



CSTP/TIP Workshop on the OECD STI Outlook and the Innovation Policy Platform

17 June 2015, Paris, OECD Headquarters

Summary notes of the “forward looking” breakout session 2:
New production technologies.

Background

The *OECD Science, Technology and Industry Outlook* (STIO) is a biennial publication that provides policy makers with the latest information on recent and expected trends in the global science, technology and innovation (STI) landscape and identifies potential implications for national policies. The STI Outlook is produced under the aegis of the OECD Committee for Scientific and Technological Policy (CSTP) with input from its Working Parties, notably the Working Party of Innovation and Technology Policy (TIP).

The OECD has undertaken a “Forward Look” exercise on future STI policy trends in preparation for the STI Outlook 2016 with a view to improve the “outlook” dimension of the next edition. The exercise seeks to project current STI and policy trends into a 10-15 year future and identify challenges and implications for STI policy makers. The approach is mainly desk-based, complemented by interviews and a small number of mini-workshops in various parts of the world. The exercise started in mid-2015 and should be completed by the end of the year.

The afternoon sessions of the June CSTP/TIP workshop aimed to scope topics of interest to CSTP/TIP that should be prioritised in the framework of this forward looking analysis. This scoping exercise has been conducted through five interactive breakout sessions during which participants were asked to present, comment and/or report on a specific topic of interest to them.



New technologies in production: Economic, environmental and policy implications

Breakout session n°2: summary note

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The opinions expressed and viewpoints herein are those of the participants and do not necessarily reflect the official view of OECD member countries and non-OECD economies. All participants were invited to contribute under the Chatham House Rule, i.e. they are free to use the information received and gathered, but neither the identity nor the affiliation of the participants may be revealed.

Country delegates are divided in 2 groups of about 3/4 persons each to discuss the following three issues: risks, opportunities and policy priorities regarding new production technologies.

I. The risks created by new production technologies

First, country delegates are asked to identify the most important risks created by new production technologies and present what steps their respective governments are taking to prepare for these risks.

Risks
Environmental and societal risks <ul style="list-style-type: none">- New production technologies may foster growing inequality and social disruption (e.g. Über taxis).- There may be a lack of public acceptance regarding the use of new production technologies.- New technologies may create environmental (health) problems which in turn could create social problems (e.g. GMOs).
Framework conditions for innovation <ul style="list-style-type: none">- Security: artificial intelligence could serve as a weapon and/or unintentionally place humans in a hazardous situation.- There is a need for sound infrastructures: e.g. energy harvesting and storage are prerequisites for efficient autonomous systems.- Too much regulation and too strong a focus on risks could hinder technological development.
STI actors' behaviour <ul style="list-style-type: none">- Firms (and countries) may be hesitant to share technological developments.

Role of government

- Government may not adapt policies quickly enough to provide a proper response to technological development.
- It's not clear how responsibilities of government vis-a-vis the private sector are divided regarding the development and implementation of new production technologies and, consequently, who will be accountable if something goes wrong.
- Prioritizing specific policy issues may prove to be a challenge for government.
- Openness, information sharing, and the remuneration of inventors could be hindered by policies defining a specific purpose of new technologies and products.

Skills for innovation and labour market

- There is a risk of brain drain (e.g. entrepreneurs going abroad).
- Countries with a 'weaker' educational system may lag behind more developed countries.
- Unemployment could grow in areas where humans may be replaced by machines.
- The regular employer-employee relationship may change for the worse.

II. The opportunities created by new production technologies

Secondly, country delegates are asked to identify the most important opportunities that could be created by new production technologies and present what steps their respective governments are taking to realise these.

Opportunities
Creativity <ul style="list-style-type: none"> - Creativity can be stimulated through democratization of knowledge in a system where inventors are remunerated in an appropriate way (ideas, not products).
New jobs and market opportunities <ul style="list-style-type: none"> - There may be a shift from employment to entrepreneurship. - Jobs can become cleaner and safer. - Researchers are encouraged to become more flexible, open-minded and interdisciplinary. - Many opportunities may arise for start-ups, which will benefit the national economy (e.g. in the field of 3D-printing).
Environmental and societal challenges <ul style="list-style-type: none"> - Sustainable development and green growth are stimulated: green fuels, bio-cars, CO₂ storage, biomass and biogas. - Renewable energy sources are fostered: hydropower plants, solar panels. - Opportunities for more inclusive innovation and growth arise owing to the use of new and cheaper technologies. - New production technologies have the potential to support the ageing population. - The population's health can be fostered through developments in genomics applied to agriculture.
Public innovation <ul style="list-style-type: none"> - Government may be encouraged to become more adaptable due to the fast pace of technological developments. - Specialised government departments may respond to technological developments. - Opportunities arise for new public-private partnerships.

III. Policy priorities, including the need for policy reforms

Thirdly, country delegates are invited to reflect upon which of today's policies is most likely to need reform, and in what ways. They are also asked to identify what we need to know about this issue that we don't already know.

Policies in need of reform	Knowledge gaps regarding new production technologies
Change in policy and governance <ul style="list-style-type: none"> - There is a need for specific policies to supplement general STI policies in order to implement actual change. - Continuous adaptation of government and governance learning in real time instead of top-down governance would be required. - More proactive governance is desirable: e.g. Government should create opportunities for other actors. - Government should make new agreements with social partners. 	Passive politics <ul style="list-style-type: none"> - What is the risk and cost of inaction? Balance between government and private firms <ul style="list-style-type: none"> - How can the responsibility for dealing with issues regarding emerging technologies be shared between government and business? Building a knowledge base and capacity <ul style="list-style-type: none"> - Awareness before readiness: Why is a particular form of technological development an issue? Only when answering this question can you think about enabling governments to reform policies and deal with these issues. - Some knowledge of the present exists (state of the art). How can it be prevented that existing biases regarding

	<p>opportunities and risks have too big of an influence on further knowledge gathering?</p> <ul style="list-style-type: none"> - Governance continuum requires continuous adaptation of learning capacity in real time. - How to learn from the past? - Lack of foresight is a threat rather than a risk, but what is the best way to embed this in an institutional structure?
<p>Emerging and non-emerging technologies</p> <ul style="list-style-type: none"> - Measurement, monitoring and dialogue about transversal issues between emerging and non-emerging technologies should be put into place. 	<p>Relation between the structure of the economy and new technologies</p> <ul style="list-style-type: none"> - To what extent does the economic structure determine policy developments concerning emerging technologies? <p>Global value chains</p> <ul style="list-style-type: none"> - How are global-value chains pushed or hindered by new technologies. Where are opportunities for countries? - To what extent is there competition between the value-added high road and low road?
<p>Skills for innovation</p> <ul style="list-style-type: none"> - Efforts should be made to get schools, universities and PRIs to the appropriate level. - Governments should stimulate better cooperation between universities and businesses. 	<p>The cultural element of innovation</p> <ul style="list-style-type: none"> - Not only 'objective' factors such as the level of universities determine the development of innovation.
<p>Intellectual Property rights</p> <ul style="list-style-type: none"> - Ownership of inventions should be redefined (man-inventor versus machine); e.g. who owns the design in 3D-printing? Who produces a new program? - There is a need for an international agreement on IPR. <p>New civil/legal responsibility principles</p> <ul style="list-style-type: none"> - Foundations of civil and legal responsibility principles should be revised with the deployment of new production technologies. Who does take responsibility in case of human injury? (e.g. self-driving cars). How to take business leaders to take responsibility for developments? - Criteria for autonomous decision-making by machines should be developed: what are they? How to define them? <p>Global coordination of national jurisdictions</p> <ul style="list-style-type: none"> - Remote control of devices from abroad (e.g. self-driving cars): which court/jurisdiction should one go to in case of an accident/claim? - A consensus on a minimum number of regulations should be reached so as not to create unfair competition conditions on technological developments. - Global regulation is needed and will require international cooperation between governments and organisations. 	<p>Legal and ethical uncertainties</p> <ul style="list-style-type: none"> - Little knowledge is available on the legal and moral status of autonomous machines. What might be their legal and moral rights and obligations?