



Национальный исследовательский университет «Высшая школа экономики»
Программа дисциплины «**Форсайт и стратегическое планирование**» для направления 38.04.02
«Менеджмент» и «Управление в сфере науки, технологии и инноваций», подготовки магистра

**Федеральное государственное автономное образовательное учреждение
высшего образования
"Национальный исследовательский университет
"Высшая школа экономики"**

Институт статистических исследований и экономики знаний

**Рабочая программа дисциплины
«Форсайт и стратегическое планирование»**

для направления 38.04.02 «Менеджмент» подготовки магистра

Авторы программы:

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Академический руководитель образовательной программы
Д. Майснер

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*Настоящая программа не может быть использована другими подразделениями университета
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Foresight and Strategic Planning

1. Introductory note

Program author: Ozcan Saritas

General Description of the Program:

The course is delivered to master students of The National Research University - Higher School of Economics/HSE. It is delivered in modules. The course length is **228** academic hours in total of which **64** hours are class room hours for lectures and seminars and **164** hours are devoted to self study.

Academic control forms are one written exam, mid- and end-term oral presentations, a supplementary home assignment and an essay of the presented topic. The course contains **8** themes which are mutually exclusive but collectively exhaustive to cover the subject.

Pre-requisites

Attendance to the previous core courses including STI Policy, Strategies in STI Management and Methodology for Scientific Research is considered to be a must. Familiarity and knowledge in the areas below are considered to be beneficial:

- Economics and / or management
- Creative, critical and interactive thinking
- Policy and institutional analysis
- Understanding of the relationships between STI and socio-economic development
- Interdisciplinary and systemic thinking

Course Objective

This course aims to provide an overview of Foresight and Strategic Planning. The course introduces several key approaches used both in Foresight and Strategic Planning in a complementary stance, including methods for scanning environments, identifying trends and drivers of change with weak signals and wild cards, developing future scenarios and visions and making long, medium and short term strategic plans for identifying priorities and actions. During the course, innovative ways of decision-making and STI policy formulation; STI strategy- and priority-setting; and cooperation and networking with stakeholders will be introduced. Through seminars, students will also be provided with practical experience in designing Foresight and Strategic Planning processes for public and private organisations.

This course will be organized as a combination of lectures and seminars. Lectures will be both (i) informatory with the aim of giving background information and raising awareness on the topic and (ii) participative and interactive with the aim of building capacity on how to implement the theory of Foresight in practice at the international, national, corporate and sectoral/thematic levels. During the lectures, students will have an opportunity to apply and practice what they learned through a hands-on practical exercise. Students will be given tasks during seminars,

which will help them to gain an in depth knowledge on the topic. A final seminar session will take place at the end of the course, where students will give oral presentations on their selected topic for the practical exercise to demonstrate the level of knowledge they gained throughout the course. The overall performance of students will be measured through seminars, and the level of their attendance and active participation in discussions.

Course Language: English.

Abstract

The course will consist of 2 basic streams – a lecture and a seminar. Lectures and seminars are based on recent academic work from different scientific perspectives; introduce case studies and state of the art approaches applied by practitioners. The combination of lectures and seminars enable participants to get much better insight into the fields of Foresight and Strategic Planning. Moreover seminars consist of introduction lectures followed by student’s self study to solve a predefined task by developing a applicable solution for applying and implementing science, technology and innovation measures in the Russian context. Eventually students will present their proposed solution in presence of invited foreign experts.

Training Objectives

- This course aims to provide an overview of Foresight and Strategic Planning by discussing the theoretical underpinnings with a view of historical and epistemological development. The theoretical background will be supported with practical exercises and case studies throughout the course. The course introduces several key approaches used in Foresight and Strategic Planning, including methods for scanning environments, identifying trends and drivers of change with weak signals and wild cards, envisioning futures, and identifying priorities and action points. In keeping with this remit, the course will cover the lecture topics listed and described below.

Target audience

- Masters students

Competences

- Develop and apply quantitative and qualitative methods for long term Foresight and strategic planning
- Analyze emerging trends, developments, uncertainties, weak signals and wild cards
- Explore alternative scenarios for the future
- Articulate future visions and identify priorities
- Develop long, medium and short term strategic plans and roadmaps
- Recommend policy and actions for public and private actors

- **Thematic Plan**

a) Lectures

Themes	Topic	Total academic hours	Lectures (class hours)	Self study
1. Basics of Foresight and Strategic Planning	Introduction to Foresight and Strategic Planning	8	2	6
	Rationales of Foresight and Strategic Planning	8	2	6
	Key concepts and approaches in Foresight and Strategic Planning	8	2	6
	<i>total</i>	<i>24</i>	<i>6</i>	<i>18</i>
2. Objectives and Processes of Foresight and Strategic Planning	Uses of Foresight and Strategic Planning	10	4	6
	Foresight in the STI policy processes	6	2	4
	Strategic Planning in corporate management processes	6	2	4
	Key functions and roles of Foresight and Strategic Planning	6	2	4
	<i>total</i>	<i>28</i>	<i>10</i>	<i>18</i>
3. Methodology for Foresight and Strategic Planning	Methodology for STI Policy Foresight and Strategic Planning	6	2	4
	Quantitative and qualitative methods in Foresight and Strategic Planning	6	2	4
	Key methods for Foresight and Strategic Planning	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
4. Gathering intelligence for Foresight and Strategic Planning	Competitive, technology and market intelligence and trend monitoring	6	2	4
	Identification of emerging and disruptive technologies	6	2	4
	Planning for emerging technologies	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
5. Scenarios technique	Scenario and vision development	6	2	4
	Case examples on selected scenarios and vision building processes	6	2	4
	Positioning of scenarios in STI strategy and policy making processes	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
6. Translating Foresight into strategy	Roadmapping for action plan development	6	2	4
	Assessment and prioritization of alternative STI strategies	6	2	4

	Approaches and methods used for the prioritization process	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
7. Generating outputs	Outputs and outcomes of Foresight and Strategic Planning	6	2	4
	Evaluating Foresight	6	2	4
	Evaluating Strategic Planning	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
8. Embedding Foresight and Strategic Planning into organisations	Linking Foresight to decisions, strategies and policies	6	2	4
	Embedding Foresight and Strategic Planning in organisations	6	2	4
	Creating a culture of Foresight and Strategic Planning	6	2	4
	<i>total</i>	<i>18</i>	<i>6</i>	<i>12</i>
	Total	160	52	108

b) seminars

The seminar consists of an introductory session which highlights the phenomena in discussion, introduces the theoretical background and practical applicability. Supervision of students will be offered using a mid-term interim presentation of additional information and facts by the supervisor and individual consultations during the seminar. Following these introductory session students will develop a practical applicable concept for a given problem which is based on sound scientific grounds. The session ends with the introduction of core themes for which the students are asked to prepare a presentation. Finally these concepts are introduced in a concluding session which is devoted to presentations of concepts developed by students and a concluding discussion of these concepts from both a scientific and a practical view. Students will develop concepts in teams and be supervised during development of their concepts

Topic	Total academic hours	Class hours	Self study
Introductory presentation	16	4	10
Interim presentation / individual consultations	26	4	24
Presentations	16	4	22
Total	68	12	56

2. Basic literature

- Ackoff, R.L. (1974). "Redesigning the Future: A Systems Approach to Societal Problems", John Wiley and Sons, New York.
- Ansoff, H. I. (1957): Strategies for Diversification. In: Harvard Business Review, 35(5): 113-124.
- Checkland, P. (1981). "Systems Thinking, Systems Practice", Wiley, Chichester.
- Churchman, C.W. (1968). "The Systems Approach", Dell Publishing, New York.
- Coates, J.F. (1985). Foresight in federal government policy making, "Futures Research Quarterly", 1, 29-53.
- Georghiou, L., Harper, J.C. , Keenan, M., Miles, I., Popper, R. (2008). "The Handbook of Technology Foresight", Edward Elgar, Cheltenham.
- Miles, I and Keenan, M. (2002). "Practical Guide to Regional Foresight in the UK", Publications of the European Communities, Luxembourg.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Porter, A.L., and Cunningham, S.W. (2005). "Tech Mining: Exploiting New Technologies for Competitive Advantage", New York: Wiley.
- Robinson, D.K.R., Huang, L., Guo, Y., and Porter, A.L., Forecasting Innovation Pathways for New and Emerging Science & Technologies, Technological Forecasting & Social Change, 80, 2, 267-285.
- Saritas, O. (2006). Systems Thinking for Foresight, PhD Thesis, Manchester Institute of Innovation Research, The University of Manchester.
- Saritas, O. (2013). Systemic Foresight Methodology. In: Meissner D., Gokhberg L., Sokolov A. (eds.) (2013) Science, Technology and Innovation Policy for the Future - Potentials and Limits of Foresight Studies. Springer, Heidelberg/ New York/ Dordrecht/ London, Springer, Berlin, pp. 83-117.
- Saritas, O. and Smith, J. (2011). "Considerations in the use of quantitative and qualitative methods for extracting and compiling knowledge for Foresight", A report produced for the Higher School of Economics (HSE), the Institute for Statistical Studies and Economics of Knowledge (ISSEK).
- Saritas, O. and Smith, J. (2011). "Integration of quantitative and qualitative methods within the concept of the Systemic Foresight Methodology", A report produced for the Higher School of Economics (HSE), the Institute for Statistical Studies and Economics of Knowledge (ISSEK).
- Smith, J. and Saritas, O. (2011). "Approaches for ordering quantitative and qualitative methods for extracting and compiling knowledge", A report produced for the Higher School of Economics (HSE), the Institute for Statistical Studies and Economics of Knowledge (ISSEK).
- Smith, J. and Saritas, O. (2011). "Best practices for combining quantitative and qualitative Foresight methods", A report produced for the Higher School of Economics (HSE), the Institute for Statistical Studies and Economics of Knowledge (ISSEK).

3. Education control forms

Final control (F): written exam (30 minutes multiple choice exam)

Seminar (S): Oral presentations (P) including a mid-term presentation (MP) and an end-term presentation (EP) to be given in seminar sessions + Home Assignment (H) + Final essay (E)

The overall course grade (G) is calculated at a 10-point scale as a sum of

$$G = 0.4 F + 0.6 S \quad (S = 0.4 P + 0.2 H + 0.4 E; P = 0.5 MP + 0.5 EP)$$

The overall course grade G (10-point scale) includes results achieved by students in their final exam F and seminar (S); it is rounded up to an integer number of points.

Summary Table: Ten-point system marks

Ten-point scale [10]
1 – unsatisfactory
2 – very bad
3 – bad
4 – satisfactory
5 – quite satisfactory
6 – good
7 – very good
8 – nearly excellent
9 – excellent
10 – brilliant

Programme Contents

Module 1- Basics of Foresight and Strategic Planning

Topic 1 Introduction to Foresight and Strategic Planning

Topic outline:

- Definition of Foresight
- Background and emergence of futures thinking
- Evolution of practice across time

Main references/books/reading:

- Ackoff, R.L. (1981). “Creating the Corporate Future”, John Wiley and Sons, New York.
- Churchman, C.W. (1968). “The Systems Approach”, Dell Publishing, New York.
- Loveridge, D. (2009). “Foresight: The art and science of anticipating the future”, Routledge, New York and London.
- Loveridge, D. and Saritas, O. (2012). Ignorance and uncertainty: influences on Future-oriented technology analysis, *Technology Analysis & Strategic Management*, 24, 8, 753-767.
- Martin, B.R. (1995). Foresight in Science and Technology, “*Technology Analysis and Strategic Management*”, vol. 7, 2, 139-168.
- Miles, I., Saritas, O. and Sokolov, A. (2016). *Foresight for Science, Technology and Innovation*, Springer.
- Mintzberg, Henry. (1994). *The rise and fall of strategic planning*. New York, NY: The Free Press.
- Salo, A. (2001). Incentives in technology foresight, “*International Journal of Technology Management*”, Vol. 21, No. 7-8, pp. 694-710.
- Simerson, K.B. (2011). *Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation And Execution*, Abc-clio.

Topic 2 Rationales of Foresight and Strategic Planning

Topic outline:

- Introduction to key concepts: Futures, Forecasting, Foresight

- Introduction to the key concepts of Strategic Planning

Main references/books/reading:

- Godet, M. (2000). The art of scenarios and strategic planning: tools and pitfalls, “Technological Forecasting and Social Change”, vol. 65, pp. 3-22.
- Miles, I. and Keenan, M. (2002). “Practical Guide to Regional Foresight in the UK”, Publications of the European Communities, Luxembourg. http://ec.europa.eu/research/social-sciences/pdf/cgrf-united-kingdom_uk.pdf, last accessed 09 June 2014
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Mintzberg, Henry (1994), The Rise and Fall of Strategic Planning: Reconceiving the Roles for Planning, Plans, Planners, Free Press, p. 458, ISBN 0-02-921605-2
- Mintzberg, Henry, Ahlstrand, Bruce, and Lampel, Joseph, (1998), Strategy safari: A guided tour through the wilds of strategic management, Free Press, New York, pp. 33–35.

Topic 3 Key concepts and approaches in Foresight and Strategic Planning

Topic outline:

- Key motivations and objectives for Foresight
- Key motivations and objectives for Strategic Planning

Main references/books/reading:

- Miles, I. and Keenan, M. (2002). “Practical Guide to Regional Foresight in the UK”, Publications of the European Communities, Luxembourg.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Mintzberg, Henry. (1994). The rise and fall of strategic planning. New York, NY: The Free Press.
- Simerson, K.B. (2011). Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation and Execution, Abc-clio.
- UNIDO Technology Foresight Manual (available on: http://www.forschungsnetzwerk.at/downloadpub/volume2_unido_tf_manual.pdf, last visited on 09 June, 2014).

Module 2- Objectives and Processes of Foresight and Strategic Planning

Topic 1 Uses of Foresight and Strategic Planning

Topic outline:

- Types of Foresight and Strategic Planning
- Uses and benefits of Foresight and Strategic Planning at international national, regional and corporate level
- Steps involved in organizing, managing and implementing Foresight exercises

Main references/books/reading:

- Barry, Bryan W. 1997. Strategic Planning Workbook for non Profit Organizations. Amherst H. Wilder Foundation
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Saritas, O. (2013). Systemic Foresight Methodology. In: Meissner D., Gokhberg L., Sokolov A. (eds.) (2013). Science, Technology and Innovation Policy for the Future - Po-

tentials and Limits of Foresight Studies. Springer, Heidelberg/ New York/ Dordrecht/ London, Springer, Berlin, pp. 83-117.

- UNIDO Technology Foresight Manual (available on: http://www.forschungsnetzwerk.at/downloadpub/volume2_unido_tf_manual.pdf, last visited on 09 June, 2014). Haines, Stephen G. (2000). The systems thinking approach to strategic planning and management. Boca Raton, FL: St. Lucie Press.

Topic 2 Foresight in the STI policy processes

Topic outline:

- Positioning Foresight in the STI policy processes

Main references/books/reading:

- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- UNIDO Technology Foresight Manual (available on: http://www.forschungsnetzwerk.at/downloadpub/volume2_unido_tf_manual.pdf, last visited on 09 June, 2014).

Topic 3 Strategic Planning in the corporate management processes

Topic outline:

- Positioning Strategic Planning in the STI policy processes

Main references/books/reading:

- Barry, Bryan W. 1997. Strategic Planning Workbook for non Profit Organizations. Amherst H. Wilder Foundation
- Mintzberg, Henry. (1994). The rise and fall of strategic planning. New York, NY: The Free Press.
- Simerson, K.B. (2011). Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation And Execution, Abc-clio.

Topic 4 Key function and role of Foresight and Strategic Planning

Topic outline:

- How Foresight is used in the STI policy processes
- How the Strategic Planning is used in the STI policy processes

Main references/books/reading:

- Georghiou, L., Harper, J.C. , Keenan, M., Miles, I., Popper, R. (2008). “The Handbook of Technology Foresight”, Edward Elgar, Cheltenham.
- Ghobadian, A., et al. (2008): Formal strategic planning, operating environment, size, sector and performance. In: Journal of General Management, 34(2): 1-20.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Simerson, K.B. (2011). Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation And Execution, Abc-clio.

Module 3- Methodology for Foresight and Strategic Planning

Topic 1 Foresight Methodology for STI Policy Foresight and Strategic Planning

Topic outline:

- The role and use of methods in Foresight for extracting and compiling knowledge
- Qualitative and Quantitative methods in Foresight
- Approaches in ordering and combining methods
- The role and use of methods in Strategic Planning for extracting and compiling knowledge
- Qualitative and Quantitative methods in Foresight and Strategic Planning
- Approaches in ordering and combining methods

Main references/books/reading:

- Loveridge, D. and Saritas, O. (2011). “Combining quantitative and qualitative in FTA: Rediscovery or something new?”, 4th Foresight and Technology Analysis (FTA) Conference, Seville (Available at: http://foresight.jrc.ec.europa.eu/fta_2011/documents/download/PAPERS/THEME%203/3f%20Combining%20quantitative%20and%20qualitative%20tools/Loveridge-Saritas.doc - last visited on January 13, 2012).
- Miles, I., Saritas, O. and Sokolov, A. (2016). *Foresight for Science, Technology and Innovation*, Springer.
- Saritas, O. (2013). *Systemic Foresight Methodology*. In: Meissner D., Gokhberg L., Sokolov A. (eds.) (2013). *Science, Technology and Innovation Policy for the Future - Potentials and Limits of Foresight Studies*. Springer, Heidelberg/ New York/ Dordrecht/ London, Springer, Berlin, pp. 83-117.
- Mintzberg, Henry, 1990, *The Design School: Reconsidering the basic premises of strategy formation*, *Strategic Management Journal*, vol. 11, no. 3, pp. 171–196.
- Simerson, K.B. (2011). *Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation And Execution*, Abc-clio.

Topic 2 Quantitative and qualitative methods in Foresight and Strategic Planning

Topic outline:

- Typologies for Foresight and Strategic Planning methods
- Ways of combining different methods in Foresight and Strategic Planning

Main references/books/reading:

- Mintzberg, Henry, Ahlstrand, Bruce, and Lampel, Joseph, 1998, *Strategy safari: A guided tour through the wilds of strategic management*, Free Press, New York, pp. 33–35.
- Saritas, O. (2011). “Integration of Quantitative and Qualitative methods within the concept of the Systemic Foresight Methodology”, A research note produced for Higher School of Economics, ISSEK.
- Saritas, O. and Burmaoglu, S. (2015). The evolution of the use of Foresight methods: a scientometric analysis of global FTA research output, *Scientometrics*, vol. 105, issue 1, pp. 497-508.
- Smith, J. and Saritas, O. (2011). Science and technology foresight baker's dozen: a pocket primer of comparative and combined foresight methods, *Foresight*, Vol. 13 Iss: 2, pp.79 - 96. doi: [10.1108/14636681111126265](https://doi.org/10.1108/14636681111126265)

Topic 3 Key methods for Foresight and Strategic Planning

Topic outline:

- Introduction to frequently used methods for Foresight
- Introduction to frequently used methods for Strategic Planning

Main references/books/reading:

- Saritas, O. (2011). “Integration of Quantitative and Qualitative methods within the concept of the Systemic Foresight Methodology”, A research note produced for Higher School of Economics, ISSEK.
- Saritas, O. and Burmaoglu, S. (2015). The evolution of the use of Foresight methods: a scientometric analysis of global FTA research output, *Scientometrics*, vol. 105, issue 1, pp. 497-508.
- Smith, J. and Saritas, O. (2011). Science and technology foresight baker's dozen: a pocket primer of comparative and combined foresight methods, *Foresight*, Vol. 13 Iss: 2, pp.79 - 96. doi: [10.1108/14636681111126265](https://doi.org/10.1108/14636681111126265)
- Mintzberg, Henry, 1990, The Design School: Reconsidering the basic premises of strategy formation, *Strategic Management Journal*, vol. 11, no. 3, pp. 171–196.
- Simerson, K.B. (2011). *Strategic Planning: A Practical Guide To Strategy Formulation and Execution: A Practical Guide To Strategy Formulation And Execution*, Abc-clio.

Module 4- Gathering intelligence for Foresight and Strategic Planning**Topic 1** Competitive, technology and market intelligence and trend monitoringTopic outline:

- Technology Trend Monitoring Methodology: Process and phases
- Quantitative and qualitative methods for Technology Monitoring including Bibliometric Analysis, Patent Analysis, Web Scraping, Horizon Scanning, Wild Card and Weak Signal Analysis
- The application of the quantitative and qualitative methods in Foresight and Strategic Planning

Main references/books/reading:

- Daim, T., Chiavetta, D., Porter, A. and Saritas, O. (2016). *Anticipating Future Innovation Pathways Through Large Data Analysis*, Springer.
- Kostoff, R.N. (1999). “Science and Technology Innovation”. *Technovation* 19.
- Kostoff, R.N. (2003). “Science and technology text mining: Global Technology Watch”, U.S. Navy, Office of Naval Research.
- Losiewicz, P., Oard, D.W., and Kostoff, R.N. (2003). “Science and technology text mining: Basic concepts”, Office of Naval Research, U.S. Navy.
- Mrakotsky-Kolm, E., and Soderlind, G. (2009). “Final recommendations towards a methodology for technology watch at EU level”, STACCATO Deliverable 2.2.1. Available at: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/12930/1/reqno_jrc50348_staccato%20tech%20watch.pdf.
- National Academy of Sciences (2005). “Avoiding Surprise in an Era of Global Technology Advances”, National Academies Press, Washington, D.C.
- Official TechCast website – www.techcast.org
- Saritas, O. and Smith, J. (2011). The Big Picture – Trends, Drivers, Wild Cards, Discontinuities and Weak Signals, *Futures*, 43, 3, 292-312.
- Saritas, O. and Burmaoglu, S. (2016). Future of sustainable military operations under emerging energy and security considerations, *Technological Forecasting and Social Change*, vol. 102, pp. 331-343.

- Nugroho, Y. and Saritas, O. (2011). Seeing the invisible and making sense of it: Scans, Networks and Scenarios (in Russian), “ФОРСАЙТ” (Russian language Foresight journal), vol. 5, no. 3, pp. 58-69.

Topic 2 Identifying emerging and disruptive technologies

Topic outline:

- What is an emerging / disruptive technology?
- Ways of detecting emerging / disruptive technologies and markets

Main references/books/reading:

- Amanatidou, E., Butter, M., Carabias, V., Konnola, T., Leis, M., Saritas, O. Schaper-Rinkel, P. and van Rij, V. (2012). On concepts and methods in horizon scanning: Lessons from initiating policy dialogues on emerging issues, *Science & Public Policy*, 39, 2, 208-221.
- Ena, O., Mikova, N., Saritas, O. and Sokolova, A. (2016). A methodology for technology trend monitoring, the case of semantic technologies, *Scientometrics*, vol. 108, issue 3, pp. 1013-1041.
- Miles, I. and Saritas, O. (2012). The depth of the horizon: Searching, Scanning and Widening Horizons, *Foresight*, 14, 6, 530-545.
- NASA (2011). “Technology Readiness Levels definitions”, Available at: http://esto.nasa.gov/files/TRL_definitions.pdf.
- Nugroho, Y. and Saritas, O. (2009). Incorporating network perspectives in Foresight: A methodological proposal, *Foresight*, 11, 6, 21-41.
- UK Horizon Scanning Centre (Available at: <http://www.bis.gov.uk/foresight/our-work/horizon-scanning-centre> - last visited on January 15, 2012).

Topic 3 Planning for emerging technologies

Topic outline:

- Making sense of emerging and disruptive technologies
- Developing responses for exploiting emerging and disruptive technologies

Main references/books/reading:

- Amanatidou, E., Saritas, O. and Loveridge, D. (2016). Strategies for emerging research and innovation futures, *Foresight*, vol. 18, issue 3, pp. 253-275.
- Porter, M. E. (1979): How Competitive Forces Shape Strategy. In: *Harvard Business Review*. 57(2): 137-145.
- Saritas, O. and Miles, I. (2012). SCAN-4-LIGHT: A Horizon Scanning and Trend Monitoring Project for the Rockefeller Foundation, *Foresight*, 14, 6, 489-510.
- Schoemaker, P. J. H., and Day, G.S. (2009): How to Make Sense of Weak Signals. In: *Sloan Management Review*, 3(50): 80-89.

Module 5- Scenarios for Foresight and Strategic Planning

Topic 1 Scenario and vision development

Topic outline:

- Definition of scenarios and visions
- Development of alternative scenarios for the future
- Ways and processes of developing scenarios
- How to articulate visions from scenarios

Main references/books/reading:

- Bishop, P., A. Hines, and T. Collins. 2007. The current state of scenario development: an overview of techniques. *Foresight-The journal of future studies, strategic thinking and policy* 9 (1):5-25.
- Godet, M. (2000). The art of scenarios and strategic planning: tools and pitfalls, “Technological Forecasting and Social Change”, vol. 65, pp. 3-22.
- Mietzner, D and G. Reger (2005) “Advantages and disadvantages of scenario approaches for strategic foresight”, *International Journal for Technology Intelligence and Planning*, Vol. 1, No. 2, pp. 220-230.
- Miles, I., Saritas, O. and Sokolov, A. (2016). *Foresight for Science, Technology and Innovation*, Springer.
- Saritas, O. and Nugroho, Y. (2012). Mapping issues and envisaging futures: An evolutionary scenario approach, *Technological Forecasting & Social Change*, 79, 3, 509-529.
- Schoemaker, P. J. H. (1995): *Scenario Planning: A Tool for Strategic Thinking*. In: *Sloan Management Review*, 37(2): 25-40.
- van der Heijden, K. (1998). “*Scenarios: the Art of Strategic Conversation*”, John Wiley.

Topic 2 Case examples on selected scenarios and vision building processesTopic outline:

- Demonstration of processes and contents of scenarios through selected case studies

Main references/books/reading:

- Amanatidou, E., Saritas, O. and Loveridge, D. (2016). Strategies for emerging research and innovation futures, *Foresight*, vol. 18, issue 3, pp. 253-275.
- Burmaoglu, S. and Saritas, O. (2017). Changing characteristics of warfare and the future of military R&D, *Technological Forecasting and Social Change*, vol. 116, pp. 151-161.
- Schwartz, Peter. 1991. *The art of the long view*. 1st ed. New York: Doubleday.
- Schoemaker, PJH. 1991. When and how to use scenario planning: a heuristic approach with illustration. *Journal of forecasting* 10 (6):549-564.
- Schoemaker, PJH. 1995. Scenario planning: a tool for strategic thinking. *Sloan Management Review* 36:25-25.

Topic 3 Positioning of scenarios in STI strategy and policy making processesTopic outline:

- Scenario analysis for strategy formulation

Main references/books/reading:

- Huss, WR. 1988. A move toward scenario analysis. *International Journal of Forecasting* 4 (3):377-388.
- Miles, I., Saritas, O. and Sokolov, A. (2016). *Foresight for Science, Technology and Innovation*, Springer.
- van der Heijden, K. (2005): *Scenarios: The Art of Strategic Conversation*. (2nd ed.). Chichester: John Wiley & Sons.
- Wack, P. (1985): Scenarios: Uncharted waters ahead. In: *Harvard Business Review*, 63(5): 73-89.

Module 6- Translating Foresight into strategy

Topic 1 Roadmapping for action plan development

Topic outline:

- Translating Foresight into action: Communication, Participation, Experimentation, Integration
- Methods for connecting the future with the present
- Practical issues in the integration of Foresight and Technology Monitoring into S&T policy and strategy
- The process and tools for generating roadmaps

Main references/books/reading:

- Kostoff, R.N., Boylan, R. and Simons, G.R. (2004). Disruptive technology roadmaps, “Technological Forecasting and Social Change”, vol. 71, 141-159
- Lundvall, B.-A., Johnson, B., Andersen, E.S., Dalum, B. (2002). National systems of production, innovation and competence building, “Research Policy”, 31 (2), 213-231.
- Markard, J. and Truffer, B. (2008). Technological innovation systems and the multi-level perspective: Towards an integrated framework, “Research Policy”, 37(4), 596-615.
- Phaal, R., Farrukh, C., and Probert, D. (2001). “Technology Roadmapping: Linking technology resources to business objectives”, Centre for Technology Management, University of Cambridge (Available at: http://www.ifm.eng.cam.ac.uk/ctm/publications/tplan/trm_white_paper.pdf - last visited on: January 15, 2012).
- Phaal, R., Farrukh, C. and Probert, D.R. (2004). Technology roadmapping – a planning framework for evolution and revolution, “Technological Forecasting and Social Change”, vol. 71, 5-26.
- Saritas, O. and Aylene, J. (2010). Using scenarios for roadmapping: The case of clean production, “Technological Forecasting and Social Change”, vol. 77, issue 7, pp. 1061-1075.
- Saritas, O. and Oner, M.A. (2004). Systemic analysis of UK foresight results: joint application of integrated management model and roadmapping, Technological Forecasting and Social Change, vol. 71, issue 1, pp. 27-65.
- Smits, R.E., Kuhlmann, S., 2004. The rise of systemic instruments in innovation policy, “International Journal of Foresight and Innovation Policy” 1(1-2), 4-32.

Topic 2 Assessment and prioritization of alternative STI strategies

Topic outline:

- Strategic priority setting
- Assessment of strategies

Main references/books/reading:

- Klusacek, K. (2006). “Selection of research priorities – method of critical technologies”, Technology Centre of the Academy of Sciences, Prague (Available at: http://www.strast.cz/dokums_raw/unidoccoursecriticaltechnologies10291_937.pdf - last visited on: January 15, 2012).
- Linstone, H. and Turoff, M. (1975) “The Delphi Method: Techniques and Applications” (Available at: <http://is.njit.edu/pubs/delphibook/> - last visited on: January 15, 2012).
- Oner, M.A. and Saritas, O. (2005). A systems approach to policy analysis – The case of construction sector in the Turkish five-year development plans, Technological Forecasting & Social Change, 72, 7, 886-911.
- Saritas, O. and Aylene, J. (2010). Using scenarios for roadmapping: The case of clean production, Technological Forecasting & Social Change, 77, 7, 1061-1075.

Topic 3 Approaches and methods used for the prioritization process

Topic outline:

- Designing and implementing the process of prioritisation
- Methods for prioritisation

Main references/books/reading:

- Georghiou, L. and Harper, J.C. (2011). From priority-setting to articulation of demand: Foresight for research and innovation policy and strategy, “Futures”, vol. 43, pp. 243-251.
- Scapolo, F. and Miles, I. (2006). Eliciting experts’ knowledge: A comparison of two methods, “Technological Forecasting and Social Change”, vol. 73, pp. 679-704.

Module 7- Generating outputs and implementation**Topic 1** Outputs and outcomes of Foresight and Strategic PlanningTopic outline:

- Typical outputs and outcomes generated from Foresight and Strategic Planning activities
- Communication and dissemination the outputs and outcomes

Main references/books/reading:

- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Saritas, O., Cagnin, C., Havas, A. and Miles, I. (2009). Impacts and implications of future-oriented technology analysis for policy and decision making, Technological Analysis & Strategic Management, 21, 8, 915-917.

Topic 2 Evaluation of ForesightTopic outline:

- Ways of implementing recommendations from Foresight and Strategic Planning
- Achieving impact through strategies

Main references/books/reading:

- Carlsson, B., Jacobsson, S. (1997). Diversity creation and technological systems: a technology policy perspective, in: Edquist, C. (Ed.), Systems of Innovation: Technologies, Institutions and Organisations, Pinter, London.
- Dawson, B. (2007). The impact of technology insertion on organizations, Human Factors Integration Design Technology Centre.
- Flanagan, K., Uyerra, E., Laranja, M. (2011). Reconceptualising the ‘policy mix’ for innovation, Research Policy, 40, 5, 702-713.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.

Topic 3 Evaluating Strategic PlanningTopic outline:

- Key indicators for evaluation of Foresight and Strategic Planning
- Approaches for measuring the impacts of Foresight and Strategic Planning

Main references/books/reading:

- Georghiou, L. and Roessner, D. (2000). Evaluating technology programs: Tools and methods, Research Policy, vol. 29, pp. 657-678.
- Ramanujam, V., Ramanujam, N. and Camillus, J.C. (1986): Multiobjective assessment of effectiveness of strategic planning: a discriminant analyses approach. In: Academy of Management Journal, 29(2): 347-472.

Module 8- Embedding Foresight and Strategic Planning into organisations

Topic 1 Linking Foresight to decisions, strategies and policies

Topic outline:

- Analytical frameworks for the integration of the results of Foresight and Strategic Planning into the process of R&D planning

Main references/books/reading:

- Campbell, A., Goold, M. & Alexander, M. 1995. Corporate strategy: The quest for parenting advantage. Harvard Business Review, vol. 73, issue 2, pp. 120–32.
- Dolata, U. (2009). Technological innovations and sectoral change. Transformative capacity, adaptability, patterns of change: An analytical framework, “Research Policy”, 38(6), 1066-1076.
- Freeman, C. (1987). “Technology policy and economic performance: Lessons from Japan”. Pinter, London.
- Lundvall, B.-A., Johnson, B., Andersen, E.S., Dalum, B. (2002). National systems of production, innovation and competence building, “Research Policy”, 31 (2), 213-231.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Smits, R.E., Kuhlmann, S., Shapira, P. (2010). “The theory and practice of innovation policy: An international research handbook”, Edward Elgar, Northampton, Mass., and Cheltenham.
- Trigeorgis, L. (2000): Real Options: Managerial Flexibility and Strategy in Resource Allocation. (5th ed.). Cambridge: MIT Press.

Topic 2 Embedding Foresight and Strategic Planning in organisations

Topic outline:

- Key skills and functions in organizations for Foresight and Strategic Planning

Main references/books/reading:

- Boyd, B. K. (1991): Strategic planning and financial performance: a meta-analysis. In: Journal of Management Studies, 28: 353-374.
- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.
- Seidl da Fonseca, R. and Saritas, O. (2005). Instruments for Strategy and Policy: Modelling the structure of the policy-making on Science and Technology, 14th International Conference on Management of Technology, 22-25 May 2005, Vienna, Austria, UNIDO, Technology Paper Series, TPS 3/05.

Topic 3 Creating a culture of Foresight and Strategic Planning

Topic outline:

- Ensuring the continuity of Foresight and Strategic Planning activities

Main references/books/reading:

- Freeman, C. (2002). Continental, national and sub-national innovation systems – complementarity and economic growth, “Research Policy”, 31(2), 191-211.
- European Commission (2012). Crating a Foresight Culture in the European Commission, European Forum on Forward Looking Activities (EFFLA), Policy Brief no.12, <http://ec.europa.eu/research/innovation-union/pdf/expert-groups/effla->

reports/effla_pb_12_-_creating_a_foresight_culture_in_the_european_commission.pdf
(last visited on: April 16, 2014).

- Miles, I., Saritas, O. and Sokolov, A. (2016). Foresight for Science, Technology and Innovation, Springer.