Wicked Problems Plaza – Minerals in a smartphone

Although smartphones have become indispensable in everyday life, we know surprisingly little about the impact of these devices. Smartphones contain valuable minerals; and from the time of their extraction up to the moment when they are thrown away, the use of these minerals has an (often negative) impact on human life and its environment. At the same time these finite minerals become ever more scarce, hence increasing the demand for them. So, how can the negative impact of smartphones be minimalised in a complex multi-stakeholder world? Since there are no instant solutions, this a real wicked problem.

Problematic from design over extraction to waste

DESIGN

Smartphones are intentionally designed with a short life span in mind. After a relatively short period one of the parts will break down. Because of the non-modular design of the phone, it will (almost) be impossible to replace this part; which means the entire phone will have to be thrown away. Moreover, the possibilities for recycling the separate raw materials of a phone at the end of its life are barely taken into account during the design process. This makes recycling such a difficult and non-cost-effective process that the majority of the metals contained in smartphones are sourced from the mining industry. Discarded electronics often end up in developing countries, where they are taken apart and some parts are recovered, but under circumstances which are hazardous to health and the environment

END OF LIFE

RESOURCES

Many of the minerals in a smartphone are extracted in countries with a miserable reputation as far as social and environmental standards and human rights are concerned. Cobalt, for example: 53% is sourced from the Democratic Republic of the Congo, where it plays a major role in funding conflict. On top of that, poor employment conditions – such as low pay, few qualified jobs for the local population, unsafe working conditions and health risks – and child labour are rife in the informal mining industry. On an environmental level, the mining industry not only exhausts water reserves but also pollutes water and agricultural areas with metals and chemicals. The mining industry also often poses a threat to human rights: land grabbing, little to no involvement of the local population before a mining project starts and violence and intimidation are methods used to suppress protest.

Lastly, smartphones are mainly produced in low-wage countries, where workers work long days for low wages in unhealthy conditions.

PRODUCTION

LOGISTICS

Smartphones have travelled a very long way before they are on the shelves. This transport is one of the causes of greenhouse gases emission.

All these external costs are not included in the price of smartphones. Their social cost is much higher than their real cost, but no one is held to account.

CONSUMPTION

Who has the power to make a change?

Theoretically, it is the consumers who hold power and influence over products through their purchase choices. If they stop buying smartphones, none would indeed be made anymore. But consumers are very poorly or not at all informed about the negative impact of the minerals in their phone. For some, this is of minor importance when choosing a new phone. Price and hype are prime influence factors, which is further boosted by marketing. Time and again consumers are encouraged to buy the newest smartphone model or other technological gadgets, even when their old phone still works. But even if consumers do want more involvement, their influence will remain limited.

A huge number of stakeholders are involved in the production of smartphones, in which profit maximisation is still key. Most of the power is concentrated in the companies. They are not transparent about the electronics chain and the origin of the materials, which helps to explain why the average smartphone owner doesn't lose his sleep over the materials and production issue. It is obvious that the big players benefit greatly from this ignorance. But this big influence of companies also creates opportunities: resources become ever more scarce and thus more expensive. This could be an incentive to use these materials in a more sustainable way - both from an ecological and economic point of view.

Governments also have their role to play, although it is limited and greatly influenced by corporate lobbies. They are relatively powerless against companies which operate all around the world in search of the cheapest working conditions and which meet only minimum environmental standards. If their plans are thwarted, they will simply move their activities to a different region. The possibilities for regulation are moreover hampered by traceability problems.
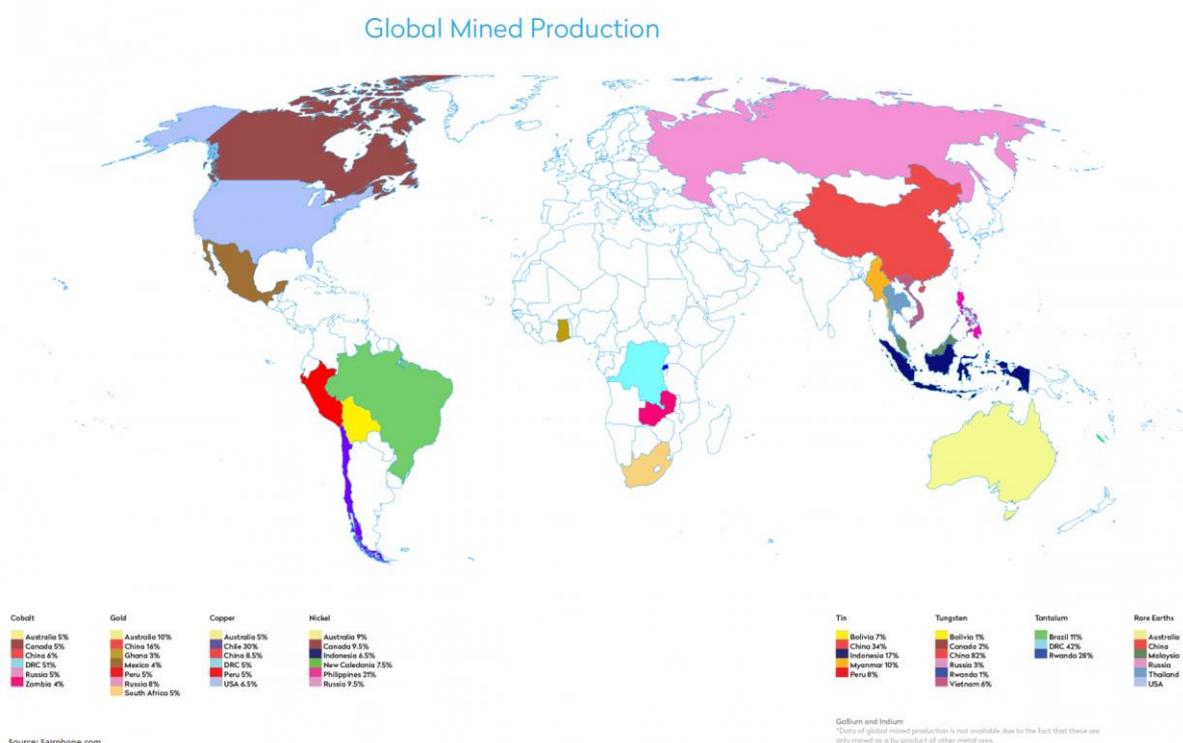
Challenging Alternatives

1. **Fairphone** is the ultimate reference for sustainable smartphones. They work as transparently as possible, make their phones as modulable and repairable as possible, make huge sustainability efforts as far as their suppliers are concerned and even their sales model is resource-saving (e.g. no earphones or charger are included). They moreover highlight awareness raising in their marketing strategy. Still, they are faced with scaling problems. They can only guarantee the traceability of 4 metals (tin, tantalum, gold and tungsten) out of more than 40 and this in a context of technical problems.
2. **Repairing** phones is an important option through which jobs can at the same time be created. Currently, sellers only occasionally repair products and parts and only within the warranty period. Reparations after expiration of the warranty are expensive and tedious for consumers and also imply that they have to forgo use of their phone for some time. This hasn't stemmed the rise of shops which offer smartphone repair services and which work independently from the big players.
   Refurbishing and *remanufacturing* are also making headway. Despite the available technical knowhow, consumers are still hesitant and doubtful. I-Fixit is a company which takes this to the next level. They sell repairing tools for electronics, put manuals for repairing these electronics online and rate products on their repairability. This has made consumers more inclined to repair their phones and has boosted the emergence of stores such as I-Fixer, which very probably use I-Fixit as a medium.

3. The **recycling** of components is also an interesting option for smartphones are full of metals which can be recycled. Some retailers and network operators already give incentives to their customers (for example, a reduction) for bringing back their old devices. But the brands themselves don't follow their example. Many consumers aren't aware of this either.

4. **Leasing** is another option which is examined. Under the current leasing systems, consumers pay a monthly fee and receive a new or refurbished device after a specified time. Because companies remain owners of the phone, the latter is designed in as sustainable a way as possible. One of the arguments against this option is that is doesn't bring about a system change.

Still, technology is not the only answer to these challenges. Structural changes in the balance of power and consumption patterns are needed for the Earth is finite.

Global Mined Production

Cobalt	Gold	Copper	Nickel
Australia 5%	Australia 10%	Australia 5%	Australia 9%
Canada 5%	China 16%	Chile 30%	Canada 9.5%
China 6%	Ghana 3%	China 8.5%	Indonesia 6.5%
DRC 51%	Mexico 4%	DRC 5%	New Caledonia 7.5%
Russia 5%	Peru 5%	Peru 5%	Philippines 21%
Zambia 4%	Russia 8%	USA 6.5%	Russia 9.5%
	South Africa 5%		

Tin	Tungsten	Tantalum	Rare Earths
Bolivia 7%	Bolivia 1%	Brazil 11%	Australia
China 34%	Canada 2%	DRC 42%	China
Indonesia 17%	China 82%	Rwanda 28%	Russia
Myanmar 10%	Russia 3%		Thailand
Peru 8%	Rwanda 1%		USA
	Vietnam 6%		

Gallium and Indium
*Data of global mined production is not available due to the fact that these are only mined as a by-product of other metal ores.

Source: Fairphone.com

Preliminary task

The Wicked Problem Plaza (WPP) is a scientific method to tackle big challenges and has been developed by Professor Rob van Tulder of the Partnerships Resource Center and the New World Campus. A WPP is a dialogue in which important stakeholders come together to discuss a wicked problem which concerns every one of them. The facilitator leads the stakeholders through four steps for relying on their heads, hearts and hands when examining both the problem and the possible resolutions to the problem.

Since all of you are students and represent only one view on the 'wicked problem', we will have you represent the other stakeholders. Roleplay will allow you to identify yourself with the stakeholder, meet other stakeholders in the WPP and negotiate with the others. This will only be effective if you prepare yourself well for the WPP and learn about the stakeholder you will represent. On the internet you will find information about this stakeholder and his/her

institutional background. Look for information about his/her (political) ideas/views and feel free to contact a stakeholder and interview him/her about what he/she would do to contribute to a solution to this problem. Also have a look at his/her CV and find out more about his/her educational background. Be creative and proactive. Collect arguments about this initiative to make sustainability a part of every study programme. To help you to be creative, we ask you to pick a subject/image that would be representative of the wicked problem according to the stakeholder. You will need to engage in dialogue with others about this subject/image.

Stakeholder	Representatives
Smartphone user: Apple	
Smartphone user: Nokia	
Smartphone user: Fairphone	
Smartphone producer: Apple	
Smartphone producer: Nokia	
Smartphone producer: Fairphone	
Somebody who has explicitly chosen not to have a mobile phone	
Phone Salesman/-woman	
I Fix It repairman/-woman	
Flemish Deputy Prime Minister and Minister for Development Cooperation, the Digital Agenda, Telecommunications and Postal Services Alexander De Croo	
Recycling Company	
Miner in DRC	
Catapa	
Consumer Association	
Rebel leader in DRC	
Congolese Government	