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## Pragmatism and Sustainability: towards an economically reasonable and pro-environment scientific change

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### ABSTRACT

Sustainability is a continuous process that takes into consideration human needs and environmental limitations. Whereas it requires committed citizens capable of developing a constant awareness of complex scenarios and changes, the current generation cannot keep waiting for general agreements without making a stand. Under such time restriction, what kind of science do we need for a sustainable future? The academic debate is full of alternative arguments and positions. From social change to process-oriented approaches, many scholars seem to converge to the so-called Mode 2 paradigm of knowledge creation. In the following paper, in order to have a sustainable future, the author thinks science must also encompass an economic-oriented approach, so that it becomes guided by pragmatic efforts that would allow behavioral changes without compromising life quality and the possibility of social mobility for impoverished peoples.

**Keywords:** Mode 2 Paradigm; Sustainable Sciences; Sustainable Economics; Social Mobility; Economic Development.

## **Pragmatismo e Sustentabilidade: em direção à uma mudança científica economicamente razoável e pró-meio ambiente**

### **Resumo**

Sustentabilidade é um processo contínuo que leva em consideração as necessidades humanas e as limitações ambientais. Enquanto ela requer uma comunidade engajada capaz de desenvolver um entendimento constante de cenários complexos e mudanças, a geração presente não pode continuar esperando por consensos sem ações imediatas. Dentro desta restrição de tempo, que tipo de ciência nós precisamos para um futuro sustentável? O debate acadêmico é rico de argumentos e posições alternativas. Desde a abordagem da mudança social até as orientadas por processos, muitos acadêmicos tendem a convergir para o dito paradigma de Modo 2 da criação de conhecimento. Neste artigo, eu argumento que, para um futuro sustentável, a ciência precisa englobar uma abordagem orientada economicamente, a fim de se guiar por esforços pragmáticos que permitam mudanças comportamentais sem comprometer a qualidade de vida e a possibilidade de mobilidade social para populações carentes.

**Palavras-chave:** Paradigma de Modo 2; Ciências Sustentáveis; Economia Sustentável; Mobilidade Social; Desenvolvimento Econômico.

### **INTRODUCTION**

What kind of science do we need for a sustainable future? In this essay, the author argues that there is the need for a sustainable science that would be guided by pragmatic efforts that would allow behavioral changes without compromising life quality and the possibility of social mobility for impoverished peoples.

As a direct outcome of problems such as climate change, resources shortage and extreme pollution, the focus on such issue has been increasing and culminated in the adoption of the Paris Agreement after the COP21 meeting (UNITED NATIONS 2015). This international agreement considers all the elements presented in the following study, including the need to take action, the importance of granting developing countries and impoverished people the right of development and mobility and the inclusion of multiple stakeholders in this change process.

Thus, in order to be pragmatic, scientists should not be kept as the main or only stakeholders of this process. It is necessary to integrate companies, governments and society in general. Subsidies for the electric car market are a clear example of it (KIM 2014; WILLS 2014). It generates knowledge, economic development and, utmost, change. Joint efforts as such make sustainable science more useful, not only to understand the current

relationship between humanity and nature, but also to produce technologies that optimize the use of resources and grant a sustainable development that merges environment protection with the preservation of social mobility and economic development.

## **PRAGMATISM AND SUSTAINABLE DEVELOPMENT**

### **CONCEPTUALIZING**

Kates *et al* (2005) present the debate on sustainable development conceptualization. Considering that “the environment is where we live; and development is what we do to improve our lot within that abode” (*ibid.*, p. 10), they assume both are inseparable and are seen as broad ideas when put side by side to define sustainability. The definition used by the Brundtland Commission was reasonably inserted into this logic as it affirmed sustainable development as “to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (*ibid.*, p. 10).

To revisit this concept regarding the current debate on the field, the author suggests an adaptation as following: sustainability is the continuous process to ensure society meets the needs of the present without compromising the ability of future generations to meet their own needs. As it should be, this concept incorporates both a universal nature, not narrowing its sense to specific challenges faced by society, and a procedural character, reaffirming its never-ending nature.

First, the same logic of preserving society needs was maintained. The author points that modern world already produces too many goods and should reverse its industrialization process. Nonetheless, such logic only applies to rich countries while the Global South still lag far behind in regards of technology, struggling to catch up with the developed world (KATES *et al*, 2001). Thus, granting them the possibility of developing their industry is essential to a sustainable world that cares not only to nature but also to the basic living standards and mankind self-development.

The same applies to our future generations. Obviously preserving the environment and its basic natural resources, such as fresh air and water, is a primary need for a

sustainable life. On the other hand, not exploring natural resources at all would mean perpetuating poverty where clean industries and highly productive services are not a reality yet. The balance between economy and the environment should be kept and debated in forums such as the United Nations Climate Change Conference.

Finally, the revisited concept considers sustainability as a continuous process, implying that there is no such thing as a sustainable stage when new efforts are not needed. Resources will always be scarce, meaning that they will not be infinite. It includes not only non-renewable resources but also renewable ones. Let us take energy as an example: wind turbines cannot be distributed across a region as they cause inefficiencies to each other; likewise, there might be a time when land available for solar farms shall become scarce. Therefore, there will be always a need of developing practices that ensure a continuous sustainability.

## **HUMAN ACTION**

Wiek (2010) is clear at showing his point of view in a tangible and pragmatic manner. He believes that understanding the complexity of sustainability should be linked to acting towards sustainable development. In his words, “sustainability requires direction that stimulates and guides our actions and impacts” (*ibid.*, p. 10). Thus, it is important to ask ourselves if it is possible to measure how much understanding is needed before start acting. Moreover, if the world is an evolving complex system, will we ever gain enough understanding of the current and future scenarios in order to act?

If the answer to any of these two questions is no, Wiek (2010) has a point in vouching for social change. Even if acting locally as a manner of solving minor issues and creating good practices to be reproduced, mankind is already able to seek a sustainable development. Ostrom’s (2015) example of natural resources governance is a prime in this sense.

Social change, nonetheless, should respect the ability of present and future generations to meet their own needs. For instance, restrictions in the emissions of CO<sub>2</sub> should be imposed only if alternative technologies are accessible to impoverished peoples.

Furthermore, stimulating sustainable entrepreneurship (SCHALTEGGER and WAGNER 2011) and sustainability as a mechanism of brand positioning (TEODOROVIC 2015) in both developed and developing economies are additional examples on how to face this challenge as they promote sustainability as a pro-businesses profit-making strategy while maintaining peoples' ability to meet their own needs.

Nevertheless, how should it be achieved? If understanding is not enough, how is it possible to create a pragmatic sustainability science capable of addressing the current challenges? Which is the fundamental scientific knowledge to be developed in order to promote social change?

Bettencourt and Kaur (2011) evidence that some steps are already being given towards this direction. One of them is the field's expansion, especially in the Global South, including the participation of scholars from countries as Brazil, China, India, Kenya, Nigeria, South Africa, and Turkey. Secondly, the percentage of technology-related themes in projects related to sustainability is also growing. When Bettencourt and Kaur's study was done, 21,6% of the research in such area was performed by scholars from chemistry, and mechanical and civil engineering.

It is obvious that research from the developed world is essential. They detain a greater capability of funding studies and implementing breakthrough technologies. On the other hand, local researchers who have more experience and a deeper understanding over their own communities should also handle challenges from the developing economies. Furthermore, social scientists are essential to promote social change, but technology-related scientists, such as engineers, are the most capable of developing inventions to optimize the use of resources. Thus, their integration to the interdisciplinary field of sustainability science is urgent.

## **RENEWED CHALLENGES**

Nowolty *et al* (2003) argue that a more pragmatic paradigm of sustainable science already exists. According to them, this new paradigm of knowledge production called Mode 2 created a new scientific environment where knowledge is context-based and

transdisciplinary, integrating a diversity of sites, using a reflexive character that substitutes the past objectivism by dialogic processes of debate among several stakeholders. In addition, it is evaluated through different forms of quality control.

Whereas the authors could not prove themselves by presenting clear evidence of this change, their argument is interesting at least from the normative point of view. As mentioned, we indeed need scientists dedicated to generating context-based knowledge, especially in the context of sustainable science in developing countries. Increasing transdisciplinarity allows social scientists, who currently dominate the field, to produce and insert technological innovations that will optimize resources while granting minimum standards of living.

A greater diversity of sites where knowledge is produced implies a greater interaction between companies, universities and society as a whole. That is something constantly vouched by studies in the field of national innovation systems, such as the Triple Helix's approach of Leydesdorff (2010). It means that knowledge creation respects the demand and supply logic and, therefore, is optimized as the outcomes are generally purposeful.

Lastly, by suggesting that universities are not the only sites in processes of knowledge creation, the Mode 2 implies that scientists should not act alone. More stakeholders should participate in the debates on what to be produced, also resulting in novel manners of evaluating the quality of scientific output, not only through peer-reviewed academic journals but also by the applicability and spread of new products. In practice, it means a model where governments are more engaged in funding sustainable technologies, supported by citizens who participate in public debates and elect pro-technology politicians and, altogether, companies with close relation to research centers.

Whereas, as said, the authors could not produce evidence that this change is already taking place, recent studies presented this transition for Norway (*cf.* GULBRANDSEN and LANGFELDT 2004), Australia (*cf.* CASSITY and ANG 2006), the United Kingdom (*cf.* SOUSA and BRENNAN 2013) and Sweden (*cf.* HAKANSTA 2015).

## **ALTERNATIVE THOUGHTS**

In a seminal paper for economic sciences, Friedman (2008) presents the debate between positive and normative economics. Whereas the first regards understanding the reality, or how things are, the second suggests potential and desirable changes, or how things should be. Friedman (*ibid.*) is pro-positivism but his argument is clear at stating that understanding how things work serves as a tool to present solutions and point out directions to create favorable conditions for how things should be.

The debate between a research agenda guided by coupled systems, generally positivist, and social change, normativist, is not different. As described by Miller (2013) the coupled systems approach proposes a focus on understanding the relationship between humanity and nature. On the other hand, it limits action as a full understanding over this sphere will never be reached, harming processes of decision-making.

Having a better understanding over the current and future scenarios should be promptly transformed into action, producing new technologies to handle, even partially, present problems. After all, although Milton Friedman has been considered a positivist, he also dedicated himself to promote his points of view as well as to develop techniques to help governments to better adjust their monetary policies.

In addition, the same argument is valid for knowledge *versus* the process oriented approach debate (*cf.* Miller 2013). Whereas knowledge is important, climate change, excessive pollution and resource shortage are examples of issues society cannot wait to deal with. Therefore, it makes sense to make efforts to apply normativism in sustainability sciences vouching for a Mode 2 paradigm of knowledge creation.

## **CONCLUSION**

In this paper, the author favored of a pragmatic sustainable science that allows behavioral changes without compromising life quality and the possibility of social mobility. In addition, the author presented the current considerations regarding the social change

and process-oriented approaches, leading to the normative suggestion that more efforts should be made to reach the Mode 2 paradigm of knowledge creation.

Moreover, the author is concerned with the need of economic-oriented solutions that would preserve the access of developing countries and impoverished peoples to economic development and social mobility. It becomes feasible when companies are stimulated to engage in profit-making sustainable changes and key players are not geographically limited to universities in rich economies.

Finally, one central arguments of the study lies on the need of a more transdisciplinary point of view, including more engineers and other professionals capable of developing innovative technologies that optimize the use of resources without compromising life quality of, both rich and poor, individuals.

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