Risk Research on Security and Safety of Society (SAMRISK)

Recommendation from a study committee appointed by the Research Council of Norway

Foreword

This document comprises the final report of the study committee for the planning of an initiative in risk research on security and safety of society (SAMRISK). The recommendations put forth this report have been endorsed by all the committee members in their professional capacities.

The English version of this report comprises Chapters 1-9 of the original report. Chapter 10 and the various annexes to the Norwegian report have not been translated.

Oslo, 29 April 2005

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Contents

1 Summary of recommendations to the Research Council of Norway

1.1 Conclusions

The study committee recommends that the Research Council of Norway establish a new programme in the field of risk research on security and safety of society (SAMRISK). The programme should be ranked as a major initiative due to the wide range and scope of relevant research tasks identified in this report. A financial framework of NOK 12-14 million per annum would represent a good starting point.

The programme will serve to enhance knowledge regarding threats and hazards, vulnerability and risk management, thus helping to better maintain safety and emergency preparedness across sectors and spheres of activity. Research activity should for the most part be multi- or interdisciplinary, and should encompass management of threats associated with deliberately destructive actions as well as management of accident risk that is important to safeguarding societal safety.

Societal safety can no longer be viewed within a purely national framework. The ramifications of globalisation, deregulation, privatisation and technological development must play a key role in the programme.

The programme should promote the further development of competence within research groups and institutions of higher education, thereby facilitating Norwegian participation in the large-scale EU initiative on security research under the Seventh Framework Programme. This implies that a substantial portion of the funding must be devoted to establishing fellowships (doctoral and post-doctoral) and international network-building activities as well as for major long-term projects.

At the same time, the programme should seek to satisfy the more short-term and applied user needs of the public and private sectors through the utilisation of user-led projects that are partially financed under the auspices of the programme.

1.2 Reasoning and scientific objectives

Globalisation leads to closer integration and greater mutual dependency between different countries and economies. Developments in technology are continually opening up new ways of achieving more effective, integrated interaction across national boundaries. One crucial result of this is that threats and risks are constantly changing. A new political and economic context combined with regulatory and organisational changes is posing new challenges to risk

management practices. Events in one place may have a direct impact in completely different places almost immediately. At the same time, a redistribution process takes place, such that certain groups or countries become more vulnerable, while others become less so. As the population gains ever-greater insight into potential hazards, it places increasingly greater demands on the authorities to devise the framework for a virtually risk-free society. The accelerating pace of globalisation and technological development have made risk assessment and decision-making under uncertainty key topics on political agendas at all levels. At the heart of the matter lies the potential for future threats and catastrophes – and a potentially uncertain future.

A natural consequence of this trend is the need to strengthen the knowledge and methodology base for cross-sectoral risk research and applications. In Norway, this type of research has traditionally been fragmented and structured within individual sectors. Each sector has independently conducted its own "small-scale" R&D activities on safety and security issues, even though many of the issues involved are fundamentally generic by nature. The increasing degree of convergence between technologies and the organisational and economic integration taking place between sectors, as well as emerging forms of fragmentation (specialisation), create a platform for a cross-sectoral initiative on risk and safety research. Such a research programme would provide a national arena for all interested parties.

Key targets for this research should include:

- Building new knowledge that promotes societal safety in a broad perspective (both "safety" and "security", and across different spheres and sectors). This will necessitate research to create a platform for policy formulation and viable solutions, as well input to generate public debate.
- Building networks between ministries, government agencies, organisations (private and public) and researchers, i.e. counteracting the implementation of fragmented, sub-optimal solutions in safety-related efforts and ensuring practical application of new knowledge.
- Helping Norwegian research institutions to qualify for participation in international research cooperation (such as the security research initiative in the EU's Seventh Framework Programme). Norway's societal safety needs must be viewed in an international perspective, and the impact of globalisation on the safety and security of our society must be clarified.

The study committee has considered the proposals put forth in light of the government white paper *Commitment to Research* (Report No. 20 [2004-2005] to the Storting). Risk and vulnerability analyses are crucial in relation to the thematic priorities and technology areas described in the report. This applies to globalisation and international research cooperation; thematic priority areas such as energy,[1] food and health; technology areas such as the vulnerability of logistical systems; and critical ICT infrastructure. SAMRISK is of overall thematic importance for research activity on challenges to society, for building up

[1] Cf. "peak oil" scenarios of an impending global collapse in the relationship between the supply and demand of energy.

and developing Norwegian research with a view to participation in international safety and security research, for enhancing the competitiveness of Norwegian knowledge industry in the realm of safety and security, and for enabling educational institutions to provide high-level, research-based education on safety and security subjects.

1.3 Scope, diversity and demarcation

A closer alliance between technology subjects, social sciences and the humanities would promote better knowledge regarding a safer, more secure society. Research activities will be dependent on broad-based scientific expertise and capacity, which can be provided by the research community seen as a whole. The establishment of links between different research groups and implementation of coordinated initiatives will help to enhance the quality of the research efforts.

The white paper on the safety and security of society (Report No. 17 [2001-2002] to the Storting) defines societal safety without setting specific delimitations. The study committee has discussed a number of phenomena, events and activities that comprise a natural part of a targeted research programme. The group has also given consideration to international research in the area when selecting the relevant topics. The study committee has chosen not to enter into comprehensive discussions on the precise conceptual content of terms such as “societal safety”, “risk”, “vulnerability”, “threat”, etc. We have, however, noted that the terms are used somewhat differently in academic vs. official government environments. The clarification and harmonisation of the terms and concepts will therefore be an important task.

This report does not describe concrete, prioritised research projects. However, a discussion of the relevant criteria and objects of study sets out a framework that provides the requisite principles regarding content and processes. It is important that the structure of the programme is flexible enough to allow later adjustment.

1.4 Designation of research tasks and examples of topics

A comprehensive overview over relevant research is provided in Annex A (Norwegian language version only). Many research activities currently taking place or planned at home or abroad will be of interest in the context of SAMRISK. With regard to the launching of a new Norwegian research programme, the study committee has determined that the following elements must be clarified:

1. key topics in which research activity is modest and the lack of knowledge is great,
2. topics that are and may be expected to be satisfactorily dealt with outside the scope of the SAMRISK initiative,
3. topics that are well suited for transfer from sector-specific programmes to SAMRISK because their research focus is either cross-sectoral or not sector-dependent,
4. topics in which Norwegian researchers are on the cutting edge and/or need strengthening in order to compete successfully for projects under the EU and other

international programmes, as well as topics that are needed to provide academic education at top international level within this field.

The number of topics listed exceeds that which can be realised within the anticipated financial framework. At the same time, interesting topics that have not been mentioned in this report may emerge. Furthermore, the study committee emphasises the following factors:

Cross-sectoral research: A variety of important, cross-sectoral problems relating to safety and security exist. Common research topics in sectors as diverse as petroleum, transport, nuclear energy and health have been identified. This applies to topics such as safety culture and organisational practice in safety and security-related efforts, the effects of rapid changes in society and technology – deregulation, privatisation and outsourcing of tasks, etc., and the need to modify methods for risk and vulnerability analyses.

There is a need for research-based, basic and general safety and security-related knowledge about methods, as well as of various human, organisational and institutional factors of importance for risk management. At the same time, a more clearly defined boundary needs to be drawn between basic and cross-sectoral research issues and the sector-specific applications and specific adaptations to individual contexts. The current Research Council programmes in safety and security, such as HSE in the petroleum sector, IKT SoS (ICT Security) and RISIT (Risk and Safety in the Transport Sector), are directed toward individual sectors. These programmes will be phased out in the next few years. It is natural to assess a future, cross-sectoral research programme in light of these programmes.

Combined basic and applied research: There are a number of challenging basic research tasks to be dealt with within the scope of the SAMRISK initiative. At the same time, there is a great need to translate the knowledge generated into practical results. Thus, the objective should be to combine a generic research programme with application-oriented projects. A model of this type may elicit funding that would otherwise be inaccessible from sector-oriented ministries and industry.

Competitiveness: When setting priorities for research under the auspices of SAMRISK, importance should be attached to enhancing Norwegian expertise with regard to qualifying for participation in international research programmes within this sphere. This applies in particular to security research under the EU's Seventh Framework Programme. It is also important to remain up-to-date on relevant OECD reports as well as on US research and related activities within NATO and the UN system. A research programme of this nature will also enable Norway to benefit from international research findings in this area.

Examples of research tasks for SAMRISK. Main groups:

Generic research questions • Patterns and magnitude of risks and threats, vulnerability and society's risk tolerance • Policy, controls and regulation • Complexity and change • Technologies in interaction with society, organisations and individuals • Crisis management and risk communication • Special dilemmas and value conflicts	*Examples of special areas of study* • Vulnerability in critical infrastructure • Complex crises and international coordination • Terrorism • Societal safety and failure of the social safety net • Organised crime • Natural catastrophes and climate change • Man-made accidents • International threats to public health
Methods and models • Risk and vulnerability analyses • Threat assessment and evaluations • Scenario analyses and simulation	

It is assumed that the need for basic knowledge in discipline-oriented studies on which safety and security research must be based, such as mathematics, natural science, social science and the humanities, will be dealt with *outside* the scope of this programme. The same applies to obviously sector-specific issues. Likewise, the programme does not encompass basic technology development, medical or environmental research. However, the more generic knowledge produced under SAMRISK will provide interesting links for specialised projects of this type. SAMRISK will *not* supplant the need to conduct specialised, applied safety and security research within fields such as transport, petroleum activities, ICT, etc.

1.5 Potential stakeholders, financial framework and organisation

Safety and security issues affect everyone and everything. In the opinion of the study committee the topics relevant to the SAMRISK initiative will be of interest to a majority of the government ministries and their subordinate agencies. Additionally, a professional and financial potential exists in relation to private enterprises, in particular those that administer critical infrastructure. Interest in the programme may well extend even more widely, such as in relation to vulnerability of logistical systems in commodities trade, finance, transport, and more.

There is a clear need for a common national arena for, among others, public players responsible for policy formulation, regulations, control, supervision and advisory services in societal safety and risk management.

The growth alternative to the 2006 budget proposal submitted by the Research Council to the Government suggests that the initiative be launched with a budget of NOK 14 million, of which NOK 9 million is to be allocated by selected ministries and NOK 5 million allotted from the Fund for Research and Innovation. The interest of various ministries, directorates, trade and industry and other

stakeholders in taking part in the funding of this research initiative – not to mention their ability to contribute – must be further examined.

At the same time, the programme should seek satisfy the more short-term and applied user needs of the public and private sectors through the utilisation of user-led projects partially financed under the auspices of the programme.

It is the view of the study committee that the objectives of this research initiative will best be fulfilled by organisation as a programme. However, the study committee seeks to minimise the use of resources in connection with programme management and grant application procedures. According to the committee, this can be achieved by establishing a programme board consisting of the principal authorities as well as researchers, at least one of whom should come from abroad. A major portion of the funding should be earmarked for fellowship positions (doctoral and post-doctoral) and long-term larger-scale projects which promote cooperation between different groups of researchers.

Broad-based representation from the various sectors is the key to promoting a cross-sectoral perspective. At the same time, it ensures that the different sectors maintain direct links to the research. In order to safeguard the interests of other users and funders of this research, the programme board may be supplemented by a resource group to assist the programme board in setting priorities, among other things.

The programme board will issue calls for proposals on broad-spectrum research topics, thus enabling the various research communities to demonstrate their expertise by elaborating and providing concrete details on the general thematic descriptions presented. The study committee recommends that the calls for proposals explicitly encourage cooperation between different academic circles and institutions, making it clear that cooperative projects will be assessed in a particularly positive light. Nonetheless, collaboration between several groups and institutions should not be viewed as a prerequisite for grant allocations.

1.6 Dissemination of knowledge and research results

The study committee has discussed a number of ways in which the results of research under the SAMRISK programme could be disseminated, including traditional research reports, seminars, user conferences, participation at international conferences, participation in the press and other mass media, electronic information channels and publication of articles in scientific journals.

The committee assumes that a website will be established for the research activities. Such a website should be established and administered by the programme administration, i.e. the Research Council.

SAMRISK should take the initiative to organise user-oriented conferences as well as seminars and workshops to promote the exchange of ideas and information between the relevant research groups and users/stakeholders. There is a tremendous need to establish a cross-sectoral meeting place and learning arena for dealing with the issues raised in connection with this programme. Moreover, such an arena would provide a conduit for spreading knowledge from international research in the safety and security sphere. In the view of the study committee, it

would also be advantageous if documentation from the research were to be written in a manner that facilitates its use in higher educational programmes.

2 Background, appointment and mandate

2.1 Cross-sectoral and interdisciplinary research on societal safety and risk

The germ of modern risk science can be said to lie in a comment to the 1755 earthquake in Lisbon, when Jean Jacques Rousseau asserted that the devastation was due to human decision-making. The question he posed was: Why were 20 000 houses of six or seven storeys each gathered in an area known to be prone to earthquakes? Questions such as this, asked by Rousseau and others in Europe during the Age of Enlightenment, represented a turning point in the perception of risk. People began to view accidents not as a question of religion and fate, but as something that individuals and societies could influence as well as take responsibility for. This laid the foundation for safety efforts based on scientific method, analyses, and risk management systems.

The need for SAMRISK

The safety and security challenges of the future will be more complex than those we are coping with today. Trade and industry, the public administration and the general public will all need access to research-based knowledge in order to meet these challenges, but researchers will need to develop to some degree completely new theories, models and methods to help make this possible. Society is changing so fast and so profoundly that it is only by freeing itself from the traditional paradigms in risk and safety research that the programme will be able to influence safety and security structures in society.

There are a number of challenging basic research tasks to be found within the scope of SAMRISK. At the same time, there is a great need to translate the knowledge generated into practical results. The primary objective ought therefore to be to combine a generic research programme with application-oriented projects, as was proposed in the Research Council pilot project[2]

The current Research Council programmes in safety and security, such as HSE in the Petroleum Sector and RISIT (Risk and Safety in the Transport Sector), are directed toward individual sectors. These programmes will be phased out over the

[2] Johnsen, T.P., 2004, *Sikring av mennesker, miljø og økonomiske verdier – En satsing på tverrsektoriell risikoforskning* ("Protection of people, the environment and economic wealth– investing in cross-sectoral risk research"), SAMRISK pilot project conducted for the Research Council of Norway.

next few years. It is natural to view a future, cross-sectoral research programme in the context of a continuation and/or supplement to these ongoing programmes.

Governmental responsibilities and cross-sectoral challenges

Today's overall approach to and system of rules for managing risk and uncertainty in the private and public sector have not kept pace with the development of society, which is characterised by increased complexity, rapid restructuring and new organisational forms. We are on the threshold of a new line of thinking, away from decisions rooted in previous experience and events, toward risk-based evaluation in which potential future losses comprise the most important criteria for setting priorities for safety-promoting measures. National as well as international legislation attaches greater importance to function-based requirements in which safety and security strategies are designed and assessed on the basis of risk analysis and/or the precautionary principle.

Societal change dictates that the government authorities must both acquire and help to enhance knowledge regarding appropriate ways to manage new risks. The complexity of and dependencies between various functions in society indicate that regulation and a systematic approach will be needed if the authorities are to maintain the requisite overview and exercise the necessary controls. The establishment of cross-sectoral research in safety and security offers a constructive approach to the new challenges.

Multi- and interdisciplinary focus

Emerging challenges to society make it more pressing to study safety and security issues across different sectors, and to incorporate a higher degree of interdisciplinarity than has previously been the case. For example, there are large methodological hurdles to be overcome in relation to *decision-making under uncertainty* for institutions and the authorities alike. The risk-analytical approach has been criticised, among other things for not adequately describing how the population can and should relate to individual risks and the overall patterns and magnitude of risks facing society. More than ever, the social sciences and the humanities will be useful as partners in further refining the role of research in promoting a safer, more secure society. The report from the Government Commission on the Vulnerability of Society (NOU 2000:24) describes the span of safety and security research, arguing for holistic thinking across disciplinary subjects. The key to safety lies in the interplay between three elements: the individual, technology and organisation.

The impact of new technology

The emergence of new technology has an impact on societal safety. On the one hand, a reliance on new, untested technologies may generate new vulnerabilities; on the other, new developments may lead to technical systems that can be used to safeguard societal safety. Today's increasing dependence on Internet-based services is an example of how technology serves to change the vulnerability of

society. A serious malfunction of the Internet could prevent access to essential information, thus largely paralyzing production throughout society today.

Newly-developed technology may also help to enhance safety, such as the application of technological aids in areas in which people are exposed to known hazards and threats. Another consideration with regard to new technology is that we have no way of knowing beforehand what the ramifications of technological innovation within various areas will be. Technological development may thus entail positive, negative and unidentified consequences for society. In the context of societal safety, it is useful to keep all of these aspects in mind, as has been pointed out in the white paper *Commitment to Research*.

Globalisation[3]

A major difference from earlier risk patterns is that hazards and threats are now independent of where one lives and works. Computer viruses are spread through global networks, epidemics travel with airline passengers, groups of religious fanatics launched terror attacks on the World Trade Center in New York, the Madrid railway station, etc. Radioactivity is carried with the wind, and toxic substances with rivers and ocean currents. Some have lost their lives to SARS and avian flu, thousands of others have died at the hands of terrorists. These threats have had a tremendous impact on the world economy. While these risks are genuine, they are also difficult to relate to in a balanced, dispassionate way. The modern focus on risk only to a minor degree incorporates the individual's own experience or risk assessments based on statistics over injuries and deaths. It revolves more around the possibility of future threats and catastrophes – around an uncertain future. [4]

Fear and anxiety in relation to threats that make us feel uncertain or uninformed pose major challenges to society's ability to manage risk – even though the probability of such events occurring is microscopic. What is frightening is that we do not know, and that we are unable to control this risk through our own actions. It gives us the feeling that we are helpless victims.

The impression given by media coverage of risk-related concerns is that we are now less concerned with the familiar, traditional day-to-day risks, such as unsafe driving, smoking, climbing a ladder, etc., than with whether or not to cancel a vacation in Egypt or China in case of terrorism or epidemics. It is worth emphasising that we in no way are asserting that the risks in our society are greater now than they have been previously. Over the last century, all relevant indicators for life span, health and living conditions show that the situation of people in the Western world has become safer. The same cannot, however, be said for the developing countries of Africa.

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[3] See for instance A. Giddens (1999) *Runaway World. How globalisation is reshaping our lives.* Profile Books Ltd. London.

[4] Discussion based on J.Hovden (2004) "Sikkerhet i forskning og praksis" (Safety in research and practice). Chapter 1 in Lydersen (ed.) *Fra flis i fingeren til ragnarok* ("From a finger splinter to Armageddon"). Tapir Akademiske Forlag, Trondheim. (Norwegian only)

Societal safety is a wide-ranging area full of new political, cultural, religious and ethnic challenges. In order to adequately reflect the vulnerability of society and the patterns and magnitude of global threats, there is a need for broad-based understanding of societal safety that can encompass technological and natural hazards and threats, unsatisfactory public planning, unintended impacts of social changes, and organised crime and terrorism. It is important that these topics be linked to scientifically founded, explicit risk evaluations and a comprehensible risk communication.

2.2 Appointment of the study committee to assess the research initiative on "Risk Research on Security and Safety of Society" (SAMRISK)

On 7 February 2005, the Division for Strategic Priorities of the Research Council of Norway appointed a study committee to plan a research initiative on societal safety and risk research.

The committee consisted of the following members:

Professor Jan Hovden, Norwegian University of Science and Technology (NTNU), Chair

Professor Tore Bjørgo, Norwegian Police University College (PHS), Senior Researcher at Norwegian Institute of International Affairs (NUPI)

Senior Adviser May-Kristin Ensrud, Ministry of Justice and the Police (JD)

Researcher Janne Hagen, Norwegian Defence Research Establishment (FFI)

Adviser Lene Orsten Haugland, Ministry of Defence (FD)

Research Director Kjell Haugset, Institute for Energy Technology (IFE)

Research fellow Odd Einar Olsen, University of Stavanger (UiS)

Adviser Lise Siverts, Ministry of Labour and Social Affairs (ASD)

Department Director Helge Stamnes, Directorate for Civil Protection and Emergency Planning (DSB)

Jan Tobiassen, Norwegian National Security Authority (NSM) has served as the secretary for committee proceedings. Halvdan Buflod and Tor-Petter Johnsen from the Research Council of Norway have taken part in the committee's meetings as observers.

The study committee held five meetings: 7 February 2005, 22 February 2005, 17 March 2005, 7 April 2005 and 22 April 2005.

2.3 Background for appointment of the study committee

Introductory statement on the background for the mandate (Research Council of Norway)

The following introductory statement was issued by the Research Council of Norway in respect of the background for the study committee's mandate:

"In light of the growing significance of societal safety, the Research Council of Norway wishes to increase research investment in this field. Activities shall be based on a broad definition of societal safety, encompassing accidents, breakdown of key infrastructure, natural catastrophes as well as organised crime and terrorism. The point of departure for the research initiative shall be the issues dealt with in Official Norwegian Reports 24:2000 (A Vulnerable Society); Report No. 17 (2001-2002) to the Storting on the safety and security of society; the Research Council report *Sikring av mennesker, miljø og økonomiske verdier. En satsing på tverrsektoriell risikoforskning* ("Protection of people, the environment and economic wealth – investing in cross-sectoral risk research"); and the report *Samfunnssikkerhet: en begrepsavklaring* ("Societal Safety – a conceptual clarification") from the Directorate for Civil Protection and Emergency Planning[5]. The initiative should be viewed in the context of the safety and security-related research being carried out within other Research Council programmes and other Norwegian research activities.

Societal safety is a complex topic and there is a need for research in social science, legal, humanities and technology/natural science spheres. Research activities shall be interdisciplinary, and shall take place within a overall perspective focused on the interrelationship between technology and society. The research initiative shall be aimed both at generating a knowledge base for understanding the background for undesirable events, and at devising measures to avert and minimise their impacts. This may comprise analyses of economic, technological, political, cultural, institutional and organisational factors. The initiative shall exercise a reflexive perspective, and shall also encompass analyses of political and ethical dilemmas, involving for instance legitimacy, legal and human rights and the protection of privacy, arising in connection with the formulation of a policy for societal safety."

Ongoing activities of relevance to the study committee's efforts

A number of activities already being carried out have been of relevance to the study committee's efforts. The national security authorities issue threat/risk/vulnerability assessments in classified and unclassified reports annually. In addition, a variety of committees have been established for coordination of government efforts on safety and security-related issues.

The Norwegian National Security Authority prepares an annual risk assessment designed to provide insight into the current pattern and magnitude of risk, to present information on security conditions, to evaluate security conditions in light of the risk magnitude and to recommend measures. [6]

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[5] Report published as: Kruke B.I, Olsen O.E and Hovden J (2005): "Samfunnssikkerhet – forsøk på en begrepsfesting" Rogalandsforskning RF-rapport 2005/035, ISBN: 82-490-0347-0 (English version: Societal Safety – an attempt at conceptual clarification)

[6] http://www.nsm.stat.no

The Norwegian Police Security Service's threat assessment summarises the status of the threat situation at the beginning of each year, and gives an assessment of anticipated developments for the coming year.[7]

The Directorate for Civil Protection and Emergency Planning is charged with preparing an annual national report on vulnerability and emergency preparedness. This report is intended to document the status of societal security and preparedness in specified areas as a platform for the efforts of the Ministry of Justice and the Police to devise strategies and set priorities for measures in the sphere of societal safety.

The Centre for Information Security compiles and analyses information pertaining to threats toward and the vulnerability of ICT systems in Norway. This information is made public in regular threat reports issued by the centre.[8]

The Commission for Safeguarding the Nation's Critical Infrastructure (the Infrastructure Commission) was established in the last quarter of 2004 to assess the challenges relating to diminished state ownership of enterprises with important preparedness tasks. The commission is charged with identifying how considerations regarding the safety of the realm and vital national interests best can be ensured vis-à-vis non publicly-owned enterprises. Additionally, it will assess which types of infrastructure the State should own wholly or partially, limited to infrastructure involving especially important considerations which could not otherwise be adequately safeguarded.[9]

The Coordination Committee for Information Security serves as an arena for coordination of government efforts in relation to information security. The committee's tasks include following up the measures set out in the national strategy for information security. In March 2005, the committee established a working group to identify problem areas in connection with, and recommend ways to optimise, regulations pertaining to information security.[10]

The Coordination Forum for Public eAdministration works at an overall level to ensure cohesive electronic interaction within and between public sector institutions in order to promote more and better user-oriented services, to contribute to industrial development and to facilitate better use of public resources. The forum's tasks include submitting recommendations in the areas of electronic services, IT architecture and the use of basic data and IT security within the public sector.

The report of the evaluation commission for the tsunami catastrophe in South Asia (the Reinås Commission) was issued while work in the study committee was underway.[11]

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[7] http://www.pst.politiet.no

[8] http://www.norsis.no

[9] http://odin.dep.no/jd/norsk/dok/regelverk/lover/012101-200019/dok-bn.html

[10] http://www.kis.stat.no

[11] http://www.evalueringsutvalget.no

2.4 Mandate

The study committee was given the following mandate:

The study committee shall draw up a proposal for the scientific basis for the initiative "Risk Research and the Safety and Security of Society". This proposal shall include the following:

- A validated proposal that identifies relevant themes and analyses research needs within a financial framework of NOK 8-10 million per annum over a five-year period.
- A brief description of the current status of knowledge in the area (see Chapter 4).
- Proposed objectives for the initiative (see Chapter 3).
- Identification of the most central users and other stakeholders, and an assessment of the financial basis for the initiative (see Chapter 8).
- Design of a proposal that satisfies the need to enhance knowledge about specific vulnerability issues in various sectors (see Chapters 5-7).
- Creation of a framework for joint utilisation of tools and knowledge associated with risk and vulnerability research between relevant sectors of society (see Chapter 8).
- Assessment of affiliation with related Research Council programmes: Risk and Safety in the Transport Sector, ICT Security and Vulnerability, Petropol, Risk and Uncertainty – Management, Understanding and Practice, and HSE in the Petroleum Sector (see Chapter 4).
- Assessment of affiliation with EU and other international research in the area with recommendations for cooperative efforts (see Chapter 4).
- Final report to be submitted by 1 April 2005.

The deadline for submission of the committee's report was changed to 1 May 2005 with the understanding of the Research Council.

Tasks dealt with under a specific chapter are identified by chapter number above. Other points on the list are discussed in several different chapters.

2.5 The study group's interpretation of the mandate and understanding of the framework for SAMRISK

Clarification from the study group

In interpreting the mandate, the study group has taken into account the recommendations given in the pilot project "Protection of people, the environment and economic wealth – investing in cross-sectoral risk research". The need to understand, assess and control risk is applicable to all sectors of society and all human activity. There is a growing degree of integration – system-related,

organisational and technical – across sectors. Globalisation and unmitigated economic pressure represent crucial challenges to societal safety across sectoral dividing lines.

The study committee interprets the mandate as primarily encompassing cross-sectoral research, in which the focus is on challenges that may be generalised. At the same time, it is important to identify topics that are sufficiently relevant to the individual sectors. This will be crucial in motivating sector-specific agencies and industry to provide support for SAMRISK.

Research activities will be dependent on both broad-based and specialised expertise. It would therefore be a good idea to link together the top-level research groups and encourage coordinated efforts. In the view of the study committee, this will enhance the quality of the programme.

Joint utilisation of tools and knowledge associated with risk and vulnerability research will be sought. This will be beneficial for users (public as well as private institutions) with regard to their understanding of and their activities involving safety and security within their own organisations.

The concept of societal safety and security

Changes in the patterns and magnitude of threats and risks since the end of the Cold War, have made it necessary to re-evaluate the traditional total defence thinking about civilian support for the military in times of crisis and war. There has been a shift in focus from civil society's support to the military during crisis or war to civil society's own needs in the modern risk society. The *Storting* (Norwegian national assembly) has adopted an expanded and modernised total defence concept which incorporates *reciprocal* support and cooperation between the military forces and civil society with regard to prevention, preparedness planning and operative aspects of the entire crisis spectrum. Military support vis-à-vis civil society in order to safeguard societal safety has become increasingly important.

The primary aim of societal safety efforts is to prevent crises, and to ensure that crises that have occurred are dealt with in the best possible manner. A key objective for these efforts is preventing disruption of critical societal functions and major accidents from leading to serious losses.

The government white paper on the safety and security of society defines societal safety as "the ability of society as such to maintain critical societal functions and to protect the life and health of the citizens and satisfy their basic needs under various forms of duress." The concept of societal safety is used to designate challenges throughout the *entire* crisis spectrum, from limited, naturally-occurring events via larger-scale crisis situations representing extensive danger to life, health, the environment and material wealth, to security issues that threaten the independence and existence of the nation.

In this report, the Government employed a concept of societal safety that encompasses both preventive and preparedness-related activity, and that in principle applies to all relevant institutions and systems in society. The concept as

defined here appears to be too broad to be used analytically to delimit the field of research.

The white paper on societal safety and civil-military co-operation (Report No. 39 [2003-2004] to the Storting) contains the following statement of priorities: "Central to current societal safety efforts is the protection of the civilian population and the vital interests of society at a time when there is no conspicuous military threat."

In its practical prioritisation of societal security efforts, the Ministry of Justice incorporates the aspect that the challenges must be of *a certain magnitude* for and within society, either as accumulated costs (e.g. traffic accidents), or as serious, major events (catastrophes and large-scale accidents). These events must be characterised by *urgency*. The concept of societal safety is not actively employed when referring to safety at the workplace and in private homes. The concept as used also indicates a focus on *overall control and coordination* of safety and security efforts, as well as on what kinds of *measures* the authorities may implement.

In Parliamentary bill no. 42 (2003-2004) on the further modernisation of the Norwegian Armed Forces 2005-2008, the Government employs a somewhat different definition of societal safety. Here it is evident that national security, which refers to the defence of Norway's territorial integrity and political sovereignty and is primarily the responsibility of the Armed Forces, is not considered part of societal safety. However, a gliding transition exists between the various dimensions of safety and security, and it may be difficult to delineate clear boundaries (cf. the concept "security-policy grey area"). [12]

The Storting has given its support to both the Ministry of Justice's broader and the Ministry of Defence's more narrow definition of societal safety and security, and various discrepancies in the use of terminology have emerged. The study committee therefore believes that one of the specific topics for research must in part comprise efforts to delimit this concept and transform it into a better analytical tool. In connection with this report there has been a need to restrict the concept somewhat in order to draw the line between types of research that will be encompassed by the programme.

A seminar on consensus regarding the meaning of "societal safety" was held in the autumn of 2004,[13] and a report from this seminar defines societal safety in the same manner as in Report No. 17 (2001-2002) to the Storting. In order to expand upon this definition, the report discusses three criteria, of which at least one must be present for processes or events to be considered to represent a threat to societal safety. These are:

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[12] See Annex C: *The concept of societal safety as understood by the Ministry of Defence*. The annex is only presented in the Norwegian version of the report.

[13] Kruke B.I, Olsen O.E og Hovden J (2005): "Samfunnssikkerhet – forsøk på en begrepsfesting" Rogalandsforskning RF-rapport 2005/035, ISBN: 82-490-0347-0. English version: "Societal Safety – an attempt at conceptual clarification"

- *Extraordinary stresses and losses*: Major events that exceed the coping capacity of the (local) society affected because they cannot be dealt with using the established systems and ordinary procedures.
- *Complexity and mutual dependence*: Events or the prevention of events in *technological and social systems* that are linked together in complicated ways and possess a high degree of mutual dependency.
- *Confidence in vital societal functions*: Events or the prevention of events that undermine confidence in the ability of social institutions to safeguard individual and collective safety.

In this report, a boundary is drawn between the concept of "societal safety" and other safety and security-related issues, such as ordinary accidents and criminal activity taking place in daily life, national security and sustainable development.

According to the committee, societal safety is relevant to risk management at all levels of society, from international and national regulation down to the actions of individual at work, in traffic and during leisure activity. Figure 1 illustrates the complexity encountered in efforts to enhance societal safety.

The horizontal axis shows that the thematic field covers unintentional events such as natural disasters and technology-related major accidents. In addition, premeditated, malevolent and even self-destructive actions can be of great significance for societal safety. Many loss events are found in the grey zone between these two extremes. This means that the actors involved in such actions do not necessarily seek the ensuing negative consequences, but that they nevertheless in a premeditated or negligent fashion have violated various safety laws, rules and norms in order to obtain economic or other benefits. As regards the dangers and threats encompassed under the concept of societal safety, the diversity shown on the horizontal axis, from accidental to deliberate events should be included.

The vertical axis describes vulnerability ranging from national institutions to the factors affecting the safety and security of the individual.

In relation to vulnerability (the vertical axis), societal safety should be limited to circumstances affecting national institutions, norms regulating interactions in society, and infrastructure that is critical to the functionality of society. Micro-values such as individual safety and security should be incorporated into the concept when they involve major costs for society and involve emergency events.

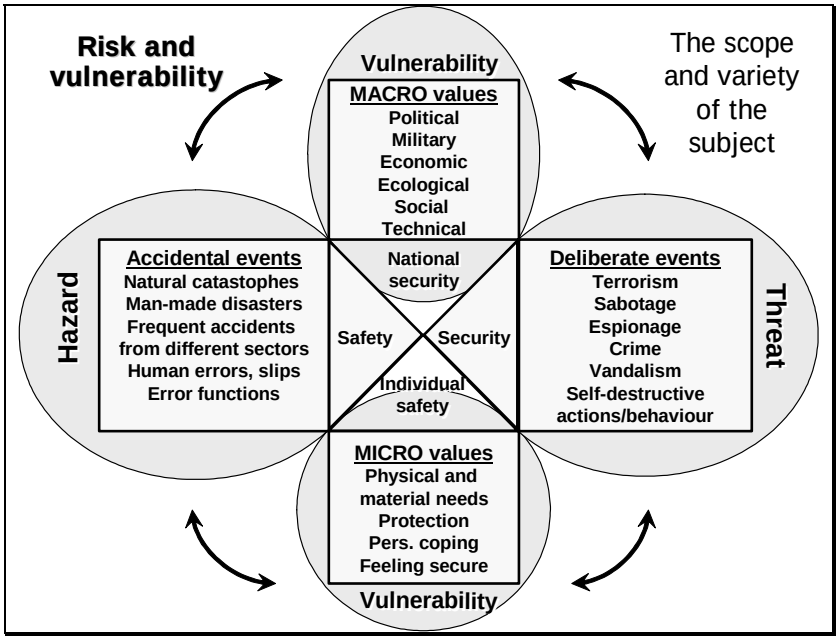

Figure 1: **The vertical macro-micro perspective on risk management combined with types of hazards/threats and events (Hovden, 1998).** [14]

When it comes to situations affecting national security, which are categorically defined in Parliamentary bill No. 42 (2003-2004) as military situations, it is the committee's view that these are not encompassed by the committee's definition of societal safety and should not be included in the research programme. However, in a modern security context, it will be difficult in most cases where national security is considered to be under threat to determine beforehand whether a situation will be dealt with as a purely military responsibility or in the form of support to civilian authorities. The Storting has decided that one of the tasks of the Armed Forces will be to uphold societal safety. Military support to civil society in this area will thus be encompassed by the definition of societal safety, and will therefore lie within the framework for the research programme.

[14] This figure is based on J. Hovden (1998*) Sikkerhetsforskning. En utredning for Norges forskningsråd.* NTNU, Trondheim, and was also used in NOU 2000:24 *A Vulnerable Society.*

3 Scientific objectives and the structure of the report

3.1 Scientific objectives for risk research on societal safety and security

The study committee has formulated the following primary objective for a research initiative on societal safety and risk.

The primary objective of the research is to enhance knowledge about threats and hazards, vulnerability and risk management, thus helping to better maintain safety and emergency preparedness across sectors and spheres of activity.

This implies, among other things:

- Building new knowledge that promotes societal safety in a broad perspective (both "safety" and "security", and across different spheres and sectors). This will necessitate research to create a platform for policy formulation and viable solutions, as well input to generate public debate.
- Building networks between ministries, government agencies, institutions (private and public) and researchers, i.e. counteracting the implementation of fragmented, sub-optimal solutions in safety-related efforts and ensuring practical application of new knowledge.
- Helping Norwegian research institutions to qualify for participation in international research cooperation (such as the security research initiative in the EU's Seventh Framework Programme). Norway's societal safety needs must be viewed in an international perspective, and the impact of globalisation on the safety and security of our society must be clarified.

Research activities must be directed toward structural risks within and across individual sectors. Embedded vulnerabilities and a failure to provide protection against hazards and threats create a favourable climate for accidents and criminal actions. One important aspect of this research initiative will be to promote more effective management through system-based solutions, exchange of experience and learning between sectors.

The ambition is to translate the results and knowledge obtained into concrete applications. Cross-sectoral issues will be exemplified and specified in relation to

individual sectors, arenas and activities. However, it will not be possible to derive concrete applications without examining more fundamental, theoretical and method-oriented topics. The educational institutions will comprise a vital information channel for this type of knowledge.

The research programme will emphasise *undesired processes and events*, both coincidental events (accidents) and deliberate, malevolent, and destructive events as its primary object of analysis (see Figure 1 in Chapter 2.5). In this context it is important to study the entire progression from the fundamental root causes, via management, control and deviation control, triggering factors, and up to the event itself, with crisis management, impact-reducing measures and on to recovery of normal function.

The study committee has discussed a list over phenomena, events and activities that fall within the scope of the SAMRISK programme. This list sets no priorities, and there is overlap in some of the content. At the same time, projects that satisfy several of these points will be considered more central to the programme than projects that satisfy only a few. The list is as follows:

- Events with major ramifications in the form of loss of life or health or of environmental, material, economic and political wealth or values.
- Events that may threaten critical civil society functions.
- Confidence in social institutions.
- The ability to adapt, reinstitution of a normal situation (“resilience”).
- The need for cross-sectoral coordination.
- Complex, closely linked and dynamic systems (uncertainty and a lack of transparency).
- The degree of uncertainty or lack of knowledge about the phenomenon.
- The potential for disagreement, conflict, social mobilisation and loss of standing.
- Practical results and new knowledge for designation of policy.
- Importance in relation to qualification for participation in EU research on security.

Relevant objects of study can also be assessed in relation to the above list. Examples of such objects are shown below.

- Terrorism - *sabotage*
- Organised crime
- Natural catastrophes
- Major industrial accidents
- Major transport accidents (sea, land and air)
- Pandemics
- Complex crises that affect many actors and sectors at the same time.
- Corruption
- Gene-/bio-/nanotechnology out of control
- Accumulated individual events that exceed society's tolerance threshold (example: patient safety)
- Social and ethical conflicts
- Symbolic acts/events
- Financial crises, such as a stock market crash
- etc.

The study committee's efforts have not been directed at producing a description of concrete, prioritised research projects. The examples of criteria and objects of study above indicate a framework for the SAMRISK programme along with principles regarding content and processes. The structure of the programme must not be made so rigid that it precludes modification underway on the basis of experience, and in light of the fact that the patterns and magnitude of risks and priorities vis-à-vis a project's target groups may shift during the programme period.

3.2 Background for designation of topics and the structure of the report

The basis and framework for this report is found in the objects of study and research topics outlined in Chapter 3 and the overview over research in the field contained in Chapter 4. In addition, importance is attached to the following elements:

- *Cross-sectoral research.* Official Norwegian Reports 24:2000 (A Vulnerable Society) points to the importance of establishing cross-sectoral safety and security research, as many of the problems relating to safety and security are in themselves cross-sectoral. This is illustrated by the fact that common research topics in sectors as diverse as petroleum, transport, nuclear energy and health have been identified.
- *Combined basic and applied research:* There are a number of challenging basic research tasks to be dealt with within the scope of SAMRISK. At the same time, there is a great need to translate the knowledge generated into practical results. Thus, the objective should be to combine a generic research programme with application-oriented projects. A model of this type may elicit funding that would otherwise be inaccessible from sector-oriented ministries, end-users and other organisations.
- *Affiliation with existing research programmes*. The current Research Council programmes in safety and security, such as HSE in the Petroleum Sector, and

RISIT (Risk and Safety in the Transport Sector), are directed toward individual sectors. These programmes will be phased out in the next few years. It would be natural to assess a future, cross-sectoral research programme in light of these ongoing programmes.

Chapters 5 and 6 of this report present the study committee' recommendations regarding the focus of further research activities, based on the background information and descriptions of the *status quo* given up to and through Chapter 4. Chapters 5 and 6 present *generic issues* and *methods and models*, respectively. This lays the foundation for *examples of special areas of study*, which are presented in Chapter 7 (see Figure 2).

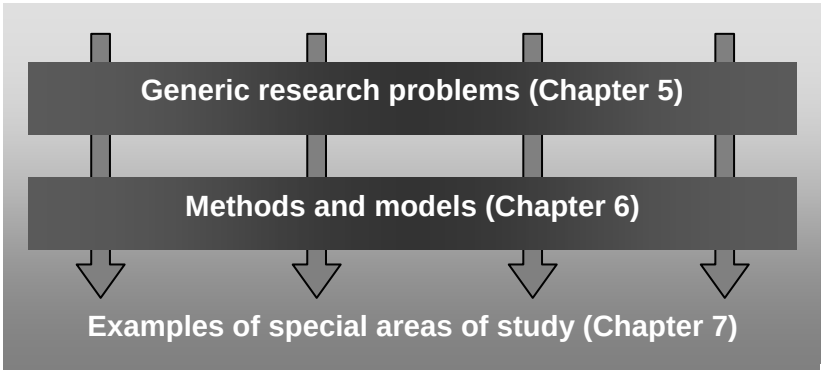

Figure 2: The examples of special areas of study presented in Chapter 7 are based on the topics discussed in Chapters 5 and 6.

The report does not describe specific research projects, but provides an overview over relevant research topics for the SAMRISK programme.

4 Relevant research in the field and its impact on SAMRISK

A comprehensive overview over relevant research activity is found in Annex A to the Norwegian version of this report. There is a wide array of ongoing research activities in Norway and abroad that are of interest in the context of SAMRISK. When launching a new Norwegian programme, it is important to clarify the following:

1. important topics in which research activity is sub-critical and the lack of knowledge is great, as well as topics that are needed to provide academic education at top international level within this sphere;
2. topics that are and may be expected to be satisfactorily dealt with outside the scope of the SAMRISK initiative;
3. topics that are well suited for transfer from sector-specific programmes to SAMRISK because their research focus is either cross-sectoral or not sector-dependent;
4. topics in which Norwegian research expertise needs strengthening in order to compete successfully for projects under the EU and other international programmes.

During the 1990s, there was virtually no publicly-financed research activity in the safety and security sphere. Most of the research that took place comprised commissioned studies and consultancy from private and public clients. The expertise accumulated in connection with the large-scale, petroleum-related safety programmes in the 1980s began to dissipate. In recent years, three sector-oriented programmes have been launched: HSE in the Petroleum Sector, ICT Safety and Security and Risk and Safety in the Transport Sector (RISIT). These programmes will all be concluded within 1-3 years.

Re 1: Lack of knowledge that should be covered under SAMRISK
There is a need for research-based, basic and general safety and security-related knowledge about methods, as well as various human, organisational and institutional factors to ensure that safety and security education at all levels remains up-to-date and academically viable. For example, some effort will be needed to adapt the methods and the data basis for risk and reliability analyses from accident research to applications in relation to intentional events. Short-term, ad-hoc programmes and individual projects that come and go do not provide the continuity needed to ensure the effective production and dissemination of knowledge.

Re. 2: Topics outside the scope of SAMRISK
It is assumed that the need for basic knowledge in discipline-oriented studies on which safety and security research must be based, such as mathematics, natural

science, social science and the humanities, will be dealt with outside the scope of this programme. The same applies to purely technological research, such as the development of sensors, specifically medical research, etc. At the same time, the application of such research in safety and preparedness systems would comprise a potential topic under the programme.

Wholly sector-specific issues will not be incorporated into the programme unless they comprise part of a comparative study between sectors. Some research issues of this type may require detailed technical-administrative knowledge of the systems under study, such as railway operations, chemical processing plant, health institutions, etc. These must primarily be dealt with by groups with special expertise in the field. However, the more generic knowledge produced under SAMRISK will provide interesting links for specialised projects of this type The implementation of specialised, applied safety and security research in transport, petroleum activity, ICT, etc., will continue to be essential.

By way of example, there is extensive research on security aspects of electronic or integrated operations taking place in the context of HSE in the Petroleum Sector. Much of this is clearly industry-specific, At the same time, issues of a more cross-sectoral nature are being revealed, especially in connection with the vulnerability of critical ICT infrastructure. These will also be of interest in relation to energy supply, transport, finance, and more. Issues such as these would benefit from an affiliation with SAMRISK.

Re. 3 Cross-sectoral research
Chapter 5 describes a number of generic issues that are not by nature sector-specific, but that are dealt with both under RISIT and HSE in the Petroleum Sector. These include:

- safety culture and organisational practice in safety and security-related efforts;
- The effects of rapid changes in society and technology – deregulation, privatisation and outsourcing of tasks, etc.;
- modified methods for risk analysis.

Here and in various other areas, more clearly defined boundaries should be drawn between basic and cross-sectoral research issues and the sector-specific applications and concrete adaptations to special contexts.

Re. 4 Competitiveness
When setting priorities for research under the auspices of SAMRISK, importance should be attached to enhancing Norwegian expertise with regard to qualifying for participation in international research programmes within this sphere. This applies in particular to security research under the EU's Seventh Framework Programme, which is expected to receive allocations of Euro 1 billion per year. It is also important to remain up-to-date on relevant OECD reports as well as on US research and related activities within NATO and the UN system. This is briefly described in Annex A (see Norwegian language version).

The Swedish proposal for a national strategy for safety and security research acknowledges the need to profile Swedish research in this field in relation to international programmes. Moreover, this appears to be crucial to enhancing the

competitiveness of the Swedish safety and security industry and services (including consultancy) on a rapidly growing international market.

It should be possible to apply the same arguments in the context of SAMRISK. However, it should be pointed out that both the EU security research programme and the Swedish strategy are more technology-oriented than this proposal regarding the substance of a SAMRISK programme.

5 Generic research problems

The following chapters present various issues and topics that should be incorporated into SAMRISK. Chapter 5 contains a number of generic research problems that are elaborated further in Chapter 7 as examples of special areas of study.

5.1 Patterns and magnitude of risks and threats, vulnerability and society's risk tolerance

There is a need to compile an overview over societal safety and security in a broad perspective. A common database for undesired events within various sectors does not currently exist and needs to be established. The EU (Joint Research Centre, ISPRA) is active in this area, and a Norwegian scheme should be coordinated with this efforts. A database of this type would be useful for:

- risk and vulnerability analyses,
- reference,
- information about specific risk objects.

Based on the needs for improved methods revealed in Chapter 6, specific *vulnerability analyses* of key risk objects and scenario – or "what if?" – analyses should be carried out. It has been ten years since the project *Beskyttelse av samfunnet* ("Protection of society") was completed, providing a cohesive overview over the vulnerability of critical infrastructure at that time. Subsequent developments in technology and society indicate that a new overall analysis is called for.

The perception of what is acceptable risk varies considerably. A total of 2 673 persons were killed in road traffic incidents in Norway between 1994 and 2003. A similar number of lives lost in, for example, air traffic incidents over the same period would undoubtedly have aroused widespread concern and triggered demands for action. An interesting research topic in the extension of this would be *what factors influence our criteria for risk acceptance?* There are at least two elements here of particular interest:

First, such knowledge would make it possible to create a framework for better informed choices and actions. Knowledge that offers greater insight into what shapes risk tolerance increases our ability to set "appropriate", balanced priorities. Second, differences in risk tolerance and variation in the criteria for risk acceptance touch on key human and social values. For instance, a political discussion dominated by science-based risk comprehension may diminish the ability of the layman to take part, and thus to influence the decisions. The perceptions of risk that dominate within a social sector may also have

ramifications for the ethical perspectives that emerge in political and bureaucratic decision-making processes.

Our risk tolerance and criteria for risk acceptance may be affected by a number of factors. In general, we can distinguish between three groups of factors[15]: characteristics of the person, characteristics of the society and characteristics of the risk/threat. Personality, attitudes, values and skills all comprise relevant components at the individual level. At the societal level, culture, policies, economics, legislation and the media are significant. When it comes to characteristics of the risk/threat, one of the keywords will be control, i.e. the manner in which we can influence a risk/threat situation. Undesired events in themselves will also affect risk tolerance. Major catastrophes that affect many people and take place close to home may exert an extremely powerful impact.

Overall, there is clearly a need to learn more about how these and other factors help to shape our risk tolerance. Knowledge of this type will lead to more informed choices and better priority-setting at the societal level.

"Societal safety" is a new concept that will hopefully be honed into a useful analytical tool. This will entail a continued focus on theory development, both to determine what "societal safety" encompasses and what needs to be done to enhance safety and security in society. Theoretical development can be carried out along several fronts, not least by:

- exploring the interfaces between societal safety and other safety and security-related areas;
- examining ways in which existing theory, developed to analyse risk and vulnerability at the organisational and individual levels, can be used to understand risk and vulnerability at the societal level.

Barometer for national risk levels: Different sectors and spheres need a system for monitoring risk levels, status and trends – an overall methodology and approach that can provide a platform for comparison and setting priorities. Norway needs a national safety and security barometer designed to "take the temperature" of the efforts being conducted in various spheres of society. Such an initiative could be based on the methodology and experience of the Trends in Risk Levels – Norwegian Shelf (RNNS) project, which has established a relevant system for petroleum activities.

A barometer of this type would help to:

- maintain a focus on the ongoing improvement efforts taking place within various sectors and spheres;
- identify any industries and aspects of society that are developing in a negative direction in terms of safety and vulnerability of critical infrastructure;
- create an arena for comparison (benchmarking) of various ways of working with risk control and management;

[15] Hovden, Jan. Public policy and administration in a vulnerable society: regulatory reforms initiated by a Norwegian commission. *Journal of Risk Research* 2004;7(6):629-642

- create a foundation for setting more appropriate priorities in relation to national efforts concerning societal safety.

5.2 Policies, controls and regulation

Strategies for safety management and preparedness planning
In public administration, the trend for quite some time has been to seek wisdom in market-economic principles. This is known as "New Public Management" (NPM), and key components include the widespread use of ICT, application of private-sector management principles, competitive tendering, outsourcing, privatisation, etc. One ramification of this has been that the government has relinquished certain responsibilities and resources, while related regulatory processes have not always followed at a the same pace.

As a result of deregulation and privatisation of societal functions, infrastructure that was once publicly owned and administered on the principle of usefulness to society is increasingly becoming privatised and/or administered on the basis of economic profitability targets. This can be illustrated by the changes taking place in Norway's energy supply subsequent to the liberalisation of the energy market. As was pointed out in the white paper on the age of globalisation and its challenges (Report No. 19 [2002-2003] to the Storting, these processes may jeopardise emergency preparedness activities, which easily fall victim to cutbacks in an organisation's effort to satisfy demands for greater cost-efficiency. Cost concerns may often lead to downsizing, which entails a loss of organisational redundancy. A market with several competing players further implies greater complexity, which poses new obstacles in the context of societal safety and preparedness. A short-term focus on costs may also have ramifications for investment in technology and maintenance priorities, particularly with regard to the long-term. In the wake of certain accidents, for instance, it has been established that outsourcing and use of sub-contractors has had a negative impact on safety levels.[16]

The degree to which such processes can generally be said to lead to diminished safety and poorer preparedness has, however, not be clarified. It is also possible that the changes wrought by deregulation serve as an incentive to think along new lines in safety and preparedness efforts, thus providing an opportunity to fine-tune aspects that have previously functioned inadequately. Regardless, it is essential to examine the effects of these processes in order to obtain reliable insight into the evolution of vulnerability and risk in society, which in turn will be a prerequisite for further policy development in relation to societal safety.

Risk evaluation in social planning
It is important that societal safety be incorporated into the structure of social planning activities, as opposed to simply being an aspect to be included in the final stages of devising a strategy. In recent years there has been an effort to create a framework for dealing with risk in collaboration between various

[16] Cf. the project on *Sikkerhetsmessige konsekvenser av deregulering innenfor transportsektoren* ("Safety-related ramifications of deregulation in the transport sector", Norwegian only) under the RISIT programme, see http://program.forskningsradet.no/risit/

regulatory authorities[17]. In brief, this involved establishing a framework for risk-related decision-making across different sectors. The initiative provided recommendations as to how different types of risks could be compared and decisions taken at a higher level. In this way, risk thinking is incorporated into the platform for decision-making, not tacked on afterwards. SAMRISK must assume responsibility for developing knowledge that can be used to devise methods for rational priority-setting between sectors. Such tools for decision-support will, however, be severely limited when it comes to providing premises for modelling and calculating the value of different types of losses.

This issue is important because it examines the relationship between societal safety and public policy, the dilemma between operation of critical infrastructure and social responsibility, and the manner in which practical regulation of society influences vulnerability and the preventive capacity of public policy. This needs to be viewed within a context that encompasses the following:

- The risk society: Emergent trends and new characteristics over the past 20 years, and the challenges this poses to formulation of policy and emergency preparedness.
- Critical infrastructure: What does critical infrastructure comprise and how is vulnerability affected by global developmental trends. What causes change in the significance of different forms of infrastructure.
- Power, rhetoric and risk: Power and rhetoric play a role in defining risk, allocating resources and giving priority to some players and measures over others. This may take place independent of a more objective assessment of the risk potential.

Risk perception and communication must be seen as an integrated whole, not something to be added at the end or when the need for it arises. This is necessary to maintain a dialogue between the authorities, the general public, the media and other stakeholders. Societal security involves information about the decisions taken and measures implemented to safeguard the safety and security of society. Another component is the challenge inherent in the need to communicate to stakeholders about the measures that will not be implemented, but that are viewed as a safety measure by the public at large.

Regulation, control and monitoring as instruments

Paradoxically, the political system tends to respond to the new liberal economy, privatisation and outsourcing of vital, safety-related services by introducing new regulatory and monitoring mechanisms. There are, however, a wide variety of other instruments that can be used to regulate activities, such as the requirements specified in licences and contracts, and stipulated use of industry standards, international standards and certification schemes. Market mechanisms, insurance, compensation liability and the courts can also be actively used to safeguard safety and security. National and international regulatory regimes influence our perception of risk and sense of safety.

[17] Hokstad, P. and Steiro, T. (2005): *Overall Strategy for Risk evaluation and Priority Setting of Risk Regulation.*

Little research has been carried out on the strong vs. weak aspects of various regulatory regimes. There may be a need for a comparative study of monitoring and control systems in different sectors at both the national and the international levels.

Safety-related impacts of dysfunctional management-by-objectives
A key element of the practice of management-by-objective (as well as in risk management) is to design incentives that motivate members of the organisation or other relevant parties to work in accordance with the established goals (cf. agent-principal theory). There are, however, many problems associated with designing incentives. If these do not comply adequately with the intentions, they can cause attention to be shifted to specific factors (which often are the easiest to measure), while other factors that are also vital to safety and security are given less priority. Some measurable incentives may also focus attention on short-term objectives instead of long-term reduction of risk and vulnerability. Even when the incentives incorporate the essential dimensions, they may be formulated such that the decision-making process may lead to an undesired result. "Perverse incentives" such as this can diminish safety and increase vulnerability in both the short and the long-term. What can be done to determine at an early stage whether the incentives in place are "perverse incentives"? How can we maintain consistent links between safety objectives and incentive structures in many simultaneous processes of change? Is it possible to transfer goals and incentive structures from the societal level to the organisational and the individual level? How can established methods of analysis in risk analyses and threat assessments be used to develop and monitor incentive structures within different spheres? How can the focus on potential risks and threats be upheld in a virtually risk-free system?

5.3 Technologies in interaction with society, organisations and individuals

The level of risks within an organisation is largely dependent on how the organisation manages to cope with various types of complexity. This becomes especially apparent in relation to technological complexity. Theories on high-risk technologies, organisations and complexity are, for example, provided by the research tradition called "High-Reliability Organisations".[18] This perspective emphasises the ability of certain types of organisations to configure themselves in relation to the different tasks they face (from classic military commando and control to team-based decision-making processes).

The manner in which organisational and technical complexity influences safety within organisations is very interesting in the context of societal safety as well.

- Firstly, closer links between organisations may increase the "area of impact" for accidents, meaning that accidents also have ramifications outside the boundaries of the organisation.

[18] LaPorte, T. R. and Consolini, P.M. (1991): Working in practice but not in theory: Theoretical challenges of "High-Reliability Organisations" og Weick, K. E. & Sutcliffe, K. M. (2001): Managing the unexpected: assuring high performance in an age of complexity.

- Secondly, accidents in certain industries, such as in transport, telecommunications, energy production or the petroleum industry, have the potential to disrupt other important functions in society.
- Thirdly, the interface between organisational safety and societal safety is a relatively unexplored area of research. At present, very few channels have been established between social science risk discourse and the more practically-oriented theories aimed at managing risk.

There is a need to know more about how organisations are coping with the growing complexity implicit in today's economy and society. This topic concerns the "classic" relationship between technological development and safety in organisations and their surroundings. Much progress has been made in the last 20 years in understanding how accidents occur and can be prevented in organisations. Relevant issues may include:

- *Technological change* and risk: Development of sub-technologies is often viewed in an isolated context. When these are implemented in a larger technological system, it may enable risk to "travel" from one part of the system to another without anyone being aware of the new hazards that may then arise. The same applies when technology is transferred from one context to another without initiating necessary adaptation to new circumstances.
- *Resilient organisations.* Much has been learned about ensuring the resilience of organisations that deal with hazardous production and have large resources available for safety efforts. The transfer value of this to other types of organisations, such as classic bureaucracies, is less well explored.
- *Organisational culture* and, more specifically, safety culture: This is still an important sphere in which new knowledge is called for. The challenge lies in placing this knowledge in the context of society instead of studying the individual organisation on its own.

Many of the activities in society that are an integral part of societal safety can be described as complex systems featuring three main components: the individual, the organisation of which the individual is a part, and the technical tools employed to satisfy safety and other quality requirements. A number of important cross-sectoral research topics can be identified here:

- *Interdisciplinary system perspective.* Technology evolves and can in principle assume an increasing number of the functions traditionally filled by individuals and the organisation. Often, new technical solutions are introduced to enhance efficiency, while negative impacts on safety are overlooked.
- *Learning from undesired events.* Socio-technical perspectives have proven to be a good basis for incident or accident analysis, and should be further refined and adapted to the different sectors.
- *How do safety barriers develop in relation to complex change.* The risk of accident decreases as the number of independent barriers goes up. There is a need for greater knowledge regarding the requirements that must be met to be able to define the individual as an adequate safety barrier in interaction with other barriers.
- *Safety culture.* There is growing recognition that increased safety and diminished risk in a society undergoing rapid change can not simply be

decided or governed on the basis of detailed rules and regulations. An alternative strategy entails internalising values, attitudes and norms to ensure safe patterns of conduct. How can we achieve an optimal balance between management through structure vs. culture?

- *Experimental studies.* Fortunately, undesired events, and particularly serious isolated incidents, take place relatively rarely. Using simulator studies in which the overall system consisting of an executive staff, organisational frameworks and the technical elements of the process provide a realistic representation of realty, experimental data can be usefully applied for a variety of purposes.

5.4 Crisis management and risk communication

It is said that crises and catastrophes strike out of the blue. Often, however, examination after the fact will show that greater attention and, for example, better planning from the outset could have prevented the crisis or reduced the magnitude of the catastrophe. This is a key issue in understanding how crises arise, are dealt with and can be prevented. Both the causes and ramifications of crises are becoming increasingly globalised, and it is therefore important to incorporate an international perspective in terms of approach and empirical scope.

Planning, organisation and management during crises: Crises have their own special features, whether they are due to natural or man-made conditions and causes. In order to facilitate our efforts to deal appropriately with subsequent crises, we will need knowledge about prevention and planning for coping with crises, about crisis management when something goes wrong, and about the recovery and learning processes that took place in the aftermath of a crisis.

Internationally complex crises encompass a set of added dimensions that place special demands on coordination as well as the actors involved[19].

Internationally complex crises often have their origin in internal conflicts or extensive environmental catastrophes. Their cause is multifaceted and no simple solutions exist. They exceed the tolerance level of the society affected, and major international initiatives are needed to reduce their scale and help the society regain its functionality. This requires coordinated efforts from many different players, each of whom has a different mandate and agenda. Both the vertical coordination within the international organisations concerned and the horizontal coordination between these organisations and the local authorities pose significant obstacles during international crises. This may be related to planning, organisational structures, cooperation models, the legal base, political positioning, financing, knowledge, crisis communication and more. This field will presumably grow more and more relevant both because the world is shrinking and because the international community is increasingly becoming involved in such conflicts on humanitarian grounds.

The importance of research to understand crises as political processes becomes apparent here. This topic is relatively unexplored, and at the same time it is

[19] See the report of the Reinås Commission, http://www.evalueringsutvalget.no

clearly essential to understand that prevention, preparation, management and recovery are greatly influenced by politics and power. At the same time, new crises and catastrophes are continuously challenging established wisdom about crisis management (cf. the tsunami in December 2004), with regard to organisational models, coordination requirements, methods for swift and targeted action, crisis communication, etc. Those who are affected have traditionally been viewed as helpless victims and little else. Often, however, these individuals (and their families) turn out to have great capacity for self-organisation in a crisis, even with little or no training beforehand. This has not been adequately researched. New knowledge in this field may change our perception of those directly affected and their families; we may come to see them not only as victims but also as an important resource in crisis situations as well, a resource that must be taken into account in planning and management. Methodologically speaking, one important challenge here is that, as a rule, researchers have limited access to crisis situations. This is particularly the case in international crisis areas where conflict is a primary component.

Risk and crisis communication have a major role to play in crisis prevention, crisis management and the learning process that takes place in the wake of a crisis. This applies to "internal" communication between active players as well as communication (or, more aptly, information) to the population at large. The vulnerability of society is growing and public awareness of risk is rapidly rising. What impact will the people's perception of risk have on the actual risk itself, and how does this affect decision-makers? How are the risk perceptions of different groups shaped? While it would be natural for those who are conscious of their own role in safety efforts to seek new knowledge, there are also players in this context, such as the general public, who have an important role to play, but who lack the same awareness. For them, the central learning arenas comprise the media in addition to the more sporadic, targeted information measures from experts in various spheres.

Risk communication

During the past decade there has been an upsurge in research on risk communication. Examples include global warming, BSE contagion, genetically modified foodstuffs, etc., which typically involve various expert groups in addition to the media, public opinion and decision-makers. Thus, it is important that Norwegian research is kept up-to-date over a broad range of topics in this sphere. High-quality Norwegian research activities will help to promote interest in Norwegian researchers in the international networks that dominate the risk communication research field.

Crises such as the tsunami in Southeast Asia demonstrated how demanding such catastrophes can be, both emotionally and operationally. The operations are international and necessitate a multi-cultural approach to risk communication. What are the risk communication challenges involved in international operations in connection with major crises and catastrophes? Why is crisis communication so important in such situations? What is needed to establish a crisis communication framework that can serve the needs of victims and their families without diminishing the effect of the rescue effort? Risk communication comprises a difficult balancing act between information that creates a greater sense of security during a crisis and communication that generates greater

insecurity than is warranted. One example of this is the US threat level code system, which is controversial due to its ambiguity and lack of clearly-defined substance. Another is found in the large-scale companies whose production implies an inherent potential for catastrophe, and who therefore need to provide information to their neighbours before anything inopportune happens (e.g. chemicals industry).

Closer examination of the various roles of the media
The media has an important role to play as the "fourth power of government" and as a public service. The media often defines topical problems concerning risk and crisis management. The public service ideal is considerably weakened for the benefit of the "good story" or commercially viable news.

A key issue to explore here is what motivates the media to focus on threats and hazards that lie in the future. Scientific expertise is concerned with ensuring the greatest possible alignment between what people perceive of as risk and what experts perceive of as the genuine pattern and magnitude of risk and threats. In the eyes of the media, the more extreme a matter is, the better. The conflict between the need of the authorities to provide information and the inclination of the media to exaggerate can develop into a battle between the media and the experts.

In times of crisis, such as during a war or a major catastrophe involving national security considerations, the authorities will try to use the media as a tool to govern the flow of information. An important research topic here will be to look at which elements lead to restrictions on the media's freedom to act and freedom of expression.

Terrorism is often defined as an asymmetrical war. The US "war on terror" may challenge the media's ability to balance between being a critical, investigative agent, on the one hand, and a patriotic mouthpiece on the other. The grey area between "the safety of the realm" and the duty to provide information is an interesting object for study. Which dilemmas arise in the borderland between the public's need to know and a society's security considerations. A similar grey area is found between considerations for victims and their families and society's legitimate need for information. How much media focus must individuals tolerate to satisfy the media's insatiable need for personification? Should the authorities help lead the media to victims and sources in order to circulate the information to the public effectively and correctly? If the media does not perform its information tasks in accordance with the authorities' wishes, should the authorities themselves establish their own media channels?

The media tend to seek different stories from those which the authorities and crisis leadership want to publicise. The authorities and the media each have their own objectives and interests to serve, and therefore their own angles to promote. With the exception of the Norwegian national broadcasting company, all the major media houses in Norway are owned by large shareholder's companies. As a result, the media is driven by commercial interests in addition to its official tasks in relation to society. Commercial media houses view news as a marketable product, and thus seek to couch news and information in an optimally saleable form. The criteria for prioritising news items can result in an inaccurate portrayal of the real magnitude of the risk.

Representatives of the authorities are also players in this context, and they have their own interests to protect during a crisis. The media sees it as an important task to reveal this, presenting all authority in a critical light. How can the authorities and crisis leadership work together with the media, to prevent valuable time and information from being lost in a quibble about who is to blame once a crisis has occurred?

5.5 Special dilemmas

Efforts to safeguard societal safety will always encounter situations characterised by complicated questions to which there are no easy answers. Research activities should focus on and confront such dilemmas or problem areas. Dilemmas need to be studied because they often typify an inherent complexity, presenting different value choices that can be seen as conflicting goals. They provide an opportunity to look more closely at matters we tend to take for granted. This is an important focus for research. Important dilemmas for study include:

Freedom vs. safety
Absolute safety entails a lack of freedom, while absolute freedom offers very little safety. Both freedom and safety are fundamental values, but they cannot be fully realised simultaneously. This is a classic dilemma that we find in a number of risk areas. Most common is the introduction of restrictions on individual conduct or surveillance of certain individuals to enhance safety or security (i.e. in traffic, in health matters, in police investigative methods, in combating terrorism, etc.). More serious are the restrictions or measures applied for entire groups (such as the group of “young Muslim men”) to prevent terrorism. Technological development, which is now being given top priority both in the USA and in the EU to improve the safety and security of society, serves to accelerate this trend. New technology is making it increasingly easy to move into ethically dubious grey areas. In some countries, democratic rights have been subject to curtailment under cover of efforts to fight terrorism (e.g. in the USA [Patriotic Act] or in Russia).

Knowledge vs. available resources
Certain longstanding trends in society are creating a growing dilemma between what we know and what we can actually do something about in terms of societal safety and security. The populations of industrialised countries know more about risks and threats, and have come to expect more or less a full degree of safety and security in their lives. These demands are addressed to the authorities. How far, for example, should the responsibility of the Norwegian foreign service for Norwegian nationals abroad extend? At what point must we ourselves assume responsibility? Safety and security efforts in many spheres in industrialised countries have come far, and the most effective measures have already been implemented. Thus the costs measured in relation to the corresponding increase safety and security begin to rise dramatically as we try to eliminate marginal sources of risk, moving towards peripheral areas in which we can only achieve marginal improvement (e.g. low probability, low damage potential events).

Safety and security vs. vulnerability

A paradox that emerges in all safety efforts is that successful prevention can lead to an unrealistic feeling of greater safety and security. The illusion of the virtually safe society can increase vulnerability because we forget or lose interest in assuming responsibility ourselves for our own safety. Advanced, highly reliable, operationally stable technological systems are extremely vulnerable if something should nonetheless fail, as illustrated in the difference between an old mechanical car and modern cars full of electronics and "black boxes".

Many minor vs. a few major events
If we express risk as an expected value representing the product of probability multiplied by consequences, we see that it is not economically rational to invest resources in preventing extremely low probability events, even if the potential consequences could be catastrophic. It is not the major accidents and acts of terrorism that have the greatest impact on national damage statistics. Nevertheless, it is the major, rarely occurring events that can strike down vital functions in society that are pivotal in a societal safety perspective. Major events that exceed the coping capacity of the (local) society affected because they cannot be dealt with using the established systems and ordinary procedures are important even though the statistical expected value may be low.

"Safety" goals vs."security" goals
Throughout this report, we maintain that there is a synergy between "safety" and "security", and that research has much to gain from viewing these together. At the same time, it is important to acknowledge that efforts to achieve "safety" and "security" may be characterised by conflicting goals. One possible example involves the transfer of experience. Good accident prevention requires a framework of active reporting and learning. This may be at variance with considerations relating to "security", where transfer of experience may expose vulnerabilities, making it necessary to withhold knowledge and information.

Power vs. knowledge
Knowledge about risk and vulnerability tends to be found in the lower echelons of organisations, while decision-makers in the upper echelons seem more often to be concerned with profits and financial risks. Top-level decision-makers need information about risks, need to be able to interpret and understand this information correctly and need to set priorities in relation to other considerations, usually financial. There is an obstacle to safety implicit in the fact that information about risk and vulnerability must pass through several hierarchical levels, and that safety coordinators are usually low-ranking in the hierarchy, with no direct dialogue with top management. Within the hierarchical chain of command it is the middle management, under pressure from both directions, which is responsible for ensuring that safety is adequately maintained at the relevant level and that safety needs are conveyed upwards through the hierarchy. A top management that lacks sufficient insight, either due to failure to communicate within the organisation or due to its own insular attitudes and views, may itself constitute the greatest threat of all.

Different aspects for research
Research activities may focus on several aspects of all of the dilemmas mentioned above. Many of these will involve similar issues or problems. It is important to note that too little is known about the effects of these dilemmas on safety, and research may help provide the answer to some of these questions. The questions

need to be adapted to the individual area, but in general, they may be formulated as follows:

- How will the specified problem areas be affected by changes in the patterns and magnitude of threats and vulnerability?
- How may the specified problem areas influence the trust between central institutions in society and the population?
- What will be the impact of technological, organisational, economic and political developments on the specified problem areas?
- Which ethical standards can be used to analyse developments the specified problem areas?
- How can new knowledge be used to generate a better basis and framework for decision-making?

6 Methods and models

The SAMRISK programme will need to further develop and adapt the methods and models used in risk and vulnerability analyses and threat assessments to the societal challenges of today. A *discussion about key concepts* within the field should be carried out as part of the programme. It is essential for interdisciplinary and cross-sectoral cooperation, as well as for ensuring satisfactory communication with the users of this research, that greater consensus be achieved. Risk and vulnerability analyses and threat assessments provide a basis for emergency planning. The methodology relating to the analysis and planning of preparedness and crisis management still needs some improvement.

A more detailed discussion of methods and tools is provided in Annex B to the Norwegian version.

6.1 Risk and vulnerability analyses

Vulnerability is a characteristic of a system that implies that the system does not function suitably in all the circumstances under which it is intended to function. A vulnerability analysis identifies various threats and the effects these will have on the system being analysed. The analysis largely consists of a structured review of discrete vulnerable functions and sub-systems, and is often difficult because it requires vast amounts of data and superior insight into the internal structure of the system. This is made even more difficult by the trend towards more and more complex systems in society. We need to determine how to develop vulnerability analyses that can more accurately gauge vulnerability at the societal level.

A number of sectors utilise risk analysis as a working method. There is a need to incorporate more perspectives from science and technology as well as social science in a number of areas where risk analysis is currently being employed. Relevant projects can be found in the RISIT programme, and are also dealt with under the programme for HSE in the Petroleum Sector in a decision-theoretical framework. It will be important to draw up adequate dividing lines in order to avoid overlapping efforts, and instead ensure further refinement of the models developed under the auspices of these programmes. The SAMRISK programme may help to promote enhanced application of environmental risk analysis, for example by generating a case study for oil activities in the north. Another area involves methods for reliability and vulnerability in ICT systems. Research should also include the interface between the computer system and the user. How can we design methods for risk and vulnerability analysis that will successfully encompass both accidents and deliberate actions?

Under SAMRISK, the study of genuine events will provide a source of increased knowledge about the underlying reasons as to why accidents happen, with a view to reducing the frequency and severity of future incidents. As a result of its close

focus on real-life events, this type of research activity will provide knowledge that supplements the more theoretical studies in societal safety and risk research. Fortunately, the frequency of events, in particular major accidents affecting society at large, is low. As a result, access to this type of data is limited, and knowledge transfer between sectors is therefore desirable. Alternative sources of knowledge include learning from near-incidents. For each incident that evolves into a serious accident, there are many near-incidents of a similar nature that have been stopped within the system. Greater focus on such near-incidents can help to provide knowledge regarding elements that must be in place for the process to be halted. This will also offer insight into the resilience of the systems. In what ways can the knowledge gained from examining events and near-incidents be used to create a better foundation on which to model risk and vulnerability analyses?

6.2 Threat assessments and evaluations

A number of different methodological approaches exist for conducting threat analyses in connection with acts of terrorism and similar intentional actions. Each of these has its strengths and weaknesses, and all are subject to great uncertainty. Some of these methods take a macro-perspective on the emergence and change of various types of threats, while others focus on threats to specified types of targets or objects.

Trend analyses use historical data or chronologies over the incidence, frequency and characteristics of different types of events as the starting point for efforts to describe future patterns, developments and trends. Trend analyses encompass a wide range of quantitative methods. The main trends emerging in relation to terrorist acts over the past decades include a higher death toll per action, a greater number of suicide actions, and an organisation that is more rooted in religious conviction, enjoys less state support, and makes greater use of networks. One advantage of this method is that its empirical foundation lends realism to the assessments. The primary weakness is that this method is not suitable for predicting qualitatively new trends or paradigm shifts, such as 11 September.

Causal analyses of terror threats are predicated on the notion that terrorism surfaces under specific social, political, economic, culture and other situation-related circumstances, and can analyse how changes in one variable may affect future terrorism campaigns.

Threat analyses focused on vulnerability often start with the assumption that certain installations, infrastructures or individuals are easy to attack, and that an assault or breakdown would have a major impact. Analyses of this type can easily exaggerate the threat if the vulnerability perspective if not simultaneously counter-balanced with player-oriented perspectives based on the players' intentions and capabilities.

6.3 Scenario analyses and simulation

We need to find methods that can help prepare us for the unexpected. The fundamental question underlying scenarios analyses is "what if...?". The problem

is that this approach can also be too deterministic and closely linked to the current situation. There is a need to develop methods better able to promote the "necessary imaginative scope". Thus, a common technique in scenario analysis is to describe two and two main dimensions in social development and put these together in a square matrix that describes four alternative scenarios with consequences for management of security efforts. Simulation comprises an experimental method in which a given system is represented in a formal model. Normally, simulation follows a rather extensive and complicated pattern of actions. The overall system to be described must therefore reflect reality to the greatest possible degree. Research-related challenges in this context involve the development of experimental methods and the translation of experimental results into improved models for risk analyses and practical system enhancement.

6.4 Overall challenge for method development under SAMRISK

As in many other fields of research, method triangulation – utilisation of several methods at the same time – provides more accurate answers than the exclusive application of a single method. An important overall task for the SAMRISK programme will be to define how the various methods can most appropriately be combined to provide the best answers to the questions posed. An effort should be made to achieve the following elements:

- Coordination and further modification of methods within risk and vulnerability analysis based on the methods that exist today.
- Simplification and increased user-orientation of existing methods.
- Development of methods for analysing risk and vulnerability in the interaction between humans, technology and organisations.
- Development of a guide that can serve as a "toolbox" for application and combination of different methods for analysing societal safety.
- Development of scalable methods that can encompass safety and security at a variety of levels, depending on what is being protected.

7 Examples of special areas of study

This chapter presents some examples of empirical areas that are of potential interest for study under the programme. However, it is important to emphasise that this in no way comprises a complete or prioritised list. Areas not specified here include corruption, out-of-control gene/bio/nano or other new technologies, social and ethnic conflicts, symbolic actions/incidents, financial crises or serious crisis in key enterprises, risk and vulnerability in development cooperation projects or other Norwegian commitments abroad, etc.

The purpose in identifying certain areas of study is to illustrate the wide range of relevant research issues that is found within the framework of the SAMRISK programme.

7.1 Vulnerability in critical infrastructure[20]

Society has changed profoundly in recent decades. Perhaps the greatest of such changes is our increasing dependence on the digital exchange of information using global systems for electronic communication. In today's world, information in itself is an important resource and investment component in all activities.

At the same time, the pattern of threats has changed since the end of the Cold War. Today, this pattern is characterised by uncertainty with regard to who may attack the country and the weapons they may choose to wield. Here in Norway, too, threats to society's ICT systems from over the Internet and the threat of terrorism have become more pressing.

Critical infrastructure, such as water supply, telecom networks, transport, finance, energy supply, etc. is made up of complex systems. These are by nature vulnerable to system failure and, increasingly, to logical attack from the Internet and to sabotage. Several features of the current trend indicate that this vulnerability is on the rise. Deregulation, globalisation and a unilateral focus on efficiency measures lead among other things to greater centralisation and concentration of business activities, growing dependence on information technology, staff reductions and less focus on preparedness measures for extraordinary situations. In addition, the systems have become extremely complex, and a strong mutual dependency has developed between different systems and infrastructures in certain contexts.

[20] *The Commission for Safeguarding the Nation's Critical Infrastructure* (The Infrastructure Commission) assesses the challenges relating to diminished state ownership of enterprises with important preparedness tasks. See the section *Ongoing activities of relevance to the study committee* under Chapter 2.3.

ICT is a technology that offers enormous positive benefits. The downside is that this technology is also accompanied by a world of hackers, virus, worms and other "infectious diseases". Technical security experts calculate that on average, it only takes a few minutes from the time an unprotected computer is hooked up to the Internet before it becomes infected by something unknown and difficult to get rid of. Laptop computers hooked up to mobile equipment, etc., move in and out of the control spheres of an organisation, causing growing concerns for security coordinators, who are forced to think in short-term solutions and devote most of their attention to urgent problems.

Most people have grasped that, in order to live with this, organised and systematic security efforts are needed. However, the standards, norms and practices within ICT security management have been shaped by the organisational world of yesterday, which had clearly-defined organisational boundaries and lines of command. This legacy causes problems when we are trying to deal with ICT security in modern, network-based, interactive knowledge organisations in which the infrastructure at airports, cafes, in homes and at partners is also embedded. Another question altogether is whether we today are not mostly protecting data at the expense of information or knowledge.

This increases vulnerability, which is cause for concern in light of society's enormous dependency on critical infrastructure. Failure in critical infrastructure can cause social frictions that have wide-ranging impacts and lead to large-scale financial loss as well as loss of life. Long-term disruption of the electricity supply, for example, will pose a threat to life-sustaining functions and paralyse production of goods and services. Nor are the conditions for the civil preparedness framework adequate for dealing with major crises involving serious breakdown of infrastructure. A security-policy crisis involving a collapse of critical infrastructure will diminish the ability of the crisis management structure to cope, thus making it difficult for civil society to provide support for the military forces.

Civilian and military players alike are dependent on an infrastructure that is resilient enough to withstand extraordinary stresses. Thus, it is important to identify vulnerabilities in various sectors of society and suggest measures to promote the soundest possible infrastructure.

There are many aspects of the role of critical infrastructure in societal safety that would benefit from more research. These include method modification for vulnerability analyses in a world in which everything changes quickly and new knowledge quickly becomes passé. Other issues include which measures are most effective and which criteria should be used when setting priorities for limited resources in a crisis situation. Critical infrastructure is also the responsibility of the authorities, and one question to be looked at is how the authorities should organise emergency preparedness and how they should administer ownership of critical infrastructure in order to ensure that society will be able to remain functional during a serious crisis. There are many challenges to be looked at here in relation to cultural and communication problems across national borders during times of crisis.

7.2 Complex crises and international coordination

A complex crisis is a serious humanitarian crisis that may lead to a breakdown of infrastructure, the local economy and authority structures in a country or region. Such crises have intricate, multi-faceted causes, with serious ramifications for those who are affected. This type of crisis is often associated with violent conflict, but it may also, for example, be caused by a severe natural catastrophe. In the future, it is possible to envision such crises triggered by major epidemics or technological accidents. As a rule, complex crises give rise to a large number of refugees, inadequate access to food or medical aid, and massive environmental devastation. The safety and security of both the civilian population and relief personnel is greatly diminished. The magnitude is usually such that assistance is needed from a wide variety of civil and military players (the UN, non-governmental organisations, military organisations, etc.) to remedy the desperate circumstances of the victims and help to achieve peaceful normalisation of the situation.

Complex crises are also characterised by the frequent emergence of smaller-scale crises within the crisis, and these require rapid, concerted action. Coordination between various international actors, local groups and the authorities, etc., is often difficult because a superior authority who can provide instructions is seldom or never designated.

Norwegian authorities and non-governmental organisations have long-standing traditions of involvement in complex crises through activities such as humanitarian relief efforts, peace mediation, contribution of military forces, and more. Norway should therefore have a special interest in, and commitment to, carrying out research on complex crises.

Much of the knowledge relating to how such crises progress, coordination in the field, human reactions and organisation has been developed empirically. More systematic research is needed to understand how the dynamics of complex crises work, to find the most effective means of managing such crises in the field, to determine how coordination takes place between various players and decision-making levels in large-scale organisations, and to interpret the interplay between what is taking place in political, humanitarian and military arenas. This would help to provide new perspectives on crisis management that would be useful within the Norwegian framework. Moreover, little research has been conducted on the ability of the victims (and their families) to organise themselves during a crisis. New knowledge in this field may change the perception of those directly affected and their families; we may come to see them not only as victims but also as an important resource in crisis situations as well. The identification of applicable research methods is important.

Rapid magnitude assessment[21]
In the aftermath of the tsunami that struck 12 countries in Asia in December 2004, a heated debate broke out in Norway and other countries as well regarding the

[21] See the report of the Reinås Commission at http://www.evalueringsutvalget.no (Norwegian only)

inability of the authorities to take action, the slow and insufficient response, and the confusion relating to measures to meet the immediate needs for assistance. Many days elapsed before some awareness began to emerge of the actual magnitude of the catastrophe, and how to prioritise help efforts. There were no organisations or experts who had any idea of the scope or degree of devastation. A similar incident can happen again. Natural catastrophes, technological accidents or grave threats to the public health within an area can severely challenge the ability of the authorities to quickly assess the extent of the damage and prioritise measures.

An alternative line of thinking is to make use of the fact that all types of catastrophes have their own dynamics of progression (almost a natural sequence of events). Better understanding of these dynamics may make it easier to estimate the scale of a catastrophe at an early phase.

Research that can enhance knowledge about the inherent progression and features of crises should seek to identify viable indicators that can be incorporated into models. This will make it possible to arrive at reasonable estimates of the consequences and at the same time describe the anticipated logical progression. The objective should be to facilitate decision-making during the critical hours after a catastrophe has struck, and at the same time to increase the accuracy of the decisions taken so that help efforts and countermeasures can be swiftly implemented.

7.3 Terrorism

Emerging trends in terrorism and changes in the general magnitude and patterns of threats create a need for research and new knowledge.

One essential topic involves problems associated with the roles of the police, the military and the Directorate for Civil Protection and Emergency Planning in light of the fact that threat patterns have changed so completely since the end of the Cold War. Whereas most security-policy threats previously came from enemy states, it is now sub-country, trans-national terror and crime networks that represent the most significant security-policy and “intentional” threats.

Another central research topic centres around Muslim minorities in the age of terrorism, and the dilemmas that arise in connection with integration, dis-integration and controls in Norway and Europe. The many planned (and the few implemented) terrorist actions in Europe in which international Jihad groups have been involved in recent years have led to rising concerns about the participation of local Muslim immigrants in such actions. Increasingly, surveillance and security measures have been implemented vis-à-vis Muslim minority populations, even though only an extremely small number of these have expressed any sympathy for the Jihad extremists. There is a danger that the increased suspicion and control measures with which these minority groups are now being met will lead them to become even more marginalised and isolated, which in turn may lead to more radical thinking and greater recruitment to extreme circles.

An interesting *comparative research project* may therefore be to study the reactions to the new terror threats (genuine or perceived) in different European

countries, in terms of various authorities, in terms of public discourse and among selected population groups. Research in this context will provide a constructive basis for the initiation of a European cooperative project.

A great deal of research has been carried out in Norway regarding the causes of terrorism. A task that still remains, and that is highly relevant in terms of policy formulation, is to examine more systematically – in relation to specific terrorist campaigns – *which causal factors it is possible to do something about*, to stem terrorist activity or reduce recruitment, or at best to be able to prevent the radicalisation of oppositional groups in the direction of terrorism. In addition to studying the question of what can be done to prevent terrorism from arising, the opposite question can be asked: What brings about an end to terrorist activity, either in that the group collectively discontinues its terrorism (voluntarily or because they have no choice), or in that individual members distance themselves from the terrorist groups? Which policies can help to promote or augment the processes leading away from terrorism?

A third interesting topic where new knowledge is also needed involves *European vs. American perceptions of security*, and the tendency to choose different types of action in the wake of major terrorist actions. How and to what degree do different groups and authorities in Norway, Europe and the USA perceive and interpret large-scale terrorism as a central and genuine threat to the security of the state, society and population? Are there fundamental differences between European and American perceptions and inclinations to take action? If so, what do these differences in risk perception and response imply? Why is the problem of terrorism given such different dimensions, which are not necessarily in keeping with the likelihood of the country's inhabitants being affected by terrorist or other violence?

7.4 Societal safety and failure of the social safety net

In the Scandinavian welfare societies, the responsibility for the individual's welfare and safety has been transferred over the past fifty years from the family and local community to public systems. If we as individuals suffer from physical, psychological, social or financial problems that we are unable to solve ourselves, society at large has assumed responsibility for finding solutions. As a result of long-term trends in demographic composition, mobility and settlement patterns, migration and types of social interaction, the safety net based on family, friends and local communities has been weakened. This is why a breakdown in the public social safety nets can lead to dramatic situations that may pose a threat to societal security.

Examples of such situations are easiest to find within psychiatrics. In Sweden, Norway's neighbour, both a prime minister and a foreign minister have been murdered. In the case of Foreign Minister Anna Lindh, the perpetrator was mentally imbalanced, while the prime suspect in the unsolved murder of Prime Minister Oluf Palme was a mentally disturbed substance abuser. In Norway, a government minister had to be issued body guards in the wake of death threats, and the house of a former union leader was burned down by a mentally imbalanced individual. A number of other figures of authority and prominent

members of society have been subjected to serious threats and various forms of persecution. Refugees suffering from mental disturbances – often as a result of traumas they have endured – have committed acts of violence on buses, trams and airplanes. Other breakdowns in the social safety nets, such as when entire groups encounter major problems that they do not know how to solve (e.g. asylum-seekers whose applications have been rejected, people experiencing poverty or housing problems) can lead the individuals affected to commit acts of desperation that pose a threat to societal safety.

The SAMRISK programme has little to offer in the purely medical/psychological research sphere. Instead, the programme should focus on studying society's response in relation to failure of the social safety nets. How can we develop better threat and risk evaluations to determine when a breakdown in social safety nets has arisen and how this may influence societal safety? What can be done to prevent a failure in the social safety nets from having fatal consequences? What is needed in terms of coordination between government agencies and between various levels of society? What are the ethical implications of breakdown of the social safety nets?

7.5 Organised crime and gangs

Good empirical studies on specific examples and types of organised crime are needed. There is also a need for more overall analyses of this phenomenon, and for discourse on and policy formulation in relation to that which is designated as organised crime. One fundamental issue is that the widespread notion of organised crime as consisting of criminal organisations resembling the mafia has little basis in reality.

The organised crime that actually takes place in Norway appears to consist of *project organisation for a specific "action"* more than acts administered from firmly-cemented institutions. These project groups are apparently put together based on loosely structured criminal networks composed of persons with different types of skills and areas of knowledge. However, there is a need for more knowledge regarding *the actual practice of organised crime in a Norwegian context*, as well as the degree to and purpose for which it is useful to employ such a perspective in the context of these criminal phenomena.

Further, there is a need to analyse the degree to which more organised forms of crime in fact represent a serious threat to society or to individual sectors, as well as what society or the sectors involved could do to protect themselves. An important aspect here is the *role of violence* in organised crime, particularly in view of the fact that in recent years, the violence seen in robberies and outlaw biker circles (primarily perpetrated by ethnic Norwegians) has been far more brutal and calculated than has previously been experienced in Norway. Some of these criminal circles have established contacts in the business sector, which they use in connection with the planning of criminal operations. These ties can also be seen in torpedo activity, where certain segments of the business sector hire individuals with a history of criminal violence to collect outstanding claims. Correspondingly, the ties between segments of the business sector and organised crime have manifested themselves through smuggling of cigarettes, meat, beer,

wine, spirits, and the like, that are thereafter distributed to consumers through local businesses and restaurants. Segments of the lorry and transport industry have been heavily involved in various forms of smuggling activity as well.

Much indicates that *insider-related issues* (there is a great deal to focus on here, in terms of both financial and organised crime) and *ties between business and organised crime*, are often far more normalised than many believe; nonetheless, they still carry major implications for society at large. The links between organised crime and the business sector remain relatively unexplored in a Norwegian research perspective.

In some local communities, the aggressive behaviour of criminal and violent youth gangs causes fear among other young people. In a number of cases, this has led youths to seek protection by forming rival groups and gangs. This in turn can generate a cycle of revenge, groups taking the law into their own hands, and acquisition of weapons, and in some cases a violent polarisation between racist and multi-ethnic or anti-racist groups. On various occasions, conflicts between gangs and other militant groups have led to shootings on city streets and use of explosives (such as the Nordic biker war between Hell's Angels and Bandidos). In several cases, what originally started as a youth gang has evolved into an organised crime group. Although some research on prevention and intervention in relation to such conflicts has been carried out in Norway, there may be a need for more studies in this area with a view to designing effective measures.

More generally, there is a need in the long-term to heighten expertise and build up dynamic research groups within the field of organised crime in Norway on a par with that achieved within the field of terrorism. Achieving this means bringing together researchers with complementary skills, to obtain the appropriate scope and depth.

7.6 Natural catastrophes and climate change

The 2004 National Vulnerability and Preparedness Report from the Directorate of for Civil Protection and Emergency Planning[22] treats climate change as a challenge to societal safety in Norway. New challenges in relation to critical infrastructure and increased damage to buildings, cultural landscapes and the natural environment are anticipated. Norway's location is such that a number of key processes in the global climate system are taking place in its Arctic areas.

The safety and emergency preparedness-related challenges associated with projected climate change need to be further defined in order to implement the necessary adjustment and preparedness measures. Among other things, it is important to gain more knowledge about the impacts on roads, areas of settlement, water and drainage systems, etc., as well as how existing infrastructure can best be adapted. The effects of climate change will have great local variations.

The Directorate's report identifies a substantial need for research and development in various areas, including:

[22] Based on a draft of report NSBR-04 from December 2004 (Norwegian language only).

- Changes in the conditions for energy supply, building construction and public communications.
- Local analyses of vulnerability and adaptation capabilities in relation to extreme weather conditions.
- Preparedness needs, regulations and institutional challenges in relation to the Planning and Building Act.

In general, the report points to a lack of cross-sectoral focus on climate change, which is a clear indicator that this topic fits very well into the framework drawn up for the SAMRISK programme. Methods for risk and vulnerability analysis have not been much applied in this area. The potential for designing adjusted methods for this sphere is great, cf. Chapter 6.

Another relatively unexplored topic is climate change in the middle-long term (5-20 year period). One example of this would be sudden shifts in precipitation profiles that may cause changes in energy or food production. Change of this type increases the stress factors on society and poses a dilemma; as long as it is not known whether such changes are temporary or permanent, it is difficult to determine whether – and when – any measures to counter the situation should be implemented. In what ways could middle-long term climate change affect societal safety? What would be the best way to deal with such climate change?

7.7 Man-made accidents

Today, man-made accidents are the primary cause of deaths and injuries within the sphere of societal safety. Such accidents range from the rarely-occurring, large-scale accidents in spheres such as transport or industrial activity, to the many small accidents that do not receive the same attention, but that can represent a greater problem for individuals and society as a whole.

One example of a sector with a great potential for improvement is the health sector. According to current calculations, some 2 000 hospital patients die each year from treatment errors, most of which could have been avoided by adapting methods and knowledge from other sectors as well as by conducting more basic safety research on cross-sectoral subjects. As in many other sectors, the responsibility for improvement lies largely with the authorities, such as the ministries and inspectorate agencies, as well as with the administration of the individual institution.

Analysis of the underlying causes of accidents in various branches of industry reveals a number of common features. The causes are complex and usually linked to failures stemming from organisation, technology and the individual. Interdisciplinary research in a number of topics is needed to gain an understanding of how to achieve safe interaction between these components. One example is the distribution of tasks between humans and technology. Far too often, efficiency measures are sought through increased implementation of technology, while potentially negative safety aspects are overlooked. This exemplifies a rising trend: A focus on efficiency at the expense of safety poses a threat to societal safety and security. Dealing with this will require more attention from the authorities, and more knowledge from research institutions.

One area in which the sectors currently differ greatly is their view of the liability of the person involved in an unintentional event in relation to the liability of the organisation. This divergence is probably more rooted in traditional practice than in genuinely differing views, but there is a great need for more knowledge in order to optimise this balance.

Analysis of many small incidents provides insight into how to avoid more serious accidents, either by preventing a new incident from being triggered or by stopping it at an early phase, before it has serious consequences. It is more difficult to amass a similar volume of experiential data for major accidents, as these occur more rarely. A basic research issue will therefore be: To what degree and how could experience gained from smaller-scale events be applied to the prevention of major accidents? Are there other methods that could be used to generate a relevant data base? One alternative is to study *normal* work procedures to identify the risk factors and vulnerability of the systems being studied. Perhaps the system theory (human-technology-organisation) used today in accident research could be developed into a more universal method for understanding other types of events that pose a threat to societal safety.

7.8 International threats to public health

Pandemics, or epidemics that spread quickly across national boundaries, pose a constant threat in a globalised world. New, multi-resistant bacteria or other resistant infectious substances can diminish the ability to implement effective countermeasures in times of crisis. Assessments carried out in Great Britain, among others, indicate that the outbreak of epidemics may lead to a far greater loss of life than most other known threats. The SAMRISK programme does not extend to purely medical or epidemiological research. However, relevant areas of study do include methods for assessing threats and risks, and perhaps more particularly, coordination of international responses to such crises. How can we most effectively identify, evaluate and cope with transboundary health risks (exposure to ionising radiation, biohazardous threat agents, effects of chemicals, etc.)? The World Health Organisation is working hard to devise uniform definitions and strategies.[23] There is, for example, some controversy regarding who and what should be defined as a threat to public health. Does HIV/AIDS pose a more important threat to public health than SARS, excessive sugar consumption or malaria?

Should terrorism be considered a threat to public health? Who should be responsible for determining when to implement international measures? On what basis should any such measures be implemented? What obligations does this imply for various countries? Different countries are coping with different threats to public health, and, at the same time, the respective authorities have different risk perceptions and widely varying interests in the circumstances that threaten the health of their populations. International threats against public health are thus a sensitive political issue in which medical criteria are not always the most crucial

[23] Through “The revised international health regulations”, see http://www.who.int/csr/ihr/whattheyare/en/IHREnglish.pdf

component. What is the impact of politics and power constellations on perceptions of transboundary health risks? What can Norway contribute in this context?

8 Organisation and financing of the research initiative

8.1 Organisation of the research initiative

The study committee has discussed various alternatives regarding the organisation of the research initiative, focusing on the two following alternatives:

1. Research programme:
2. Strategic institute or university programme (SIP or SUP).

A programme is a cluster of projects administered by a programme board. The programme board normally consists of 50 per cent researchers and 50 per cent user representatives. Funding is allocated in connection with calls for proposals based on a programme document drawn up by the programme board. Grant applications are submitted via standard application forms. The programme board reviews the applications received. Each project that is granted funding is required to submit a progress report each year. This organisational form is relatively resource-intensive because it necessitates the establishment of a programme board and because the researchers often invest a good deal of effort in the preparation of grant proposals.

A strategic institution or university programme (SIP or SUP) is a project extending over several years, often four or five, in which the relevant institution is relatively free to define the substance of the programme. Programmes of this type are often oriented towards basic research, with one of the main objectives being to enhance the expertise of the researchers. A strategic programme places great demands on the institution in charge.

It is the view of the study committee that the objectives of this research initiative will best be fulfilled by organisation as a programme. However, the study committee seeks to minimise the use of resources in connection with programme management and grant application procedures. According to the committee, this can be achieved using the means elaborated below.

A programme board will be established for the Research Council The programme board should consist of the following:

- Four representatives of the most central users and funders;
- Four researcher representatives, of whom at least one should come from abroad.

Broad-based representation from the various sectors is the key to promoting

a cross-sectoral perspective. At the same time, it ensures that the different sectors maintain direct links to the research. In order to safeguard the interests of other users and funders of this research, the programme board may be supplemented by a resource group to assist the programme board in setting priorities, among other things.[24]

The programme board will issue calls for proposals on broad-spectrum research topics, thus enabling the various research communities to demonstrate their expertise by elaborating and providing concrete details on the general thematic descriptions presented. The study committee recommends that the calls for proposals explicitly encourage cooperation between different academic circles and institutions, making it clear that cooperative projects will be assessed in a particularly positive light. Nonetheless, collaboration between several groups and institutions to submit an application should not be viewed as a prerequisite for grant allocations.

Research projects should be large in scale, and last over several years. The projects should function in virtually the same way as a strategic institute or university programme within the responsible institution. Institutions performing research will be required to submit progress reports to the programme board once or twice a year. Otherwise, the institutions involved will be at liberty to conduct their projects as they wish, within the agreed-upon financial framework and stipulated deadlines.

In the view of the study committee, the SAMRISK research initiative should seek to support 3-4 doctoral degree candidates and motivate the publication of a substantial number of articles in scientific journals. The programme board should accept articles published in scientific journals as final deliveries from the projects combined with various targeted popular dissemination activities.

8.2 Financing of the research initiative

The study committee has discussed the interest of various ministries, directorates, and other stakeholders in taking part in the funding of this research initiative as well as their capacity to do so.

The growth alternative to the 2006 budget proposal submitted by the Research Council to the Government suggests that the initiative be launched with a budget of NOK 14 million, of which NOK 3 million from the Ministry of Education and Research, NOK 1 million from the Ministry of Trade and Industry, NOK 2 million from the Ministry of Fisheries and Coastal Affairs, NOK 2 million from the Ministry of Defence, NOK 3 million from the Ministry of Justice and the Police, NOK 1 million from the Ministry of Transport and Communications and NOK 2 million from the Ministry of Foreign Affairs. The ministries will provide notification regarding allocations in connection with the submission of the annual national budget in October 2005.

[24] The programme for HSE in Petroleum Research is organised in a similar fashion.

The Division for Strategic Priorities has recommended the allocation of NOK 5 million from the Fund for Research and Innovation for 2006. This will be dealt with by the Research Council Executive Board in a meeting before the summer of 2005.

The research programme should be open to the participation of other ministries as well. Additionally, a professional and financial potential exists in relation to private enterprises, for example those that administer critical infrastructure, such as energy suppliers, Telenor, the Norwegian National Railway Administration, Avinor, finance institutions, and more. These may either be incorporated into research projects under the programme itself, or via associated user-driven projects.

9 Dissemination of research results

The study committee has discussed a number of ways in which the results of research under the SAMRISK programme could be disseminated, including traditional research reports, seminars, user conferences, participation at international conferences, participation in the press and other mass media, electronic information channels and publication of articles in scientific journals.

There is agreement within the study committee regarding the relevance of all of the above. Beyond this, the committee believes that the institutions and researchers involved should be given the liberty to decide which forms of dissemination they consider to be most appropriate in each individual case. It is assumed that, as a minimum, results will be conveyed in the form of research reports, scientific articles and popular science presentations in the media.

The committee further assumes that a website will be established for the research activities. Such a website should be established and administered by the programme administration, i.e. the Research Council.

The SAMRISK programme should take the initiative to organise user-oriented conferences as well as seminars and workshops to promote the exchange of ideas and information between the relevant research groups and users/stakeholders. There is a tremendous need to establish a cross-sectoral meeting place and learning arena for dealing with the issues raised in connection with this programme. Moreover, this will provide a conduit for spreading knowledge from international research in the safety and security sphere.

In the view of the study committee, it would also be advantageous if documentation from the research were to be written in a manner that facilitates its use in higher educational programmes. This should not be perceived as a requirement for all documentation, but rather as something for researchers to keep in mind as they document their efforts. There is a widespread need for study materials and textbooks as well as interactive teaching materials at many institutions.

The study committee also considers it beneficial for research to be presented in a manner that allows it to serve as constructive input to the designation of policy relating to societal safety.

Learning and transfer of experience and knowledge
The need for learning and transfer of experience and knowledge is relevant to most sectors. While there is a great deal of experiential information available in some areas, little or nothing is found is others. This may pose difficulties for efforts to promote cooperation and priority-setting across sectors. There is a need for a collaborative endeavour to look at existing sources, and to establish new ones. How high is the quality of existing statistics over undesired events, damage and loss, and to what degree can this information be utilised?

10 Key documents and Internet addresses

10.1 Reports and documents

Cabinet Office, Government of the United Kingdom: "Risk: Improving government's capability to handle risk and uncertainty." Full report – a source document

NOU 2000:24 Et sårbart samfunn – Utfordringer for sikkerhets- og beredskapsarbeidet i samfunnet. Innstilling fra utvalg oppnevnt ved kongelig resolusjon 3. september 1999. Avgitt til Justis- og politidepartementet 4. juli 2000

Stortingsmelding nr. 7 (2001-2002): Om helse, miljø og sikkerhet i petroleumsvirksomheten. Tilråding fra Arbeids- og administrasjonsdepartementet av 14. desember 2001, godkjent i statsråd samme dag. (Regjeringen Bondevik II)

Stortingsmelding nr. 17 (2001-2002): Samfunnssikkerhet. Veien til et mindre sårbart samfunn. Fremmet under regjeringen Stoltenberg St.prp. nr. 3 (2001-2002)

Stortingsmelding nr. 18 (2003-2004): Om forsyningssikkerheten for strøm mv. Tilråding fra Olje- og energidepartementet av 19. desember 2003, godkjent i statsråd samme dag. (Regjeringen Bondevik II)

Stortingsmelding nr. 19 (2002- 2003): En verden av muligheter - globaliseringens tidsalder og dens utfordringer

Stortingsmelding nr. 39 (2003-2004): Samfunnssikkerhet og sivilt-militært samarbeid Tilråding fra Justis- og politidepartementet av 14. mai 2004, godkjent i statsråd samme dag (Regjeringen Bondevik II)

Stortingsproposisjon nr. 42 (2003-2004) Den videre moderniseringen av Forsvaret i perioden 2005-2008 *Tilråding fra Forsvarsdepartementet av 12. mars 2004, godkjent i statsråd samme dag. (Regjeringen Bondevik II)*

Strategy Unit Report – November 2002

10.2 Internet addresses

26.12 – Rapport fra Evalueringsutvalget for flodbølgekatastrofen i Sør-Asia, http://www.evalueringsutvalget.no

Directorate for Civil Protection and Emergency Planning (DSB), http://www.dsb.no

Etablering av utvalg for sikring av landets kritiske infrastruktur, http://odin.dep.no/jd/norsk/dok/regelverk/lover/012101-200019/dok-bn.html

HSE in the Petroleum Sector, https://www.hmsforsk.no

Knowledge base on terrorism and international crime, http://www.nupi.no/English/Research/Knowledge_base_on_terrorism_and_int._crime/

The Coordination Committee for Information Security (KIS), http://www.kis.stat.no

The Norwegian National Security Authority (NSM), http://www.nsm.stat.no

Norwegian Institute of International Affairs, http://www.nupi.no

The Norwegian Police Security Service (PST), http://www.pst.politiet.no

Norwegian Police University College, http://www.phs.no

Reliability, Safety, and Security Studies at NTNU, http://www.ntnu.no/ross

Risikoforskning i Norge: https://www.risikoforsk.no

Secretary-General of the United Nations: In larger freedom: Towards development, security and human rights for all, http://www.un.org/largerfreedom

Secretary-General's High Level Panel on Threats, Challenges and Change: A mopre secure world: Our shared responsibility http://www.un.org/secureworld/

The Centre for Information Security (SIS), http://www.norsis.no

The revised international health regulations, http://www.who.int/csr/ihr/whattheyare/en/IHREnglish.pdf

The Commission for Safeguarding the Nation's Critical Infrastructure (the Infrastructure Commission), http://odin.dep.no/jd/norsk/dok/regelverk/lover/012101-200019/dok-bn.html