

CHAPTER

Addressing global and social Challenges and the Role of University

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INTRODUCTION

The world today is experiencing drastic transformations of its functioning and its underlying systems, driven by entrepreneurial individuals, institutions and States, characterized by increasing interdependency, and multi-dimensional and global nature. This creates new economic opportunities and entails social progress, but can also have negative consequences that may induce the spread of instability and a domino-like effect of a particular crisis worldwide. More generally, it is becoming apparent that the progress of our society generates unintended impacts on global welfare. Being embedded with a somehow limited rationality, economic agents do not foresee all the consequences of their acts and therefore do not bear the full cost of their actions. We are confronting global challenges, such as climate change, loss of biodiversity, food scarcity and hunger, shortages of energy, water and other natural resources, all of them having the characteristics of “global” public good (or “public bad”) and they are evolving and interlinked. In economic terms, a public good has three particular properties. The first one is non-rival possession, or the fact that a good is not depleted by its use. The second is its low marginal cost of reproduction and distribution, which makes it difficult to exclude others from accessing it. Third, there is a substantial fixed cost of original production. Because of these properties, it is argued that the producers cannot capture the benefits stemming from the production and therefore market forces remain inadequate in delivering the socially optimal level of the

desired good. For instance, the fight against global warming is the problem of all and of no one at the same time. The solution has to be global, as it would be difficult to exclude a country, which did not participate in halving it, to benefit from a solution to the problem. Therefore, there is a need for collaboration and co-operation in solving these issues.

How do we tackle these global challenges, while increasing the quality of life and leaving room for development? To deal with these market failures, traditional policy tools — incentive taxes, subsidies or regulation — may be mobilized in theory. In the case of climate changes, economic solutions can be used to create incentives to move forward a decarbonised economy, such as carbon taxes and emissions trading systems. But a genuine solution would need to involve more dimensions such as widespread political recognition, a better scientific knowledge of the process, sociological understanding and public awareness among others. Indeed the reality is often more complex than economic models predict: the premises of underlying economic models, notably information asymmetry, are not fully fulfilled; a solution for static optimality is not necessarily optimal in an evolving context; each of the challenges being multi-dimensional, and at the same time being interlinked with other challenges, difficulty and tension may arise when defining political and operational objective and targeting actors, and identifying an appropriate policy tool, and even more, the solution, the result of a trade-off, would be partial, far from an overall solution; these challenges call for a choice of certain values to society, but the consensus making on social choice is often out of the scope of policy actions.

However, pressed by the urgency and severity of the problems, we should take action, despite these constraints and our limited capacity to foresee the future, while remaining humble by addressing global challenges. Our approach should be also pragmatic, at least try out some solution, while being aware of sustainability in terms of economic, social and environmental perspectives. Here, experience sharing and policy learning at a global level, based on credible information and mutual trust among actors, prevail. In our view, however, the existing framework for policy making, basically confined within national borders, is not appropriate to induce a move in this direction. How to prepare the ground for a more global and co-operative approach? This paper attempts to respond to this question, focusing on the eventual role that universities may play. We will discuss whether it would be appropriate to talk about “University Social Responsibility (USR)”, paraphrasing the concept of Corporate Social Responsibility (CSR). Broadly speaking, CSR could be defined as actions that favour social goods beyond the pure economic interest of the firm and that required by law. Some examples of CSR actions include going beyond legal requirements in recycling, banning animal-testing, abating pollution, supporting local ventures, developing products with social

attributes or characteristics. More to the point of our analysis, CSR not only takes into consideration shareholder values and returns, it also encourages and is mindful of co-operation through the evaluation of the firm's activities on the environment, consumers, employees, communities and all stakeholders. In that sense, this paper argues that universities could embrace social responsibility in tackling global challenges by not only providing scientific and technical expertise, but by actively targeting potential stakeholders, facilitating the sharing of ideas and solutions, and playing the role of a catalyst in multi-actor initiatives. In that way, it could increase the rate of solutions to global issues, without being consumed by the reaction itself.

The structure of this paper is as follows. The first section analyses the role of science, technology and innovation in addressing global challenges and underlines the importance of international co-ordination, based on an OECD project "Governance of International Co-operation on Science, Technology and Innovation for Global Challenges (STIG)", launched in 2010. The second section focuses more specifically on the social dimension, referring to the OECD works on "Fostering Innovation to Address Social Challenges". Based on the discussion developed in the first two sections, the role of universities addressing global challenges is highlighted in the third section, followed by the concluding section.

THE ROLE OF SCIENCE, TECHNOLOGY AND INNOVATION, AND THE NEED FOR AN INTERNATIONAL CO-OPERATION

Science, technology and innovation (STI) play a key role in understanding global challenges and the interaction between various environmental, technological and social factors framing these challenges, in the assessment of risks and the development of solutions. Gaining scientific knowledge of the phenomena is essential to understand the root of the problem and the mechanism through which key determinants interact; technological solutions may be envisaged and tested to mitigate damage or to propose an alternative to the existing technologies; once proven, these technological solutions would be implemented and adapted in the real context of social system, thereby transforming the functioning of our society. It is worth noting that the process through which science, technology and innovation are mobilized on the ground is rarely in a linear manner: most of the time, actions are undertaken by diverse actors at different parts of STI with possible interactions among them.

To enhance our capacity to react to global challenges, recognizing the role that STI could play, government may initiate and co-ordinate these actions. The presence of double externalities — first one engendered by the nature of global challenges and second one by the public good characteristics of STI —

supports government intervention. Governments may give incentives to speed up scientific and technological progress, or facilitate the implementation of new technologies by changing the regulatory framework.

However, as we have already remarked, these problems do not stop at national borders, thus there is a need to address these challenges collectively. Then arises the question of who should initiate, how to make this initiative operational, how to support its cost and how to assess its effectiveness?

We recognize that several international STI co-operations initiated by a certain number of lead countries or decided by an international organization have been implemented in the past, e.g. the Group on Earth Observation (GEO), the Consultative Group on International Agricultural Research (CGIAR) or the Inter-American Institute for Global Research (IAI). But existing policy frameworks and governance mechanisms seem to fall short of adequately supporting broad-based collaborative action of the scale and intensity required to tackle the global challenges we face today.

Given the importance of governance dimension for the success of collective actions in STI for global challenges, the OECD has launched a project with the aim to provide a space for discussion and sharing good practices on governance, named “Governance of International Co-operation on Science, Technology and Innovation for Global Challenges (STIG)” in 2010. This project focuses on five key spheres of governance as follow:

- Institutional arrangements, agenda and priority setting: Strong and inclusive agenda and priority setting mechanisms and models that ensure optimal outreach and stakeholder involvement, while keeping co-operation effective and efficient.
- Funding and spending arrangements: Models that lead to a significant up-scaling of funds, flexible and responsive spending arrangements, monitoring and evaluation that impact the funding and spending cycle.
- Knowledge-sharing and intellectual property: Mechanisms for improved access to and utilization of knowledge generated from international collaborative STI activities; institutional arrangements for benefit sharing.
- Capacity-building and technology transfer: Mechanisms that factor the different levels of STI capacity in countries into the conceptualization of co-operation, including technology transfer, build-up of absorptive capacities, joint laboratories.
- Delivering benefits — putting STI into practice: Arrangements which ensure that innovation is rolled out in a timely and dynamic manner and that the outcomes of international collaborative STI efforts are delivered into practice.

It is too early to extract policy implication from this on-going project, but, given the interest expressed by the OECD member countries and non-member countries, including China and South Africa, there is a need to frame appropriately an international setting, enabling participating countries to take concrete actions in a co-ordinated manner, which in turn would trigger not only technological but also social innovation within the national context.

SOCIAL INNOVATION TO ADDRESS GLOBAL CHALLENGES

Making efforts in science and technology may be a first step to address global challenges, but if we want to move ahead towards global sustainability — taking account of environmental, economic and social dimensions — not only the co-ordination and co-operation problems, as discussed in the previous section, but also problems of implementation and social acceptances should be tackled.

In recent years, most OECD member countries have increased the weight of target-driven research funding, aiming at bringing scientific and technological insight to the problems recognized as critical by the government and more generally responding to societal needs, but rarely have the outputs of this funding been translated in terms of social practices; or else we have to wait for a long time to perceive their impact on society. How is it possible to trigger or accelerate this process?

In order to explore these issues, an OECD project was initiated in 2009, resulting in two workshops on “Fostering Innovation to Address Social Challenges”. This project contributed to clarify key concepts — such as “social innovation” or “social entrepreneur” — assess needs for and barriers to social innovation and review a range of local and national initiatives to promote STI with a view to address social challenges. This project did not refer explicitly to “global” challenges, while it recognizes the “global dimension” of the problems we face today. The preference for “Social Challenges” came from the fact that this project focuses on the “social” responsiveness, which could be localized actions, rather than on the capacity to bring response “globally” (OECD, 2011).

The key findings of this project are the following:

- Addressing social challenges by means of innovation requires setting clear and agreed definitions and the creation of a new framework to better understand the changing nature of innovation and the multiplicity of economic, social and technical drivers.

Box. Toward the conceptualization of social innovation

The most pervasive definition of social innovation encompasses all social impacts of STI activities and progress. Indeed, regardless of their objectives, all STI activities have direct or indirect social impacts. Evaluations of research and innovation policies and programmes aim to assess these impacts, along with other effects (scientific progress, economic and policy impacts). The significant methodological issues to be tackled as to best assess social impacts (imputation, timescale of effects) are not the only limitations of this definition of social innovation. It is far too narrow as it relates to the understanding of social progress as an unintentional by-product — not as strategic driver — of STI activities. A more comprehensive definition of social innovation is therefore needed. Social innovation refers to a group of strategies, concepts, ideas and organizational patterns with a view to expand and strengthen the role of civil society in response to the diversity of social needs (education, culture, health). The term covers, inter alia: new products and services, new organizational patterns (e.g., management methods, work organization), new institutional forms (e.g., mechanisms of power distribution by assignment, positive discrimination quotas), new roles and new functions, or new coordinating and governance mechanisms. The OECD LEED Forum on Social Innovations has endeavoured to clarify the situation and provide a common understanding of innovation to address social challenges. The key principle of this definition is that social well-being is a goal, not a consequence. Thus, “*there is social innovation wherever new mechanisms and norms consolidate and improve the well-being of individuals, communities and territories in terms of social inclusion, creation of employment, quality of life.*”

Key actors in this early period where social innovation is still weakly institutionalized are so-called “social entrepreneurs”. A social entrepreneur is someone who:

- Intends to create systemic changes and sustainable improvements with a view to sustain the impact.
- Assesses success in terms of the impact s/he has on society.
- Identifies a social challenge and has stepped up to make social change with social mission, to find innovative, immediate, small-scale and large-scale solutions that produce sweeping and long-term change, transforming the system, spreading the solution and persuading entire societies to take new leaps. Is encouraged to produce social impact with a selfless, entrepreneurial intelligence and innovative drive.
- Can simply manage to apply an existing idea in a new way or to a new situation, simply needs to be creative in applying what others have invented (designed?) On the funding side, social entrepreneurs look for ways to ensure that their ventures will have access to resources as long as they are creating social value.

Intends to provide real social improvements to their beneficiaries and communities, as well as attractive (social and/or financial) returns to their investors.

- Social innovations are by nature multidimensional insofar as a variety of issues are addressed as social challenges, which entails a significant degree of diversity in terms of knowledge basis in science and technology. The complexity derives from the wide scope covered by “social innovations”, as social challenges are related to demographic changes, climate change, poverty, employment, health care, education. The multidimensional package of existing social challenges and the systemic failure in fostering social innovation clearly call for a reform of the research and innovation system governance.
- Social challenges are also multi-stakeholders (e.g. universities, research institutes, private companies, government, civil society, citizens). This calls for more research activities on multi-disciplinarity and promoting stakeholders’ involvement, in particular by favouring the implementation process of research priorities (while avoiding lobbyism). To do so, the development of a new governance system, in particular participative tools aiming at facilitating partnerships, is still to be strengthened in order to be effective. Moreover, new actors have emerged and challenge the current established innovation support institutions and instruments. These actors range from social entrepreneurs and enterprises to amateur scientists, International Organizations, NGOs and private foundations, and new ways to establish proper and fruitful cooperation between them have to be found. Their respective role in the social innovation system has to be reshaped so that they become an effective driving force of technical and social progress. In particular, as a new actor, social entrepreneurship proves to be more and more essential to promote this trend but still has to be fully recognized and supported by governments.
- Social challenges have a public-good nature. Market processes and the “invisible hand” are, even more than in other innovation activities, inefficient to coordinate these activities that directly address social challenges. Prospects of large, private profits in the social area are limited, which hinders incentives to invest and commit resources to these activities. As a consequence, specific processes and mechanisms should be specifically established to support innovation activities that aim to address social challenges.
- These barriers result in governance and coordination inefficiency, lack of incentives to invest in social innovations, uncertainty, which hinder the development and dissemination of social innovation. As social challenges are growing, the cost for failing to solve them is increasing dramatically. Innovative solutions to address these social challenges are clearly not adequately exploited. New solutions, new

collective initiatives, new instruments, as well as new modes of public support and management, are required to allow STI to address social challenges.

These findings led to a set of policy proposals, which are:

Policy response to conceptual barrier

- Launch an international initiative to agree upon a common definition of social innovation.
- Continue research and reflection on the definitions and measurement of innovation based on the Oslo Manual definition, in order to better take into account social innovation efforts and results.

Policy support to social innovators

- Design information systems (e.g. through technology scanning and foresight) to be able to detect, characterize and diffuse knowledge on cases of social innovation.
- Design support scheme dedicated to social entrepreneurs and, more generally, social innovation.
- Support interdisciplinary research on social innovations, provide incentives for linkages between research and social innovators.
- Provide incentives for corporate firms to address social challenges.

Creating the framework conditions that are conducive to social innovation

- Favour cross-sectoral, inter-ministerial initiatives to foster social innovation.
- Seek a more inclusive and forward-looking policy-making process.
- Explore rationale and need for specific training.
- Encourage new forms of evaluation.

ROLE OF UNIVERSITIES

In our view, universities are expected to play a key role in search of global sustainability.

Through their research function, they may contribute to a better understanding of the phenomena and underlying mechanisms of the global challenges we mentioned. Aware of their social responsibility, certain universities are already strongly committed by setting their own agenda, and mobilizing their expertise and knowledge in different fields, including social sciences and humanities. By doing so, universities may create scientific basis to better formulate the “perceived” global challenges and to identify key issues to be tack-

led, and this would help the policy-makers to move a step further in the direction of evidence-based policy making.

Also, universities are largely responsive to government incentives and actively participating in target-driven research projects aiming at addressing global challenges, and some projects in cooperation with private companies focusing on particular technologies are already in a phase of prototyping or testing. Technological advancement initiated by universities is becoming perceptible in some fields, while implementation and diffusion are still slow to come. It is worth noting that here we face not only well-known problems of innovation cycle and management of technology, but also and precisely the underlying problems of social innovation we identified earlier. This, in turn, raises the problems of co-ordination of interests among stakeholders and identification and allocation of responsibility. Should or would universities take the lead to induce social change beyond their accustomed role of proposing technological solutions? This remains an open question, but what is certain is that universities are a key stakeholder in this framework.

Putting this question another way, we may ask what are the comparative advantages of universities relative to other existing institutions with respect to attempts at gaining sustainability in our society?

Universities may contribute to increase awareness of the public of sustainability, by framing the problems as objectively as possible, providing state-of-the-art information in an appropriate way at the same time as signalling the limits of a scientific approach, offering a place to debate on the evolution of social values. In this perspective, universities, while mobilizing their competencies and experiences in research, teaching and training, could offer a “learning space” to society, and by acting so, they would prepare eventual future “globally conscious citizens”.

Gaining the awareness of the people is one side of the coin. To mark a step forward in moving society toward more sustainability, this awareness should be translated in terms of concrete actions, including policy action. Here, universities may play the role of catalyst. Universities, throughout their development as a social institution, acquired their own social capital, which could be mobilized to identify potential key stakeholders, to facilitate sharing their ideas, working together and formulating an eventual action plan. The comparative advantage of universities in this task resides in their neutrality — prerequisite of any scientific approach — vis-à-vis particular private interests, together with their expertise in a wide variety of disciplines, propitious for multi-disciplinary approach.

It could be a consequence of the exercise of their missions, and/or a deliberate choice, nonetheless, the fact is that universities have the potential to play a role in promoting global sustainability. By exploiting this potential to

serve society, universities could exercise what we may call “University Social Responsibility” (USR). Universities could be encouraged in their actions that favour social goods beyond their pure academic interests and missions.

Until recently, universities have been preoccupied with two missions: research, mainly of a fundamental nature, and teaching. These two activities have been beneficial to society as a whole by providing human capital and basic knowledge to society. On top of that, recent developments have moved forward a third mission for universities: contributing to innovation. Indeed, universities play an important role as a source of new knowledge, and, on occasion, industrially relevant technologies. Since the 1970s, governments have pushed to increase the rate of transfer of academic research to industry and facilitate its utilization by national firms as part of a broader effort to improve national economic performance in a “knowledge-based” society.

Within the boundaries of these three missions, universities could easily engage themselves in proactively promoting public interest and solutions to global problems by encouraging the diffusion of best practices and information, favouring the development and education of social entrepreneurs, and be part of an innovation eco-system which promotes international, cross-sectorial and interdisciplinary solutions to global challenges. All capabilities that universities possess and could push forward in the direction of a USR.

CONCLUSION

STI are certainly key elements to consider while trying addressing global challenges, as they are involved in many parts of the process of recognizing, analysing and finding ways to alleviate them. Recognizing the increasing scope of the scientific inquiry, the physicist and historian of science, Silvan S. Schweber, (1993) noticed that:

“[...] the goals of most of the scientific enterprise are no longer solely determined internally; other interests come into play. The scientific enterprise is now largely involved in the creation of novelty — in the design of objects that never existed before and in the creation of conceptual frameworks to understand the complexity and novelty that can emerge from the known foundations and ontologies. And precisely because we create those objects and representations we must assume moral responsibility for them.”

Moral consideration, or we might say responsibility, is bound to play an increasing place in STI issues. Scientists, certainly, should freely decide the path of research they decide to follow and pursuing them in the light of their own judgment as put forward by Michael Polanyi. They should also embrace,

especially when working in university, wider goals to tackle social challenges that are to some extent the results of their quest for novelty.

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