

External effects in the maritime sector leading to new economic perspectives.

Magdalena Rozmiarek, and Ad Faasse.

Abstract. Our present economic system is facing some real challenges. It is a so-called linear system like “take-make-use-lose”. Sustainable economic development requires valuing (environmental) resources correctly and factoring them into production and consumption decisions. Having a focus on the economic production process, external effects do not seem to fit in the linear system. So-called external effects are not included in economic models, business decisions etc. External effects like the Sustainable Development goals and legal actions in court are of growing importance for economic developments ranging from port development to design of ships and logistics. The distinction Economic Capital, Social Capital and Natural Capital is helpful in creating consciousness about the concept of circular economy. Nature provides tools, systems and knowledge from 3.8 billion years of evolution that will enable us to enter and develop new circular economic developments, to develop real “green ports”; to combine divergent functions in a smart way.

Keywords externalities, legal actions, biomimicry, sustainable economic growth, circular economy, doughnut economics, green port development.

Introduction

Koos Biesmeijer [1] distinguished three types of Capital: Economic Capital (labor, capital, raw materials); Social Capital (labor and e.g. regulations & law) and Natural Capital (all living organisms, ecosystems, as well as wind, sun, gold etc.) This division means to show the interrelatedness between different, though not separate elements of our present economic concepts and thinking.

Each distinguished capital forms a system with its own dimension, doctrines etc. The real challenge and power is or will be in drawing hyphens between the different systems and create a more circular economic system by doing so.

Economic Capital

The science “Economy” originates from the Greek words “oikos” and “nomos” which in the basics means the home economics. In other words, how to manage all the things that relate to a living; running a family c.a. From origin a social science, economics evolved as a metric concept without a value system and with the fiction of infinite growth. Adam Smith’s “invisible hand of the market” seemed only focused on the economic production process and did not consider “external effects” like politics, law, nature, or in his case the (unpaid) care by his mother.

Our economic system is a linear system best defined as a “through-put-system”² or “Earth is inexhaustible – so take all you want. There will be no shortage of Earth resources if markets are permitted to do their job.”^[3 4]

The monetary (or mathematical) value of our economy is – on macro level – expressed in the concept of GDP, as the total value of everything produced by all people and companies in the world. This excludes explicitly the value nature provides. GDP is concentrated around (certain aspects of) human behavior. GDP is made of a set of elements as there are: personal consumption, expenditures plus business investment, plus government spending

[1] Leiden University. Oration teaching assignment Functional Biodiversity “Natural Capital”. (March 9th 2018)

[2] Utrecht University. Farewellspeech Herman Wijffels. (October 3rd 2016)

[3] K. Raworth “Doughnut Economics, Seven ways to think like a 21st Century Economist” p 70. (2017). ISBN 978-1-847-94138-1

[4] Though: Frankfurter Allgemeine Zeitung: “BMW tries to secure the supply of cobalt and lithium for the upcoming 10 years” (14.02.2018)

plus export minus imports. GDP has been criticized for being complex, not being optimal and for not including “costs” of externalities in the economic system.

In his famous speech for the University of Kansas Robert Kennedy said that ...”GDP counts napalm and nuclear warheads but does not allow for the health of our children...etc.”^[5] D.J. Thampapillai in his text on Environmental Economics: “Clearly, the natural environment is a critical component of the economic system, and without the natural environment, the economic system would not be able to function. Hence, we need to treat the natural environment in the same way as we treat labor and capital; that is, as an asset and a resource”^[6]

“Externalities occur where the use of a resource by one party imposes costs or benefits on others, but these impacts are not factored into economic decisions. As a result, economic agents – individuals, firms or governments – do **not face the full costs/benefits of their actions on society**. Externalities can be either positive or negative, depending on whether actions produce unpriced beneficial or detrimental effects – positive externalities will tend to result in under-provision of the good or service, whereas negative externalities will lead to over-provision. For example, in the absence of regulation, sewage companies discharging effluent into waterways (cf. the Baltic Sea. AF) will not face the full social cost of their activities – in terms of recreational and other benefits foregone and/or the cost to society to remediate the damage – leading to degradation of the environment beyond the economically efficient level. Conversely, the pollination of plants by bees kept for their honey is a positive externality, which cannot necessarily be captured by beekeepers, leading to under-provision of this service compared to the economically efficient level.”^[7]

In the example of the sewage company discharging (polluted) effluent into waterways, Defra (Department for Environment, Food and Rural Affairs/UK) speaks about social costs. In our opinion these costs are of economic value as well, the private property affected by polluted waterways will be less valuable, health can be affected by polluted water, which causes medical costs etc. This example shows that social costs are interlinked with economic costs like lost value in real estate, health costs etc. Those costs are often divided over several parties, excluded by the sewage company, nevertheless they are simply there and not to be ignored.

Sustainable economic growth requires valuing (environmental) resources correctly and factoring them into production and consumption decisions. Underestimating or not adequately valuing these (costs or) benefits leads to overuse.^[8]

If we make this definition of externalities applicable to business cases, business plans or other economic decisions on a large scale, we consider that (nearly) all business cases we know about do not integrate ‘externalities’ like clean air, clean water, contributing to biodiversity etc. As stated before by Kate Raworth it is about “take-make-use-lose.”^[9]

Social Capital

Social Capital is a system, a network of regulations, laws, work and social relations all around. We share our view on economics with the Rotterdam based Goldschmeding foundation^[10] which means economics is not about money, it is about relations, relations between human beings, and the interrelatedness with nature in the broadest way.

Part of this (socio-political) system is formed by the Sustainable Development Goals (SDG) from the United Nations and the Paris Agreements in 2015. The SDG’s together form a framework of – at first sight – separate topics. These topics are interlinked and interact with each other, they are to be distinguished and not to be separated. The SDG’s express the desire of the world community for clean air, clean water, avoidance of pollution; physical and mental health, a decent work environment, good relations with the surrounding areas, biodiversity, clean seas etc.

It is the task of governments/companies to show their responsibility by integrating those targets in policies and business plans/decisions. The SDG’s – though likely being considered as externality - are of growing importance for all economic sectors. Especially for the maritime economy the SDG’s 8, decent work & economic growth; SDG 9, Industry, innovation & infrastructure; SDG 11, sustainable cities & communities; SDG 13, climate action; SDG 14, life below water; SDG 15, life on land; are to be considered.

^[5] Robert F. Kennedy Speeches, University of Kansas (John F. Kennedy Presidential Library and Museum) (March 18th, 1968)

^[6] S. Beder “Economy and Environment: Competitors or Partners”. University Wollongong <http://uow.edu.au/~sharonb>

^[7] Defra, Everett, Ishwaran, Ansaloni & Rubin “Economic growth & Environment PB 13390” (March 2010) p.31

^[8] Defra, Everett, Ishwaran, Ansaloni & Rubin Economic growth & environment. PB 13390 (March 2010) p. 30

^[9] K. Raworth “Doughnut Economics, Seven ways to think like a 21st Century Economist”. Random House Business Books (2017). ISBN 978-1-847-94138-1

^[10] Goldschmeding Foundation Rotterdam. www.goldschmedingfoundation.org.

They might be looked at as blocking economic growth, or prohibiting economic activities, in our opinion they are a framework and possibilities for a new and more circular economy, adding more quality to life and the environment. This requires a change in mindset, the acceptance of the necessity to change our behavior, the willingness to develop transition pathways, and creativity. The power of a different public mindset is shown explicitly in the Netherlands in the public noise about the 50 % pay-rise of the CEO of the ING-bank. The Supervisory Board decided to allow the CEO this pay-rise because they concluded that in the international context he was considered to be under-paid. The public and political noise, as well as accountholders leaving the bank caused the rollback of this decision for reasons of reputation damage control and to restore confidence in the bank. The conclusion is justified that reputation and reliability is difficult to express in monetary value but as a social asset/externality of importance for sound economic development. [11] The public noise inspired politicians to work on legal (administrative) instruments to avoid future pay rises like this in the (system)bank sector.

How SDG's are related to specific areas can be seen in investigating problems in and around the Baltic sea. The Baltic Sea faces a lot of challenges and problems. An integrated and coordinated cross-sectoral and cross-governmental approach as well as a shared vision is needed to create solutions for the three primary threats in the Baltic Sea as there are; eutrophication, contamination and overfishing. Two scenarios were developed, "Clear Waters" and "Shipwrecked". Choosing for and working on the Clear Water scenario could amount to 550.000 jobs (in tourism, agriculture and fishing industry) and €32 billion in value added by the year 2030. This demonstrates that the health of the Baltic Sea is not only an environmental concern but an important economic and social one as well. [12] "The Baltic Sea region has the potential to become a global leader in technology-driven environmental solutions. Reframing the challenges as "economic" will create positive benefits of a "Clear Water" scenario."

A special spotlight of attention deserves functioning of the civil and international law system. Mission statements and annual reports of – most times – larger and international organizations refer to or state that legal requirements will be met. In general, this refers to legal obligations prohibited by criminal law and/or imposed by administrative law. Both legal systems are dominated by government and therefore under political influence. [13] Law-enforcement is the monopoly of the government and depends on the priorities set by the governing parties. It requires a government organization with its own attributed powers, priorities, budgets, expertise (or the lack of it) etc.

An interesting and for the moment unique criminal case is the following: The Dutch shipowner "Seatrade" is summoned for the criminal court in Rotterdam [14] for demolishing 4 of their ships on the beaches in the far East. Demolition on those beaches causes large environmental damage, is bad for workers health and safety, and waste is dumped without proper treatment. The public prosecutor accuses the ship owner of violation of the European waste directive, by dumping hazardous waste (components like bunker oil, asbestos, PCB's) outside Europe. "As court proceedings are going on there is no verdict yet. The prosecution expects more similar criminal cases to follow.

The system of (international) private/civil law does not require such governmental meddling. It depends on the plaintiff's discretion. Civil law suits can be called to help in situations where the balance between economic activity and social capital and natural capital is at stake. Or, in other words, where economic activity affects the interests of the other party. Even when it is about nature itself, civil legal actions are possible. Most times this is not included in business decisions.

To protect their own (or nature's) interest, civilians, action groups and even local governments use civil law to force the other party to comply with the law and/or to forbid causing damages or to order (punitive) damages related to private and even public interests. In some parts of the world even nature has legal standing in court. [15]

A general legal principle is that behavior, though not always specified in detail and being detrimental to "the other party" in the circumstances of the event, may constitute liability for damages. And, the execution of rights of one party could be prohibited or limited by the rights of the other party.

Several big cities in the USA filed cases in courts against "big oil" for the damages climate change constitutes to these cities. The damage claimed consists of all the measures that must be taken, to prevent cities and citizens for the changing climate conditions, heavy storms etc. Impacts of weather extremes can lead to large-scale disasters

[11] Compare: The Facebook and Cambridge Analytica scandal caused a major reduction (10 billion US \$) in Zuckenburg's stock value.

[12] Boston Consulting Group "The economic case for revitalizing the Baltic Sea". March 2014.

[13] F.e. the Trump administration opens ways for monopolists by cutting in the prohibitions and granting permits to establish pipelines in protected areas, by allowing drilling in vulnerable places like the arctic.

[14] Criminal Court Rotterdam, (15.03.2018) State versus Seatrade.

[15] A brook with Legal Rights: The rights of Nature in Court <http://scholarship.law.georgetown.edu/facpub/1906> (2016); New Zealand's Whanganui River is a person under domestic law and Ganges River (India) was granted human rights. The Conversation. (June 19th 2017).

if organizations across sectors and related communities incur physical damage, losses and/or disruption of their routine functioning and are unable to cope with the event effectively [16]

A Peruvian farmer [17] appealed his case in the Regional Court of Appeal in Hamm, Germany, suing for 0,5 % of his (climate) damages caused by the German based energy company RWE. The amount of damages sought is based on the fact that RWE is responsible for around 0,5 % of global historical industrial emissions. It is “.....not about “guilt” it is about taking responsibility for what the company has done and what they continue to do...”

The US District Court of California [18] ruled:

“..Plaintiffs state law nuisance claims are premised on the theory that – despite long-knowing that their products posed severe risks on the global climate – defendants (Royal Shell; Chevron; Exxon; BP ConocoPhillips) produced fossil fuels while simultaneously engaging in large scale advertising and public relations campaigns to discredit scientific research on global warming, to downplay the risks of global warming, and to portray fossil fuels as environmentally responsible and essential to human well-being. The plaintiffs were allowed to advance the litigation. This decision of the court does not mean (yet) that the claims will be granted, but that the plaintiffs have a justified case in court.

These judicial findings are relevant for a worldwide as well as local or regional legal approach of polluters. Ignoring these upcoming “signs of noise” in economic decisions or business plans will be economically disastrous. On the other hand, they are strong incentives for changing economic modelling and behavior.

Natural Capital

Natural Capital is essential for economic development as it allows companies to make products or deliver services. “Nature” is not to be exchanged for money and/or subsidiaries. Natural capital is the stock of all resources, we could use for improving our existence. Natural Capital is to be cherished, and preferably be strengthened.” [19]

In economic terms: we should use the interest on the capital, instead of consume/exhaust our capital. National law and international treaties shape the framework for the protection of the “vulnerable nature” as indicated in the prior text.

By introducing the concept of Natural Capital Biesmeijer draws attention to the wealth of nature, and the way nature serves our economy. This is not done by extracting things from nature but by learning from nature and adding something to the eco-system, like what happens in nature, e.g. “.. a whale contributes to life in the ocean by diving deep, chasing krill, supplying poop as food for other organisms and working on the oxygen system of the world by reducing carbon dioxide. But.... Whales are killed for so called scientific research, with no specific results, other than a piece of whale flesh in a certain cuisine.”²⁰

Einstein once said: “Look deep into nature, and then you will understand everything better”. In line with this statement the upcoming science Biomimicry is an approach to innovation that seeks solutions to human challenges by emulating nature’s time-tested patterns and strategies²¹. “Innovation inspired by nature”, Biomimicry [22] is a rather new shoot to the trunk, and important for economic development.

In her book Dr. Benyus shows a deeper look into nature and displays the best natural solutions for our today problems. From the waterproof fibers of a spider (five times stronger than steel) to photo-syntheses in plants, to organizing patterns in nature. For example, the way a sharkskin is developed is of importance for new ship design. The specific texture of the skin does not allow for fouling or parasites, it allows a shark to develop speed with less energy. So why not develop ship’s skin in this way? [23]

Wageningen University conducted a research about the value of “green” in urban developments in Amsterdam.²⁴ One of the conclusions was that, depending on the location and the surrounding area the value of **green** might even have a higher monetary value than the existing real estate. “If housing is realized at the cost of “green” the question arises whether or not social prosperity will increase” The recommendation for the City of

[16] Martina Linnenluecke e.a. “Extreme weather events and the critical importance of anticipatory adaptation and organizational resilience in responding to impacts.” Business Strategy and the Environments (2011). Doi 10.1002/bse.708

[17] Reuters (Nov, 10, 2017)

[18] US District Court of California. 27.02.2018 judge William Alsup. No. C17-06012WHA

[19] Koos Biesmeijer. Oration “Natural Capital” Leiden University (March 9th 2018)

[20] Produced by Chris Agnos. <https://youtu.be/M18HxXve3CM>. How whales change the climate

[21] Joint Global Conference Biomimicry and Bio Inspired Innovation November (11th – 13th 2016) Utrecht University

[22]Janine M. Benyus Biomimicry, Innovation inspired by Nature. (2002) HarperCollings Books ISBN 978-0-06-053322-9

[23] Compare: Bloomberg Technology “Boeing copies Flying Gees to save fuel” (08.08.2017)

[24] Wageningen University & Research “Growth versus Green” in dutch “groei versus groen”. (March 2018) Report 344. ISBN 978-94-6343-758-5 DOI <https://doi.org/10.18174/443008>.

Amsterdam was to act sensibly by taking into account “green” in decision processes about where and how to realize housing”. ‘Green’ creates values, in monetary terms as well as in leisure. Living environment, sustainability, SDGs etc. are important aspects for developments.

The situations at stake were about urban developments. This conference is about the maritime sector, part of which is about port development. Having regard to the above mentioned “movements” it is at the least interesting to consider these findings in port developments, and the relation between ports and the hinterland.

Circular economy

The concept of circular economy is much discussed. It seems that some 114 definitions exist, ranging from vague, to theoretical dreams etc.[²⁵] Most times the concept of circular economy is used as a buzz-word and in politically correct statements, assuming that when we e.g. collect our garbage and recycle the fractions we do a good job in circularity. The best way to learn what circularity means is to investigate nature, as circularity is to be found there.[²⁶]

Circularity starts with design, how to design in such a way that no damage is done to the environment, there is optimal use of the design, and after use, no harm to the environment. Circular economy is considered a concept for the future, with new business models, new financial models and may be a solution for the upcoming lack of raw materials.

For being able to really think and work “circular” a new mindset is needed, an innovative approach to doing business and to design our economy. The scientific world needs to (re-) organize itself in a transdisciplinary way to be able to contribute to cohesively and integrated transition. Therefore, we need people with a deep knowledge in a discipline and the capacity to integrate this knowledge in outcomes.[²⁷] Learning from nature is one of the solutions to be recognized and explored though it can – at the moment - be regarded as “terra incognita”

Dayna Baumeister [²⁸] formulated life’s principles. All of them fit in the concept of circular economy. Some of them are now worth drawing attention to as they contain interesting concepts: “evolve to survive” > ensure enduring performance; “adapt to changing conditions” > appropriately respond to dynamic contexts; “be locally attuned and responsive” > fit into and integrate with the surrounding environment; “integrate development with growth” > invest optimally in strategies that promote both development and growth. These concepts are applicable to develop “circular economy” and they fit into the point of view prof. Wijffels previously suggested, namely reorganizing the scientific world into a transdisciplinary way and integrated transition.

Closing remarks

The underlying message is a call for change, awareness of the (deplorable) state of our planet and a call for cooperation and integration. The World Economic Forum 2018 put a series of important topics on the agenda like shutting all coal fired power stations by 2021 (Macron); How to do business with doughnuts (Raworth); Global cooperation, not walls (Merkel); How companies must adapt ; How investors can help save the planet, energy transition etc.

Broadening the context of the economic science will offer interesting opportunities for (circular) economic development. The examples mentioned in this text are inspiring and open ways to new economic opportunities. Being aware and integrate planning and working with Economic, Social and Natural Capital will lead to an economy that will be more distributive and generative.

Externalities like the SDG’s and the upcoming series of legal actions around climate change could be considered as incentives for transforming the present economic concepts into a more circular approach. The city council of Paris recently adopted a motion to study the feasibility of suing oil companies for climate damages.[²⁹] So, it seems to be time to include “externalities” into economic models and decision making. As for the Baltic Sea, the “Clear Water” scenario is interesting, feasible, worth developing.

There is a lot of interesting and inspiring work to be done with new economic perspectives.

No time to waste.

[²⁵] Kirchherr, Reike, Hekkert “Conceptualizing the circular economy: An analysis of 114 definitions” <https://doi.org/10.1016/j.resconect.2017.09.005>.

[²⁶] Albert Einstein quotes: “Look deep into nature, and then you will understand everything better.”

[²⁷] Utrecht University School of Economics. Farewell speech Herman Wijffels, prof. Sustainability and Social Change (October 3rd 2016)

[²⁸] Biomimicry Resource Handbook. A seed bank of best practices. Biomimicry 3.8 Missoula MT USA.

[²⁹] Conseil de fevrier 2018 (23 janvier 2018) “Voeu pour un Paris decarbone. “a l’instar de New York, etudie la faisabilite d’assigner en justice les petroliers. (Like the example given by the city of New York, to study the feasibility of suing oil companies for climate damages.)

References

1. S. Durston, T. Baggerman, Changing understanding of reality, Amsterdam University Press (2017).
2. K. Raworth Doughnut Economics, seven ways to think like a 21 st Century Economist Random House Business Books London SW1V 2 SA, (2017).
3. J. Benyus, Biomimicry Innovation inspired by Nature, HarperCollins Publishers NY, (1997).
4. D. Baumeister, Biomimicry Resource Handbook , Biomimicry 3.8 Montana USA , (2014).
5. Hajer, Nilsson, Raworth c.s, Beyond Cockpit-ism: Four Insights to enhance the Transformative Potential of the Sustainable Development Goals. MDPI Sustainability (2015), **7(2)** 1651-1660 doi:10.3390/su7021651.
6. Linnenluecke et al., Extreme weather Events and the Critical Importance of Anticipatory Adaptation and Organizational Resilience in Responding to Impacts. published on line Wiley Online Library DOI 10.1002/bse.708 (2010)
7. S. Beder, Economy and Environment: Competitors or Partners, Prof. Sharon Beder's Publications <http://www.uow.edu.au/~sharonb>.
8. "Growth versus Green" Wageningen University & Research, ISBN 978-94-6343-758-5 DOI <https://doi.org/10.18174/443008>, (March 2018).