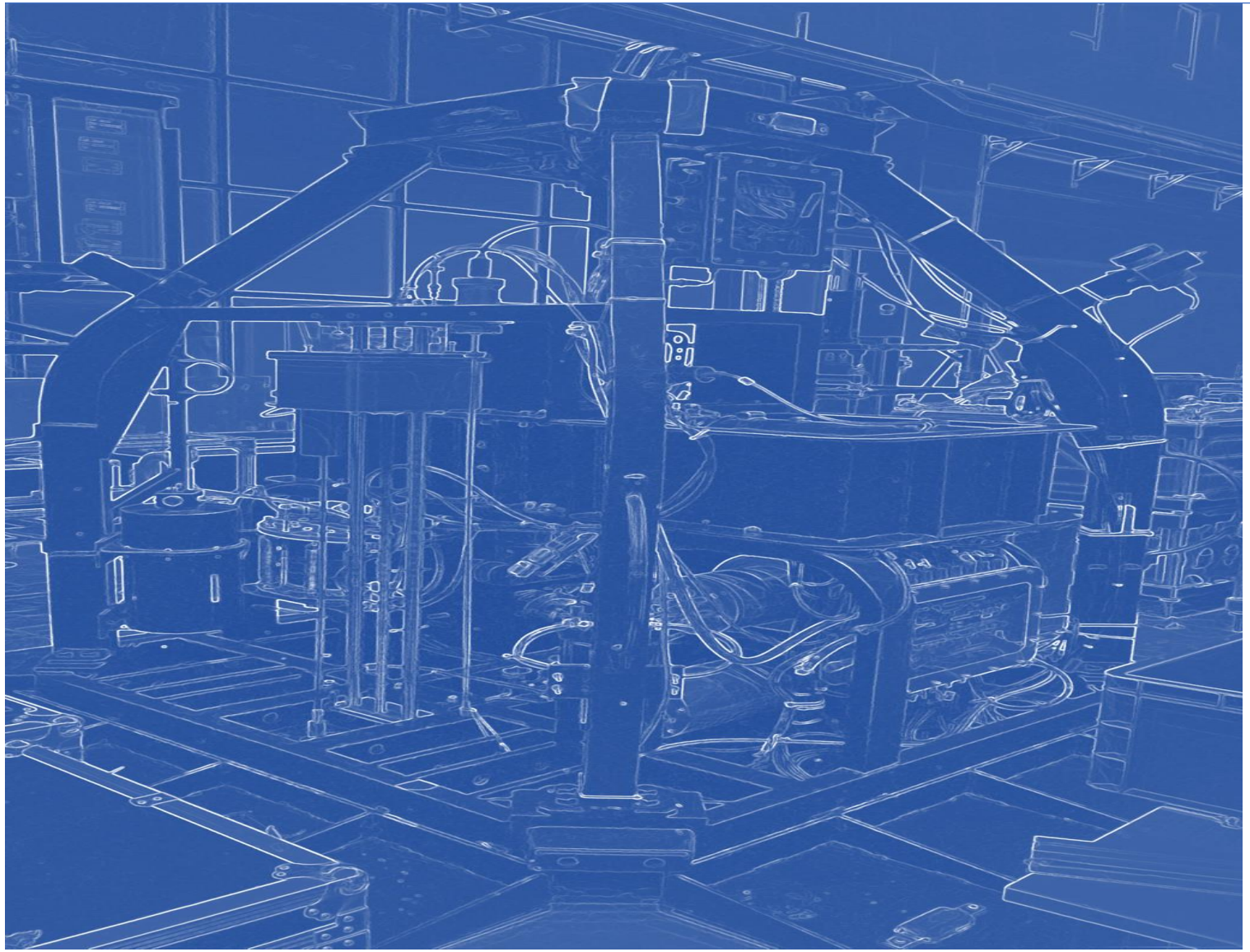

Trading Wealth-/Technology Distribution Against Environmentally Sound Exploitation

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Disclaimer:

The following presentation sets out the personal findings and opinions of the author. It is not intended to provide (a) a comprehensive treatise on the subject, or (b) legal advice in any manner.

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Overview:

- The „dispute" and new megatrends
- Employment of environment friendly technology as part of a solution; example: sensors
- Potential advantages for industry, environment and mankind
- Challenge to the approach by ISA Rules and UNCLOS
- Three Suggestions to respond to these challenges
- Résumé: Who gives what and who gains what

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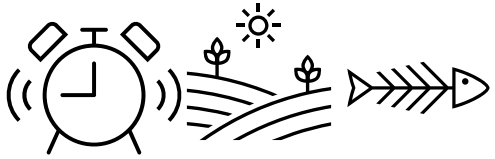
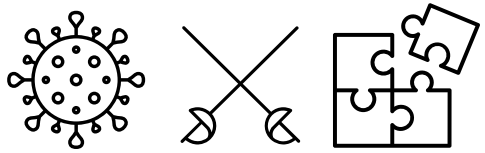
DSM: Concerns , Expectations, Megatrends

Megatrends



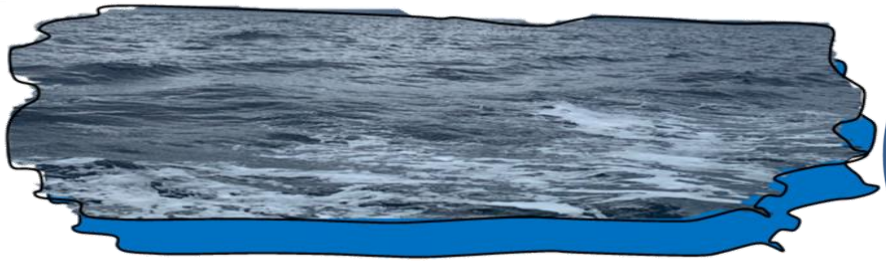
Environment crisis deepens



Supply Chains & land resources in jeopardy

Concerns

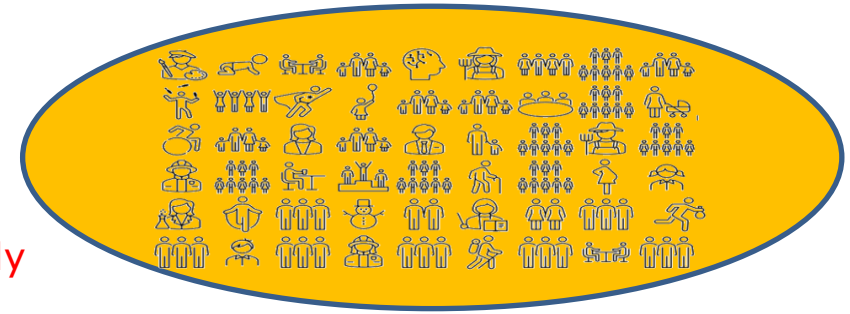
Pollution
Destruction of seafloor
Fauna affected
Uncontrollable effects



High cost
Uncertain markets
Technical risks
bureaucracy

Expectations

Best possible preservation of environment
Treat Common Heritage responsibly



Share of income for, and technology transfer to, DCs & LLDCs

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Megatrends may lower barriers of communication & understanding by leading to:

- Increasing industry awareness of climate change‘s and pollution‘s effects as driving factors for legislative action and consumer orientation

- Increasing preparedness of environmentalists to factor the supply of raw materials into the formula of how to safeguard the future of the planet

➡ It is not all „black and white“

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Under the pressure of the megatrends, both sides may explore and discover joint fields of interest.

A good example: **marine monitoring and sensing**

- Multitude of **purposes**
  - DSM: e.g. gathering of baseline and impact data, equipment operation & maintenance, compliance control, hazard identification/safe management
  - Marine environment in general: e.g. census and migration patterns of fauna, composition of water column and subsoil, behaviour of currents, temperature patterns
- Multitude of **types**
  - e.g. Chemical, optical, inertial, sonar, temperature, acoustics
  - Platforms e.g. mounted on surface or underwater vessel/vehicle, animals, or as autonomous units, e.g. buoys, drifters, floats, sleds, gliders
- Vast **space** to be covered: worldwide ocean watermass env. 1,4 bn cubic km → good business!

Argo float
(source: NASA)

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Eco-innovative approach: What‘s in it for the industry?

- **Large users to come**: DSM still is largely a field for academics, NGOs and some daring technology SME. We are yet to welcome the larger players to the scene who today dominate land based mining.
- **Funded R&D**: the more the Environment megatrend deepens, the more public funding for sensor R&D will become available.
- **Market**: fostered by the Supply Chain megatrend, DSM will grow, creating a larger market for sensor products. Additional opportunities may open for „sensing as a service“, particularly where focus shifts to large data handling and platform networking.
- **Access to exploitation licenses**: a larger choice of commercially available sensors facilitates „ISA-proof“ setup of mining work plans.
- „**Spill over**“: both sensor- and large data processing/networking technologies are capable of being put to additional uses, e.g. marine non-DSM applications, but also employment in autonomous vehicle fleets, manufacturing environments, agriculture.

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What‘s in it for the environment?

- **Availability of sensors**: Both as a product to procure and as a service to solicit, available sensing capacity would increase → Scientists could substantially increase their areas and diversity of Deep Sea research.
- **Availability of Data**: Increased use of sensors in a growing commercial DSM activity in principle means more third party data which also scientists can work with, without corresponding increase in cost and/or person power.
- **Motivated compliance:** by using more self-gathered data, industry may be better motivated to implement changes called for by the measuring results, than in case such results would be presented to them by researchers or the Authority.
- **Learning curve:** Mass employment of sensors of a given type may provide more and better field experience with twofold beneficial effect:
  - enhance maintenance proficiency and update potential regarding the installed base →more sustainable use of the equipment
  - Shorten turnaround time for replacement innovation

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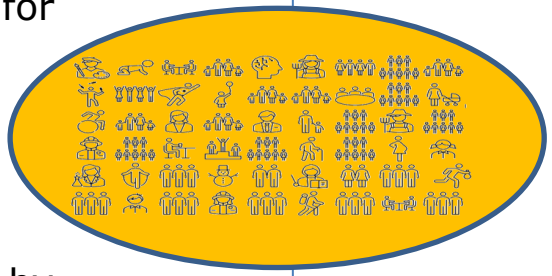
Upshots for the world community

The megatrends, if influencing the two other groups of players as described above, would in principle be playing into the world community's interests, by:

- helping to **solve supply chain problems** regarding minerals, or products therefrom, as alternative to land based sources which may be subject to political uncertainties;
- **promoting the exploitation** of the high seas subsoil in the manner envisaged for decades, and



- supporting the **preservation of the environment** for future generations, both by allowing DSM to be more environment friendly, and by enhancing the scientists knowledge of the seaspace also beyond the DSM field.

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Challenges for the industry

Increased attention to environmental requirements will likely lead to **technical innovation** in coming DSM projects, be it in the field of sensors or other parts of the equipment and processes. Unless publicly funded, the inventing company usually bears the **full cost** and also expects to enjoy the **full benefit** of the innovation.

Yet, in the UN Law of the Sea Convention (UNCLOS) and the Draft Exploitation Rules of ISA („ISA Rules"), this expectation is challenged twofold:

- Requirement to **disclose**
  - In several instances, the ISA Rules require that an applicant for an exploitation license discloses the technical details of the mining equipment intended to be used (e.g. as a general **proof of capability** in the main body of the application cf ISA Rules, Annex 1, No. 18, in the **Mining Workplan** (ibid., Annex II lit. d), and the **Environmental Impact Statement** (ibid., Annex IV, template, item 3.3.2), both to be filed along with the application.
- (Indirect) obligation to **transfer technology**
  - Having to agree to be bound by the applicable rules of UNCLOS (cf. ISA Rules Annex I, No. 24), applicant acknowledges that its home state can cause it to **transfer technology** (Art. 144, 266 UNCLOS & 1994 amendment, Annex, Sect. 5), and to **disseminate scientific results** (Art. 244 UNCLOS).

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Challenges for the industry (II)

Downsides of such disclosure/transfer:

- (inadvertent) **leak** in disclosure process may **gravely lessen** innovator‘s chance to commercialize the invention (if others then can do it „for free“);
- **Royalties** for licenses granted, als main element of technology transfer, may be (a) **substantially less** than the markup received out of own production, and (b) do **not compensate** for losing an entire customer or a product/service package out of which the innovation is only a part;
- **Patents** are rarely helpful to „contain the damage“ as (a) many intelligent solutions are not patentable, and (b) with no patents being effective on the High Seas, the patent holder is left to enforce them in countries where the infringer manufactures the product;
- The **documentation** of the solution as required for the application may be the **only instance** at which the innovation is disclosed: „The sea will keep the secret“ once the equipment is deployed in the ocean

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How to address these challenges?

Suggestion 1: **reduce the detail** of required disclosure in applications for exploitation licenses

Purpose: limit disclosure to information necessary for Authority to assess effects on process or impact on environment

Status of rules: present wording of disclosure obligations (cf. slide 10, „Requirement to disclose") rather broad. However, „Standards and Guidelines" („S&G") are presently in preparation to supplement the Rules. These go into more detail.

Proposed action: Re. **disclosure**: during stakeholder submission process to be expected in fall, review said S&G for specific language, and either suggest to remove or modify in a sense that technical detail shall only be provided as far as relevant to the purpose of the rule, e.g. environmental safety in the EIS-Guideline.

Re **technology transfer**: the UNCLOS provisions cited are broad enough to allow for certain exceptions from a license scope. Alternatively, the „lead time" model described in Suggestion 2 may be considered.

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How to address these challenges? (II)

Suggestion 2: contractor to start with a reduced disclosure as provided under Suggestion 1. During a **lead time**, contractor can exploit its innovation alone, however will be required to report wherever negative environmental effects are produced by undisclosed devices/processes. Disclosure/tech. transfer after expiry of lead time

Purpose: allow contractor to get initial higher returns to compensate initial investment, combined with solution for case where there is some likelihood that withheld information becomes relevant to the quest of the Authority.

Status of rules: same as Suggestion 1.

Proposed action: **disclosure:** as this scenario is more case specific, it might not be addressed in the Guideline/Standard, but in the contract which anyhow needs to be concluded between applicant (later: contractor) and ISA. There is no exhaustive template in the Rules, just some standard clauses.

Technology transfer: For this, not even standard clauses are foreseen. A lead time approach thus can be negotiated ad liberty with a partner. It frequently occurs in other fields that a license is granted for a certain part of the know-how, while for some reserved portions the licensor commits to ship the devices produced by himself.

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How to address these challenges? (III)

Suggestion 3: in relation to ISA, n offer **mining royalty incentives** to innovative investors, e.g. in form of offsets from initial or early running payments

Purpose: compensate contractors (a) for exceptional invest in environment friendly innovation (r&d, validation etc) otherwise not, or not then, incurred, and/or (b) for lost profit out of a technology license described under (II)

Status of rules: Draft regulation 63 para 1 of the ISA Rules provides for incentives if they serve a purpose listed in Annex III Art. 13 para 1 of the Convention. According Lit (b) of that para, an eligible purpose is: „*to attract investments and technology to the exploration and exploitation of the Area*". In view of the author, the provision can be applied both for supply and for licensing of an innovation.

Proposed action: Like the leadtime, the royalty rebate could be offered as an element of the ISA contract terms.

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Résumé

„Environmentalists“	„Regulator“/Authority/ World Community	Industry
Give: Give up blocking DSM conditional upon industry’s commitment to innovate DSM and provide data	**Give:** • Give up – temporarily - some of the control means to monitor the DSM activities → risk environmental hazard • Forego – temporarily – some of the royalty income share claimable by the 3rd world countries	**Give:** • Develop, employ & sell environmentally state-of-the-science mining & monitoring equipment (instead of just state-of-the-art) • collect&publish more & „better“ environmental data
Take: • obtain better equipment for own research • attain objective to have more attention paid to environment by industry	**Take:** • Chance to extract wealth from the ocean floor **and** to do it in an environmentally sound way • Spin-off effect: more insight about the functioning, as well as the limits, of the submarine ecosystem in general.	**Take:** • be allowed to keep more biz secrets when contracting DSM, at least during a lead time • more turnover w/sensors & services • save royalties in the initial phase

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Thank you very much for your attention and patience!