van de risicomanagement discipline (de organisatietheorie “in use) (Huber, 1991) Ook hebben we in detail twee extreme gevallen in onze dataset geanalyseerd, daarbij zorgvuldig de ingevoerde risicomanagement praktijken beschrijvend, waarbij ze als “immature” resp. “mature” organisatie zijn gekarakteriseerd.

Wij stellen dat deze studie een aantal bijdragen levert aan de wetenschap en de praktijk. Door het doel van het meten van de implementatie van risk management praktijken hebben we getracht om de risk maturity modellen taan te passen en te verbeteren. Dat leidde tot het onderzoek van enkele theoretische stellingen bedoeld om de problemen gevonden in de literatuur op te lossen. Zoals ook genoemd door Wendler (2012), die een systematisch literatuuroverzicht over maturity modellen heeft gemaakt, meer dan de helft van de gepubliceerde artikelen in het veld volgt een conceptuele onderzoeksopzet (welke de maturity ontwikkeling beschrijft), maar faalt in de theoretische reflectie en empirische toetsing van de voorgestelde modellen. Onze eerste wetenschappelijke bijdrage is de bestudering en interpretatie van de logica van risk maturity modellen, en het identificeren van theorieën die hun logica kunnen onderbouwen. Daarbij hebben we in ons model ook de verschillende fasen van de risk management cyclus geïncorporeerd als voorwaarde voor dit evolutionaire leerproces. Tot slot hebben we ons voorgestelde maturity model empirisch gevalideerd voor een sample van Nederlandse gemeenten, waarbij de risicomanagement praktijken welke zijn geïmplementeerd in Nederlandse gemeenten zijn verwerkt. Als gevolg heeft deze studie de gaten gevonden in de relevante literatuur gevuld, wat een relevante bijdrage aan het veld geeft.

Hoewel het voorgesteld risk maturity model een methode in ontwikkeling blijft welke additionele verbeteringen behoeft, kan ons voorgestelde model een geschikte methode zijn voor de diagnose van risicomanagementpraktijken van Nederlandse gemeenten, alsook bijdragen aan de correcte implementatie van de discipline door deze lokale organisaties. Het voorgestelde risk maturity model en de data verkregen bij de empirische toepassing kunnen waardevolle informatie verschaffen aan besluitvormers, niet alleen in Nederlandse gemeenten, maar ook in provincies en waterschappen die ook risicomanagementpraktijken moeten invoeren. Deze organisaties kunnen de resultaten van deze studie relevant achten als benchmarking mechanisme (zich vergelijkend met vergelijkbare organisaties), maar ook voor de evaluatie van het beleid dat publiek risicomanagement reguleert. Zo kan ons onderzoek een bijdrage leveren aan de verdere discussie over de benadering van de weerstandsparagraaf: hoewel deze benadering voldoende zou kunnen zijn om Nederlandse gemeenten te behoeden voor een majeure financiële tegenvaller ten gevolge van een onvoorziene gebeurtenis, hoeft de benadering niet de invoering van een ruimer perspectief op risicomanagement te stimuleren.



## ACKNOWLEDGEMENTS

*“At last I turned and walked, without looking back again; and my steps were quick on the highway.”(Theodor Storm, The rider on the white horse, 1888, p.109.)*

Once I heard that the acknowledgements are the most read part of a PhD thesis. I hope this is not true, since I found this part of the book the hardest to write. I think it is difficult to revise in a couple of pages such an intense period of my life and also to be fair with all those people that, in one way or the other, contributed to make this journey an unforgettable one.

I should start by mentioning the particular conditions on which I developed my PhD research at Twente. While a PhD is challenging and demanding on its own, in my case, I dragged my partner and two kids to the Netherlands, having to combine the duties of a modern father, with those of academia. That forced me to be even more methodic and organized, not having really the time to think of any loss of motivation. We were here because of me, so I was forced to accomplish the main goal of the expedition. Off course not everything was about the PhD dream and we all gained a lot by living in the Netherlands, but I could feel the pressure at moments, which at the end just kept me going. Overall, the flexibility of this line of work and the scale of a first world small town like Enschede, allowed me to be more close to the boys, watching them grow and experienced so many different stimulus during this four years.

But any of this would have been possible without the generous support and guidance of my promotor Peter Boorsma. So first and foremost, I offer my sincerest gratitude to him. I met Peter in Chile through my father, he was at the moment very active in Latin America, organizing conferences and seminars for public servants. It took two years since we first discussed the possibility of me coming to Twente and the time I finally arrived. A PhD research proposal had to be written and the financial aspects to make this possible needed to be arranged. Once in the Netherlands, Peter not only supported me throughout the thesis with patience and knowledge, but showed a permanent interest on my family's wellbeing. It has being an honor to be supervised by Peter Boorsma, a man who has contributed so much to his country, both as a social scientist and politician. I could only dream to be as versatile, recognized and productive as Peter has been in his professional life. While our meetings as supervisor and student were always rigorous and enlightened my research, his enormous cultural background leaded always to the most interesting conversations. I'm very proud to be in the select list of Peter Boorsma's *promovendi*.

I also owe my gratitude to Harry van der Kaap for assisting me in the analysis of the data. The statistical analysis presented in this dissertation would definitely not be possible without Harry's explanation, guidance and patience. I would like to express my deepest gratitude as well to NAR and its director Geert Haisma, who provided a financial support for the research. I hope that the proposed risk maturity model and the findings of the research can be useful for your organization.

In addition, I'm incredibly grateful to the colleagues of the former department of Finance and Accounting, for their support, encouragement and feedback. I would like to particularly thank Nico Mol for believing in me and generously allowed to become part of the group. Naturally, I would also acknowledge all my colleagues of the Department of Public Administration, the capacity group where I spent the last part of my research. My most warm and candid words of gratitude and affection go to the residents of the mighty room RA4262: Ann-Kristin Kölln, Sedef Turper, Kira Killerman and Wenqi Dang. Although it was a bit difficult sometimes being the only guy in the office, I couldn't have asked for better roomies than you guys, I had the greatest time. Thank you for putting up with me.

Moreover, without the cooperation of Dutch municipalities, the empirical part of this study could not have been carried out. I'm most thankful to all those public servants for their willingness to respond to the amount of information asked. I would also like to thank the "expert circle" of the Ministry of Interior of the Netherlands, who gave its moral support and assisted us by sending the questionnaire to its members. I'm especially indebted to William Segers and Jan Vos, members of the Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. I would also like to acknowledge the collaboration of the public servants of the municipalities of Hengelo, Hof van Twente and Haaksbergen who gently participated in the pretesting of the survey.

There were many people who gave interesting feedback and valuable suggestions during the conferences and seminars that I participated. I am indebted to those scholars for the discussions that helped me focus my thesis.

I have been fortunate to come across many fun and interesting people during this PhD journey, which made this process even more pleasant and entertaining. Special thanks go to Gonzalo and Margarita, Alejandro and Monica, Irina and Alan, Oscar and Daniela, Juan and Diru, Eduardo and Nayeli, Jorge and Maite, Vicky and Lorenzo, Ansfrida, Karel and Martha, Truus, the great leader of the Chilangos Habaneros; David and the members of the small but unique Chilean community: Leo, Loreto and Carla. I would also thank the members of the famous football team UTKring for letting me play with you every Monday, I had a blast during all those matches.

Finally, I would like to not only thank but actually dedicate this book to Daniela, Mateo and Santiago. Daniela made several material and emotional sacrifices to accompany me into this journey, leaving her professional career, family and friends behind. Although because of her extraordinary character and talents, she managed to find her place here, developing successful projects during these years, she had to postpone herself professionally, not being able to accomplish everything that she could have achieved. Thank you for believing in this venture and keeping always an enthusiastic attitude towards all we experienced in this expedition. My kids who are my main source of joy and inspiration, I'm sure you will always remember this time of your life as the most challenging and exciting period. Just thinking about that, makes everything worth it.

## APPENDICES

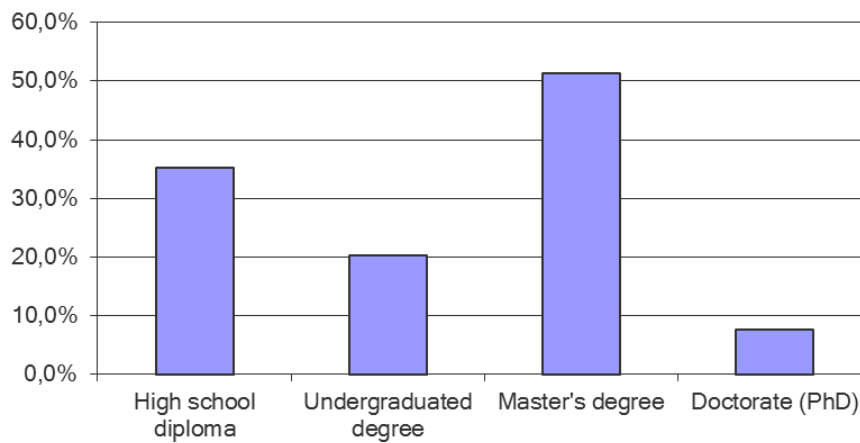
### Appendix 1.

Distribution of the respondents considering their function

Function of the respondent	N	Percent
Alderman	12	16.4
Controller/Manager	23	33.6
Risk Manager	8	10.7
Adviser	8	11.4
Professional Staff	19	25.7
Others	2	2.1
Total	72	100%

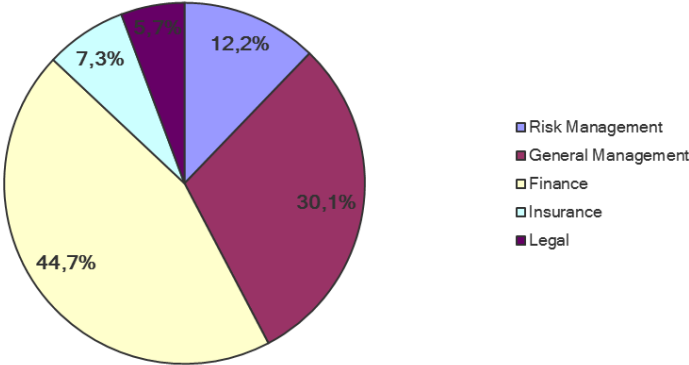
Level of education of the respondents.

Please indicate the level of education that you have obtained. You might check as many options as apply.



Work experience of the respondents.

In what area is the majority of your work experience?



## Appendix 2.

### **Risk Maturity Survey for Municipalities in the Netherlands**

#### **Instructions**

Thank you very much for your cooperation in our research on Risk Management. All the information provided by respondents on behalf of their municipalities will be completely anonymous.

The respondent should answer based on his/her knowledge and experience in the risk management processes of the municipality.

This survey will take approximately 20 minutes to complete. Please try to respond the questions as honestly as possible with the answer that automatically comes to mind.

You need to use the buttons at the end of each page to navigate through the questionnaire.

Please click 'Next' to start with the first question

## Risk Maturity Survey for Municipalities in the Netherlands

### 1. General information about the municipality and the respondent

**1. Please state your function in the municipality (you might answer in Dutch).**

**2. Please indicate the level of education that you have obtained. You might check as many options as apply.**

- High school diploma
- Undergraduated degree
- Master's degree
- Doctorate (PhD)

Other (please specify)

**3. In what area is the majority of your work experience?**

- Risk Management
- General Management
- Finance
- Insurance
- Legal

Other (please specify)

**4. Number of inhabitants of the municipality, please check the appropriate option.**

- < 5,000
- Between 5,000 to 20,000
- Between 20,000 to 50,000
- Between 50,000 to 100,000
- > 100,000

## Risk Maturity Survey for Municipalities in the Netherlands

**5. Are you member of the “expert circle” on Risk Management of the Ministry of Interior (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties)**

YES

NO

Comments

**6. Is your municipality member of PRIMO Nederland?**

YES

NO

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**1. Do you have a Risk Manager (Risicomanager) or a Special Unit for Risk Management in your municipality?**

YES

NO

Comments



## Risk Maturity Survey for Municipalities in the Netherlands

### 1. To whom does the Risk Manager directly report? (Please check all the options that apply)

- Municipal Council (Gemeenteraad)
- College of B&W
- Mayor (Burgemeester)
- Alderman (Wethouder)
- City Manager (Gemeentesecretaris)
- Director of Finance (Directeur financiën)

Other (please specify)

## Risk Maturity Survey for Municipalities in the Netherlands

### 2. Context and objectives

**1. Does your organization have a written risk management policy as mentioned by the B&W for the 'resilience paragraph' (weerstandsparagraaf)?**

YES

NO

Comments

**2. Developing a risk management policy. Please check just one option for every row.**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
The risk management policy has established roles and responsibilities for the strategic level (e.g. for the Council and Alderman)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The risk management policy has established roles and responsibilities for the operational level (units or departments within the municipality)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The municipal risk management policy considers legal requirements (such as environmental regulations, labor regulation, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The municipal risk management policy considers socio-political threats (e.g. citizen opinion on a particular policy, decision or project, the consequences of the possible resignation of the alderman or mayor, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**3. What is the objective for developing the risk management policy in the municipality?  
Please check one of the following options.**

- There is no clear objective for risk management
- The risk management policy partially follows the criteria and recommendations of the "weerstandsparagraaf" (establishing a financial reserve for the "uncovered risks")
- The risk management policy fully contains the criteria and recommendations of the 'risk paragraph'(weerstandsparagraaf)
- The risk management policy contains the criteria and recommendations of the 'risk paragraph' but is also looking for the best way to deal with "funded" and "unfunded" risks.
- The risk management policy fully contains the criteria and recommendations of the "weerstandsparagraaf" and also pursues the 'wider' perspective of risk management (such as including all types of risk in the risk management policy independently of its nature and source)

Comments

**4. How do you consider the support of the Municipal Council (Gemeenteraad) towards risk management ? Please check one of the circles below.**

- No awareness or interest in risk management, gives passive support.
- Gives partial and reactive support. Interested only after major incidents have occurred. (e.g. catastrophes, crisis or events that might have political/public consequences)
- Supports risk management and participates in the definition of the risk management policy.
- Defines the criteria to measure the failure or success of the risk management policy.
- Full commitment to risk management, gives incentives and requires risk reporting.

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

### 5. How do you consider the support of the College of B&W towards risk management?

Please check one of the circles below.

- No awareness or interest in risk management, gives passive support.
- Gives partial and reactive support. Interested only after major incidents have occurred. (e.g. catastrophes, crisis or events that might have political/public consequences)
- Supports risk management and participates in the definition of the risk management policy.
- Defines the criteria to measure the failure or success of the risk management policy.
- Full commitment to risk management, gives incentives and requires risk reporting.

Comments

### 6. How do you consider the support of the Mayor (Burgemeester) towards risk management? Please check one of the circles below.

- No awareness or interest in risk management, gives passive support.
- Gives partial and reactive support. Interested only after major incidents have occurred. (e.g. catastrophes, crisis or events that might have political/public consequences)
- Supports risk management and participates in the definition of the risk management policy.
- Defines the criteria to measure the failure or success of the risk management policy.
- Full commitment to risk management, gives incentives and requires risk reporting.

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

### 3. Risk identification

**1. Does the organization identify opportunity elements (kansen)? (public-private projects, investments, etc.)**

YES

NO

Comments

**2. Are risks related to external incomes and subsidies such as from the European subsidies or Central Government identified by the municipality?**

YES

NO

Comments

**3. Does the municipality identify possible damage inflicted on a third party caused by the entity?**

YES

NO

Comments

**4. Does the municipality register risks that have been materialized (losses) and threats that have been prevented?**

YES

NO

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**5. Which statement better describes the risks identified by the municipality? Check one of the options that suits your organization most.**

- The municipality does not identify risk in a systematic way, giving only a listing of risks.
- The municipality identifies just regular risks (such as fire, storm flooding, etc.)
- The municipality identifies regular risks and also pure risks related with internal activities, (e.g. lack of experience or qualification of staff in a particular area, lack of internal control and fraud)
- The municipality identifies general external risks, (such as the variation or the reduction of the general grants and other with social, political, and economic factors) as well as specific risks related with catastrophic threats and internal activities of the municipality.
- The municipality develops a comprehensive list of risks based on those events that might affect the achievement of objectives.

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

### 4. Risk analysis and measurement.

**1. Does the municipality measure risk by determining its consequences and its likelihood?**

YES

NO

Comments

**2. Is the level of risk acceptable or tolerable in the municipality, based on the calculation of the financial resilience ratio (between financial capacity available and financial capacity needed)?**

YES

NO

Comments

**3. Does the municipality consider the interdependence of different risks and their sources in the measurement of risk? (e.g. polluted ground in an industrial zone with financial and reputational threats for the municipality.)**

YES

NO

Comments

**4. Does the municipality mention in its policy what instruments it uses for the analysis and measurement of risk?**

YES

NO

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**5. Does your municipality have a formal risk analysis process? Choose the option that fits your organization most.**

- We don't have a process for risk assessment.
- Our organization has ad hoc and intuitively activities for analyzing risks.
- Risk is assessed using formal qualitative methods such as risk rating technique (risk checklists) and probability-impact matrices
- Risk analysis is established using statistical tools and also qualitative methods formalized in the municipality.
- Risk analysis uses advanced methods (e.g. simulation models, Monte Carlo, etc.) and related instruments for assessment.

Comments

**6. Does your municipality have access and uses external support for risk analysis?**

- YES
- NO

Comments

**7. Who is dealing with the assessment of risk in your municipality?**

- There is no one responsible for risk assessment.
- Only external consultants
- The financial unit of the municipality or the insurance department (Afdeling Financiën of Verzekeringen)
- A separate risk management department or public servant on risk management (Risicomanagement) with the participation of the financial units of the municipality.
- A well trained risk management team of people from different sectors of the municipality (financial units, risk management unit, land department and other areas such as fire department, police, etc.), with the support of external consultants.

Comments



## Risk Maturity Survey for Municipalities in the Netherlands

### 5. Decision or Control

**1. How does your organization determine responses for future risk events? Please check one of the circles below.**

- We respond to risks as they emerge in the municipality.
- We develop responses to deal only with pure risk events (insurable risks).
- We have measures for pure risks and also comply with the "resilience paragraph" (weerstandsparagraaf), reserving financial resources for future unfunded events.
- For most risks identified strategies are developed, including financial and non-financial responses as well as having reserves allocated to cover the unfunded risks.
- For all risks identified, risk management strategies are taken selecting all possible risk responses based on the output from risk analysis and measurement

Comments

**2. Does the municipality mention explicitly in its policy which measures are taken for each specific risk?**

- YES
- NO

Comments

**3. Does the municipality adopt a combination of treatment options? (e.g. insured a building against fire and also have a prevention program)**

- YES
- NO

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**4. When selecting risk treatment strategies (e.g. insurance, outsourcing, prevention programs, safety measure, self-insurance, etc.) does the municipality consider also the opinions and perceptions of stakeholders and citizens?**

YES

NO

Comments

**5. How does your municipality decide on what risk management solutions to implement? Please check the appropriate option that suits your organization.**

Decisions on risk treatment are based on the past experiences with similar cases.

Comparing between the current situation and previous strategies implemented, developing then small adjustments.

Measuring by how much the implementation of the treatment benefits exceed its costs.

By developing a weighing system of the most relevant alternatives or options for risk treatment.

Exhaustive and comprehensive analysis of option is preform for prioritized areas of the organization.

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

### 6. Implementation, reviewing and feed back

**1. Does your organization have a dedicated budget for implementing risk management (for training, systems, experts, etc.)? Please check the appropriate option.**

- No budget allocated for the implementation of risk management (attention only on the compliance of the resilience paragraph, risicoparagraaf).
- Budget allocation for implementation is not consistent, depends on priorities and contingencies.
- There is a permanent allocation for risk management in the municipal budget to implement risk management controls (e.g. insurance, prevention programs, etc.).
- Budget is allocated for risk management control and also for the improvement of risk management practices (training).
- Budget allocated for the improvement of risk management controls and practices, the purchasing of risk management tools and systems, as well as for hiring the assistance of experts.

Comments

**2. Is there a training program on risk management in your organization? Please check the appropriate option for your municipality.**

- None
- Sometimes/not frequently
- Training on risk management when required
- Annual training to enhance risk management skills
- Annual training on risk management is encouraged, defining specific requirements (e.g. competency requirements).

Comments

**3. Is there is a procedure for monitoring the risk management program defined by the municipality? (i.e. detailing when, what and how to monitor).**

- YES
- NO

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**4. Does the municipality define and implement an organizational plan for change management (e.g. training how to adapt to new practices.)?**

YES

NO

Comments

**5. Are regular audits of the risk management policy carried out annually in the municipality?**

YES

NO

Comments

**6. Do you have a documentation process for risk management? Please check one of the circles below.**

None

Reports sometimes prepared on an ad-hoc basis

Reports are always prepared and risk information is stored.

Risk information is stored and reports are prepared but also distributed within the municipality

The municipality has a risk management system to store, analyze and distribute risk management information.

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

**7. Are risk management reports used by decision makers in the municipality? Please check the appropriate option for your municipality.**

- Not at all
- Reports are used only by the heads of financial units (eg. Hoofd Afdeling Financiën) or the city manager (Gemeentesecretaris)
- Reports are also used by Alderman of Finance (Wethouder Financiën) and the members of the executive committee related with financial matters
- Reports are also used by the financial executive committee and the College of B&W.
- Risk management reports are also used by the municipal council and the Mayor (Burgemeester).

Comments

## Risk Maturity Survey for Municipalities in the Netherlands

This completes all the questions in the survey.

Thank you very much for your time and effort!

Please click 'Done' to submit your answers.

### Appendix 3.

Written policy	No (n=9)	Yes (n=63)
	12.5%	87.5%
Mean (S.D)	4.48 (1.36)	

### Appendix 4.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Combined items	10.5856	9.590	.461	.250	.594
Budget for implementing RM	11.8380	12.209	.528	.350	.562
Training program on RM	11.4907	13.469	.465	.265	.594
<b>Change Management</b>	13.3912	16.731	.026	.083	<b>.686</b>
Documentation process	10.7199	11.313	.473	.252	.573
Reports used by decision makers	10.5972	12.698	.353	.184	.621

## Appendix 5.

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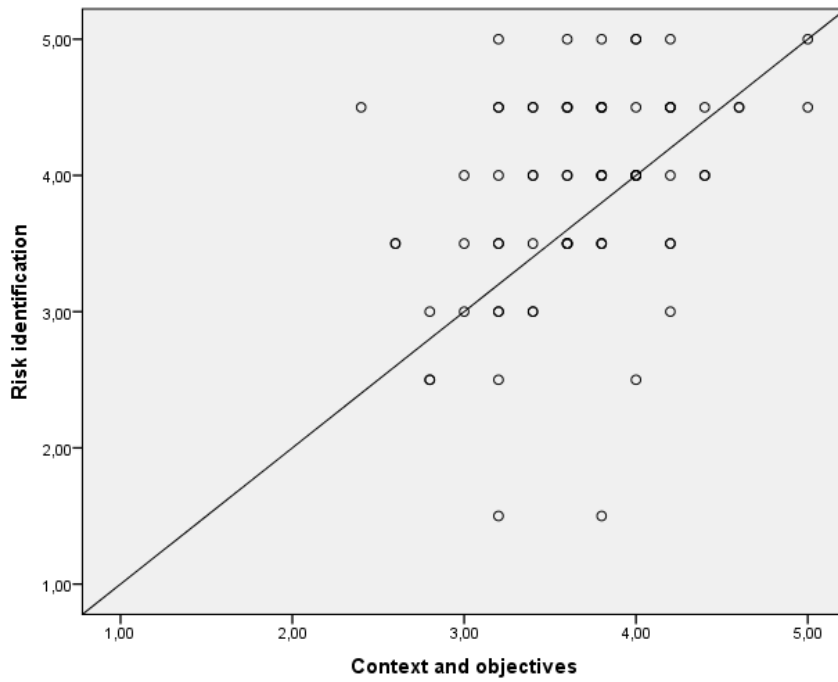
Risk Management stages	1	2	3	4	5	6
1. Context and objectives						
2. Risk identification	.383**					
3. Analysis and measurement	.280*	.520**				
4. Decision and control	.366**	.512**	.552**			
5. Implementation and reviewing	.409**	.580**	.686**	.560**		
6. Overall Score	.566**	.775**	.825**	.799**	.862**	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

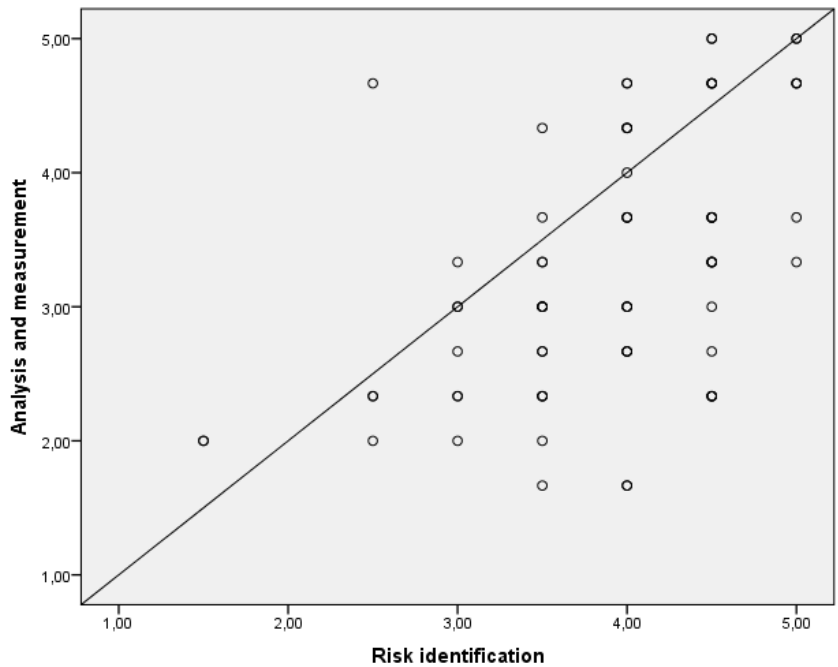
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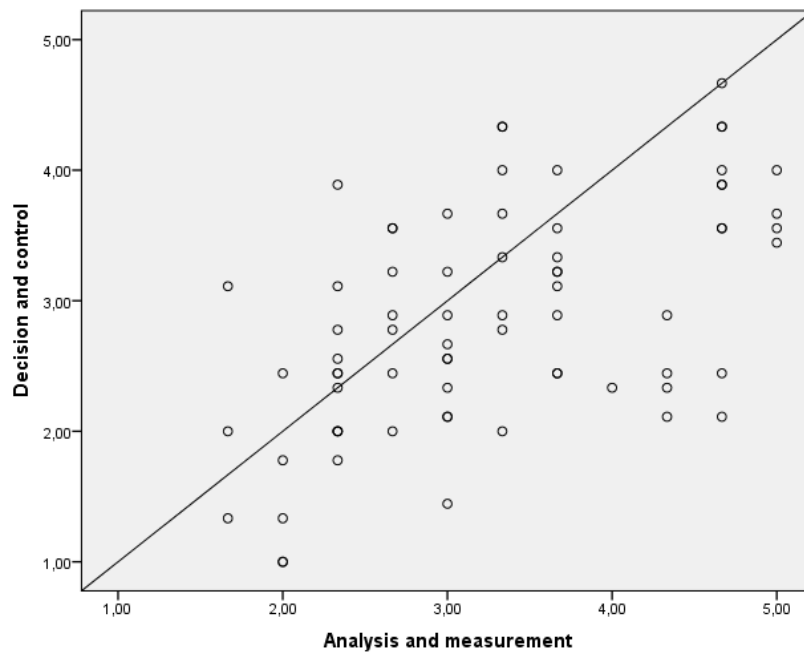
Scatterplot of the “Risk identification” stage and the “Context and objective” stage.



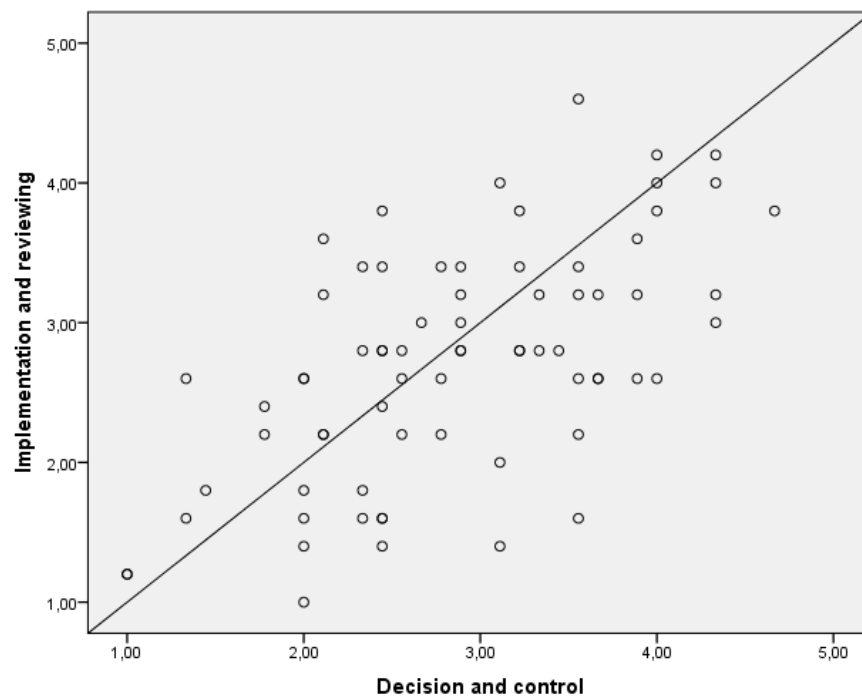
Scatterplot of the “Risk analysis and measurement” stage and the “Risk identification” stage.



Scatterplot of the “Risk decision and control” stage and the “Risk analysis and measurement” stage.

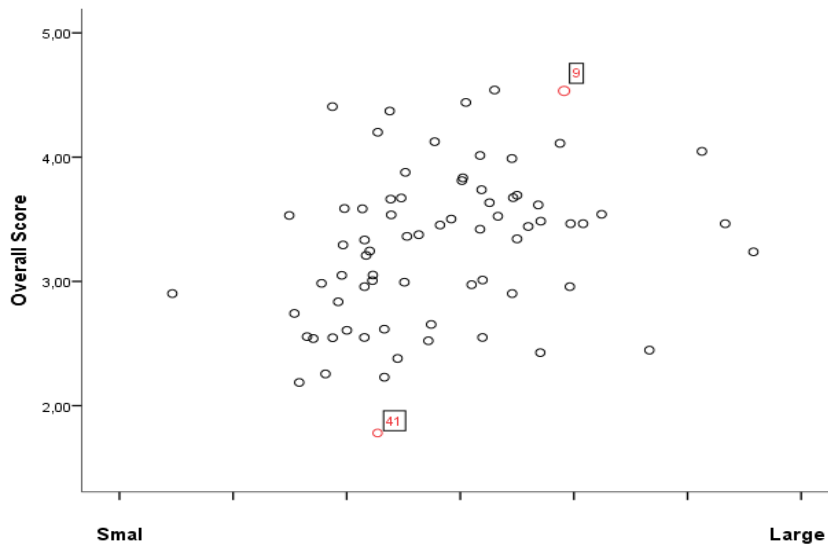


Scatterplot of the “Risk implementation and reviewing” stage and the “Risk decision and control” stage



## Appendix 6.

Scatterplot of the “overall scores” and “size” showing where case A (9) and B (41) was taken in the data set.



## Appendix 7.

Size	Organizational arrangements	Mean	SD	N
<b>&lt; 20,000</b>	No	2.74	(0.41)	7
	Yes	3.17	(1.13)	3
	Total	2.87	(0.66)	10
<b>20,000 to 50,000</b>	No	2.94	(0.56)	16
	Yes	3.43	(0.56)	13
	Total	3.16	(0.60)	29
<b>50,000 to 100,000</b>	No	3.15	(0.33)	3
	Yes	3.66	(0.49)	16
	Total	3.58	(0.50)	19
<b>&gt;100,000</b>	No	3.21	(0.35)	2
	Yes	3.48	(0.60)	12
	Total	3.45	(0.57)	14
<b>Total</b>	No	2.93	(0.50)	28
	Yes	3.51	(0.58)	44
	Total	3.29	(0.62)	72