Strategies and policies for Grand and Global Challenges – EDOC – MGT 641

Teacher
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General objective

*" Societies today face a number of formidable challenges, many of them global in scope. These include adverse climate change, devastating diseases that are not yet under control, uncontrolled population growth in many low-income countries combined with stagnant or declining populations in many high-income economies, rapid urbanization in low-income economies that places stress on the provision of public services, massive education needs in all parts of the world, the development of piped water and sanitation in poor countries, the increase in agricultural productivity in the South, and others. (*Foray, Mowery and Nelson, 2010).

This course addresses the issue of designing strategies and policies for societal Grand Challenges. It aims at analyzing the various dimensions of Grand Challenges and at providing a policy tool box which fits all dimensions – while supporting students in designing and writing the first pillars of a transformational roadmap to address one specific grand challenge (or mission).

The course will alternate lectures on grand Challenge policies with guided work to support teams' project developments. The sessions are scheduled within a time period of two months – in order to maintain momentum and dynamism.

Audience

The target audience of the course is EPFL PhD students from any discipline (ranging from engineering science to life science, computer science, basic science, environmental science, architecture, management). The hope is that the audience will display a high diversity of disciplinary and field backgrounds so that the course will benefit from a rich variety of Grand Challenge cases.

Key message

While this course will strongly focus on innovation as a critical determinant to meet Grand Challenges, another key message is that brilliant technologies are not enough to solve them. The relevant technologies need to be adopted by consumers or firms, their "entry" in the economy or society requires relevant business or social models – which often imply new economic regulations and new social norms.

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In a nutshell – a general policy framework to address a Grand Challenge includes: i) a narrative (a shared perception in society about "what is the problem" and "what are the solutions"); ii) significant market reparations (to fix negative externalities and advance regulation); iii) the promotion of the needed technological innovations; iv) the transformation of social norms (persistent patterns of consumption and of social practices). Two other essential pieces of policy deal with : v) the generation of adequate funding mechanisms to finance novel infrastructures, expensive R&D projects and other investments and manage the redistributive effects generated by any big transition which creates winners and losers and, vi) the governance of the whole transformation which involves multiple stakeholders and requires strong coordination.

Then the roadmap the students will write on a specific Grand Challenge will deal not only with incentivizing innovation but also regulating the economy, involving society, funding the transition process and governing the grand transformation. Each of these pillars will be discussed intensively during the course to support students in writing their roadmap and strategic document.

For the success of the course, students need to think carefully about the topic (the ''mission'') they like to choose.

Three important qualifications to help you to choose your topic

1) <u>What kind of Grand Challenges?</u>

Looking at the Sustainable Development Goals of the UN (SDGs), there is a high variety of grand challenges. In this course, we will focus on the class of grand challenges dealing with any kind of "capital" which are crucial for economic growth and social development -

- human capital (this is about health and education),
- natural capital (climate, environment, biodiversity, water, animal or vegetal species, natural ecosystems),
- manufactured capital and infrastructures (cities and urbanization, mobility systems, energy systems, agriculture and food, etc..),
- social capital (trust, networks, communities)

and which are subject to overuse, depletion, destruction, uncontrolled growth, etc.[1]

In short, we will consider any capital assets which are part of *the productive base of societies* and which are not well managed in the current period – raising issues of sustainability and inter-temporal social welfare. Such mismanagements are often not reflected in GDP calculation and this creates a gap between two trends: the GDP is growing (generating the illusion of greater prosperity) but the productive base is shrinking (so perhaps there is no progress at all because GDP growth does not compensate for significant (natural or human) capital depreciations).

[1] The term of capital implies three assumptions : i) extension in time ; ii) deliberate sacrifice in the present for future benefits ; alienability. (Alienability makes the concept not entirely relevant for human capital or social capital).

We will not consider in this course grand challenges such as eradicating poverty, fighting against crimes, stopping wars, etc… which are of course important grand challenges but cannot be managed with the same policy toolbox which is applied to the ones mentioned above. The policy toolbox we want to use is essentially about promoting technological innovations, changing economic regulation, influencing large scale behavioral tipping, supporting systemic transformations and funding transitions through the use of new tools of financial engineering – a toolbox which is obviously not adequate for solving problems such as wars, poverty or crimes. Students need to choose topics which are consistent with this framework.

2) From Grand Challenges to missions

The concept of Grand Challenges is useful to identify great societal needs and to indicate priorities and directions in terms of resources allocations and policies. However, most grand challenges are so broadly defined that it does not provide the right framework to work then on a detailed roadmap. This means that any Grand Challenge – global health, climate change, water supply, food security, etc. – can be sub-divided into more "specific missions". For instance – "fighting against obesity" is a mission within the global health grand challenge or "decarbonation of air transportation" is a mission within the climate change grand challenge.

Missions can be sector specific (e.g. decarbonating air transportation or developing a circular economy in the food industry) and/or place-based (e.g. developing wind energy in Switzerland, improving air quality in the big cities of Latin America).

Student's projects should be designed at this level of "mission". See examples in the slides ("What is your mission?" – posted on Moodle during the summer).

3) The case will be more challenging if the private sector is involved

Improving secondary education in Africa is a mission which meets qualifications 1 and 2. However, this looks as a pure *public*, perhaps philanthropic, mission where the role of industries and markets is very marginal – so making the problem less challenging intellectually. It is good to choose a mission where some private business has a stake and, thus, involvement and alignment of the private sector are a key condition.

Assignment and interactive sessions

Teams of two (or three) students are designing a *policy roadmap for a specific mission* – to be developed during the interactive sessions. The objective of each team is to finalize a strategy document (around 5 pages) – to be delivered 2 weeks after the end of the course.

Interactive sessions aim at supporting short presentation and discussion about the various dimensions of the strategic roadmap. **Given the high number of students (about 39), the organization of these sessions needs to be adjusted. Instead of formal presentations by teams**

(about 13 teams), we will emphasize more informal and short presentations (no slide or very small number) and discussions.

The final assignment (graded) will consist in a strategic paper including the presentation of the mission, its narrative (using a problem/solution space) and a strategic roadmap. This roadmap will include some of the various tools which will be presented during the course in order to regulate markets, fix externalities, promote innovations, change social norms, finance transformation and coordinate all actions.

To prepare the first interactive session – August 29th

This session will be devoted to discuss initial ideas of students about specific missions in prospect of the final assignment.

It will be helpful if students or teams send in advance one slide presentation on : *Preliminary identification of the mission – Does the mission meet the three criteria (above)? Why this choice (importance for society, my own competence/interest)?*

This first discussion will help teams to be formed, to get the right focus and check the relevance of their choices. All teams will have to refine their presentations for the next sessions – according to comments and discussions.

I will appreciate if most students (or teams) come to the first session with a tentative idea about their mission. It can still be very rough and preliminary. This is not a problem! The goal is to have a starting point! It is also obvious that teams can be formed during the first two session for students who could not find a team partner before the course

Please send your one slide presentation (if you have one) before the course to:
dominique.foray@epfl.ch – subject header: "MGT 641 – my mission"

Organization

In case of questions, organizational issues - contact me – dominique.foray@epfl.ch
Moodle will be our main channel for communication
https://moodle.epfl.ch/course/view.php?id=16406

Room – to be confirmed
From August 29th to October 24th – 14 : 00 – 17 : 00

Warning – on Sept 19th and October 3rd – NO COURSE – but an additional session on October 24th and perhaps a final one on October 31st*
*Because of the high number of students – our work will progress at a slower pace. This is why I will propose an additional session on October 31st.

Course program – dates, topics and interactive sessions

Dates	***Topics, formal lectures***	***Interactive sessions (IS)***	***Readings (posted on Moodle)***
Before the course	Preparation: think of a topic, build a team	*What is my mission?* Prepare one slide	
August 29th	Introduction – the big picture	IS 1 - *What is my mission?* Discussion	Doc 1, 2 Economic growth, sustainability
Sept 5th	Introduction (cont.) Ch.1 – Innovation fundamentals	IS 2 – *What is my mission?* Discussion	Doc. 3 Where innovation happens and where it does not
Sept 12th	Ch.1 – Innovation fundamentals (cont.)	IS 3 – *What is my mission? Final choice*	Doc 4 Micro-economics
Sept 26th	Ch.1 – Innovation fundamentals (cont.) Ch. 2 – Developing a narrative	IS 4 – *Starting and writing your roadmap* Preparation of IS 5	Doc 5 Narrative
Oct 10th	CH.3 – Repairing markets	IS 5 – *Mission and narrative* Preparation of IS 6	Doc 6, 7, 8 Externalities Tragedy of the commons
Oct 17th	CH.4 – Promoting technologies CH.5 – Funding social norms	IS 6 – *Mission and markets* Preparation of IS 7	Doc 9, 10, 11 Technologies Social norms
Oct 24th	CH.6 – Funding the big transformation	IS 7 – *Mission and technologies - Mission and social norms* Preparation of IS 8	Doc 12 Financial engineering
Oct 31th (optional)	CH.7 – Better rules for policy	IS 8 – *Mission and the funding problem*	Doc 13, 14 Better rules for policy
After the course		Writing a short strategic paper combining all aspects of the roadmap	