Rapid Foresight

Methodology

AGENCY FOR STRATEGIC INITIATIVES

GLOBAL EDUCATION FUTURES

COMMUNITIES OF PRACTICE DEVELOPERS

0.4

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Introduction to Foresight

This section is dedicated to the following questions:

- What is foresight? How is foresight different from other methods of analyzing the future?
- What foresight methods are there and how do they differ from each other?
- What is Rapid Foresight?

Foresight - definitions

Foresight (future outlook, ability to predict) is a social technology and a communication format which allows participants to agree upon an vision of the future and, once the desired vision of the future has been defined, to agree upon an appropriate action plan.

Rapid foresight (RF) is a tool for forecasting and shaping the future, which allows the user to receive highly accurate forecasts of the future and methods of achieving future goals over a short period of time, as well as to unite people for the realization of their ideas about the future.

Rapid Foresight is a Russian version of a foresight method developed by RE-ENGINEERING FUTURES group (refuture.me) which allows the user to achieve representative results over a shorter period of time than in the case of classical foresight technologies.

What is “foresight”?

When we say “foresight” we mean one of the following:

- Method of organizing one’s activities – developing projects of change, investing time and efforts, supporting people and their activities in order to move towards the desired vision of the future.
- Mode of thinking – from the future towards the present, from the vision of the future towards today’s situation through the points where efforts should be made.
- Technology (a means) of organizing group work – specific rules for conducting work on creating the desired vision of the future and developing ways of achieving it including: rules of gathering participants; procedures and steps for conducting group work; moderation rules and techniques; methods of achieving and recording agreements; methods of analytical packaging and presenting materials to share with other interested parties.
- Product – a specific document (forecast, roadmap) which becomes a reference book, support document or even a set of guidelines designed for long-term decisions of considerable scale.

When people say “foresight” they usually imply activities related to developing the vision of the future and projects for its realization. In the case of Rapid Foresight, it is a foresight session.

Basic methodology of any foresight method includes four-level activities:

- present (working with cards, participants’ statements, moderation); future (forecasting methods, working with perspectives, etc.);
- planning (strategic analysis, defining priorities);
- networking (tools aimed at creating a dialogue and co-creation by foresight participants).

Basic principles of foresight:

- the future depends on the efforts applied, it can be shaped;
- the future is variable – it does not stem from the past, but depends on the decisions of participants and stakeholders;
- there are spheres where one can make predictions, but the overall future cannot be predicted with certainty;
- one can be prepared for and shape the future the way we would like to see it.

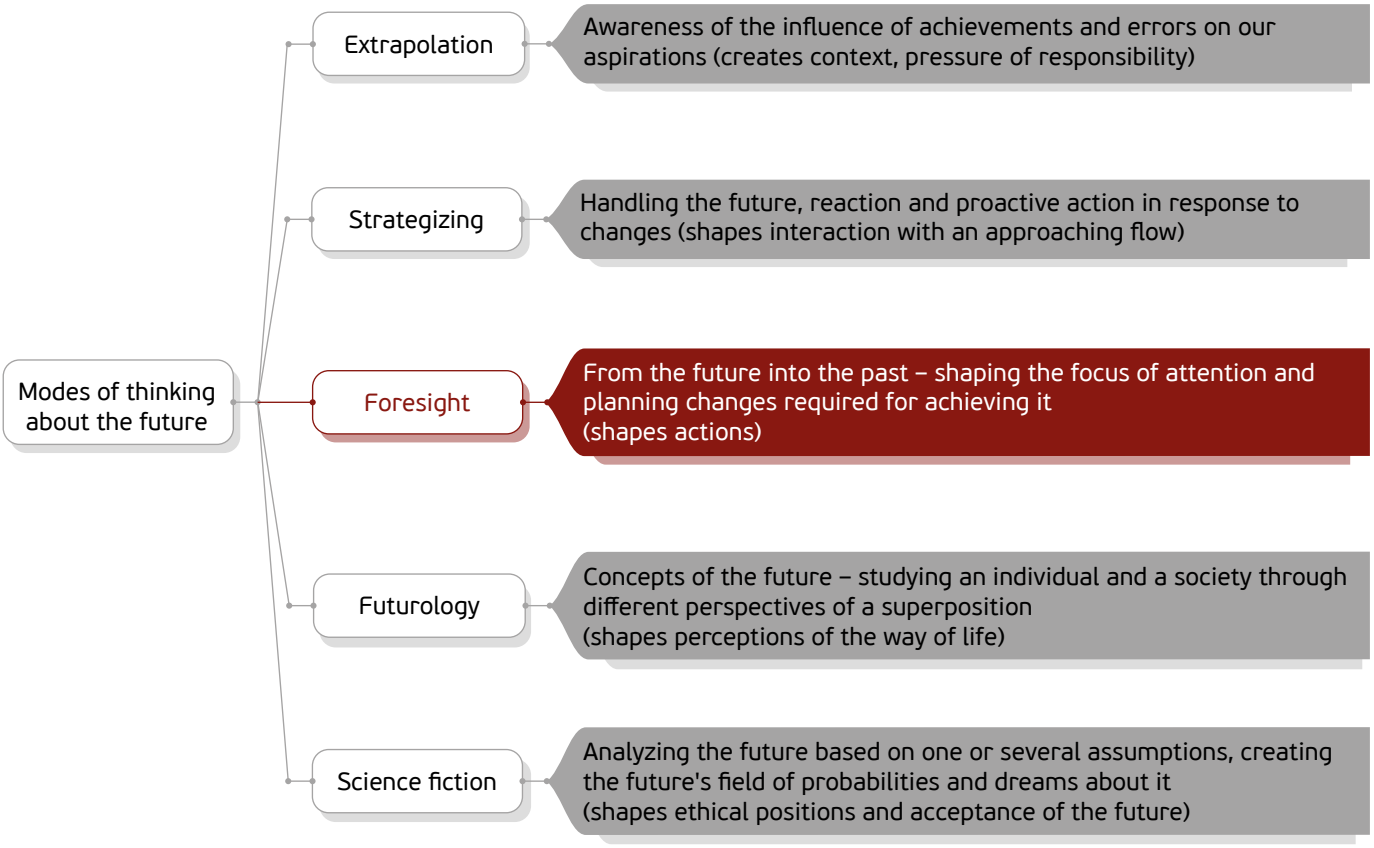
A critical element of the foresight approach is the fact that it is applied to the distant future (from the near future to the distant future 10-15 years away from now), takes into account alternative scenarios and deals not only with possible, probable, and desirable events, but also with “black swans” – low-probability events that can potentially have a considerable influence on the future of a researched field. For instance, one way of working with “black swans” is Emerging Issues Analysis, which is a methodology for searching in the present for those “seeds” of change that can impact the future course of events.

> *“Future has multiple variants and highly depends on which path the majority will select. There are always “rebels” and “revolutionaries” who make technological revolutions, but, as a rule, humanity follows the mainstream of technological development. And mainstream is created by those who really “play” in the technological market. That is why foresight should be done annually in order to monitor the transformation of their joint vision.”*
>
> Vladimir Knyaginin, President of the Center for Strategic Research (CSR)

Future thinking: modes, approaches, distinctive features

Foresight is not the only approach to exploring the future. Overall, we can identify five approaches (see Figure 1).

Figure 1. Five approaches to exploring the future



Presently all above-listed methods are in use, developed and employed simultaneously. Furthermore the results of some tool applications (e.g., extrapolation) are used in work with other tools (e.g., foresight or futuristic forecasts).

Yet the questions that analysts or forecasters should ask themselves when applying any of these approaches remain the same:

- What are the limitations of the approach? (with regard to the object of our studies, time horizon, scale of phenomenon, method and place of results application)
- How to achieve a correct (i.e. applicable) result, having made correct technological steps?
- What conditions should be met to ensure that technology is rigorously followed and results are adequate?
- How does one shape the vision of future? How objective is it, i.e. does it result directly from the developed model or has it been replaced by baseless dreams along the way? Where does the vision of the future originate from?
- What knowledge, experience, skills and information should participants possess in order to create a working vision of the future?
- How strictly should the technology be followed?
- When it comes to foresight which, unlike other approaches, involves plenty of participants, answers to these questions become even more crucial in order to achieve a proper result.

Foresight - history, scaling, application, current state

"First and foremost, foresight is an instrument for people to communicate about their future. The more influence people have on this future, the stronger a foresight is. In a situation where many structured visions of the future are competing, the people behind them play a crucial role. When there are few or practically no competing visions of the future, you can enter the future and shape it not at the expense of your money, power, force, or connections, but through your agenda."

Dmitry Peskov, Director of Young Professionals Division, Agency for Strategic Initiatives

RAND Corporation started developing corporate foresights in the 1950s and since then, the foresight approach has been widely used both in business and public administration. Over time it has become a powerful tool for defining strategies of shaping the future in big corporations "responsible" for entire technological fields, as well as in public administration, science and development of civil society.

For an example, see iftf.org/home/

In the 1970s, the concept of foresight came to Japan. In the 1980s and 1990s the European Union started facing issues related to fragmentation of the R&D sector, weak interconnections between various institutional structures, technology transfer and commercialization of R&D conducted in science institutions and universities, identifying scientific and technological priorities.

The term "foresight" became popular only at the end of the 1980s.

At the beginning the 90s many developed countries such as Great Britain, Germany, France, the Netherlands and Austria, among others, launched technological foresight programs. South Korea and India also launched similar programs. Each country has different expectations depending on the specifics of its political and economic environment and the level of technological development.

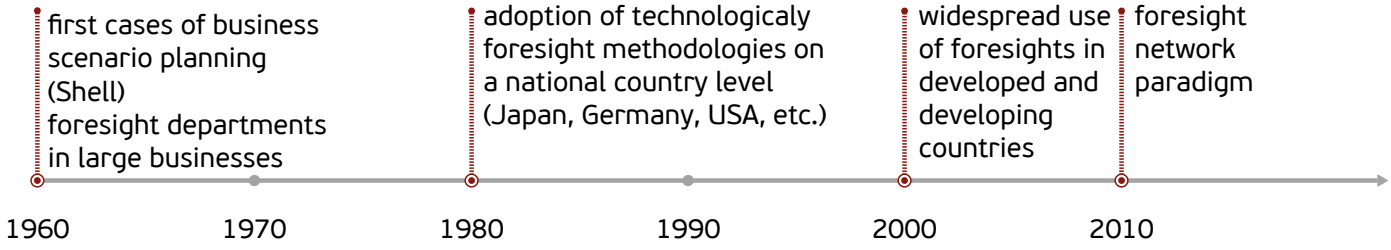
In March 2000, the European Union adopted the so-called Lisbon Strategy, which encouraged the EU countries to promote extensive use of an innovative forecasting tool, i.e. Foresight, which helps identify prospects for science and technology development.

Different countries put emphasis on different expected effects of the foresight approach: technological effects on economy and public life, marketing, industry and telecommunications, ecology and sustainable development, as well as opportunities for creating new technologies and making technological advances. As a rule, technological foresights are based on earlier goals and objectives of state development.

Traditionally, various foresight methods are considered to constitute a part of future studies and future strategies development. The ability to create life strategies is an integral quality not only in humans, but in many animals as well. However, an informed development of a coherent collective strategy based on a shared vision of the future by a group is an ability that belongs to humans exclusively. Strategic thinking, strategy-based decision-making, and the implementation of such decisions are three basic steps of working with the future.

Foresight is a method that refers more to "strategic thinking" and less so to making decisions based on the formulated strategy. The objective of a foresight is to broaden the perception of available strategic capabilities of an organization or field represented by the participants of a foresight.

Figure 2. History of foresights



Many foresight tools have been developed and are being used these days:

- Delphi;
- Scenario planning; SWOT analysis;
- Brainstorming;
- Science fiction and futurology;
- Backward prediction (retrodiction);
- Panel discussions;
- Essays;
- Literature reviews;
- Patent analysis;
- Simulation games;
- Structural, multi-criteria, cluster and other types of analysis;
- Method of critical technologies;
- Industrial and technological foresight (CSR, National Research University Higher School of Economics);
- The "inevitable future" (Future Designing Group); etc.

As a rule, each foresight method is a combination of multiple tools.

The "classical" approach to foresight is characterized by extensive analysis (surveys, essays, data analysis, etc.), plenty of discussions in small focus groups or collecting individual feedback, which makes foresight a long-term and expensive exercise.

Main achievements of foresight methodology by regions:

European Union

- More than 100 foresights on different levels.
- Creation of roadmaps for technological development in the energy, nanotechnologies, biotechnology, medicine, robotics, etc.
- Germany: priorities for science and technology development since 1991.
- Methods: literature reviews, future-dedicated seminars, scenario planning.
- The 7th Framework Program (and priorities for the 8th Framework Program).

Japan

- Key method of coordinating state and corporate R&D.
- Since 1971 - publication of the list of priorities based on 30-year forecasts every five years.
- Main method: Delphi surveys of experts (the methodological core of 150-200 specialists, 2000-2500 specialists participating in surveys).
- 10-15 subject areas, 100-150 priorities, 700-1000 topics.

South Korea

- First technological development foresights made in the mid-1990s, the first roadmaps created in the early
- 2000s.
- Korea 2030 Foresight (in 2003-2004) for science, healthcare, transportation, etc.
- Creation of special foresight departments in the leading tech companies (Samsung, LG).
- Creation of strategic “departments of the future” in ministries and agencies.

South Africa

- The Mont Fleur Scenarios (1992) – the vision of South Africa in 2002 created an opportunity to find a compromise during the post-apartheid period (contributed to the first multiracial elections in 1994).
- Foresight as a tool of national science and technology policy (used only at the end of the 1990s) did not assist in setting priorities, but contributed to the integration of the scientific community.

Russian Federation

Several hundred foresight sessions have been conducted since the end of the first decade of the 20th century, when the notion of foresight first appeared in the country.

At present, the following foresight methods are being used in Russia: industrial and technological foresight (National Research University Higher School of Economics and others), the “inevitable future” scenario planning (Future Designing Group), and Rapid Foresight (only since 2008).

The most significant foresight results are the following:

- Education 2035 Foresight, which brought about a number of projects (Global Education Futures, Atlas of Emerging Jobs, the membership of Russia in WorldSkills and the creation of FutureSkills, promotion and wide adoption of a number of experiments in the sphere of education, etc.) (according to Rapid Foresight);
- National Technology Initiative Foresight – working on creating new industries in the marketplace of Russia where Russia has high chances to become a leader by 2035 (according to Rapid Foresight);
- Since 2012 - Foresight Fleet, an annual large-scale session which provides an opportunity to compare visions and launch new projects (according to Rapid Foresight);
- 2030 Forecast of science and technology development in Russia.

Foresights were conducted and developed for industries (including large, industry-shaping corporations) and territories (including those with distinctive features).

At present, foresight is an established tool for conducting work on state, business and community levels.

Rapid Foresight. Introduction to the method

History of development

In 2008, a new method of conducting foresight was developed and tested within the framework of the “Metaver - Education of the Future” Russian movement. Unlike classical foresight methods, it was a much faster process to conduct, did not place a considerable strain on budgets and allowed for the achievement of comparable, and often even better results than a combination of several classical foresight methods. This method was called Rapid Foresight (RF). Under this method, significant and verified results can be achieved within days or even hours, unlike the months of research required by other methods. Since 2011, the method of RF has been developed by RE-ENGINEERING FUTURES (RF

GROUP) (refuture.me). The group is working on extending the scope of method's application and realizing visions of the future developed in the course of foresight sessions in the following areas: human and social development, education and skills development, management of complex systems.

In 2012, the Agency for Strategic Initiatives began to apply Rapid Foresight in its work as a tool for defining the area for the most effective project and initiative implementation. During the same period, the method was brought to a new level: government representatives, leading businessmen and heads of civil society organizations and development institutes began participating in various sessions.

Since 2012, a special Foresight School has been conducted and developed from a three-day seminar into a six-week specialized intensive training for moderators of foresight sessions.

Current state

> *"Foresight, as a tool, helps us understand what will happen in the future in terms being objectively linked to trends, i.e. demographically, and in terms of what plans and intentions of participants exist within a particular sector. In their turn, these plans are connected with the objective market changes.*
>
> *If today we witness an objective trend or public demand, then there will be a logical sequence as to how the events will unfold. As such, foresight is a tool which allows us to understand through expert sessions what the map of future events will look like and what a specific company, university or person can do in connection with that, what their personal strategy may be like.*
>
> *For instance, if the percentage of the older population in the country is increasing, this starts creating demand for products related to health and relevant recreation. Important objective processes are taking place in the economy that change the structure of demand. Then comes the demand for new products, which in its turn, brings about the response of those who operate in this market. They start developing and implementing new solutions. And so on and so forth."*
>
> Pavel Luksha: 26 June 2014. Excerpt from an interview (zillion.net)

Today the Rapid Foresight method is recognized at an international level. In cooperation with the International Labour Organization, pilot sessions were conducted in Vietnam, Armenia and Tanzania, and the Global Education Future project (edu2035.org), uniting global leading experts in the field of education.

Currently, the following fully operational foresights have originated in the Russian Federation:

- Global Education Future – international discussion of future education formats;
- National Technology Initiative is a body of activities set by the President of Russia and aimed at establishing prospective markets in which Russia will be able to claim leadership;
- Education Foresight 2030;
- Atlas of new professions (skills foresight);
- Participation of Russia in WorldSkills movement and FutureSkills system initiative.

Just over 2015 there were over 100 foresight sessions conducted in Russia including industry-specific sessions (NAKS foresight, "childhood" foresight), sessions for large companies (Tatfondbank), sessions on the development of specific professional fields (HR foresight), sessions on territorial development (Obninsk, the Yamal-Nenets autonomous district) and communities (youth entrepreneurship).

The method is constantly reviewed and fine-tuned. There are major development areas:

- Development of interfaces for introducing the RF session results into the external environment including coordination of the method with other instruments for working with the future (e.g. roadmaps);
- Technological development of RF session elements (e.g. development of templates for a moderator, templates for the initiative description, templates for converting projects of change into a roadmap).

In addition, new formats of foresight sessions were tested in 2015: foresight session with participation of teenagers ages 12-14 (Sochi/Artek), game-session (youth entrepreneurship section at All-Russian Student Forum 2015), methods of ultrafast achievement of results (up to 2 hours) and other methods.

Main: Rapid Foresight as a method

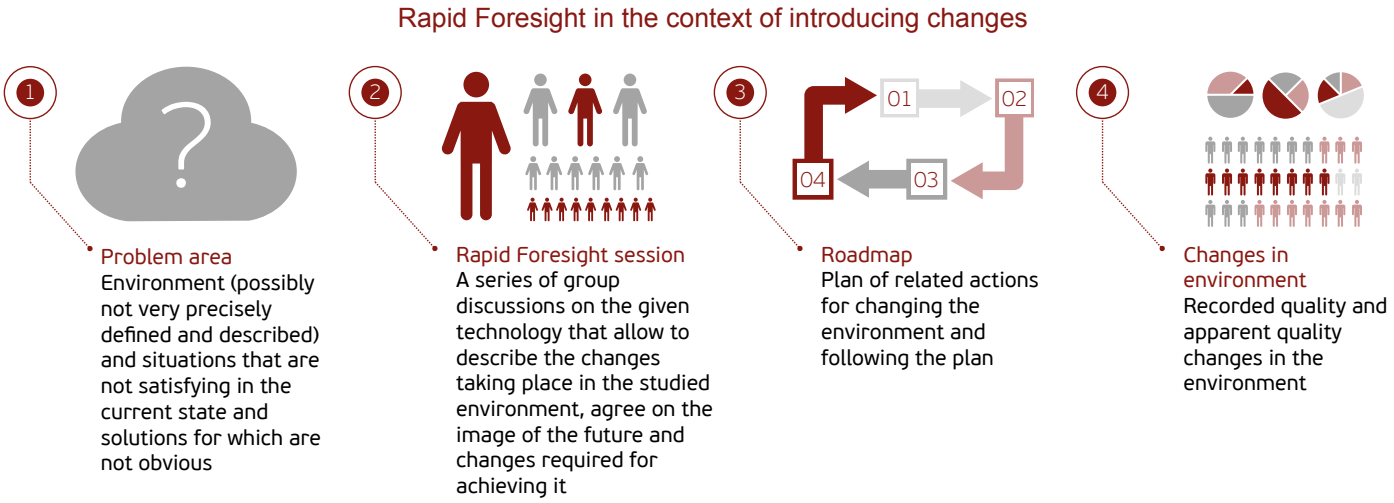
This section is dedicated to the following questions:

- What is foresight?
- What makes Rapid Foresight different from other methods of future studies?

Key principle of Rapid Foresight

Rapid Foresight is a system of interconnected actions that eventually lead to changes in the environment. The objective of a foresight is to create (formulate, shape) the vision of the future and general vector of development, as well as initiate a series of coordinated projects and programs of change (implemented by various interested parties) aimed at achieving this vision of the future.

Figure 3. Four steps of Rapid Foresight



This is a simplified description which represents one session only. In reality, multiple sessions are conducted on the same topic or related topics (with different clients, different participants, different requirements for the result) and a network, environment, cloud of visions of the future, projects, and actors working towards its implementation are created.

The key techniques for a successful foresight session are as follows: participants work jointly on the “map of the future”, a reference chart on a big sheet of paper (in the future – interactive projection or electronic board) consisting of three parts, or three horizons: short-term (next 5 years), medium-term (next 10 years) and long-term (15-20 years). With the help of a moderator, participants place cards with titles on the map of the future – trends, technologies, formats, threats, etc., gradually creating the vision of the field they are working on.

Rapid Foresight functions

Rapid Foresight serves four main functions simultaneously:

- Forecasting, which means shaping a fast collective vision of possible variants of development for the subject in question.
- Planning, which means selecting the most suitable development path for the subject, including instruments of its change.
- Programming, which means shaping project flash groups that are ready to move in the direction of the defined results.
- Projecting, which means designing collective vocabulary and key ideas for understanding the subject under discussion.

The willingness of foresight session participants to continue communication and cooperation in order to achieve the desired future differentiates Rapid Foresight from many other forecasting methods in which analysts are separated from actors.

The result of the Rapid Foresight session is a visually rich space that allows participants to see the field as a whole and vision of its future, as well as various means to achieve desirable and undesirable states, and factors that have an impact on the likelihood of any scenario. A map of the future can be easily transformed by participants into a goal-oriented “roadmap” which represents not only the vision of the joint future including key trends, forecast of technology development, events, strategic crossroads, but also decision-making points, launch points for specific social and technological actions and projects, plans of legislative and lobbying measures.

Sequence of steps of Rapid Foresight

Rapid Foresight includes the following sequence of steps:

1. Pre-Foresight: Preparation of a foresight session plays a crucial role in achieving high-quality results and covers:

- Literature review for the subject in question (including previous foresights dedicated to the same or related topics, global experience research, research of scientific and R&D publications).
- Collection and analysis of statistical data (including extrapolation, correlation and regression analysis).
- Analysis of statements made by recognized opinion leaders in particular fields (leading scientists, speakers, entrepreneurs).
- Public opinion analysis (forums, social networks, research through search engines).
- Data published by expert institutions and think tanks (for example: Gartner reviews).

2. Group selection: pre-session organizational works must involve the selection of expert groups where the most competent participants with different positions in the context of the foresight session are selected. The following approaches may be applied:

- Expertise of the client and their suggestions for others who possess the necessary expertise.
- Lists, ratings and rankings in this field (the biggest, fastest, most efficient, etc.).
- Searching for authors of subject publications (including social media and blogs).
- Bibliometrics and patent analysis (in rare cases).

Often, experienced moderators of foresight sessions are in a position to suggest candidates that could be invited to participate in this work, as they have taken part in past foresight sessions and may already be involved in some projects of change.

3. **Generation – Foresight session itself** which includes the most efficient teamwork tools such as:

- brainstorming;
- scenario planning (while working on the map);
- free associations method;
- expert panels (partly represented by group work);
- science fiction (while generating cards, participants often rely on images from science fiction and discuss possibilities and conditions for implementation of such “forecasts”);
- surveys (only within the moderated group);
- verification of results (map) of previous foresight sessions;
- voting of participants.

4. Action: Public format of a foresight session is natural for the RF approach. The most common result of a foresight session is a set of initiatives (projects of change) that can be represented in the form of a “roadmap”.

As a rule, in the course of the session participants will agree on upcoming activities to implement initiatives and launch projects of change, which they have agreed upon during group work. The critical elements of foresight are monitoring, IT support, moderator involvement and a communication platform. These elements guarantee that results of the session will not be forgotten.

Furthermore, the foresight session will produce new leaders ready to develop a specific subject (initiative, project of change, set of projects).

5. Renewal. Rapid Foresight has several built-in instruments for constant method renewal, namely:

Planning each foresight session requires organizers (moderators) to review the tools available and their applicability in a particular session, and consciously apply these to the method.

Reflection, which is an obligatory element of work, requires analysis, recording and publication of methodological findings and modifications made in the course of a specific foresight session.

Regular updates of the map of the future are key for large system management (for example, the map of the future education foresight is reviewed and updated annually).

Clearly, Rapid Foresight is one of the most efficient methods compatible with all the five iterations of a foresight project, which ensures results at every step.

Elements of a Rapid Foresight session

"Each of us has our own piece of the future vision, some kind of a pixel; therefore, the aim is to lay out a common skyline from these small pictures. That is why we often call foresight a 'pixel vision'."

Vladimir Knyaginin, President of the Center for Strategic Research (CSR)

A Rapid Foresight session consists of three projections, the combination of which provides a full three-dimensional vision of the future:

- Specific sequence of steps for a foresight session, which guarantee necessary and sufficient content for participants to navigate both short-term and medium-term horizons.
- Practice of moderating and working with participants, which allows moderators to host foresight sessions with a broad range of social groups.
- Practice of collating the results of group work, which makes it easy to quickly organize received information for a result achieved independently from the group.
- Therefore, quality results require that participants follow the work procedure (sequence of steps, use of cards) and practise moderation (encouraging teamwork for groups, identifying content).

In terms of work with content, Rapid Foresight includes the following steps within group work (a session):

- situational analysis – defining the scope (boundaries) of the subject matter and trends, describing the most probable development of the situation.
- objectification – describing technologies, formats, legislative limitations and the vision of the predetermined future (the "extended present") within the set boundaries.
- problematization – identifying areas of discomfort for participants on the map of the future.
- subjectification – self-identification and selection of the most favourable vision of the future, including identification of one's own place in that future.
- prioritization – selection of projects of change by participants which, in their opinions, contribute to meeting their expectations for the future.

The process of a foresight session includes objectification (i.e. concretization) and adding projects and events that may lead to certain consequences on the map. The best-case scenario is when some entities (trends, formats, events, threats, opportunities) are perceived by individual participants as their personal goals or states desirable for the field under discussion. In this case, projects and events within those trends, leading to the desired state, become effectively iterations of its realization.

Moment of subjectification

Subjectification means the appropriation of the future by a participant identifying their place in that future, formulating their attitude (position) towards it, and therefore, being ready to take action for the realization of their expectations or against events that are negative for the participant (subject).

Subjectification becomes apparent at the moment when participants openly articulate what interests they represent and defend.

Oftentimes, subjectification turns into an internal dialogue of the session participant with himself which lasts throughout the entire session. This dialogue is manifested through the participant's particularly emotional behaviour, desire to go over specific trends, formats and technologies in great detail, insistence on certain wording, attempts to participate in moderating, avoiding specific trends, unwillingness to acknowledge gaps, etc.

Experience shows that, despite their unconditional right to existence, domination of general trends does not bring participants closer to tackling the task of subjectification. As a rule, such trends are intuitively perceived and shared by everybody. Therefore, they do not bring about identification of discontinuity points (points of growth). One of the most valuable moderating skills is the ability to disrupt trends that participants are trying to stretch beyond the horizon set for the session and reveal the problematic aspects of certain trends.

Distinctive features of the Rapid Foresight method

"You have to prepare for the future. Preparation implies a prompt realization of start, growth of some beginning, and an ability to be as flexible and mobile as possible."

Yevgeny Kuznetsov, Deputy CEO, RVC

The Rapid Foresight method and foresight session have a number of distinctive features:

- Collaborative expert work covers images and diagrams, but not texts;
- Work with simple materials: templates of roadmaps, event cards;
- Absence of questionnaires and unnecessary paperwork;
- Visualization, infographics and use of visual aids.

Collaborative expert work is based on shared images and diagrams, unlike, for example, the method of expert panels or roundtable discussions. Therefore, work becomes truly collaborative and collective. Due to thoroughly planned instruments for future thinking support in the form of maps and diagrams, collective work goes beyond subjective positions and thinking modes that every foresight participant is accustomed to, creating unique conditions for new content.

In terms of achieved results, distinctive features are as follows:

- Creation of a map of the future and a roadmap;
- Fast and highly-reliable results; Concise and adaptable results;
- Possibility of attracting a wider audience and not only specialized experts.

In terms of foresight session management:

- Managerial and not analytical approach (recognition of the trend is more important than knowledge of the quantitative changes of the parameter);
- Discussion and project logic, brainstorming, game theory methods;
- Simple technological steps that practically any person can manage.

Foresight technology is proactive towards future events. This means that foresight authors and participants not only assess the probability and risks of certain conditions in accordance with the Delphi method, but play an active role and collectively plan their current and future activities in order to enhance positive trends, increase the probability of desirable events, and prevent negative, undesirable trends. That is why foresight technology has the following distinctive features:

- Direct, “face-to-face” communication;
- Development of strategic thinking among participants;
- Opportunities for self-determination of participants directly during the course of the session.

Advantages of the Rapid Foresight method

> *“Previously the prerogative of very special people like rulers and their advisers, managing the future is becoming the business of every person. Each person is becoming the owner of some piece of the future. And those who possess the skills of managing faraway territories and understanding where they are going, and why, have a tremendous advantage over those who don’t. Because they can act in the present based on the future, armed with the understanding of where they are going. Those who act based on the future discreetly change the rules the way they want.”*
>
> Pavel Luksha, Professor of Skolkovo Moscow School of Management

The first advantage of Rapid Foresight is the ability of each person to participate in designing the future, provided they are proactive and willing to take steps to implement their vision of the future. As an instrument of forecasting, future planning and reaching a consensus on the immediate program of action, Rapid Foresight is easy to understand for the vast majority of participants (very different social strata, diverse social composition of participants) and does not require foresight session participants to have a certain level of training, education or ability to work with specific instruments.

The second advantage of Rapid Foresight is the rate of developing the vision of the future and generating initiatives for its achievement. The usual duration of a foresight session according to the Rapid Foresight method is 2-4 days. However, often the work is done over one day and this amount of time allows moderators to obtain results of sufficient quality and, most importantly, to reach an agreement among participants on the vision of the future.

The third advantage of Rapid Foresight is considerable cost-efficiency, as the costs of formulating the vision of the future and generating projects of change are significantly lower when compared with other applicable methods.

The fourth advantage is the high accuracy of the forecast. Forecasters themselves start bringing the desirable future closer, making it more probable.

The fifth advantage is scalability of the method, which allows users to create a coordinated vision of the future both at the level of one project team, and on the scale of states and intergovernmental organizations. The methodology also allows for the possibility to create one’s own foresight for designing an individual’s personal future. From the moment of its creation, the method keeps improving year after year.

The difference between foresight and forecasting

- Forecasting means:
    - Mushrooms (attention to which direction the wind blows).
    - Expert’s finger (forecasting directive).
    - Market research (long and costly).

- Foresight means:
  - Collaborative work (there are always several people involved as authors).
  - Map of the future (prospects, not a directive).
  - Bets of participants (the likelihood of an event is evaluated by several people).
  - Reality check (adjustments on-the-go).

Limitations of the method

S with any other method, Rapid Foresight has its own limitations.

As a key element of the method, the foresight session has the following obstacles to receiving quality results:

Limited number of session participants – quality discussion results are achieved when there are 50 or more participants and when there is an opportunity to have 3-5 discussion subgroups, each with a different focus of attention. Limitations on the number of participants in a subgroup – subgroups consisting of 7-12 participants – are most productive.

Influence of "lobbyists" – attempts of some participants to impose their own vision on others instead of coming to an agreement, disregard for the opinion of the group.

Low quality of group participant selection – absence of experts in the fields that have a direct or indirect impact on the field addressed during the foresight session.

Simulation of working with the future – when all formal technical requirements are fulfilled, but there is no real problematization and subjectification.

Low activity of participants – lack of effort and time in order to organize the results into roadmaps, decisions and plans; attempts to sit it out; unwillingness to make bets.

Unverified data – during a foresight session there is no time for additional analysis and data verification, which can disrupt the forecasts.

Lack of time – conducting a full-fledged foresight session requires two or preferably three days of work.

Short-term horizon – most groups shape the vision of the future (map) for an interval of no more than 3-5 years in the future. That is the downside of quality and level of expertise of the selected participants.

- This is sufficient for planning immediate steps and making urgent changes, for designing or making adjustment to business strategy, planning the development of communities;
- This is insufficient for planning development on the level of a region or industry sector.

The most efficient groups are the ones in which a minimum of one third of participants are familiar with the foresight method (they have participated in one or several foresight sessions, read methodology guidelines and are familiar with the results of previous foresights).

The quality of group work (the scale of perspective, horizon) improves considerably if there is one or several futuristic reports at the beginning of a foresight session.

Predominance of qualitative results over quantitative ones is an important limitation.

This follows directly from the method's technology.

At the same time, development of the method, including the use of possibilities offered by modern IT instruments and the inclusion of a considerably higher number of participants in discussions (edited maps from previous foresight sessions with options to comment, add quantitative data, probability and timing estimates), allows us to turn the RF method into the most versatile foresight instrument.

At present, Education 2035 Foresight is an example of such an edited and updated map.

In terms of the method as a whole, an important limitation is its applicability only to large entities (region, sector, society, market). The method can be applied for the development of a company's strategy or relevant agenda for a community (an NGO) only if a wider framework is analyzed in the course of a foresight session (for a company – its industry and related industries, for a community – changes in the social groups of interest), and the session results are further refined and fine-tuned according to specific criteria.

Rapid Foresight - existing variations

"In many cases, the issue of strategy is not crucial. It appears at the moment when the situation changes and the level of uncertainty rises sharply. And in order to have a position towards oneself, one's own future and specific events, it is necessary to have a vision that goes beyond the current situation."

Vladimir Knyaginin

Over the course of nearly 10 years of design and development, the method of Rapid Foresight has been tested on very different entities such as:

- Sector;
- Market;
- Region (territory);
- Corporation (shaping the industry);
- Community (NGOs, communities of practice);
- Domain (education, public service).

The application of the method helped identify its distinctive features as well as points that should be taken into consideration during the work.

Foresight is an instrument of problematization, and at the end participants should be ready to act (otherwise the result will be a vision of the extended present) as well as define the ways they can act. As a rule, a moderator's primary goal is to provide for this willingness to change and readiness to take a proactive stance at the conclusion of the session.

Sectoral foresight

The key objective of sectoral foresight is to identify the role of the sector in the general production system (labour division system), i.e. in the big picture, and identify a list of critical technologies or management formats that may either help the industry develop or hinder changes. An essential part of working with a sectoral foresight map of the future is the identification of legislative barriers that put the sector at a competitive disadvantage. Results of sectoral foresight may be as follows:

- expertise and offers to develop strategies for new sectors (for example, composites, system engineering, etc.) and reviews of existing development strategies (transportation);
- development projects for gaps between strategies and actual activities of a company, coordination of strategies of different players of the sector among themselves;
- project (road) map based on strategy and selection of working groups that are ready to work;
- defining the map of key skills and professions that are necessary for the long-term development of the sector; shaping the image of education programs that would support the development (move towards skills foresight);
- identifying a place for the sector in the developing market and global agenda of tomorrow, identifying future products that the sector can introduce or refrain from producing.

Here are examples of work with sectors according to the RF method:

- Association of children's goods producers – creating strategy for the new sector.
- Transport strategy of the Russian Federation – evaluating the existing strategy with the use of the RF method. Education foresight – designing a new global education agenda with the use of the RF method.

Product life cycle models and user scenarios (time of consumption: day, month, year; modes of consumption: individually or collectively, at home or at work) are used for the analysis while working on sector foresight.

Market foresight

Since 2015, attention has diverted from the production system and consumption and behavioural patterns, and sectoral foresight has transformed into market foresight. The most significant project in this area is National Technology Initiative, which is basically the development of nine new promising markets in which Russia can claim leadership by 2035.

Distinctive feature of a market foresight session is the fact that at first, participants identify the range of needs that consumers will be satisfying by different means, and only then do they analyse ways of organizing the environment to address these needs. After that, they make forecasts regarding products and methods of their production.

Skills foresight

Skills foresight is a variant of sectoral foresight. The key difference is that the focus of attention is on the tasks that will need to be carried out in workplaces, rather than on technologies and work formats.

As a result, a list of skills is created.

The most significant projects in this area include:

- Atlas of new professions – a handbook that helps teenagers and their parents navigate through new professions, and makes vocational schools and higher education institutions consider the development of future-oriented training programs.
- Development of WorldSkills in Russia.

The following model is used for skills foresight: hard skills – soft skills, analysis of work objectives (functions) and their changes in the framework of general trends of digitization, robotization, and automation.

Territorial foresight

The key objective of territorial foresight is the establishment of a unique position of the region under discussion, or essentially its competitive advantage. When working with territories, Rapid Foresight enables participants to cover all critical points of development, however large-scale or specific the task is. The situation in which the foresight takes place could be urgent, for example, in the case of a sudden change of territory status, or it could be routine, such as an annual revision of the sector's development strategy in light of changing circumstances. As a rule, typical results of foresight sessions fall within the following list:

- appraisal and re-engineering of existing development strategies of the territory and businesses located there; verification of conformity of the strategy with current activities, compensation of unprofitable activities with development projects;
- designing a project (road) map based on the strategy and synthesis of working groups for its implementation; assessment of the existing strategy and designing a new appropriate strategy for the "change team" – civil society leaders, subjects and platforms for communication between the authorities and civil society;
- shaping the "development team" under the head of the region in close connection with the actual active core of the civil society of the territory;
- making forecasts and designing a development strategy in the context of meta territory development trends (region- city, country-region, etc.);
- making forecasts and designing a development strategy in consideration of changes in meta territory's strategy, status of the
- territory, its borders, benchmarks, social conditions.

Examples of work with territories according to the RF include are the following:

- Foresight of science towns of the Moscow region – designing a strategy for science town development.
- Foresight of the Solnechnogorsk district of the Moscow region – designing a strategy for district development.
- Development of tourism in the Komi Republic – designing a strategy for tourism development.

Foresight as a strategizing for companies

Applying the RF method to companies allows those companies to achieve similar results as those achieved by territories using the same method, as well as set priorities according to distinctive features of a company. As a rule, even large companies are able to make decisions faster than a territory and are aware of being in a more competitive environment. This determines the shift of typical results towards more pragmatic and project-based areas.

- Like territories, companies receive and review reports and suggestions for redesigning existing development strategies. Companies receive a project (road) map, coordinated with their own agents of change, based on the strategy and a set of working groups for its implementation.
- In cases where a company is rather large, as a result of work according to the RF method, not only project groups are identified, but also parallels to civil society elements in a territory, for example, communities of innovators, clubs of engineers, mentors, etc.
- If the head of a company is capable future-oriented thinking, it is possible to create a talent pool or a "development team" that shares their vision of the future.
- Identification of the company's position in a developing market and in the context of the global agenda of tomorrow. Designing the development strategy of a territory in the face of changes in company strategy, rapid changes in the market, M&A.
- As a final result, just like territories, companies get an opportunity to position themselves in the outside world (in the sector or global markets) and position their internal resources such as coordinated multi-level strategies, real development teams, project maps and instruments.
- At the end of a session, according to the RF method, companies have an opportunity to define a precise request for further support, namely:
    - education programmes, both internal (corporate universities) and external (higher education institutions);
    - consulting;
    - project supervision;
    - automation;
    - restructuring of regulatory framework (strategies, regulations, job descriptions, etc.).

Here are examples of work with companies under the RF method:

- PJSC Rosseti – sectoral championship in designing new energy companies.
- JSC ROSATOM – foresight sessions in the framework of education programs.
- Tatfondbank – strategy of bank development.
- A business division of Pepsico – development of a new product line and transformation of the current one.

Product lifecycle models, user scenarios, outsourcing matrix, experience curve, normative models of business processes and other instruments are applied when working with companies in accordance with the foresight method.

Foresight for communities

> *"You need foresights to reassure people or explain what is actually happening. Foresight means placing the future in the present, developing ideas about the future, creating collaborative maps, clarifying your intentions and getting an opportunity to receive your future in the present."*
>
> Pavel Luksha, Professor of Skolkovo Moscow School of Management

The key to the Rapid Foresight method is, first and foremost, working with people and then with the future, schemes and maps. The most important component is the creation of "agents of change" teams through the design of the shared future and development projects.

A map is a space for communication, and the common future located in it is a subject of that communication. The most important aspect occurs in the process of this specially organized communication — a community forms itself and self-determines, builds and coordinates its own development strategy, defines itself in relation to the most important development focuses, chooses key projects and gathers into working groups to implement them. Therefore, for a community depending on a subject's initial maturity level, the result of using the method can be creation, formation, strengthening and development of a community. It is always a combination of development team, map of the future and projects for its implementation that lead to success.

- Formation or self-determination of a community as a result of a foresight session.
- Definition of a community within another subject (company, territory, industry).
- Expertise and creation of a development strategy, a map of development, community roadmap.
- Compliance test of a strategy of a current activity, providing places that show lack of development projects.
- Creation of a roadmap on the basis of a strategy, and formation of projects and project teams to implement it. Formation of communities' core - "change team" — project leaders who share the map of community development.
- Examples of working with communities under the RF method include:
- Collecting and supporting;
- Communities of Practice Designers' work;
- Re-assembling «Skolkovo» graduates community;
- Launch of Neuronet's group.
- Launch of the work of the Committee of Corporate social responsibility «Delovaya Rossiya.

While conducting foresight for a community's "collective's development curve", analysis of personal expectations, and other tools are used.

Main: Rapid Foresight Session

“It is easier to invent the future than to predict it.”

Alan Kay

This section is dedicated to answering the following questions:

- Why conduct a foresight session?
- Who needs it and when?
- What needs to be done to gather, organize and conduct a foresight session?
- How does one conduct a foresight session to get a certain result?

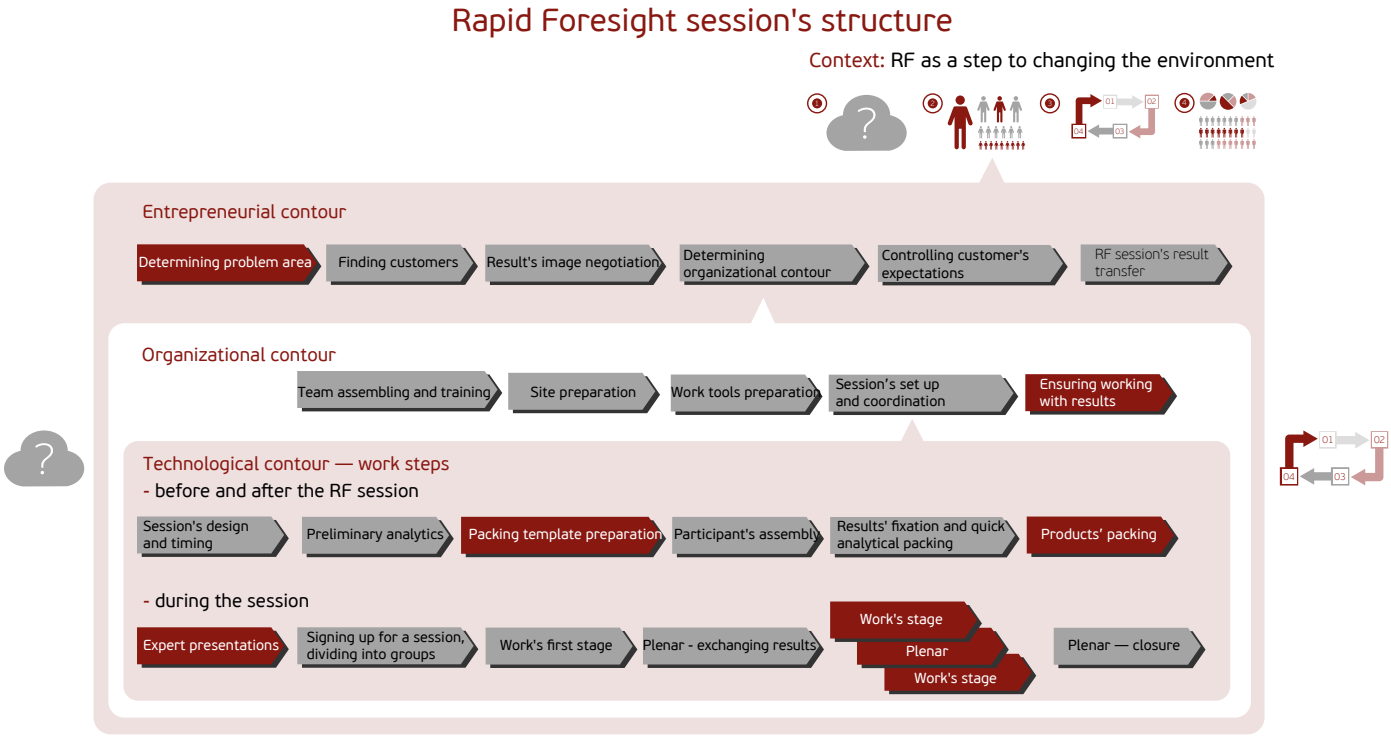
A Rapid Foresight session combines several aspects:

- Entrepreneurial contour — forming ideas about who uses the results of a foresight session, how and for what; in other words, placing the result of group work into another activity.
- Organizational contour - creating conditions for a high-quality session;
- Technological contour - the actual conduct of a session which consists of two interconnected elements:

a. Technological steps to manage the RF session and use structural elements of techniques (map of the future, cards, descriptions of initiative templates, etc.).

b. Rules and methods of moderation, control of group dynamics.

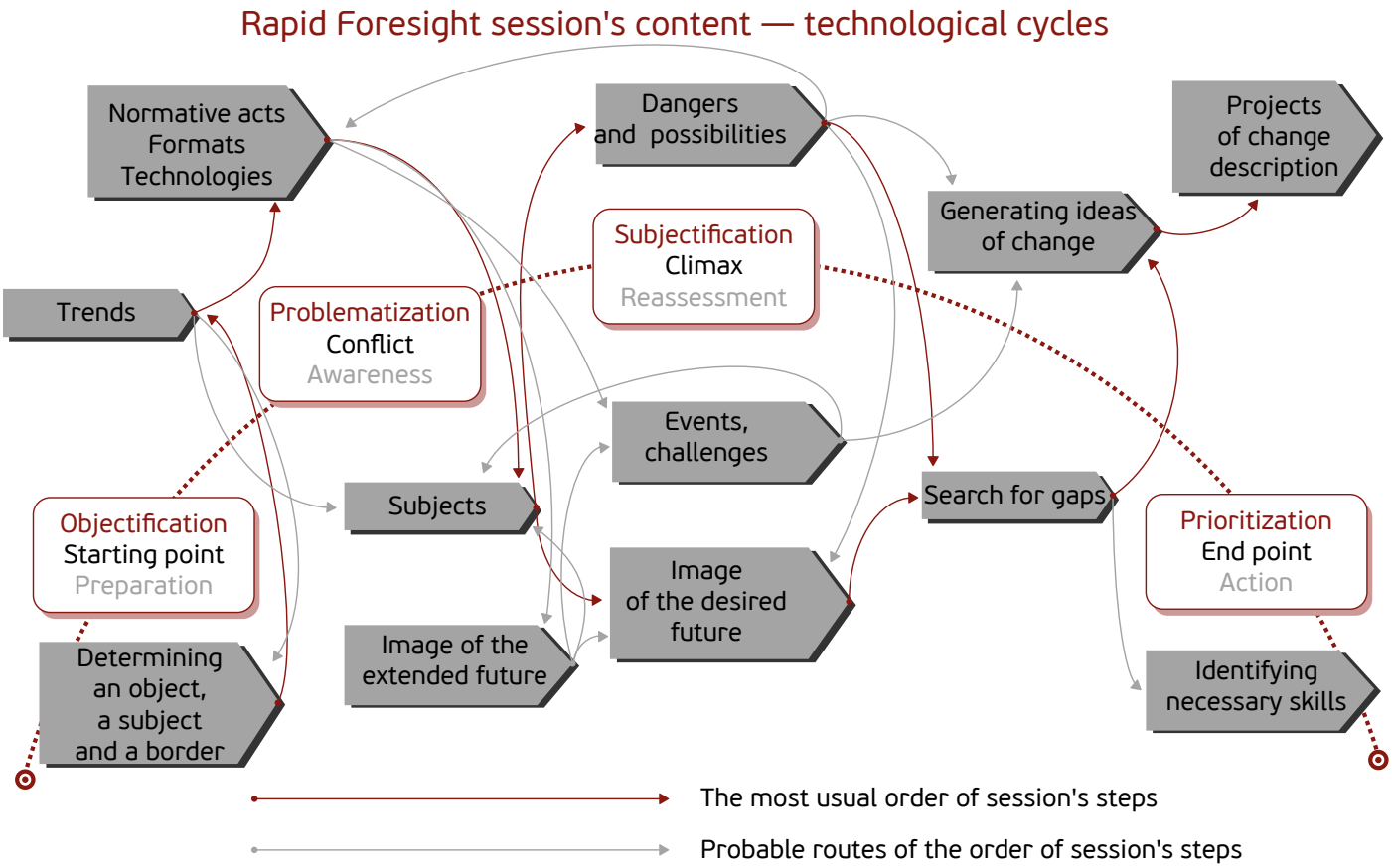
Figure 4. Composition of elements of a foresight session: from work with a customer to the moderation of working groups



Technological contour of a foresight session

Depending on the goals and tasks, as well as organizational opportunities, a foresight session under the Rapid Foresight methodology can be held in several scenarios. One basic and several possible combinations of scenarios are reflected in this figure.

Figure 5. Scenarios (itinerary) of a foresight session



The basic (most common) scenario of a foresight session consists of the following cycles:

1. General plenary session: Session goals and task descriptions. Expert presentations. Work setting. Division into groups.
2. Group work: Determining an object, a subject (focus of attention) and borders of the map of the future.
3. Group work: Formation of the field of trends. Working with trends.
4. Group work: Formation of policies' space and technologies.
5. General plenary session: Comparing and sharing maps of the future.
6. Group work: Formation of subject list. Choosing subjects-actors of the map of the future.
7. Group work: Determining threats and opportunities for subjects in the current map of the future
8. Group work: Determining "gaps" - places on the map of the future which can enhance benefits and compensate threats for functioning subjects.
9. General plenary session: Comparing and sharing maps of the future with points of possible changes ("gaps", bifurcation points). Bets for the future.
10. Group work: Generating ideas of change.
11. Group work: Description of projects of change.
12. General plenary session:

Presentation of projects of change. Prioritizing projects of change. Summing up results of the work.
Insight claims ("breakthrough" ideas that emerge during work).

This figure does not reflect all options. There are cases where the work began as an iteration of subjects determination.

There is always inner drama in session management:

- Objectification - description of the environment, a situation that exists here and now and in some way develops in
- the future;
- Problematization - identifying discomfort, inability to exist in this environment in the form in which it will develop;
- Subjectification - defining a subject's clear position in relation to the future and current situation;
- Prioritization - establishing a chain of actions required for conducting changes.

Subsequently, the description of iterations is presented in accordance with the basic scenario.

Expert presentations

"Future, to me, is not what we are building today. It is what gives us an opportunity to choose what we can do. I do not only look forward to foresight-fleet's ideas about the future, but in fact a set of criteria for today's action. Here, the vision of the future enables me to make the right choice. I do not need foresight as a project that I implement, but as a criterion I can use on which to build today's action."

Isak Froumin, scientific advisor of the Institute of Education NRU «HSE»

Experts may be customer representatives, industry specialists, government representatives, scientists, futurists, company spokespeople and others who have their own solid position and ideas about the future.

An expert's task is twofold.

Customer representatives usually focus on the significance of a foresight session, and further steps that will be taken in accordance with its results, and benefits that participants may obtain according to results of the joint work. It motivates participants, allows them to experience an emotional connection with the conducted work and see themselves in its results.

External experts lead an introduction into the subject's session. Their task is to put participants' imagination in motion, broaden the horizon and scale of vision of the situation, provide an idea about different points of view, ask problematizing questions. It allows participants to tune in to the freedom of thought and expression of their thoughts.

Expert presentations can open and close foresight session. In case of closure - experts refer to maps of the future and development projects, and identify the most promising and ground-breaking content, as well as implementation steps that, in their experience, need to be taken for the implementation in the near future.

Work setup and division into groups

Work setup is conducted by a general moderator responsible for the integrity of the work scenario. As a rule, the general moderator is either an entrepreneur (one who has had contact with the customer) or a technician (responsible for the methodology of work and further material assembly).

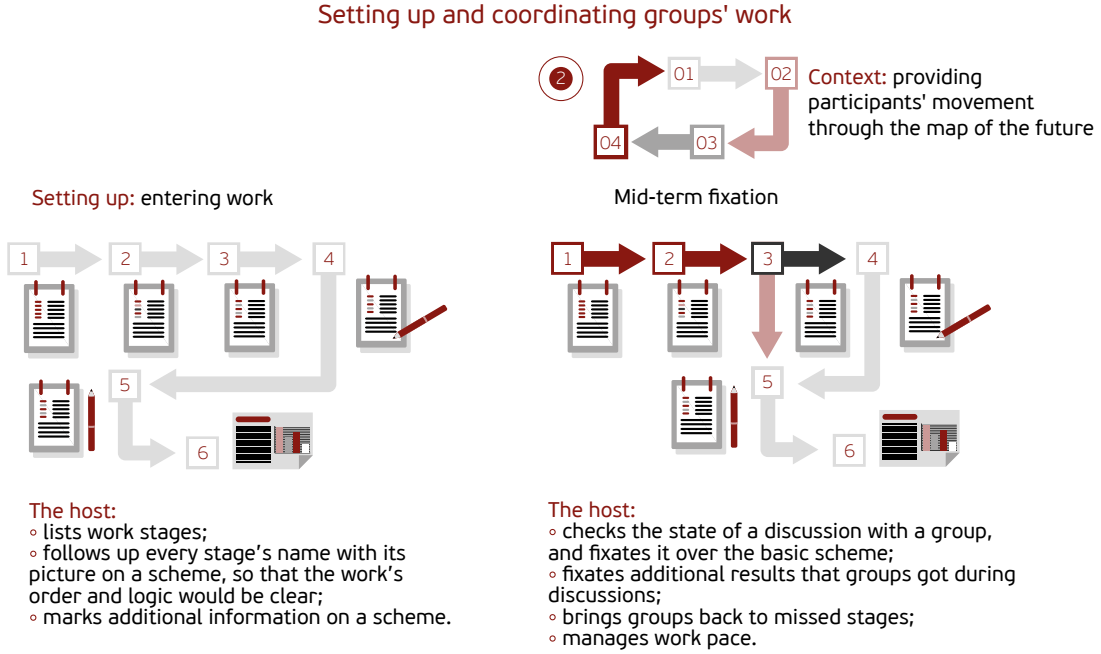
Work setup is divided into content and organization.

Content setup

Organization-wise, the host tells participants how the work is going to be arranged (timing), briefly formulates the session's task, makes a brief introduction to the Rapid Foresight methodology, names working groups and their focus points (topics), places participants in theme groups and introduces a team of moderators.

Content-wise, the host describes the context in which the work is conducted, formulates the problem and the situation that triggered this session and describes requirements for content results and next steps.

Figure 6. A method of demonstrating work iterations by the host during setup and mid-term plenary sessions



During a foresight session, the following methods are used for group division:

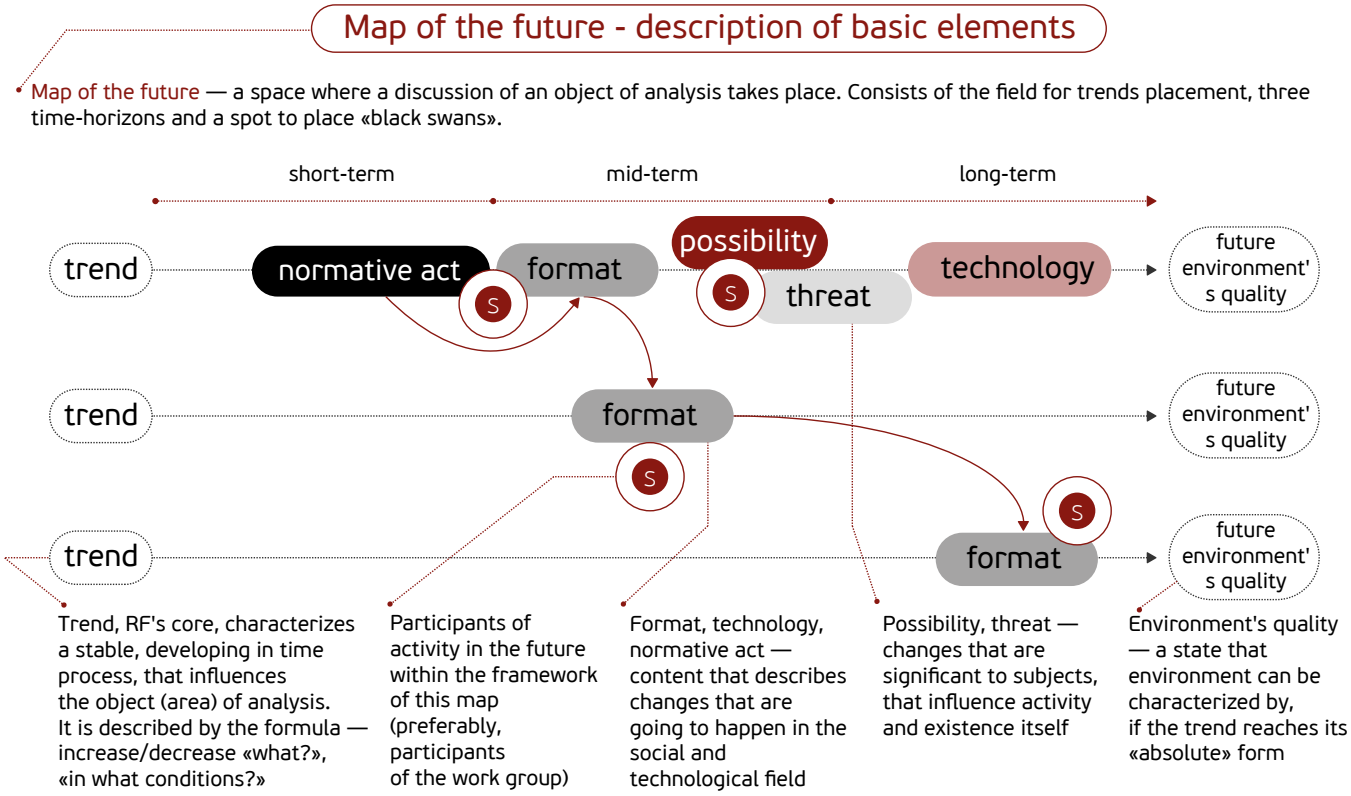
- By preliminary assignment, when organizers know in advance which participants have to work on what topic.
- By equal division if all groups are working on the same setup.
- By participants' self-identification (assigning themselves, with declared topics) when teams are working on different focus points (different topics). In this case, the size of the group is often limited so that one group does not significantly outnumber another.
- By participant uniting around proposed principles if it is necessary to form subject or positional groups, and participants' basic expertise/qualification is not clear. In this case, participants are offered the option to, first, figure out their attitude to some thesis ("stretch"), and then groups are formed out of them.

Map of the future and its basic elements

At the beginning of the session a host briefly covers work iterations, principles of visualization of everything that has been said in the group, a map of the future and its basic elements.

Then, at the beginning of each work iteration, a moderator in the group gives a more detailed description of elements used in a particular work iteration to the group.

Figure 7. Map of the future - formation of the vision of the future



A detailed definition of the elements of a map of the future is found in the next section of the manual.

Layout of the map of the future

At the beginning of a session, a moderator, together with the group, lays out a map of the future.

Map's sizes are defined by how convenient it is for a group to work with. From this point of view, the reasonable size of the map is from 1 to 1,2 metres height, and from 2 to 2,5 metres width.
Find out where and how can you place the map beforehand. It might give you an idea on how to organize everything (for example, put three flip-charts together side-by-side, if it isn't possible to attach paper to the wall or use a board.

The standard version is divided into three time horizons: short-term, mid-term and long-term. Three basic time horizons are on the map of the future:

- **Short-term** — for events that most participants can see already. In fact, a variety of materials of this horizon is determined by the level of professionalism and knowledge of current processes of their own subject area.
- **Mid-term** — for events, that already show signs of existing prerequisites, but will occur (according to participant assumptions) in the near future, that experts themselves believe to be significant and ground-breaking even now, however, experts are well aware of the ambiguous terms of the appearance of these events, so they believe and do not believe in them at the same time, hereby pushing the events into the future. Placing cards in the mid-term horizon may be the result of experts being sure that all prerequisites will appear at this very moment. For example, some social trend will be enhanced, or predecessor-technologies will be used on a massive scale.
- **Long-term** — for events that are expected by participants based on their ideas. There are two categories of objects. First, objects whose appearance on the map is dictated by the development of some technological trend. Second, familiar objects that were developed at a new technological level.

Time blocks are determined by moderators in advance (based on the goal during session design) or discussed by a moderator with a group.

Selecting time horizons must be guided by two rules:

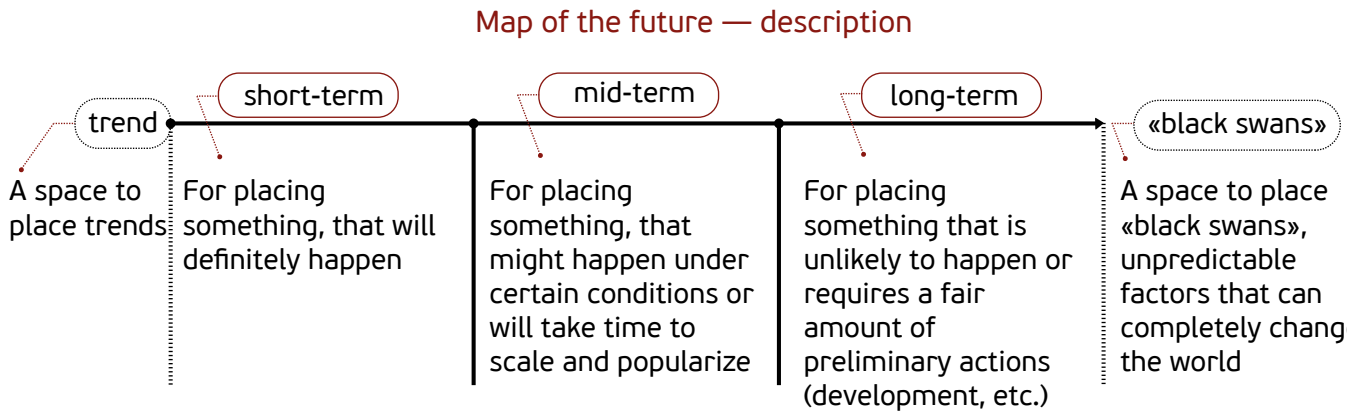
The probability of events - short-term horizon concerns only something that will happen for sure, the only question is its specific embodiment; mid-term horizon - something that will happen under certain conditions, long-term — something that is wanted, or something that trend development will lead to.

Life cycle of elements (soft and hard technologies) located in the area of object foresight — most of all it is necessary to take an investment cycle and service life into account.

For example, an investment cycle of a big power plant is 4-6 years, service life is up to 50 years and the cost of technology replacement or liquidation is fairly high. This means that during this period, there will be subjects that are interested in maintaining the use of this technology.

For example, the price of entering the light industry is low, the investment cycle is short (up to one year), and service life is 3-7 years. This means that changes in the consumer segment may occur every two years.

Figure 10. Map of the future and its description



The “black swans” field is located on the right-hand side of the map, beyond the long-term horizon border. This is the fourth, special “horizon”. Any type of card whose place on the map does not find support by the majority of the group participants can be sent into this field. For this card to end up in this section of the map, it is necessary for one of the work participants to suggest it, and for the majority to reject it. Cards that are found in this section of the map, as a rule, can be one of two types. The first type are light fantasies that are not systematically related to the map of events, that do not pass the group expert level. The second type — expertise-backed cards in a group that is not competent in this area or, on the contrary, with prevailing traditional views.

It’s interesting that cards may appear in the “never” area at the moment when their implementation is an established fact of today or even yesterday. It is also interesting that for some types of subjects, cards that fall into this area are precisely the most interesting and informative. In fact, in this area there are objects that are understood and named already, but for some reason have no place in the reality of group participants. In cases where a group is a close-knit team of conservatives, these cards show a real map of the future of a subject area.

During work, participants, with the moderator's help, fill the time map with different objects (entities), which are represented by cards attached to the map.

Cards must be accurately filled in, easily readable (good handwriting or print) and be understood by an external participant with minimum explanation; that is, wording should be clear to every participant of a foresight session, including members of other groups that were not present during this card's discussion. The map should not have too many objects: during work process the moderator assesses a map's readability, since the map is not only the result of teamwork, but it is also the main instrument throughout the whole foresight session. On the map there are usually 50 to 150 objects of all types, as well as comments on them that, in this case, are part of the card's objects. The main moderator's duty in this respect is to provide a discussion between participants that will produce worthy, important and interesting suggestions to place on the map.

Determining the object, the subject and boundaries (frame) of the map of the future

The goal of this iteration is to clarify the subject matter of work, focus point, subject boundaries (topics for discussion).

Often, a group requires a moderator to establish these boundaries. If the session plan does not provide a specific definition of the work boundaries, then it is necessary to encourage the group to do so themselves. In this case, the moderator points out that it is not necessary to look for the only right definition of the object - the participants' consent "here and now" is enough. This step is crucial for a group discussion of the subject matter as a whole, and every group's proposal in particular, to be related to the topic of the conversation, rather than to subjects adjacent to it, or subjects that are several levels above or below.

For example, if the subject of work is "a taxi for people", then "vulcanizing flat tires" or "WTO transportation system" are wrong choice to focus the work on.

It is easier to clarify the work subject on the basis of partially presented trends because the fact of their appearance and negotiation indicates that the group, at least partly, works with a joint subject. Clarification even in express mode allows for the creation of a better map and does not miss important trends and other entities that are important for the unclear aspects of the objective scope.

One of the methods of work is delineation of the map of the future with conditional "borders" indicating a super-system (a bigger frame), subsystems, territorial boundaries, scale of events, etc.

In order to determine subject boundaries, a group, together with a moderator, defines "super-systems" - objects of a higher level, with an examined subject as a subcategory (for example, "education as a whole" - "education in transport"), and "subsystems" that make up the subject's elements. It must be noted that trends are the type of entity that always belong to a higher level since it is an objective context where the subject develops.

For example, the "growth of means of production automation" is a trend for any specific production area.

The second tool for determining subject boundaries is the determination of processes and actions which occur within the subject, and connections to nearby subjects, i.e the definition of functions or functions of the work subject.

For example, in the subject "Science in transport education", several such processes can be distinguished: training specialists in the field of transportation based on knowledge in this area, training teachers in the field of transportation (cycle), creation of specific technologies based on knowledge of transportation, implementation of customer requests through specialists, training or technology preparation for the customer. Processes "entering" and "exiting" the examined subject allows participants to clearly determine subject functional boundaries.

While working with basic or simplified verification, a moderator offers participants a final description of the work subject for which a complete or partial map is made.

Field of trends formation

All trends can be narrowed down to just three basic types:

- *change of process speed.*
- *change of the scale of the observed object (phenomenon).*
- *change of the permeability of object borders.*

Denis Korichin

The purpose of this iteration is to develop a description of the environment, trends and dynamics of its change and factors affecting it.

The concept of trends is a foresight's basic and organizing core. "Initial" trends capture foresight's starting point, and the development of these trends (and produced phenomena) on the time map guides the foresight filling process. Other objects enter the map only regarding trends as a significant development point or trend's culmination, or as a response to the challenge posed by the trend. For this reason, cards that are outside of the trend aren't allowed on the map (except for cards in the "black swans" field).

Trend (definition):

- function (direction) of change of any numeric parameter in time;
- development of a body of similar events in a particular direction.

A trend in foresight session is:

- an objectively observed and measured process of gradual qualitative or quantitative change, that is developing within at least one horizon of a time map;
- a factor which takes place in the "big system", object's foresight super-system - for example, in transport and education in relation to the "transport education" subject, or in the country as a whole, if the subject is a region, etc. Processes at "+2" level (hyper-systems) can be involved as a trend - that is, for example, «in the world as a whole» for a region, and «all kinds of collective activities» for «transport education»;
- a factor which has a principally measured (not necessarily already measured) indicator that moves in a certain direction with time. For example, «driving humans out of routine activities by automation tools» can theoretically be counted for every year, and the trend can be objectively registered.

The meaning of the work is in iteration progress — placing trends on the map of the future with main tendencies that increase or decrease their influence on the subject area.

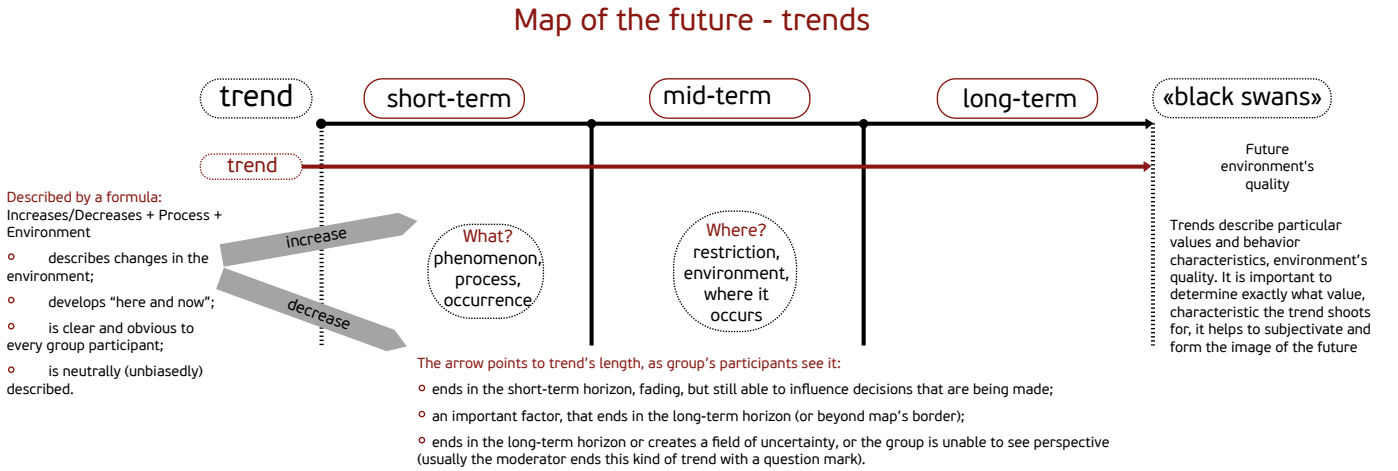
A moderator introduces the concept of a trend through the description of a statement that consists of three parts. The first part is a changing feature of a phenomenon. For example, "increase, growth, acceleration, reduction, slowdown etc."

The second part is a description of a phenomenon. For example, "the number of vehicles, environment's pollution rate, interest in researching the field of artificial intelligence, etc."

The third part is an indication of the area or territory that a trend forms in relation to. For example, "in Russia, in the world, in science, in the suburbs in the evening, etc."

For example: «Increase of carbon dioxide emissions into the atmosphere of the big cities - capitals of Asian countries.»

Figure 11. Working with trends on the map of the future



Trends must be directly related to the theme of a foresight and occur in the foresight's object super-system.

Group participants approve wording, content and time of the trend occurring on the time map is approved by the group as well. The year of «appearance» is noted on the card where possible.

"Simulacra, words that aren't backed up by a particular action, are prohibited in foresight. Words like 'crisis', 'sustainable development', 'nanotechnologies' can be viewed as such. Every word should imply specific action. If you think that schools and universities should be around in 20 years, you have to prove it to your colleagues in the group and the moderator. If you are not able to do so, this phenomenon will not be on the map of the future."

Dmitry Peskov

On the map, trends are indicated by straight lines coming out of trend cards (usually on the left, at the beginning of the time line of the card, in «present day»). Trends that start in the future extremely rarely, but they do happen sometimes. For example, the “growth of influence of artificial intelligence on science” trend can only start once the technology is invented and will have the ability to influence science.

Once a group has generated a sufficient number of trends (or, if qualification allows, on-the-go) a moderator invites the group to form clusters around trends and to gather and compile them into groups. The maximum number of trends with which effective work can be done is no more than 10. If there are more trends, they should be grouped according to their meaning. If this is difficult, an introduction of a mini-iteration with a scheme of work subject may help, as usually trends usually relate to different parts of a subject’s scheme.

A set of trends is identified primarily as a result of working with materials of a subject area and experts. Everything that happens in the framework of a map, happens in trends, may generate trends and is associated with them.

If it is difficult for a group to formulate a trend, a moderator can suggest a discussion, in the context of work subject, trends from related and familiar fields, or systemwide laws such as, for example, “driving humans out of technical systems” (TRIZ), “Convergence of sciences” (NBIC), “increasing complexity” (evolutionary approach), etc.

The result of work on this iteration is the group’s ability to formulate what exactly will change in life during the period that is being reviewed on the map of the future.

In some cases (for example, with emphasis on the description of trends during work, as opposed to subsequent iterations of work) additional symbols that describe specific types of trends can be used with a moderator’s permission:

- Steady, strong (trend value will increase over time) solid line.
- Uncertain (value is changed over time) - a wavy line or a question mark at the end of the trend in a mid-term time zone.
- Declining (value will be reduced over time) - a dash line.

Trends can change their character over time, which is indicated by a line type change.

Every change in a trend’s classification is marked by an event after which a new trend begins and the group works with it as with a separate trend. The situation is similar with a declining type of a trend. Instead of this type of trend, a steady one is used with a reference to an event that marks the decline or the end of a trend.

In working conditions of basic or simplified verification format, a moderator offers to participants a ready set of trends for which a complete or partial map is created.

Subject field formation

The purpose of this iteration is to define the list of participants who act in the object’s space and the foresight topic. As a general rule, the list of subjects is written down separately on a flip chart next to the map of the future.

The result occurs when participants find themselves on the list of subjects, and select those subjects which indeed operate on this map of the future, express their position, and are dependent on how the situation develops further.

There are two ways to identify a list of subjects:

- Direct discussion during which the moderator invites the group to brainstorm and list subjects, and then, if necessary, splits them into groups on a basis which has been approved by the group.
- Indirect emphasizing during the course of work on other iterations (policy, soft technology, hard technology, threats and opportunities) during which a moderator writes down on a separate sheet piece by piece subjects that participants name while generating relevant cards. These subjects are crucial actors on the map of the future under discussion.

Sometimes a basic list of subjects is created as one of the support tools to create a scheme of the object of group work on the first or second iteration.

A complete discussion of the subjects’ map is held by the «gear» method during which subjects are not placed as list, but in a form of a map, connections between them are established in the form of arrows, and each connection is signed both in one direction and another. Here one can outline interests of those subjects, resources that can be used to enhance those interests, the extent and direction of influence, information flow and other characteristics. The result is a graph of subjects and their connections. Where there are too many connections and/or subjects, tables are used.

A full iteration of work with subjects is mostly used in work with companies, territories or organizations for which a foresight session is a way to take a look at the present and the future of their organizational structure. In this case, a subject net, especially enriched with references to threats and opportunities, is an opportunity to discover and strengthen subject positions which are barely supported, but necessary for development.

Filling the map of the future with content: policy, soft technology, hard technology

The purpose of this iteration is to fulfil the content of the described environment (foresight object) with elements of activity, and to understand how this activity is being implemented. The result of this iteration is to understand which part of the object is «blocked» by various elements of the activity, and to identify empty areas.

Descriptions of cards and requirements for how to fill them in are presented in the next section of the document.

During this iteration participants work with cards titled «normative acts» (NA) «format» (F) «technology» (T).

Depending on group's work organization:

- All types of cards are filled in and suggested by participants simultaneously.
- Attention is paid to every type of card in turn.
- One type of card or another is not considered at all (as a rule, «policy» is taken out of consideration).

All cards must be «connected» to a particular trend. If they are connected to two or three trends simultaneously, a moderator makes a respective mark on the map of the future.

All cards must indicate a subject interested in this element. A moderator marks connections between cards if necessary. Participants often name both soft technology and technology or policy and technology. In this case, cards are placed side by side.

In working conditions of basic or simplified verification format, a moderator offers well-prepared and final elements to the group members who discuss them and decide whether to accept, reject, or add their own.

Format Card

Format is a social/institutional response to a challenge or an opportunity. In fact, it is the embodiment of social practices. Format in Rapid Foresight refers to a way of organizing subject communication: who? with whom? about what? and on what basis organizes joint activities?

For example, "young pioneer palaces network" (youth centres) as a format on a "social self-organization network" (type of relationships between people) trend that is always generated by the subject. Format does not have an ultimate goal.

Format can start a new trend. Format can contain its own tendencies which are similar to trends, but lie three levels below a trend's subject area, and trends relating to the subsystem level are not trends for the system for the purposes of the Rapid Foresight methodology. Group participants, with the help of a moderator, should always correlate a trend's scale with systematic multi-level vision of a subject of foresight's work.

Technology Card

Technology is a separate technological solution ("a new type of fuel") or a collection of technological solutions ("fast- neutron reactor") significant for development, opening or decline of a trend or format. The distinctive feature of a Technology Card is that it is located outside of subject relations' system, and has the following characteristics:

- describes a "response to the challenge" that comes up in TR (technological revolution system);
- is a physical or informational object;
- is specified by its own logic of technological revolution whose unraveling takes place outside of the framework of subject's foresight session

For example, a "quick neurointerface" is a product of a line of solutions in the field of psycho-physiological monitoring, but on the map of «Transport Education» system it appears only when it begins to affect an object's condition (creating opportunities for a new type of education).

Soft and hard technologies are entities with a life cycle. This means that participants may confuse them with trends.

On the map of the future, soft and hard technologies are placed at the precise time when members of the group believe they will reach significant distribution and social recognition.

Policy Card

Policy is a card that describes rules of regulating any activity and has the following characteristics:

- is an entity that works to launch, break, or slow down a trend or change its direction;
- is partly specified by trends (posing "challenge");
- is specified by its own "institutional development" logic (subject's target that manages a "large system", for example federal/regional government, industry regulator, etc.).

For example, “allowing foreign pilots to fly the Russian Federation airlines’ aircrafts” or “establishing a separate position in the prime minister’s rank, responsible for implementation of the transport strategy”, “a decree to separately fund all of the Russian ederation’s higher education institutions’ subscription to trade journals included in SCOPUS”.

Policy is a simplified (standardized, regulated) soft technology. Institutional (regulatory) “challenge acceptance” is in fact a momentary act of administrative will (embedded in a regulator’s document, law or policy). The formula of describing a policy: who exactly regulates it and how it is regulated in relation to which activities.

Policy card is placed on the map of the future at the time when participants believe it will be accepted.

Identifying threats and opportunities

“We live in a globalized, global world. How do we connect two trends, when national education systems are required more and more often to build a state-system identity? On the other hand, closedness is fatal. This is a huge question that future must answer.”

Isak Froumin

“If foresight does not cause pain, then the work has not been done well enough.”

Dmitry Peskov, Director of Young Professionals Division, Agency for Strategic Initiatives

The purpose of this iteration is for the participants of the session to identify and understand realistic and probable situations that either open up “windows of opportunity” for them, or destroy the possibility of the existence and action in the space of this foresight.

The result of this iteration is to identify places on a map of the future that need change as agreed on by the majority of participants.

In fact, this is the most important iteration for the group to reach a collective vision of the map of the future.

Every threat or opportunity implies the existence of a subject for whom a trend, a format, a policy, a soft or hard technology means winning or losing in the foresight’s area in question. The same phenomenon is one subject’s threat and other subjects’ opportunity. It makes sense to put a threat or an opportunity on the map for those subjects that win/lose more, for whom it is crucial.

Threat Card

A threat is a consequence of trend development, as well as a significant consequence of soft or hard technology or or other entity on the map, which can negatively influence one subject or another and shut down its work in a foresight’s area in question.

For example, “the loss of a goal-setting function by children that have used recommendation systems since childhood” is a threat to parents, but an opportunity for a dictator.

“The loss of educational sovereignty of the country as a result of translating Coursera courses into Russian” is a threat to the state, etc.

Opportunity Card

Opportunity is a consequence of the trend development, as well as a significant consequence of soft or hard technology or other entity on the map, that can positively influence the subject and create significant benefits for it.

For example “traffic jams increase” is an opportunity for air conditioners with filters or insulated glazing manufacturer. A “loss of education sovereignty of the country as a result of translating Coursera courses into Russian” is an opportunity for online-aggregators of global education.

A generation of threats and opportunities is stimulated by work with a list of subjects and entities on the map. For every trend and every different card on the map, a participant asks a question: “How can it hurt this subject? What is the disadvantage of this phenomenon or this trend’s development for a given subject?” Or “How can it help or benefit

this subject?"

When working with "threats" and "opportunities" cards, group participants often think of SWOT analysis methodology (used for companies). However, the Rapid Foresight methodology considers the extremes of "threats" and "opportunities" obstacles which are caused not only by other agents in the described area, but also by objective processes (trends). Therefore, they affect all subjects of this type.

Working with events and challenges

The purpose of this iteration is to describe critical events that can drastically change the course of trends, launch new trends, and record challenges for subjects of this foresight's space. The result occurs when participants understand and agree on the likelihood and type of critical changes that may change this foresight's object in the future.

An event is a momentary phenomenon that expresses the culmination of a trend, its breaking point - a mark that is placed at such "breaking" points. An event is introduced only when it is necessary to mark the point where something happens with a trend. A trend either appears or breaks, and the event marks it.

It is convenient to think of event names as headlines in papers. For example, the trend "growing percentage of Asian population in Russia" may culminate with "Chinese woman becomes 'Miss Moscow'" An event is generally measurable - it is possible to mark the precise moment when it occurs.

An event can be an index of a soft or hard technology that lies on the trend, such as "brain-computer interfaces are officially used in schools" or "1.5 billion students in online universities around the world."

It is extremely rarely for an iteration to happen separately. As a rule, during other iterations, cards sometimes occur, which, according to the group, are a soft technology, a hard technology or a policy, that may in fact be an event. In this case, a moderator suggests rewriting such cards' content as an event card. Sometimes during discussion of a trend that has a breaking point, events' concept and card are introduced on purpose and then used during all remaining iterations until the end of the session.

Vision of the future formation

The purpose of this iteration is to form a collective vision of the future or multiple options for the future. The result of the iteration is a picture (a vision) of the future that satisfies group expectations.

Currently, there are four basic ways to look at the future:

- The "stretching" of trends, bringing them to their absolute state and attempting to describe "what if" — a sum of all those descriptions of all trends will be the form of the vision of the future, also referred to as "present continuous".

Example: Trend - Increase in the number of families choosing an out-of-school form of education for their children. The absolute value of this trend is as follows: "No one chooses a school form of education", for the vision of the future this means that school as an institution disappears.

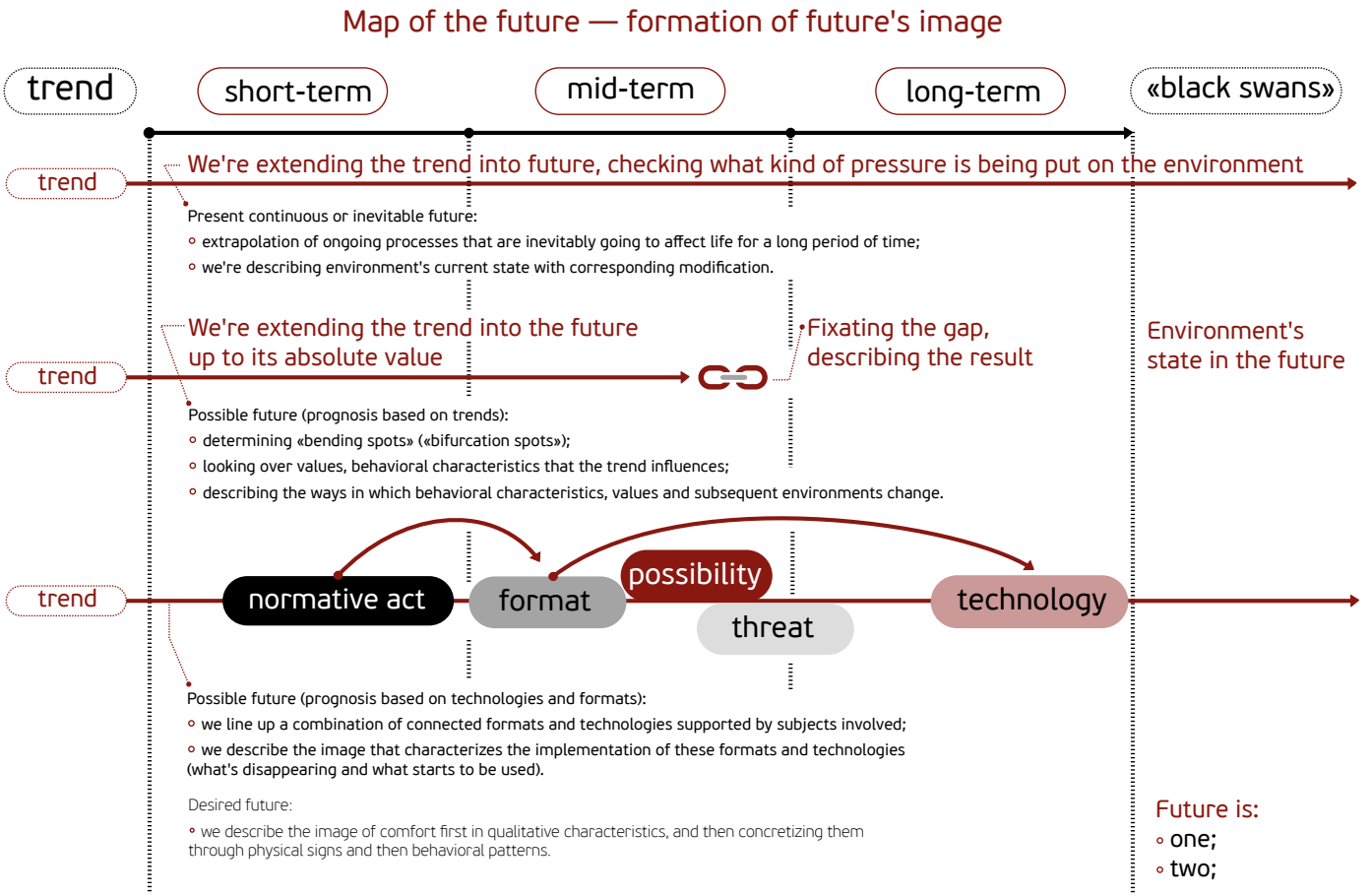
- Looking at a behavioral characteristics, values that are the basis of the trend, and trying to determine what can be changed in those values - the amount of value changes provides an vision of the future.

Example: Trend - Increase in the number of families choosing an out-of-school form of education for their children. The trend is based on parents' wish for their children to be competitive in life. This means that the winning institutions (including schools) are the ones that are able to provide this in the future.

- Looking at policies, soft and hard technologies located within trends, and describing how they are changing the world around us.

Example: Trend - Increase in the number of families choosing an out-of-school form of education for their children. If there is a policy authorizing the hosting of various teaching events in school buildings in "school as a neighborhood space for continuous education and social communication" format, we get school as a center of social and cultural life of the neighborhood in future.

- Describing the desired (ideal) vision of the future.



At least two options of forming the vision of the future are considered during a Rapid Foresight session (for example: inevitable and desirable), and areas of projects of change are determined in-between those images:

Generation of ideas and description of projects of change

> *"Stakeholders can change laws on the map of the future to enhance their position. Here it is allowed to use moral categories and reason: 'That's right, so we will support it.' But it is not allowed change world's trend such as human cyborgization, for example, even if you do not like it. And you cannot change the order: first, we examine the inevitable future, then, the probable, and only then, the desired."*
>
> Dmitry Peskov

The purpose of this iteration is to create a linked multitude of changes that enable subjects to move into the desired future from the current state. Depending on the overall goal of a foresight session and the time available, the result of this iteration could be: a list of initiatives, a list of projects or a prototype of a roadmap.

An iteration can be viewed as an independent design session which consists of several sub-iterations:

- Generation of possible project initiatives (around challenges, change areas, unrealized soft and hard technologies, policies).
- Presenting and criticising project ideas.
- Search for add-ons, mutual influences between projects. Prioritizing by ranking or member bets.
- Determining projects' logical order and locations on the map/under the map.

Participants are required to determine which projects will have the greatest (desired) effect on the development of the subject area (industry, region). Projects should be scaled to the subject area's size.

> For example, if the work is implemented under the "domestic tourism" theme, then the project creates a new system of national parks, not a major travel agency.

Projects may include:

- creation of new (large-scale) businesses;
- creation of trade associations or other forms of political force in a subject area;

- development of new product solutions;
- adoption of new laws/policies, introduction of new performance standards or other rationing; development, implementation and promotion of new work formats.

Thus, it is necessary to avoid “pseudo” projects such as: establishing a working group, developing an informational portal and the like.

Often during this iteration session, participants forget the vision of the future that they formulated for themselves as desired in previous work iterations. Moderators bring participants back to the vision of the future with following questions:

- What are the grounds for your project?
- What problem does your project aim to solve?
- Why is your project stronger than other initiatives launched during the session or already existing in the field of
- foresight?

It is necessary to avoid situations where participants list more than 2-3 trends and 1-2 threats and opportunities to substantiate their project. Typically, this situation indicates that the projects are too general or in fact do not eliminate any of the alleged gaps in the map of the future.

The names of the projects must also be placed on the map of the future (with post-its or by writing additional notes with a marker), thereby returning participants to trends, threats and opportunities, and allowing them to be related to the map.

The result of the work on generating initiatives and projects of change is forming a roadmap prototype. A few ways of moving into the roadmap are worked out at this moment:

- Policies, soft and hard technologies are linked in a logical order, according to criteria of having something to do with one trend “break”, one characteristic of the desired vision of the future. This order becomes a roadmap and “events” mark milestones in its implementation.
- Policies, soft and hard technologies marked on the map of the future are called an “initiative”. A set of initiatives is a roadmap. Furthermore, each initiative is detailed by the rules of formation of the project’s passport. (Option worked out: Foresight-fleet in 2015).
- According to values (characteristics) selected as a basis for trends, achievable targets (elements of the vision of the future), processes (policies, soft and hard technologies) are defined, results are described according to the results of every action and resources it needs. (This approach worked during a session for developing tourist clusters in the Republic of Komi). For all initiatives, one or two grouping principles are set - stretching. For example, the ones aimed at improving activity, at external development, aimed at traditional characteristics and development of new characteristics, and in addition declared scale and implementation timing are imposed. It makes up a field of overlapping projects. This project field is a strategic choice and a roadmap. (The approach was worked out at a session hosted by Tatfondbank).

The creation of a roadmap prototype illustrates how the Rapid Foresight method ends, but the foresight session itself may include several iterations of work on detalization and verification of the roadmap.

Description of work tasks

In the case of working with foresight competences, the latest iteration instead of generating initiatives and projects of change, is detecting a list of work tasks that must be figured out by people in the future, which are grouped by session participants into competenc’ packets (occupation prototypes).

In this case, the group may work with a “specialist” card.

Specialist Card

The specialist card is a personnel “answer” to a trend’s challenge, which may be associated with threat and hard technology, as well as a trend’s soft technology. A professional solves a specific industry problem associated with the market/soft technology/hard technology/threat.

For example, a “biotransducer” as a specialist on replacing non-biotech solutions with biotech ones.

Only new specialist cards are placed on the map, they currently do not exist in the industry. In cases where the foresight session is not devoted to working directly with educational entities, specialist cards appear somewhat rarely.

The specialist card is rarely used and is not included in the standard set, as it has been specially designed to work in the area of competences’ foresight.

Creating a «map of the past»

Sometimes an iteration of work to form a «map of the past» is conducted in order to dig deep and search for causes of the current situation. Participants’ task is to try to understand the circumstances that historically determine the development of foresight’s subject areas, namely:

- key players;
- physical (wider - economic) resources, such as the presence of people, infrastructure and so on. For example, RAS (Russian Academy of Science) institutes' base in university-towns for university research;
- "cultural codes": What historical events from the past (in this area, in this field of action, or anywhere else) set a frame (or back up a certain vision) according to the subject area. For example, for the "Global Education" program, one of the frames is set by Peter the Great for the children of boyars (members of the old Russian aristocracy) to study abroad and create a new noble class.

The moderator can use "notes made beforehand" to stimulate the productive process, but as in other iterations, may give participants an opportunity to identify the circumstances and cultural codes. In the event that the map of the future was made in advance, modern trends, extended into the past can help create a «map of the past». Participants form a map out of images and codes provided on a separate flip chart.

Material processing and analytical packing of the RF session result

"Analytical packing" means the creation of a separated result of group work.

Chronologically, a foresight session's material processing is conducted in several iterations:

- Technical fixation during the course of work (photo, audio, fixation on the map of the future and flipcharts, map transfer, its elements and key phrases from discussions into an electronic form, working with paper and electronic templates, etc.).
- Quick processing — gathering information on one or two criteria to conduct the final plenary, which can be presented to all participants of the session (for example: a list of initiatives for ranking their efficiency or speed of implantation, or a presentation with a card of initiatives on the map of the future to submitting to the customer).
- Quick analytical packing — material processing in the next couple of days, highlighting the most important content, selecting a content's idea in the most compact and convenient form.
- Complete analytical packing — processing in its fullness including if necessary the collection of additional analytical data, preparation of official reports.

It is important to note that each iteration of material's collecting and processing is a result that can be separated from the moderator and participants of the group.

Technical fixation of group work results

Group work technical fixation includes:

- Visualization (on a wall, a flip chart) — a packer can form an overall scheme of group consideration of the foresight object during work.

> Once there are resources, additional tools can be used: scribing, cloud of concepts and others. Everything that allows the group to deeper understand the object and then form a comprehensive separate picture is appropriate.

- Audio-fixation (with subsequent decoding).
- Photo-fixation.
- Video-fixation.
- Filling templates (map of the future in MS Visio, cards' description in MS Excel or direct packing of the card using http://foresightmap-ru.1gb.ru/ resource).
- Detailed log of the session, followed by material's structuring.

With technical analytical packing it is important to fix and maintain the context of the discussion, without which it can be difficult or even impossible to re-establish cards' true meanings at the end of the session. In addition, it is important to notice the emotional state of the group as it speaks volumes about participants' attitude to elements on the map of the future.

If resources are available, it is recommended that several packers work in the group. This will allow for further re-packing and composing the overall final product including discussion of advantages, disadvantages and characteristics of every individual result.

Re-packing can be conducted by collectors together with a team of moderators, as well as a host of a session to create a unified map of the future and link all the individual or small-group results together.

Summary of the material at the final plenary session

Presentation of group work material is conducted in the form of a short report:

- using a flip chart, where all key information is written down;

- using presentations in electronic form.

The speaker is chosen among the participants. This is an additional act of participants' appropriation of the content of the map of the future.

The leader of the session during the final plenary (and sometimes during the in-between one):

- designs a discussion scheme by tracing similarities and differences in understandings of groups, ground-breaking ideas and a field of project initiatives;
- integrates and summarizes the results of particular group work, forms a single picture in the context of event goals and tasks.

In some cases, a vote can be held during the plenary session with respect to proposed initiatives and projects of changes, visions of the future or some of its elements. The leader of the session can ask the participants to rank the initiatives and projects of change.

For example, in order to quickly create a program of work and a roadmap, a ranking based on three criteria is used: the fastest - a project or an initiative that can be implemented as soon as possible; the cheapest - a projects or an initiative with no tools required for implementation; the most effective - a project or an initiative, the implementation of which will draw maximum attention to the desired future approach.

During the final plenary session expert presentations, participant questions to each other and a debate comparing visions of the future or programs of change can be planned.

Quick analytical packing

Quick analytical packing involves processing session results within 1-2 days upon session termination, and does not include additional materials. Key objectives of this packing are:

- fast presentation of results into the external environment for the launch of initiatives;
- circulation of material to session participants to collect their feedback and include it in further work in the field of foresight.

The most important thing in a quick analytical packing is to fully and fairly reflect the content of work in groups and its generalization on the final plenary session. However, it is advisable to consider the following aspects during the quick analytical packing:

- a description of a session structure (goals, tasks, scenario);
- an overview of the process of group work (context of discussion);
- the scheme of object development and understanding of the object which have been integrated in the session;
- marker-sentences and marker-words that allow participants to identify the result of the work and relate to it;
- visualization of work materials, that allows participants to see their content;
- packers' generalizations that demonstrate the result to third parties who did not take part in the session.
- Quick analytical packing form presentation is negotiated with the customer.

Main analytical packing

Main analytical packing includes two composite parts:

- Preparation of concentrated packed content for further work.
- Preparation of official reports.

In addition to materials of the session main analytical packing includes:

- data verification (for example, checking quantitative assessments of trends, checking availability of soft and hard technologies, policies, etc.);
- materials of preliminary analytics, conducted by a foresight session team; processing materials of preliminary and post-session interviews and work meetings;
- comparing results of the conducted session with the results of a similar foresight, strategic sessions, predictions of futurists and visionaries;
- detailing project initiatives.

These recommendations can help with report creation:

- discuss the document logic with colleagues: what conclusions do you want to exhibit, what is the chain of reasoning that leads to these conclusions;
- discuss your methodical approach with someone, check whether you clearly state everything, whether there's anything left that wasn't talked over as obvious;
- write down suitable phrases;
- write down specific facts that you have identified during the course of work;
- write down paragraphs (not related) in the form of a text into document sections;

- look at product requirements for the project and your commitment to the client.

And of course, try to discuss your thoughts more often in the working group and with strangers, provide materials to look over. The more you talk, the faster you understand what and how to write.

The final report, among other things, must comply with normative requirements for these kind of documents, that are determined by the type of customer and nature of contract arrangements. However, there are some general rules for preparing of the final report:

- document design must comply with requirements regarding the title page, font, margins, headings, diagrams design, tables, applications, glossary, etc.;
- the language of the document must reflect images, metaphors, comparisons, graphic techniques, which are already known to the customer, and have been discussed and are understood by the customer;
- a document must use the customer's terminology;
- all dates, numbers, names, nominations in the document have to be verified;
- a document should be checked for spelling and syntax.

In the best case, main analytical packing becomes a finished product. For example: The atlas of new professions.

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