Aiming at information superiority:

the information concept of the defence administration
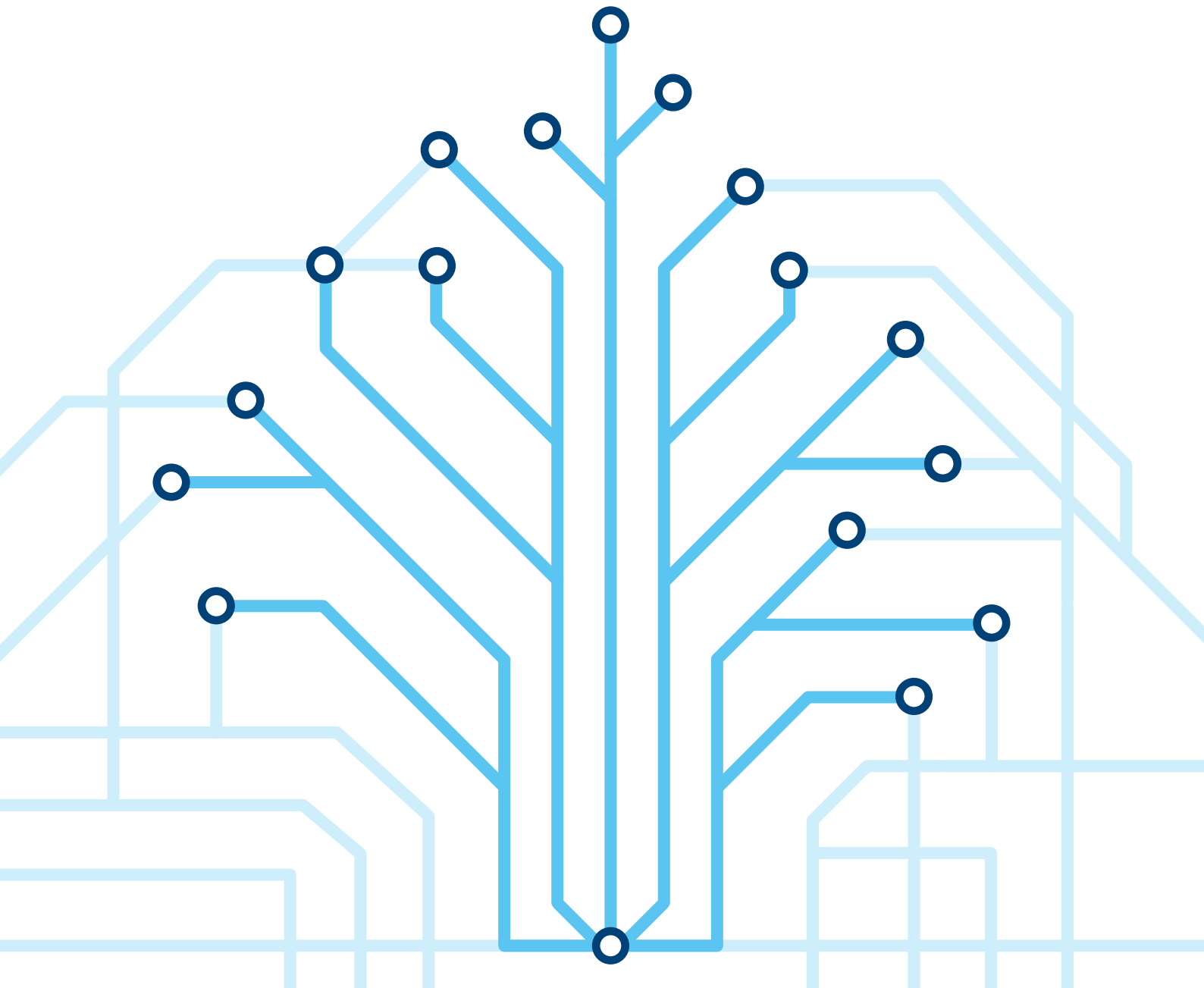
Description sheet

Abstract

The purpose of the information concept is to guide the Finnish defence administration's information work and promote discussion related to it. The concept is intended for all those working with or utilising information in the defence administration as well as the defence administration's stakeholders. The aim is to gain better control of information – to achieve information superiority! Based on expert interviews, four workshops and a consultation round, policies and principles have been collected to this concept to promote the information culture and utilisation of information in the administrative branch of the Ministry of Defence. The concept briefly describes the basics, challenges and solutions of information as well as concise policies and principles. Definitions of the terms used are provided at the end of the document.

The view of the defence administration on information is summarised in the following principles:

1. Information is a strategic resource and a critical success factor. It enables new capabilities. Future is made with information.

2. The change in the information culture and its promotion extend to the personnel of the entire defence administration. Information is part of day-to-day life. Information is part of everyone's task and role. We know how to summarise and justify information. Information has a customer.

3. Information was made for sharing. Instead of the ownership of the information, it is more important to discuss the rights to using information. A data balance sheet provides a joint situational picture of the current state of knowledge and knowledge-based management.

4. Information serves as a basis for decision-making. Decisions are made on the basis of analysed data. Whatever the situation, we recognise which information we need to support management.

5. The benefits brought by information increase when it is combined and enriched in an organised manner. The organisation requires a joint data policy. This enables us to anticipate the future and draw better conclusions. The defence administration has joint policies in cross-administrative work.

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Introduction – why an information concept?

The purpose of the information concept is to guide the Finnish defence administration's information work and promote discussion related to it. The concept is intended for all those working with or utilising information in the defence administration as well as the defence administration's stakeholders. The aim is to gain better control of information – to achieve information superiority! Based on expert interviews, four workshops and a consultation round, policies and principles have been collected to this concept to promote the information culture and utilisation of information in the administrative branch of the Ministry of Defence. The concept briefly describes the basics, challenges and solutions of information as well as concise policies and principles. Definitions of the terms used are provided at the end of the document.

Through technological development and digitalisation, organisations and networks increasingly create value from intangible resources, the most crucial of which is information and knowledge. The means of producing, analysing, processing and sharing information provided by new technologies enable creating added value for activities in new ways. This development is transforming both public administration and other parts of society to be increasingly knowledge-based. Better use of information promotes making decisions more rapidly and with higher quality, which becomes particularly relevant in crisis situations.

Different types of information are produced, transferred and recorded in significantly greater amounts than previously. Different agents have better opportunities for operating based on more extensive knowledge capital. The increase in knowledge capital and changes in the operating environment for information require developing the current information processes and models and the related competence. There is need for managing information as technology does not solve the problems of knowledge management in itself. The competence requirements for information and data management must be revised. For example, new professions related to data and information have emerged in recent years, including Big Data analyst, data architect, conflicted data analyst and fact checker. This demonstrates how attitudes towards information have changed.

Information security requirements have increased. The development of technology and digitalisation has increased the risks associated with cyber threats. Legislation and increased cooperation both nationally and internationally result in new obligations to information security. These factors have a direct impact on the processing and sharing of information.

A digital world has emerged alongside its physical counterpart. Together, these factors create an entity that works in a new way and requires new kinds of operation. The change requires the development of structures, operating methods, competence and management as well as a changing operating culture to correspond to the new world. The development begins by identifying what the change requires and by exploring the methods and tools that can be used to promote the change.

Figure 1. A digital world has emerged alongside its physical counterpart.

The basics of information – why are we concerned with information?

In this concept, information is understood through its use value in use. Value in use of information is generated when information is utilised to achieve some activity in an operating environment containing various structures, such as an organisation, technical systems and people. Information can be defined as a general concept that includes data, information, knowledge, understanding and wisdom. As we get closer to wisdom, the level of refinement of information grows and the greater the human impact on it. The bottom layer of this data-information-knowledge-wisdom hierarchy consists of data, which can be processed to produce information that can be utilised in different activities. At the top of the hierarchy are knowledge, insight, understanding and wisdom, where information is closely connected with the competence profiles of the people processing information as well as the prevailing culture. When information is translated into choices and further activities, it is strongly linked to the skills, knowledge and motives of people using it, such as political, cultural and religious motives.

Degree of refinement and individuality

Transferability

Wisdom

Understanding

Knowledge

Information

Data

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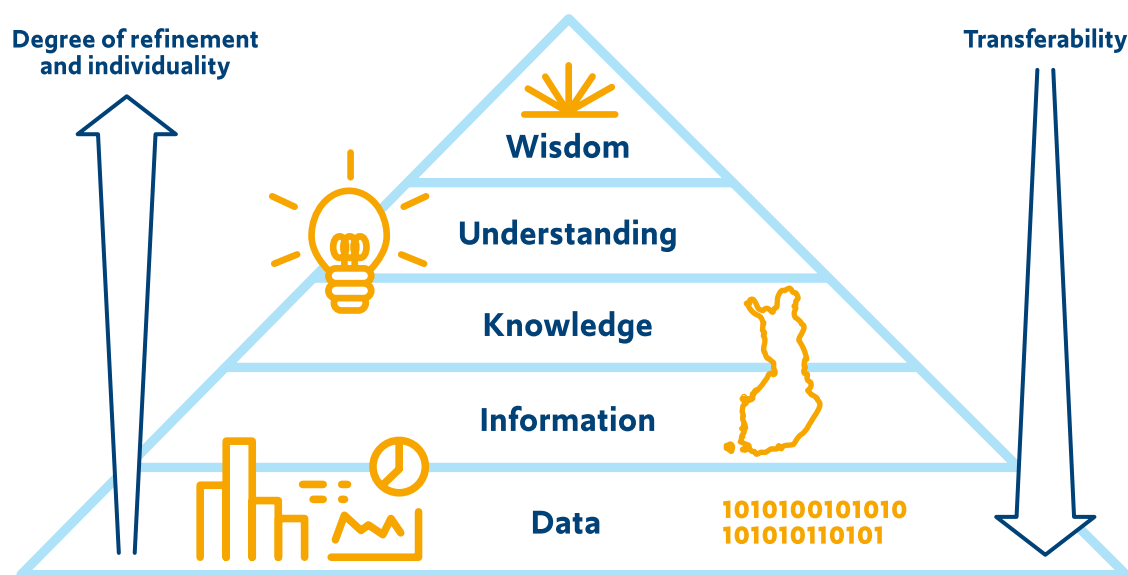
Figure 2. The data-information-knowledge-wisdom hierarchy from data to wisdom, the development and transferability of the level of refinement.

The different types of knowledge can be divided into explicit and tacit knowledge. Explicit (or expressive) knowledge, such as a computer program or document, has been determined structurally and can be determined using information models. It can also be stored and distributed as it is. By contrast, transferring tacit knowledge, such as competence, values and practices, requires interaction, interpretation and activities in the prevailing situation.

The knowledge capital of an organisation consists of both intangible capital and stored information. Intangible capital comprises the human capital, structural capital and relational capital of an organisation (figure 2). Dividing knowledge capital into different areas helps identifying the organisation's key information resource and further developing knowledge capital.

Knowledge capital
Capital in the organisation consisting of intangible capital and stored information

Information
Interpretable data that can be refined into knowledge

Intangible capital
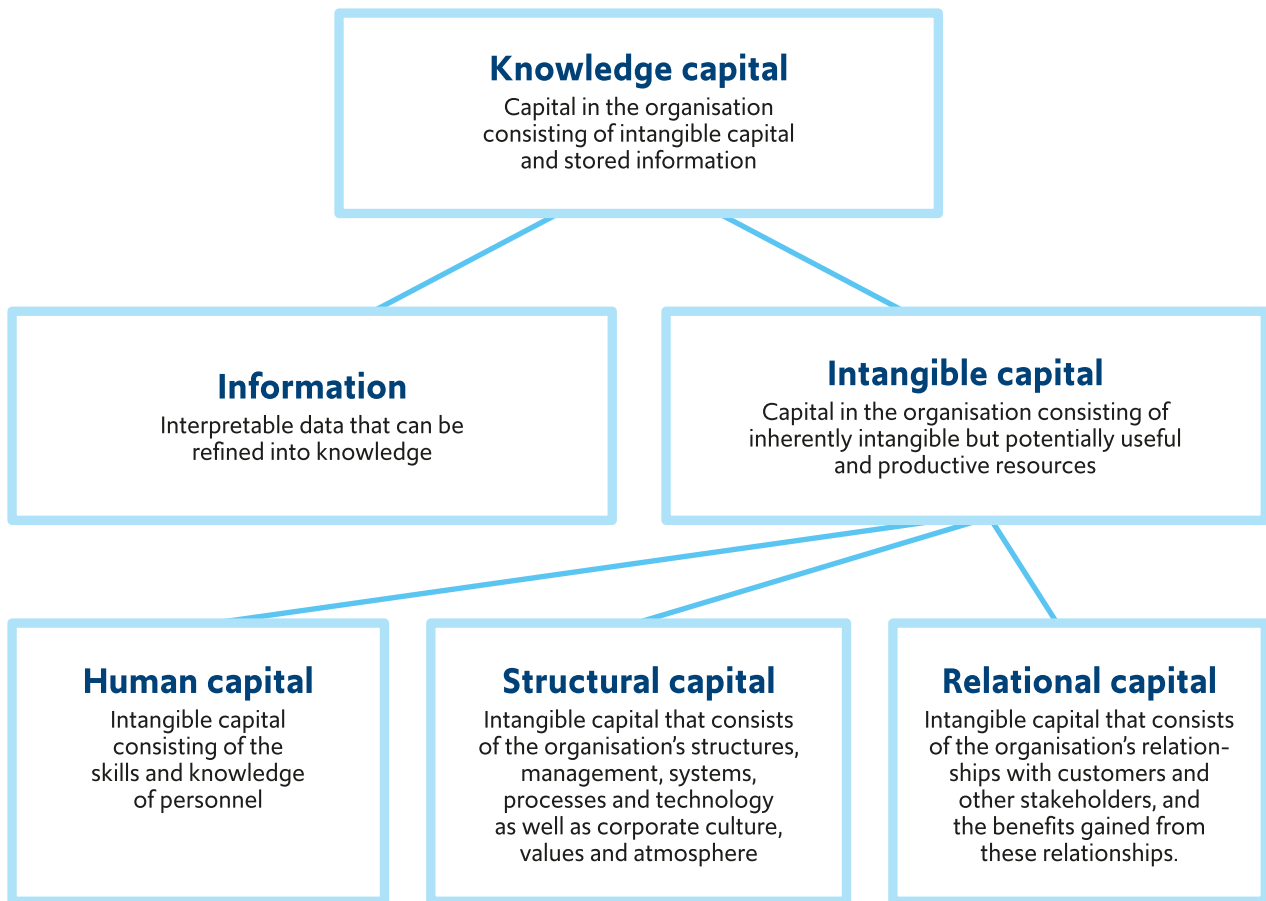Capital in the organisation consisting of inherently intangible but potentially useful and productive resources

Human capital
Intangible capital consisting of the skills and knowledge of personnel

Structural capital
Intangible capital that consists of the organisation's structures, management, systems, processes and technology as well as corporate culture, values and atmosphere

Relational capital
Intangible capital that consists of the organisation's relationships with customers and other stakeholders, and the benefits gained from these relationships.

Figure 3. Knowledge capital in an organisation.

Source: www.finto.fi (tietotermit).

Ensuring that the knowledge and information in an organisation can be found requires reliable, high-quality and interoperable knowledge processes and consistent information management that takes into account operations as a whole, and efficient data management. In this context, it is important to also take into account the information obtained from and provided to partners. Indeed, we can say that information and its utilisation are the key to the organisation's intelligence. This occurs in four areas:

1. **acquiring and processing information for various needs,**
2. **using information for creating and observing meanings,**
3. **the evaluation and use of information in decision-making, and**
4. **utilisation and use of information in operations.**

The information in an organisation may be subject to deliberate actions by third-party operators, the aim of which is to either disrupt operations or gain a unilateral advantage at the expense of the organisation. Information may also be subject to curiosity or vandalism. In this case, the harm caused may involve making the information public in the wrong context, stealing or copying information for damaging activities, or altering or destroying the information, or threatening to do so, either immediately or after a delay.

Information security is a combination of the management, practices and implementation of providing access to information, ensuring its confidentiality, and user management. Information security must be in balance with the use of information in accordance with the situation, also taking into account the long-term value of information for the organisation.
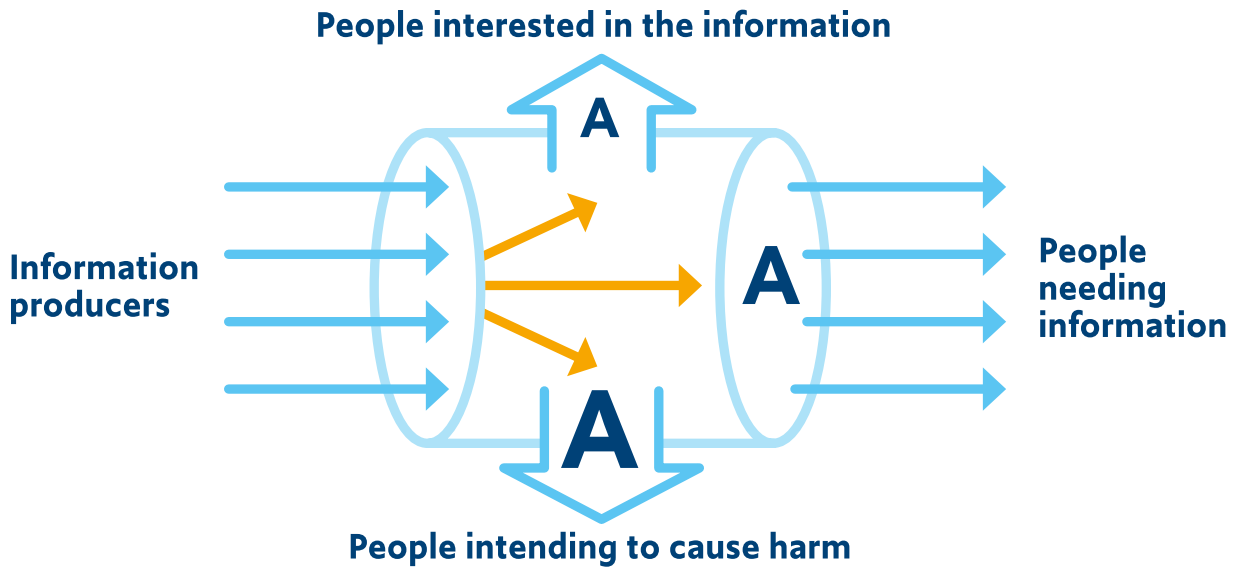
People interested in the information

Information producers

People needing information

People intending to cause harm

Figure 4. Analytics (A) significantly improve the efficiency of utilising information.

Source: Rauno Kuusisto, Finnish Defence Research Agency.

The objective of the organisation is to optimise interactions between operations, information and data systems. Ensuring that these elements work seamlessly together requires continuous reassessment, especially in the current operating environment. The managed maintenance and development of this entity requires introducing a management model, such as an enterprise architecture description or an information management model. The purpose of the management model is to produce an idea of both actual and planned enterprise architecture that can be used for making changes to the entity in a controlled manner.

Information culture is the key to the good utilisation of information and knowledge. This is built on the foundation of the organisational culture. Information culture is gradually constructed starting with the technical practices of data processing, progressing to the development of the practices of data management and, over time, becomes established as a standardised and jointly approved way of working as part of the organisational culture. There are no shortcuts in this process, so it requires determined strategic management and staff commitment to promoting the information culture as well as increasing competence systematically.

The success of the defence administration depends heavily on the operating environment and cooperation networks in which it operates. It is vital for the administrative branch to acquire and disseminate information that corresponds to its purpose from the perspective of operations and to safeguard information critical to operations. Increasingly, this requires keeping track of the situation based on several sources, source criticism, functional information processes, the sharing of information between actors based on trust, continuous dialogue in the cooperation network and securing information resources that are critical to operations. The entire information environment presented above must be thoroughly investigated and its significance for the operation of the administrative branch understood.

Operations
E.g.
· Processes
· Services

Information
E.g.
· Concepts
· Main information groups
· Information resources
· Competence

Interaction

Information system
E.g.
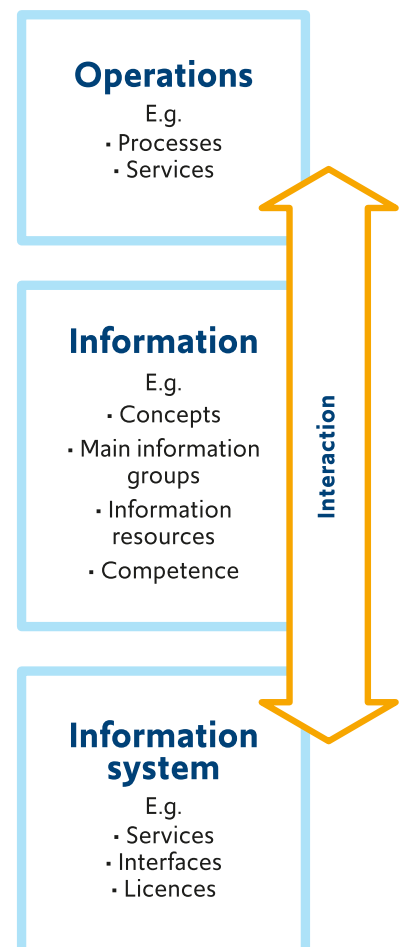· Services
· Interfaces
· Licences

Figure 5. The relationship between information and operations and information systems.

3 Challenges in the defence administration – the current state of information management

Thus far, the development related to information in the defence administration has concerned the focus areas of technology, its development and information systems. The discussion on the significance of information has relied on a traditional view of data management processes and the use of information in planning and decision-making. Information security has been strongly viewed from the perspective of the confidentiality of information. Archiving systems have been used to safeguard the integrity of information. The availability of information has been perceived as a consequence of the above. The increase in information potential has been mainly discussed from the perspective of the overall increase in the amount of available data. Less discussion has concerned which agents information reaches or could potentially reach. Similarly, the topic of the information environment as the equal "twin" of the physical environment and as a distinct operating environment has been overlooked in the mainstream discussion. While the concepts of information management, knowledge management and knowledge-based management emerge as concepts in discussions, they have failed to reach the maturity leading to practical actions beyond being individually highlighted at some stages of different processes. As information is perceived as a "self-evident fact" that is part of day-to-day activities, taking a profound stand on it has been considered unnecessary.

The amount of information is constantly increasing. This increase is largely based on the fact that the number of devices storing data has increased dramatically in recent years and that it has become increasingly easy to store data on these. The number of parties producing data and information has also increased considerably. The increase in the amount of data and information and the use of several different systems has resulted in the fragmentation of information between systems. Information has been stored in various systems, which makes finding and accessing it challenging. At worst, information gets lost or is contradictory. The defence administration has also identified an increase in the so-called "dark data". Dark data refers to data that is contained by systems but which people fail to manage and utilise. This has a negative impact on the productivity and meaningfulness of work, as the same data have to be produced recurrently. Attention should also be paid to a development trend in the information environment that involves a shift from a stable information environment operating similarly with a line organisation to a more network-like and open operating environment subject to constant changes.

New technological solutions for processing data and information emerge at the same time. One of the major challenges related to the introduction of new technology is concerned with managing the operations as a whole. The defence administration uses many of its own systems as well as those administered by others that have been developed in part as stand-alone systems. The administrative sector has lacked a clear enterprise architecture which would have been used for managing the development process. From the perspective of development, this has meant that different projects have contributed to building partly optimised solutions. Among other things, this partial optimisation has led to a situation in which systems are based on different standards and structures. Additional interface solutions are required between the systems, which continue to generate additional procurement and maintenance costs. The solutions are also overlapping or there are gaps between them, as the big picture cannot be seen. Similar challenges can also be seen elsewhere in central government.

Figure 6. Organisations, people, functions, information and information systems form constantly changing networks.

Steps towards a solution

4

Vision:

Information will be a strategic resource in the decision-making by the defence administration. Reliable information will be readily available.

Mission:

The quality and usability of the knowledge capital in the defence administration will be continuously developed to improve efficiency.

Key identified steps towards the better utilisation of information in the defence administration are:

1. **Charting the information environment, including determining critical information**
2. **Charting the agents involved, including relationships between them**
3. **Charting functions, incl. the situations in which the information is used**
4. **Identifying the benefits sought**
5. **Development plan for information use and its implementation programme**
6. **Competence development**
7. **Development of management**
8. **Programme for the technology of information**

Development path:

From awareness of the operating environment to the goal with the help of the steps guided by the information concept.

4.1 Operating environment analysis (steps 1–3)

To ensure that information of high value in use can be found and utilised in a timely manner, it is vital to have knowledge of the operating environment and its properties. There is need to identify the information required by activities, and determine its locations and availability. Projects carried out at the European Union and national level related to the opening and utilisation of data have further emphasised the meaning of the correctness, reliability, criticality and compatibility of information. It is important to understand what information is critical from the perspective of national defence and national security. The second, third and Nth level combinations of information and data are increasing in an information environment that we do not fully know. The grey area between confidential protected and public information is growing.
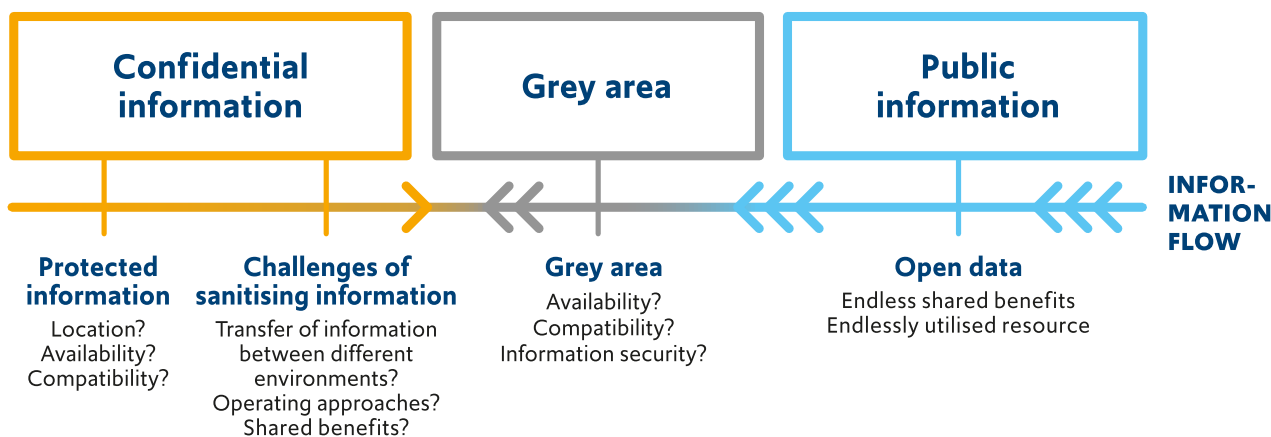
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┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│  Confidential   │   │    Grey area    │   │     Public      │
│   information   │   │                 │   │   information   │
└─────────────────┘   └─────────────────┘   └─────────────────┘
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Protected
information

Location?
Availability?
Compatibility?

Challenges of
sanitising information

Transfer of information
between different
environments?
Operating approaches?
Shared benefits?

Grey area

Availability?
Compatibility?
Information security?

Open data

Endless shared benefits
Endlessly utilised resource

INFOR-
MATION
FLOW

Figure 7. Data protection, information flows, and questions concerning data management.

We will identify key partners. We will engage in collaboration with other authorities. We will create mechanisms to identify, share and protect critical information and eliminate threats caused by the accumulation of information, such as disinformation. We will promote the implementation of risk assessment related to national security in various development projects related to information.

The operating environment in the domain of information is global. Due to the global nature of the environment, it is also constantly changing. The structures in which information is produced, processed, stored, distributed and used change either as a result of activities by the operator or a third party, intentionally or unintentionally. The structure determines what kind of information can be available and which agents it can reach. The structure is a prerequisite for the use of information, which requires agents to have knowledge of the interfaces in their knowledge and be able to monitor changes occurring in these. We use the information management model and change management to maintain a situational picture of our information resources and systems.

Functions include key situations in which information is used, the nature of the information needed in them, and the roles of critical actors in these situations. Charting the functions will produce a description of key information flows and the results produced with them. It is important to know information flow and the significance of information to ensure that the necessary information can be found and its value in use assessed. For this reason, investigating the operating and information environment requires a separate management model. The annual development related to information can be monitored by means of a data balance sheet.

4.2 Sought benefits (steps 4 and 5)

This concept serves as a top-level framework for organisation-specific development plans. The common objective of the plans must be information processes that are as uniform as possible to enable the availability, findability and usability of information

between different agents and in an appropriate manner. This will also help develop a uniform information culture in the administrative branch.

Based on section 4.1, we will identify future development targets related to information and analyse their benefits and the achievement of our ultimate goal, information superiority. Next, we will assess the methods used to achieve the benefits. Based on these methods, we will prepare a development plan including the necessary resources. The plan is used to commit staff and management, which determines the order of priority for the development work.

The expertise and knowledge of stakeholders will be utilised in the preparation of development plans. This will ensure that the development plans are commensurate and aim at the utilisation of joint information.

4.3 The development of competence and management and technology (steps 6–8)

Core issues of competence development:

In our work, we need to be able to search for information and produce information independently, be innovative and apply critical media skills. Instead of merely knowing things, what matters is how we use information and which actions it can produce. The role and customer profile of the information user will gain increasing prominence. The customer requires information appropriate to the situation to support decision-making. Ensuring that information is comprehensible requires different competencies. Emphasis is given to processing, summarising and visualising information. Information users must be able to apply information and give it meaning in a given context. The customer relationship related to information is developing. New roles will emerge around information. The role of the data architect is emphasised. Analysts, facilitators and data scientists represent new kinds of expertise and utilisation of information.

Figure 8. Research data is conveyed to decision-makers through facilitation.

Source: Juha Martelius, Ministry of Defence.

Core issues of competence management:

Management related to the utilisation of information must be at the core of the leadership in the organisation. Information management refers to the identification, management and efficient utilisation of information resources. Information management is a prerequisite for knowledge management, which refers to the principles and techniques, processes and practices based on which arrangements have been made on searching for, disseminating and utilising information in the organisation and its networks. These methods must be developed one step at a time, while paying attention to the big picture, to ensure that the development efforts do not stifle the organisation.
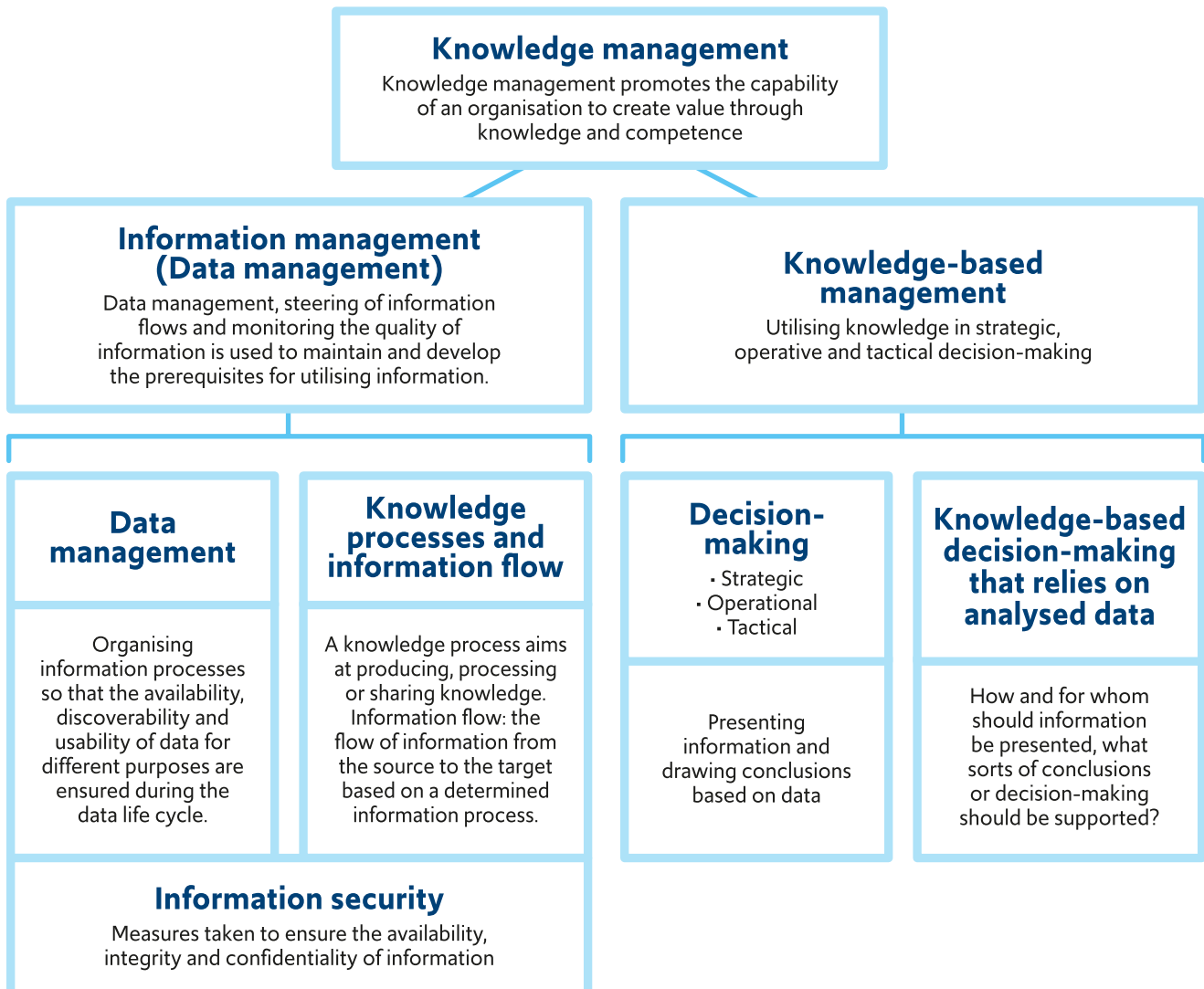
Knowledge management
Knowledge management promotes the capability of an organisation to create value through knowledge and competence

Information management (Data management)
Data management, steering of information flows and monitoring the quality of information is used to maintain and develop the prerequisites for utilising information.

Knowledge-based management
Utilising knowledge in strategic, operative and tactical decision-making

Data management

Organising information processes so that the availability, discoverability and usability of data for different purposes are ensured during the data life cycle.

Knowledge processes and information flow

A knowledge process aims at producing, processing or sharing knowledge. Information flow: the flow of information from the source to the target based on a determined information process.

Decision-making
· Strategic
· Operational
· Tactical

Presenting information and drawing conclusions based on data

Knowledge-based decision-making that relies on analysed data

How and for whom should information be presented, what sorts of conclusions or decision-making should be supported?

Information security
Measures taken to ensure the availability, integrity and confidentiality of information

Figure 9. The definition of knowledge management, which includes information management and knowledge-based management.

Information is not managed according to traditional organisational models, as it is involved in all operational processes and moves across boundaries. Information management results in reducing the boundaries and territories between different units in the organisation. In a hierarchical line organisation, information flow is poorest when it is a carefully regulated bureaucratic administrative operation. Information management must emphasise the formation of networks and their steering, which enables different agents in the network to achieve synergies related to the information and competence of others.

The decisions of the defence administration are based on information. As decision-making situations vary, so does the need for information. In the defence administration, different cultures such as public official, political and military cultures enrich views and produce new information for decision-makers. Increasingly efficient use of knowledge and competence leads to better management, therefore resulting in a higher level of performance and anticipation. Information-based activities are emphasised in all sectors of the defence administration.

Core issues of the technology of information:

New technologies and the constantly increasing amount of available information require both innovativeness as well as controlled actions from information systems, while taking information security requirements into account. Technological choices will take current systems into account, but their operating models should be challenged when designing new systems. In the future, we will use technological choices to support network structures and solutions based on reciprocal information flows. The systems must support data management and access to up-to-date, optimal information by experts and management. In connection with technology projects, the operating models related to information will be developed and changed, which must be taken into account in the development of personnel competence.

4.4 Defence administration policies in cross-administrative work

There are currently ongoing projects related to information in the public sector, in which the defence administration is also participating. The interdependence between information producers and users will increase, as a result of the shared use of data and the "once-only" principle, for instance. Assessing the impacts of the measures taken on information will gain emphasis. The defence administration supports advancing Finland's information policy in accordance with the Programme of Prime Minister Sanna Marin's Government, while emphasising the following:
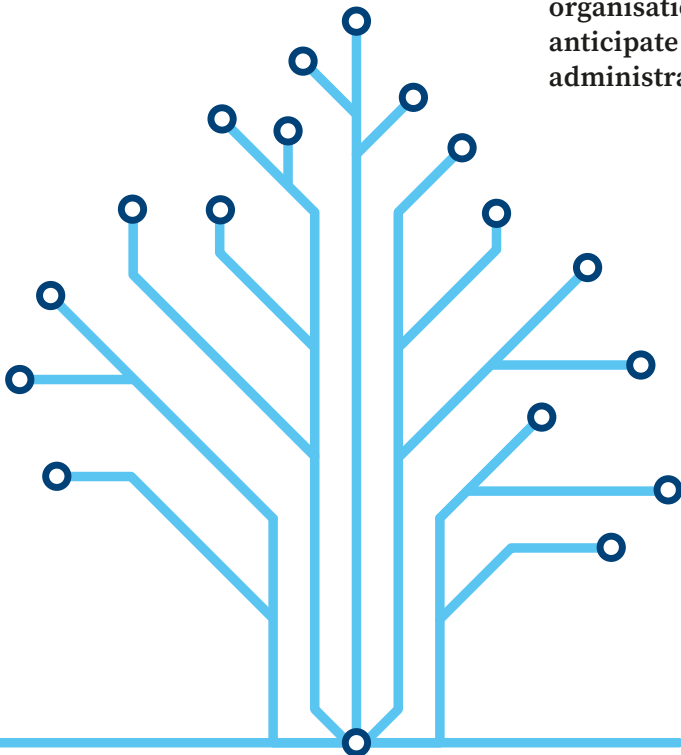
- **Placing continuity management at the core of activities. Safeguarding the use of information in all situations is vital.**

- **Pursuing a balance between opportunities and threats, transparency and security in a changing operating environment.**

- **Identifying information critical to security and assessing risks. Information critical to safety also exists outside the defence administration. Detecting interdependencies and managing the whole gain emphasis.**

- **The impact assessment is not exclusively a task of the defence administration. It is the responsibility of the competent authority to carry out an impact assessment from the perspective of the whole.**

- **Managing the disclosure of data. The process of disclosing data must be clearly defined.**

- **Taking readiness and preparedness into consideration in competence.**

5 Principles for achieving information superiority

The view of the defence administration on information is summarised in the following principles:

1. Information is a strategic resource and a critical success factor. It enables new capabilities. Future is made with information.

2. The change in the information culture and its promotion extend to the personnel of the entire defence administration. Information is part of day-to-day life. Information is part of everyone's task and role. We know how to summarise and justify information. Information has a customer.

3. Information was made for sharing. Instead of the ownership of the information, it is more important to discuss the rights to using information. A data balance sheet provides a joint situational picture of the current state of knowledge and knowledge-based management.

4. Information serves as a basis for decision-making. Decisions are made on the basis of analysed data. Whatever the situation, we recognise which information we need to support management.

5. The benefits brought by information increase when it is combined and enriched in an organised manner. The organisation requires a joint data policy. This enables us to anticipate the future and draw better conclusions. The defence administration has joint policies in cross-administrative work.

Terms

Term	Definition	Source
data	information at the lowest level of refinement that is not necessarily interpretable but that can be refined into information	Finto.fi, referred to on 10 February 2021
explicit knowledge	information expressed using some language or other code	Finto.fi, referred to on 10 February 2021
tacit knowledge	knowledge gathered by a person through experience	Finto.fi, referred to on 10 February 2021
information	interpretable data that can be refined into knowledge	Finto.fi, referred to on 10 February 2021
critical information	Information necessary to maintain vital functions of society	Adopted from the Vocabulary of Comprehensive Security. TSK 50. 2017.
availability	a property of information that indicates that the information can be utilised at the desired time and in the required manner	Finto.fi, referred to on 10 February 2021
knowledge-based management	an area of knowledge management aiming at knowledge-based decision-making and enabling it	Finto.fi, referred to on 10 February 2021
information management	an area of knowledge management that involves maintaining and developing the prerequisites for utilising information through data management, steering of information flows and monitoring the quality of information	Finto.fi, referred to on 10 February 2021
data management	organising information processes so that the availability, discoverability and usability of data for different purposes are ensured during the data life cycle	Finto.fi, referred to on 10 February 2021
information management model	An information management entity must maintain an information management model that determines and describes data management in its operating environment. The model is maintained to plan and implement the management of services, case processing and datasets, to implement the rights and restrictions on access to information, to reduce multiple data collection, to implement the interoperability of information systems and information resources, and to maintain information security.	Act on Information Management in Public Administration 906/2019
data mining	automatic or semi-automatic review of extensive structured datasets to find significant information	Termipankki.fi, referred to on 10 February 2021
knowledge, information and data	string of characters, message, fact, observation or understanding	Finto.fi, referred to on 10 February 2021
dataset	set of data containing the data stored on some information device	Finto.fi, referred to on 10 February 2021
knowledge management	management by promoting the capability of an organisation to create value through knowledge and competence	Finto.fi, referred to on 10 February 2021
information culture	socially structured behaviour and values that define the manifestations of information, ways of using it and data management approaches	Finto.fi, referred to on 10 February 2021
data model	a model describing data and relationships between data	Termipankki.fi, referred to on 10 February 2021
knowledge process	a process that aims at producing, processing or sharing knowledge	Finto.fi, referred to on 10 February 2021
knowledge capital	capital in the organisation consisting of intangible capital and stored information	Finto.fi, referred to on 10 February 2021
data balance sheet	a report to support knowledge management that describes the state of the organisation's data processing and data management	Finto.fi, referred to on 10 February 2021
information resource	a dataset or a collection of datasets generated for a specific purpose comprising logically or physically related data	Finto.fi, referred to on 10 February 2021
information security	measures that are used to ensure the availability, integrity and confidentiality of data	Finto.fi, referred to on 10 February 2021
information flow	the flow of information from the source to the target based on a determined information process	Finto.fi, referred to on 10 February 2021
information superiority	A situation in which the data transmission and processing capabilities of our own capacity far exceed those of the opponent. This can be achieved through the methods of traditional and modern warfare. Information superiority emerges from data management, processing, visualisation and dissemination.	STAE 2020 part 2. 2004, 93
knowledge, insight	information accepted and internalised by the recipient as a result of an internal interpretation process, can be refined into understanding	Finto.fi, referred to on 10 February 2021
understanding	information explaining the reasons and connections between issues, can be refined into wisdom	Finto.fi, referred to on 10 February 2021
wisdom	knowledge based on extensive experience and learning from it that can be used to assess, process and solve complex situations, while taking into account likely consequences and uncertainties	Finto.fi, referred to on 10 February 2021