

## Chapter 1 Introduction

### 1.1 Organizations and the Netherlands Defence Organization in the information society

Organizations are confronted with many changes as a result of the information society. Information Technology has created many opportunities for alternative ways of working, managing and communicating information, as well as cooperating with international partners in a global world. At the same time information security risks have increased as a consequence of the implementation and potential of Information Technology (Siponen, 2001; Elletson, 2005; Bonatti, e.a., 2006). Information management has proven to be very complex and managers struggle to define their role in the new setting (Beijen, Broos & Lucas, 2003). However literature shows that managers play an essential role in implementing ICT in the organization (Hargrove, 2001; Kluytmans, 2005; Boonstra, 2005).

According to Florijn (2001) the differences between various kinds of organizations like professional organizations, production businesses and traditional line organizations are fading. The Netherlands Defence Organization (NLDO) is thus confronted with similar changes compared to other organizations in the information society. A military organization however has a different primary vision from regular corporate business organizations. They are not primarily economically driven and their value is primarily to be available in a variety of national and international crisis situations and to be sufficiently prepared in dealing with those crisis situations. To work effectively was an important criterion in the past, but in the current political climate in the Netherlands, society and politics demand efficiency whenever possible. The NLDO has to be transparent and accountable (Sandee, 2004). Often outsourcing is considered and civil contracts are sought to justify the costs of specialized departments and hence concurrence has also become part of the military organization. Finding relevant information when needed, knowledge management, competency management, organizational changes and innovations, electronic Human Resource Management as

well as establishing a learning organization have become just as important for the NLDO as they are for other civil organizations in the information society.

Research has shown that alternative ways of working through ICT-technology require employees in general to develop new competencies (Dhondt & Kraan, 2001). This is especially true for managers who require new competencies in order to become effective managers of information, influence strategy in this regard and inspire their staff to participate in the new ways of working and learning (Hargrove, 2001; Yukl, 2006). The top of organizations set out the strategy for the new ways of working and select suitable applications. At an organization level jobs are created for information professionals and project teams are established to help the implementation of the new applications and ways of working, but it is at the level of the individual managers that the day to day implementation needs to happen and success is determined (Boonstra, 2005). Furthermore, managers have to inspire and coach their staff to participate in the new ways of working.

Many employees of the NLDO have been sent on ICT-courses to develop a number of important ICT-competencies. However by interviewing a number of senior officers in the NLDO it became clear that this is often insufficient for the complex and varied ICT-related work for which officers in the NLDO are responsible. Furthermore students in their final year of study that have done a module 'Personnel and ICT', in which some of the learning aims include that they obtain insight in the influence of ICT on personnel and organizations, indicated that in their opinion they did not have enough ICT-competencies to deal with the complexity of the work environment in the information society.

When addressing the issue if education is suitable for the information society, it is essential to look critically at the curriculum for such education (Plomp, 2006; Zaccaro e.a. 2006; Kessels, 1999). According to Oliver (2002) the use of ICT has fundamentally changed business and governance, but the impact on education lags behind. Plomp (2006) claims that different learning and development strategies are currently needed and Oliver (2002) claims that ICT could play an important role in transforming teaching and learning.

In order to prepare officers in the NLDO properly to work in the information society, it is essential firstly to understand how the information society has influenced the working environment of the officers, secondly to obtain insight in the ICT- and ICT-related competencies that are required by the officers in the NLDO and thirdly to investigate how a digital learning environment could be implemented to support the development of those competencies. Since the Netherlands Defence Academy (NLDA) has stated that innovation in education is an important instrument to improve the quality of education (Onderwijsvisie, 2005), contributions to the evolution of an effective digital learning environment for the Faculty of Military Sciences (FMW) as well as other academic training programmes in the NLDA are encouraged.

Furthermore, it appears worthwhile to investigate whether a need exists for a digital learning environment for officers currently employed in the NLDO who need support in developing the ICT- and ICT-related competencies that they required to function effectively in the information society. According to Kessels & Keursten (2001) it is an important challenge to create an environment where learning and working come together. They argue that both organizations as well as individuals could benefit from such an initiative. A Human resource development programme should be seen as an important aspect in learning and knowledge management in the information society (Harrison & Kessels, 2004).

In summary can be said that managers play a crucial role in implementing new ways of working in organizations in the information society and although a number of managerial competencies currently required have been described in the literature, the specific information, communication and technological competencies for managers in the information society have not been identified and described as a group of competencies, nor for organizations in general nor for military organizations specifically.

## 1.2 Purpose of this research and the research questions

The objectives of this research are twofold:

Firstly to contribute to the knowledge fields of Organizational Management and ICT, by identifying the influence of ICT and the information society on the labour environment of officers working in the NLDO and creating a conceptual model that contains the ICT- and ICT-related competencies that are currently required by those officers. From the results of the case study a general model of ICT- and ICT-related competencies required by managers in the information society will be suggested. Secondly to contribute to the knowledge field of innovation practice in higher education by considering the implications for a digital learning environment in the NLDA in order to support the development of the identified ICT- and ICT-related competencies.

The main research question is:

***What is the influence of ICT and the information society on the labour situation of officers in the Netherlands Defence Organization and what are the implications thereof for a digital learning environment for the officers in the Netherlands Defence Academy?***

The second research question is:

***What are the information, communication and technological competencies required by managers in the information society?***

This research is in its essence a holistic investigation into a complex information system in the context of the dynamic systems theory, in which the organization, information and communication technology, the employees and the society each play an important role, are interconnected and influence each other (Boonstra, 2000) as is illustrated in figure 1.1.

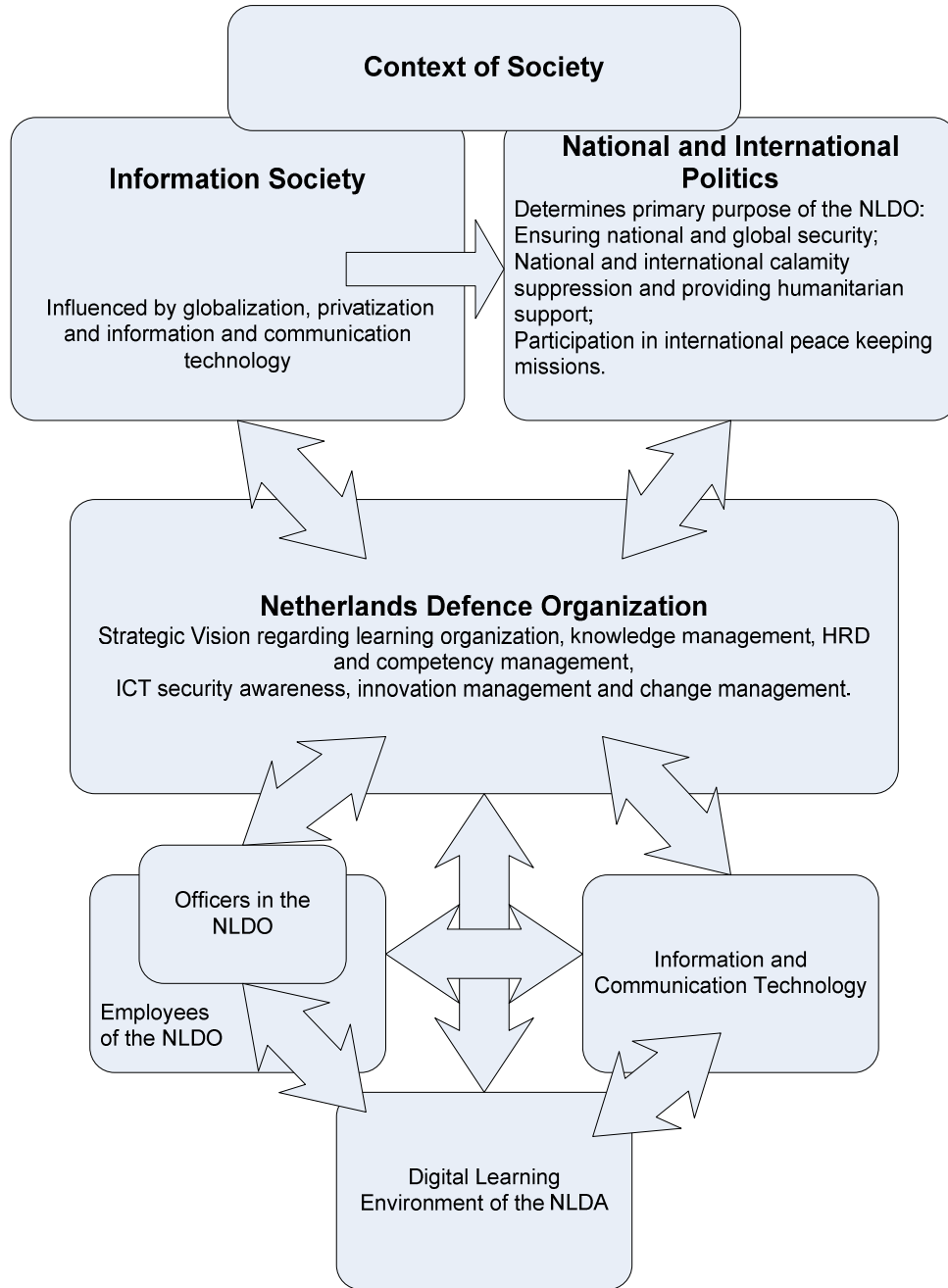


Figure 1.1 an illustration of the complexity of this research

### 1.3 Terminology

The important terms used in this research are defined in Table 1.1. Where appropriate other terms will be defined in the text.

Table 1.1 Definitions of the important terms used in this research in alphabetical order.

Term	Meaning	Remarks
Digital learning environment	All digital learning opportunities that are offered to the officers in training and officers currently working in the NLDO. This includes multi-media, electronic communication opportunities, the internet, intranet, mobile learning, tutorials, games, simulations and remedial applications presented to the learning community. A learning management system could be used to structure (part of) the digital learning environment, but this is not a requirement. As such a digital learning environment includes an electronic learning environment.	The focus of this study is on a blended learning environment where contact education (face-to-face teaching) is combined with a digital learning environment for initial training of officers and on an embedded learning environment where officers could learn when they need to in a working environment. Performance support could also be offered via such a digital learning environment or via other means like an Intranet.
Information, communication and technological competencies	Competencies consist of a combination of knowledge and insight, skills and behaviour as well as attitudes. In this research the specific competencies are focused on effective participation of officers in their labour environment, irrespective of field of specialization.  To evaluate the required learning competencies it is necessary to describe them in terms of criteria for learning outcomes and to record the progress for each student ideally in a digital student profile.	A distinction is made between <b>ICT-competencies</b> which are categorized in this research as operational, structural and strategic ICT-competencies and <b>ICT-related competencies</b> which are competencies that are related to the use of ICT in the information society and include a leadership component.

Table 1.1 Definitions of the important terms used in this research in alphabetical order.

Information society	<p>The society in which organizations in modern countries currently are operating. Globalization, privatization and ICT and the opportunities and challenges that come with it, play an important role in the information society.</p> <p>The information society is characterized by a high level of information intensity by the use of technology and organizations in the information society and individuals, organizations and governments are connected internationally.</p>	<p>A number of authors speak about 'the rise of the information society' (Castells, 1996). The researcher recognizes that the information society is continuing to emerge and the participants in it are continuing to learn how to participate, however in this research the term 'information society' will be used. Terms like network society, knowledge society and global society place the focus of the information society on different aspects, but the terms are all closely related to the information society.</p>
Manager, leader	<p>Leadership is stipulated in this research as <i>"the ability of an individual to influence, motivate and enable others to contribute toward the effectiveness and success of the organization"</i> (House e.a. In Yukl, 2006:3).</p> <p>Managers in the NLDO can be seen as leaders in the organization who play an important role in influencing the strategy of the organization, communicating the vision and strategy of the organization to their subordinates and coaching their subordinates to work within this strategy and vision.</p>	<p>It is acknowledged that there are differences identified in the literature between leaders and managers. However for the purpose of this research where the context is a military organization it is assumed that most managers need to lead their subordinates as well and therefore no distinction will be made in this research.</p> <p>An officer is seen as a manager who has received a higher education.</p>

## **1.4 Background to the problem**

According to Hornby & Clarke (2003) the term information society is often used without using a clear definition and different perspectives are often used. Some authors even challenge the existence of the information society. Black (2003) as well as Wajcman (2006) argue that there have been many information societies in the past and they object to the technological determination in the current society. They are supported by Muddiman (2003) who argues that the information society is a restructured rather than a transformed social order. However there are also many authors who are of the opinion that the influence of ICT, especially the technology that makes (international) networks possible as well as mobile technologies and globalization is so substantial that the society has indeed changed into an information society (Boonstra, 2005; Hargrove, 2001; Feather, 2004; Town, 2003).

### **1.4.1 Lack of research about the influence of the information society on the labour environment of managers**

Globalization and communication technology in the information age require new competencies from employees working at different levels in organizations. Research has been carried out to determine the influence of the information society and technology on labour in general, mostly from a sociological perspective (Batenburg et al, 2002), but little research has been done to determine the influence of the information society and technology on a managerial level specifically (Yukl, 2006). Yukl claims that such research is necessary. It appears from the literature review that ICT- and ICT-related competencies needed by managers in the information society have not yet been identified as a related group of competencies.

Furthermore, officers often have managerial and leadership roles that have also changed as a result of the information society and ongoing information innovations and changes need to be managed (Boonstra, 2005; Hargrove, 2001). Hargrove (2001) claims that managers play a crucial role in the implementation of ICT in organizations on three different levels:



Firstly in influencing the strategy of the organization in this regard, secondly in implementation of this new strategy, thirdly in influencing their subordinates in participating in the new ways of working and using ICT. It therefore makes sense to investigate the influence of the information society specifically for managers.

#### **1.4.2 The role of the manager in changed ways of working**

Since knowledge is rapidly changing and finding relevant information becomes vital in organizations, knowledge including best practices, needs to be managed digitally at all levels in an organization. A manager needs to be able to share and benefit from the knowledge of others himself, but at the same time it is vital for an organization that managers actively encourage participation of their staff in knowledge management, lifelong learning and communities of practice. Awareness of the need to learn in combination with knowing where to find the information is the first step in the right direction (Hargrove, 2001). According to Hargrove, managers play a vital role in communicating a holistic vision and strategy to make the organization more innovative with regard to the management and communication of information. Senge e.a. (1999) claim in this regard that the learning ability of organizations leads to improvements in the organization and that this is especially determined by the way in which managers deal with challenges.

A number of organizations are in the process of describing the competencies that are required at different levels to work effectively in the information society, in an attempt to implement the rather abstract term competency management into a concrete operational form. As organizations often have to work with fewer employees in a more effective way, competency management becomes vital (Kluytmans, 2001). Effective competency management requires a different way of managing the human resources available in the organization. It is important to have a clear insight into the vital competencies of the broader organization as well as the working units within organizations. At the same time a clear picture needs to be available of what the competences are that are available in the current staff of the organization at all levels. Gaps in the required competencies and the available competences need to be identified and development and recruitment programmes need to be adjusted accordingly.

Managers play an important role in this regard especially since employees often do not work within the strict limits of function descriptions of the organizations (role-oriented) any longer, but need to become flexible and task-oriented (Kluytmans, 2005).

Globalization and information and communication technologies bring great opportunities for organizations in the information society, but at the same time contain enormous information security risks and make organizations at many levels vulnerable. Digital security can only be implemented successfully when all employees of an organization become aware of the potential security risks (Peltier, 2005; Parker, 2001; Siponen, 2001; Eckert, 2005; Chalmers, 2006). The managers again play a vital role in establishing an organization in which all employees are sufficiently ICT-security aware.

Organizations in the information society can never just be, but are always in a process of becoming. Aspects like change and innovation management as well as creativity have thus become important competencies and are relevant for managers in organizations in the information society.

### **1.4.3 Higher education in the information society**

Policymakers and teaching staff of Institutes of Higher Education need to establish whether the student learning outcomes are compatible with the competencies and attitudes that are specifically required by managers working at a level where higher education is a requirement in a global information economy (Eaton, 2002). Institutes of Higher Education increasingly realize that they need to evaluate those required competencies and attitudes for individual students, to make sure that students having completed their study are able to function at a managerial level in constantly changing organizations.

Most of the academic institutions in the Netherlands are busy identifying and describing academic competencies in general, but it is noted by the author that ICT- and ICT-related academic competencies are not identified in the same way as that English and Dutch language competencies, Research Methods and Philosophy of Science are identified and given attention to across the curricula. Communication is seen as

important, but communication using ICT technology is somehow not seen as being different from communication through verbal and written language.

A number of specific operational ICT-skills like using MS office and basic knowledge about PCs are in some instances included in introduction programmes of universities, but the author suspected that the ICT- and ICT-related academic competencies required in the information society entail much more than that. It is essential to identify those ICT- and ICT-related competencies and that the development of those competencies need to be given a structural place in the curricula of institutions of higher education. A syllabus for ICT- and ICT-related competencies at institutions of higher education could include competency training for structural and strategic ICT-competencies. Some examples are how to find relevant information on the closed net, how to evaluate the importance and reliability of sources found on the internet and how to use a management information system as well as managerial ICT-related competencies like creating awareness amongst staff regarding innovation, information security and communities of practice as well competencies to participate effectively in strategic decision-making regarding the implementation of ICT and in establishing a learning organization, knowledge management and competency management. The researcher suspects that the development of ICT- and ICT-related competencies will not intuitively be obtained by employees, but needs to be planned and structurally implemented in a training programme. Furthermore, opportunities need to be available for officers in order to develop specific ICT- and ICT-related competencies when the need arises.

The identified ICT- and ICT-related competencies that are required in organizations in the information society, not only have a direct impact on the curricula of the training and development of new employees, but also on the training of current employees in organizations who might be insufficiently prepared to participate fully in the information society. Organizations need to have insight into those competencies so that they can adequately provide learning opportunities for their current managers when needed. Furthermore, it is important for policymakers and educationalists in institutions of higher education to have insight into the required ICT- and ICT-related competencies, since higher institutions of learning need to ensure that the development of those competencies is supported in their learning programmes as the focus of their curricula is increasingly needs-driven (Plomp, 2006). In this sense he claims that a new balance needs to be found between learning as a process and learning as a product.

Students need to develop those competencies that make it possible for them to react adequately to learning contexts with which they are confronted during their study and as life-long learner in their working life (Eaton, 2002). They need to be motivated to act in such a way that they select correct procedures to obtain correct results. ICT- and ICT-related competence needs to mature during the time that the student spends in higher education and those competencies need to be evaluated as part of a student profile. In this context it is also necessary to identify the specific ICT- and ICT-related competencies that need to be part of such a student profile. Furthermore, it needs to be determined to what extent the innovations in the digital learning environment could contribute to developing those competencies. Without the commitment of the teaching staff and students however, the possibilities that the digital learning environment brings to higher education will not be utilized fully (Reeves, Herrington & Oliver, 2005).

#### **1.4.4 New educational environments**

In the past decade, there has been an active discussion about new educational environments in higher education where the emphasis is shifting from education by teachers to learning by students. The role of a teacher has changed from deliverer of instruction to the facilitator of learning by designing learning environments (Eaton, 2002; Oliver, 2002). According to Lieberman & Guskin (2002) the role of technology is beginning to change how students learn and will likely transform student learning experiences in the future, as digital technology will be integrated further into the core of education. Many universities have implemented digital learning environments by now and use blended learning techniques where face-to-face education is combined with a digital learning environment. The digital learning environment creates opportunities to set up alternative learning landscapes which could enhance the quality of learning and which could prepare the students to successfully participate in global organizations functioning in the information age (Lieberman & Guskin, 2002; Oliver, 2002; Eaton, 2002).

The question arises if the learning environment has changed in such a way that it does contribute effectively to the learning of the students and if the confidence of teaching

staff and students to use information and communication technology has increased sufficiently to participate in a new learning environment. Early indications are that there are improvements in the learning landscape, but that the possibilities of the digital learning environment are not utilized sufficiently and in such a way that the students obtain the skills and experience needed in a knowledge-based society where often the only constant is the fact that everything changes (Eaton, 2002).

A lot of research has been done in the field of the digital learning environment and instructional design, but more research is required to determine specifically how the development of ICT- and ICT-related competencies could be supported by a digital learning environment. In this regard the focus of the last part of this research will not be on determining the effectiveness of the delivery medium, but rather on the instructional strategies and tasks that could be used to support the development of those ICT- and ICT-related competencies identified in the first part of the research. Furthermore, the factors that have an influence on the outcome of learning need to be understood in order to improve and fully utilize the opportunities of this environment.

It is however clear from the literature that the didactical methods are of more importance than the delivery medium (Clark, 1994; Reeves e.a., 2005), but as Kozma (1994) argues, in the information age there are new skills to be learned and new worlds to be discovered that cannot be learnt without a digital learning environment. ICT- and ICT-related competencies are of such a nature that they need to be learnt in a digital learning environment. The author does however believe that a holistic approach is needed in creating a digital learning environment in that the human factors (teaching staff as well as students), the technology, the required information and content all need to be taken into consideration integrally.

Apart from the opportunities that the digital learning environment creates, reforms are also necessary according to Lieberman & Guskin (2002), because institutions have to deal with reductions in financial resources and increases in costs and demands for accountable student learning outcomes while implementing new higher education models. Lieberman and Guskin continue their argument by stressing the need for Institutes of Higher Education to become accountable for student learning outcomes. Flexible learning routes have also become a necessity, since students have different

study needs and move increasingly between institutes nationally as well as internationally (Oliver, 2002).

It is expected that in the Netherlands a new law for Higher Education and Academic research will be implemented in 2007. Some of the aims of this new law (WHW 2) are to stimulate flexibility and demand-oriented education, but at the same time Institutes of Higher Education will be held accountable for their performance both regarding education and research.

## **1.5 Summary of the setup of the research**

A combination of qualitative and quantitative research methods is used to answer the research questions. A case study was conducted using in-depth expert interviews, a survey to determine the current state of ICT- and ICT-related competencies required by officers of the NLDO as well as a group discussion with some of the students.

The survey was conducted in the NLDO amongst the research population of officers currently working in the NLDO. Civilian employees at a similar working and thinking level in the NLDO were not included in the survey, because the training at the NLDA is exclusively meant for military personnel. It is interesting to do a case study in the NLDO for this research because it also contains its own academy where officers are trained. The vision of the Netherlands Defence Academy (NLDA) is that officers are trained at an academic level since the functions that they will fulfill in the organization are at an academic working and thinking level, however there are also officers in training doing a shorter training programme since they have already concluded a study in higher education or they are trained to fulfill specific tasks for a limited period of time.

The results from the survey, combined with relevant literature review and expert interviews are used to discuss the implications for a digital learning environment for the NLDA where students could be supported optimally to develop the ICT- and ICT-related competencies that are required in the NLDO in the information society.

A general model for ICT- and ICT-related competencies required by managers in the information society is suggested based on the results of the survey using factor analysis. Furthermore, a first instrumentalization for such a model is developed. Although the model is based on just one case, it could be tested and developed in further research.

The theoretical fields of information society, knowledge management, learning organizations, competency management, human research development, information security awareness, innovation and change management, learning in a digital learning environment in higher education, instructional design, mobile learning and simulations and gaming will be drawn upon to create a theoretical framework for this research.

## **1.6 Background of the organization in which the case study is conducted**

The NLDO consists of an army, air force, navy and military police that since November 2005 have been working in a joint organization. The primary tasks of the NLDO are ensuring national security, participating in international peacekeeping forces and providing assistance during national and international disasters. Furthermore, they play a role in the 'war against terrorism', drugs control and assisting public and civil organizations within different fields of specialization like diving under dangerous circumstances and optronical designs.

The NLDA consists of three previously independent higher education institutes namely the Royal Netherlands Military Academy (*KMA*) located in Breda, the Royal Netherlands Naval College (*KIM*) located in Den Helder and the Netherlands Defence College (*IDL*) located in The Hague.

Traditionally the KMA is responsible for the training, forming and education of the officers in command that will serve in the army, air force and military police of the NLDO. KIM is responsible for the training, forming and education of the officers who will serve in the navy of the NLDO. The IDL offers career training and specialized job-oriented courses for the officers of all the armed services and civilian personnel of the NLDO, as well as various courses for foreign officers. It also has facilities for conferences,

seminars, meetings and training activities for other defence organizations and affiliated organizations.

The NLDA organization is responsible for the training and education of approximately 2000 students by 200 lecturers and 600 other staff members. The FMW was formed in November 2005, is integrated in the NLDA and is responsible for the initial academic education of the officer as well as academic research. This military application domain is not covered by civil universities because it is characterized by a unique combination of academic forming, character forming as well as military/maritime forming which is guided by a professional profile for the officer, recently updated and provided with a competency dictionary. Close links exist between the faculty and a number of universities in the Netherlands. The FMW is responsible for the training and education of approximately 800 students by 160 staff members.

The structure of the newly formed FMW within the NLDA is mainly grouped in three departments: Military Systems and Technology, is mainly located in Den Helder, Military Sciences, which is mainly located in Breda and Military Organization Sciences, which is mainly located in Breda. The students in those departments follow different academic programmes, however a period of approximately half a year is identified for a combined officers training programme, hereafter referred to as GOO (*Gemeenschappelijke officers opleiding*), where an introduction of each of the learning areas will be given to all students in addition to training and forming activities. The GOO will take place at the respective higher education institutes. This means that the naval officers in training receive the introduction at the KIM in Den Helder and the officers in training for the air force, army and military police receive a similar introduction at the KMA in Breda.

In each department a number of knowledge areas are identified and grouped together in sections. Each section consists of a combined staff from the institutes mentioned. The responsibilities of the sections are the development and teaching of the curricula of the various subjects and a number of research projects.



### 1.6.1 Competencies in the NLDO

The NLDO has developed a dictionary with competencies that are seen as important for the organization (Hoofddirectie personeelsbeleid, 2004). In this document competencies are defined as skills and behavioural aspects that make employees suitable for their function. There are 27 competencies identified which are categorized in five clusters: thinking power, personal effectiveness, interpersonal effectiveness, treatment of work and management. Only two competencies are associated with management, namely delegating and development of staff. Leadership is not described as a separate competency since it is seen as a combination of other competencies already described in the competency dictionary. The competencies are described at four levels and the specific level of competence required is determined by the type of function.

Some of the competencies like creativity, analyzing, ability to learn, networking and communication are especially important in the information society, but no specific mention is made about competencies related to ICT, nor the role ICT could play in developing those competencies. This is interesting since ICT is identified as playing an important role in the integral organizational concept in the organization as is illustrated in figure 1.2. A number of other aspects from the organizational concept are specifically identified as competencies, for example vision, planning and organizing.

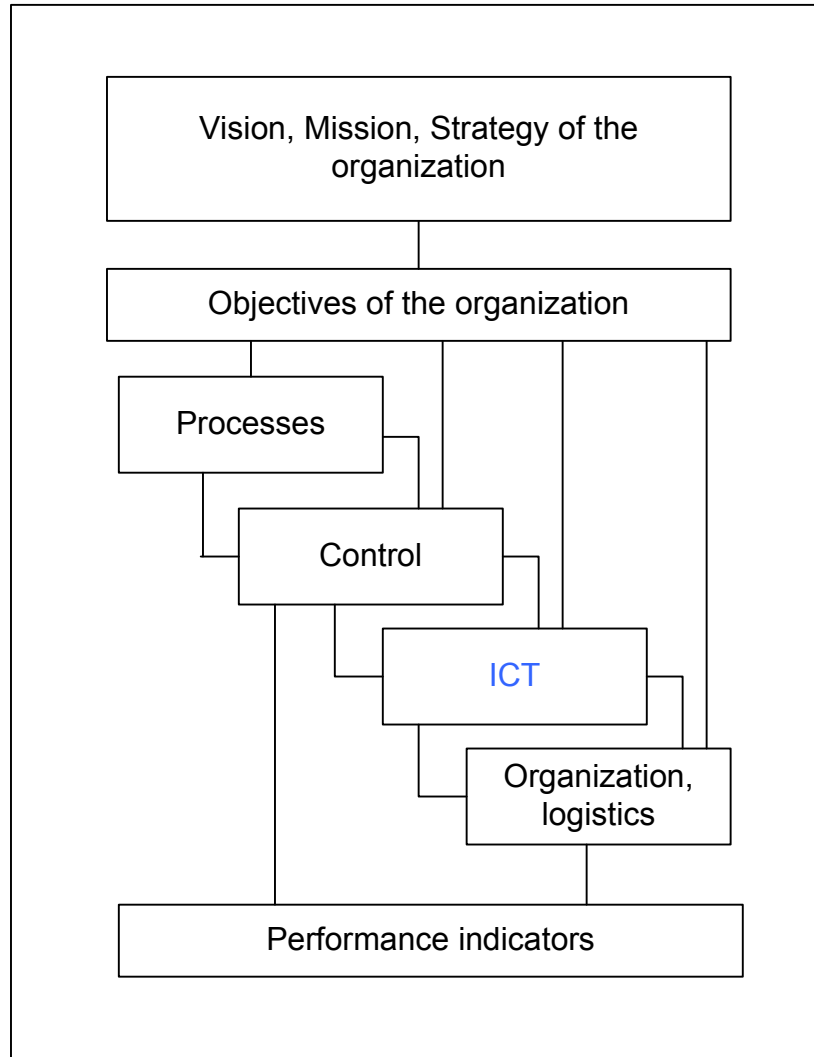


Figure 1.2 The integral organizational concept used in the NLDO

## 1.6.2 Applications in the NLDO

The officers in the NLDO have access to MS Office and depending on their function area officers are authorized to access specific applications needed to do their work, including a combination of information management systems, decision support systems, logistic support systems and material configuration support systems. Officers could apply for further applications when they indicate a functional need for those. Those applications include for example MindManager and MS Project. Shares with exclusive access by group members are available on request for project groups. Authorization to a number of shares is based on which function an officer has in an organization.

The NLDO is in a process of changing the level of access and in the course of 2007 most of the officers will have access to both the Internet and the Intranet of the NLDO at their working place, although the access for the officers taking part in a mission and during time at sea will still be limited. The Intranet of the NLDA contains a broad variety of information about the organization including authorized access to databases and can be seen as the primary application to manage the knowledge of the organization. The NLDO has selected PeopleSoft as their primary software to manage some HRM processes. All officers have access to this application, although not always on their own workplace. During operational missions officers need to be able to work effectively with command and control as well as battle management applications. A digital care system in which medical and personal information is recorded of all employees is also used by the officers.

### **1.6.3 Academic forming in the Netherlands and the NLDA**

One of the results of a combined Europe is the introduction of common and recognizable university degrees. The Bachelor – Master structure, hereafter referred to as BaMa structure, has recently been introduced in the civil universities of the higher academic institutes in the Netherlands and has officially been introduced in the FMW in the academic year 2004/2005. It needs to be noted that the KMA has started a pilot teaching programme in the BaMa structure in the academic year from 2002/2003. Officer's education programmes in progress before the start of the BaMa structure continue at the respective institutes and will naturally be phased out after a few years. In addition to this, a special situation exists in the Netherlands in that the Bachelor – Master structure is introduced in the Netherlands as a result of extending the cooperation within the European Union and has as aim that it is easier to compare university degrees obtained in the Netherlands with university degrees obtained elsewhere in Europe.

Furthermore, to make it possible for students in Europe to study a variety of domains at different institutes across Europe according to certain conditions and obtain a communal

degree. In the past, accreditation for academic forming in the Netherlands was dependent on the reputation of the university.

The understanding was that anyone who successfully completed a university degree from a recognized university was regarded as being academically formed. However in the new Bachelor-Master structure each Bachelor and Master offered in the Netherlands needs to be accredited by a recognized accreditation organization according to a number of criteria (Douma, 2004). For universities in the Netherlands this means a critical evaluation of academic forming in general and recognition of the fact that substantial criteria needed to be formulated. The technical universities of Eindhoven, Delft and Twente have worked together in a project to describe the general academic criteria for Bachelor and Master Curricula. The criteria described during this project have been reviewed in an extensive pilot project on usability and adjusted on the basis of the results of the pilot. The criteria thus obtained can be regarded as an operationalization of academic forming for the universities that use the Dublin descriptors that are developed in 2002 by the Joint Quality Initiative Informal Group (JQIIG). The Dublin descriptors are used by many policy makers in the Netherlands (Meijers, van Overveld & Perrenet, 2005:3). The Dublin descriptors are described by the NVAO as follows:

- **Knowledge and insight**
- **Applying knowledge and insight**
- **Formation of judgement**
- **Communication**
- **Learning skills**

The descriptors have to be translated for each bachelor study into concrete performance criteria, also referred to as end-terms, before an accreditation organization considers accreditation for the bachelor. Since the FMW aims to obtain accreditation for the bachelor's degrees that they offer, their academic forming is described according to the Dublin descriptors. The FMW abides by the criteria for academic competencies as described by the universities of Delft, Eindhoven and Twente, therefore those are taken as the standard for this discussion. The universities mentioned have identified seven areas of academic competence as follows.

A university graduate can be characterized as someone who:

1. is competent in one or more scientific disciplines
2. is competent in doing research
3. is competent in designing
4. has a scientific approach
5. possesses basic intellectual skills
6. is competent in co-operating and communicating
7. takes account of the temporal and the social context

The above areas are described by Meijers, van Overveld & Perrenet (2005: 4) as follows:

**Is competent in one or more scientific disciplines**

A university graduate is familiar with existing scientific knowledge and has the competence to increase and develop this through study.

**Is competent in doing research**

A university graduate has the competence to acquire new scientific knowledge through research. For this purpose, research means: the development of new knowledge and new insights in a purposeful and methodical way.

**Is competent in designing**

Designing is an activity aimed at the realization of new or modified artifacts or systems with the intention of creating value in accordance with predefined requirements and needs.

**Has a scientific approach**

A university graduate has a systematic approach characterized by the development and use of theories, models and coherent interpretations, has a critical attitude, and has insight into the nature of science and technology.

### **Possesses basic intellectual skills**

A university graduate is competent in reasoning, reflecting, and forming a sound judgment. These are skills which are learned and sharpened in the context of a discipline, and which are generically applicable.

### **Is competent in co-operating and communicating**

A university graduate has the competence of being able to work with and for others. This requires not only adequate interaction, a sense of responsibility, and leadership, but also good communication with colleagues and other professionals. The graduate is able to participate in a scientific or public debate.

### **Takes account of the temporal and the social context**

Science and technology are not isolated, and have a temporal and social context. Beliefs and methods have their origins; decisions have social consequences in time. A university graduate is aware of this, and has the competence to integrate these insights into their scientific work.

Three main categories of competence can be identified firstly as the domain of the student, secondly as the academic method of thinking and doing and thirdly the context of practicing science.

In order to develop the seven areas of competence further, a distinction is made between competences at the level of Bachelor and Master. For the purpose of this research the focus will be on the competences that are related to the Bachelor, since the students studying in the FMW of the NLDA are required to minimally obtain a Bachelor's degree.

The FMW is in the process of working out those seven areas of academic competence to the level of performance outcomes. Although those seven areas of academic competence have to be achieved throughout the course of the study, a number of

subjects have been identified through which the development of some areas of academic competence is supported.

Communicative skills in the Dutch and English languages are to deal mainly with the communication criteria and ICT is not identified explicitly as such as a means of communication and currently no mention is made about the need of officers in training to develop ICT- or ICT-related competencies. This is remarkable since the literature shows that ICT has a substantial influence on the labour situation of managers and information behaviour is unlikely to change automatically (Davenport & Prusak, 1997). In this regard ICT is seen as a tool to deal effectively with communication as well as information. During the course of the study however some assistance is provided to the students regarding applications like Excel and self-teach modules for other MS Office applications are electronically available to the students. Furthermore the opportunities that ICT offers for example in doing research or cooperating are not explicitly considered.

#### **1.6.4 The electronic learning environment in the NLDA**

The board of governors of the NLDA has initiated a workgroup to research how web technology could be included in the education at the NLDA. One of the conclusions of this workgroup is that an educational network needed to be established between KIM, KMA and IDL in order to apply web technology in the educational programmes. The first step towards this network was to create a suitable infrastructure and ICT facilities which has recently been realized. The second step was to select a suitable package to support the electronic learning environment envisaged. After completing a pilot period of two years in 2002 and 2003 and a favorable evaluation, KIM has started an implemented project of a customized electronic learning management system called TeleTop, in January 2004. The other institutes of the NLDA have used different electronic learning environments before, but after an evaluation of TeleTop in comparison with other customized electronic learning management systems, it became the standard application for the NLDA from September 2005 onwards.

The NLDA offers a blended learning environment. In addition to the electronic learning environment where the lecturers enrich their courses by adding to the variety of learning

activities and work forms, it is expected that students with different learning styles are supported by the electronic learning environment in combination with contact education.

Some simulators are used to support the development of military and maritime competencies. For example a bridge simulator forms part of a wider digital learning environment of KIM. The students in the seaman officer's branch are trained to control the bridge. Computers, data projectors with a semi-circular display as well as a replica of the bridge of a ship are used to simulate a variety of situations at sea. The bridge simulator looks like the bridge of a frigate, which is a type of ship in the Netherlands defence organization, but with adjustments bridges of other ships could also be simulated. Sailing and maneuver properties as well as safety situations compare well with reality. Mistakes can be made without having serious and expensive consequences. The students have the opportunity to experience a wide variety of situations at sea through simulations, before they may continue their training under supervision on a real ship.

Within the NLDA a workgroup ICT in Education was formed in November 2005 with the task to answer the question: What can the digital learning environment add to the learning environment of the NLDA? This provides a unique opportunity to critically evaluate the opportunities that are available in this regard and to contribute to the digital learning environment for the FMW, supported by recent research.

## **1.7 Structure of the chapters in this research report**

Table 1.2 illustrates the structure of the research report. It shows how the chapters follow each other and where the main addenda fit in.



Table 1.2 Structure of the research report

	<b>Content</b>	<b>Addendum</b>
Chapter 1	Introduction	
Chapter 2	Literature survey	Addendum 1: Results of searches
Chapter 3	Research methodology	Addendum 2: Semi-structured interviews Addendum 3: Questionnaire Addendum 4: Group discussion
Chapter 4	Results of research	Addendum 5: Statistical analysis using SPSS
Chapter 5	Discussion, conclusions and recommendations	

## 1.8 Summary

The main objective of this research is to contribute to the knowledge fields of Computer Assisted Education, Management and Organization and ICT by doing a case study in the NLDO to determine the influence of ICT and the information society on the labour environment of the officer in the NLDO. A model was created that contains ICT- and ICT-related competencies that are required by officers of the NLDO in the information society and of innovation practice in a digital learning environment by suggesting a digital learning environment that could support the development of the identified ICT- and ICT-related competencies in the NLDA. A practical objective of this research is to contribute to the evolution of an effective digital learning environment of the NLDA in the light of a curriculum suitable for the information society.

A model that could apply in general to the information, communication and technological competencies required by managers in the information society is suggested and a first instrumentalization for this model is provided. The author realizes that such a model could never be static and will need to be adjusted in accordance with further research results and new technologies becoming available. The attempt is a step into structuring the perhaps unstructurable.

The philosophical view underpinning this research is critical realist, conducting a case study applying a survey method, using expert interviews and a questionnaire. A combination of qualitative and quantitative research methods is used.