Digital Oil: Machineries of Knowing

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In the last decade, "data is the new oil" was a metaphor commonly used to demonstrate the economic significance of data. Labeling data as "the new oil", was a way of expressing how data is now considered to be the most valuable asset, just like petrol once was. Empires were built over it, and tech companies are now more valuable than petrol companies once were, as demonstrated by the European Parliament briefing "Is data the new oil?" (Marcin Szczepański 2020). Eric Monteiro draws on this metaphor, exploring the digital transformations in offshore oil and gas work practices, and delving into obstacles faced by digitalization. What is distinctive about Monteiro's approach is the use of the metaphor "data is the new oil", to analyze the Norwegian offshore oil industry – which has been through an intense process of digitalization – as a backdrop to discuss datafication in a broader landscape.

The author, who is located at the Norwegian University of Science and Technology in Trondheim, chose a relevant topic in Norway – the industry of commercial oil and gas – to explore practices, roles, and organizational decisions in the field throughout the evolution of technology, highlighting how societal and political decisions have shaped the process. The goal of the author is not to feed the divide between early or predigital practices of offshore oil exploration and recent forms of digitalization but to advocate that the adoption of technology is part of an evolutionary, small-step movement and that digital representations are as real as the physical in the material of knowledge and that oil and digital oil is a suitable example of this affirmation.

Digital Oil: Machineries of Knowing is divided into three parts, in which the eight chapters of the book explore all the phases of commercial oil activities, taking place as follows. In Chapter 1, the *Introduction*, the author centers the narrative of the book on the context of the Norwegian continental shelf with the North Sea and the Barents Sea, where offshore gas and oil reservoirs reside over one to five kilometers below the seabed. The chapter offers the reader a historical outline of the political and institutional process that has shaped Norway's oil and gas industry.

The first part of the book, Chapters 2 and 3, work as the backdrop of the subsequent parts, outlining the historical conditions of Norway's fifty years of oil exploration, and the further digitalization of oil, a process that was initiated around the 1980s and early 1990s and that has significantly transformed since then. Throughout Chapter 2, named *Context*, it is possible to observe how the political choice of recognizing oil resources as a public good and the impor-

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tance of learning by doing was essential to place Norway as one of the leaders of commercial oil and gas activities. Initially, the political choice was to maintain control over oil handling to national companies and to gradually open the market to international competition, a process that allowed Norwegian companies to be competitive with major international companies but also control not only its oil but also the data later extracted from it. Demonstrating how the process of digitalization and generation of data is highly influenced by technical, economic, ethical, and political factors, as highlighted by Rob Kitchin (2014b; 2021).

Chapter 3, *Apparatus*, focuses on the different technological developments and adaptations across all phases of Norwegian oil activities. Throughout the chapter, the author enlightens that each phase of oil activity – such as exploration, drilling, production, and logging – is measured by different instruments, with different purposes, generating different data with different quality. The volume of data is considerable, which also results in several issues such as the veracity of data that might be under question due to noise and the calibration of sensors. This process of constant adaptation to collect data despite the adversities posed by the specific phase of oil drilling is the perfect example of the point made by Rob Kitchin (2014b). Data is not a single homogeneous concept, instead, data is partial, selective, and aimed at drawing conclusions from a specific environment, which in this case corresponds to each phase of the oil drilling activity. At the same time, the example brought by Monteiro fits to explain common issues faced by many other areas that depend on data collection, since its concerns with data quality, the volume of data, and the need for constant adaptations are present. Thus, although data is not a single homogeneous concept, the obstacles faced by the Norwegian oil industry when collecting oil data are also faced in data collection in other areas, bridging the gap between the metaphor "data is the new oil" and the "oil data".

In the second part of the book, Monteiro focuses on empirical studies which mirror the phases of commercial oil activities. Initiated with Chapter 4 titled *Data*, the author explores the process of "cooking data" – as coined by Rob Kitchin (2014a, 5) – or "crafting data" (as Monteiro refers on p. 75), through algorithmic cleaning and repairing. To do so, Monteiro delves into the work of "data managers" who are multidisciplinary professionals who work at different organizational units of Norwegian Oil production and are responsible for grasping different datasets of historical geodata with different formats, patching them together. Their work holds value due to their knowledge of going through data noises – such as seismic data – and knowing what data to trust and to disregard, an essential task for the corporate quality system. The role of data managers sheds light on the process of datafication described by Jose van Dijck (2014), which is characterized by the process of quantification and digitalization of all human activity. While data managers are essential to the corporate quality system due to their knowledge of historical seismic data, their jobs are vulnerable due to the potential for automation, a process which is again a metaphor for the current process of datafication that occurs outside the world of oil mining and embraces many professions.

Chapter 5, named *Uncertainty*, focuses on the work of geoscientists and geophysics along oil exploration, which is an essential and strategic phase for global oil operators that is full of uncertainties with a hit-rate of 5%, (p. 89) but representing 10 to 20% of total investments for an upstream oil operator. The task of digitalizing a highly uncertain activity seems contradictory in a world that often takes data as the ultimate source of truth and makes decisions based

on them. However, as Rob Kitchin has pointed out, data analysis must take into consideration the issues of representativeness, error, bias, and uncertainty that come (2014b). Thus, in reality, data collection in all sectors requires attention due to technical and ethical considerations often ignored, and therefore causing bias, injustices, violation of rights, and unethical behaviors. And just like the work of "explorationists" – a concept created by Monteiro to refer to geologists and geophysicists that feed the data that data managers will eventually analyze – must balance these considerations with corporate necessities, other professionals in other areas also face the same dilemma, with often deeper consequences such as dataveillance as pointed out by Jose van Dijck (2014).

Chapter 6, titled *Knowing*, inaugurates the section of the book that covers the development of oil production and addresses the issues coming with the process, especially sand. Sand monitoring is an essential process in offshore gas and oil explorations since it reduces the plant's processing capacities and oil quality. At the same time, sand is used by Monteiro to discuss other types of "data dirt" – lack of quality data – present in other areas of data collection and discuss how operators know and act upon these challenges and what mitigating actions are taken. To make this analysis, the author conducted interviews in which he observed how engineers navigate and interpret "real sand" – the dirt that comes out of the ocean's soil – and "digital sand" – errors that real sand causes to the IoT sensors and to the data their collect. He highlights that although real sand can be digitally represented and sand-monitoring routines are put in place to address related issues, this digital representation carries little value if there is no accompanying company infrastructure, practices, and technologies. This analysis brings back the discussion raised by Rob Kitchin (2014b) related to the ethical and technical issues with data. Issues such as bias, injustices, and violations of rights can be digitally represented in datasets, yet if the ones that are using the collected data do not adapt their infrastructure, practices, and technologies to address these issues, this digital representation holds little value.

The following Chapter 7, *Politics*, explores the political discussion behind oil exploration, which was responsible for financing the Norwegian welfare state but also its repercussions on data control and collection in the country. This section ties back with Chapters 2 and 3, which outlined the political process of oil exploration in Norway to explore how digitalization – of oil but also of any other world aspect – is complex and nuanced with political choices which might affect the quality of data and who has access to it. In Norway, the political process of oil exploration and later digitalization was essential to make the oil data a public good and finance the Norwegian welfare. In other countries, such as the United States, the process of privatization of oil drilling was essential to put data in the control of the private sector and eventually further the divide between the private and the public sector. Through this analysis, the author connects directly with Rob Kitchin (2014b) and Lisa Gitelman (2013) who argue that data is not simply data, but instead, a process that is conceived and nuanced depending on those who capture, analyze, and draw conclusions from them, and that data is not "raw", but a cultural resource that is socially interpreted and shaped.

In this context of social interpretation and shaping of data, the author explores datafication of the marine environment through the Venus Project, a project that started in 2005 aiming to test the viability of using IoT in the ocean. While the project did not get much attention initially, political processes and the need for further exploration of oil reserves located in the ocean have raised

attention to it, demonstrating once again how political and financial motivations often influence the collection and interpretation of data. The hard task of quantification of the marine environment, as well as other phenomena such as climate change, has the effect of reducing nuances into metrics, "transforming quality into quantity" (p. 164), eventually influencing the methods of environmental classification to ones that favor a specific political or philosophical thought. Therefore, the environmental complexity of the ocean is transformed into numbers through datafication, and once parameters are put in place, numbers become more acceptable than reality, allowing the exploration of ocean zones that before were excluded from oil exploration.

The third and last section of the book is named *Implications* and consists of the *Conclusion* in Chapter 8. Here, the author elaborates and synthetizes the previous sections, exploring the implications of digitalization moving from oil to the process of datafication of society. Overall, Monteiro takes the readers on a journey that initiates from a very specific context of the Norwegian oil exploration, and its process of datafication but expands to explore how the same obstacles are faced in multiple scenarios that are going through datafication. Taking a provocative route, the author accomplishes the task of demonstrating the interconnections between the tangible and the intangible worlds by emphasizing how organizational and institutional aspects shape how data is collected and processed. Through this process, Monteiro demonstrates how data is a dynamic concept, and how this changeable characteristic impacts how it is perceived and how its results will impact the world.

Hence, the merit of this book, in addition to allowing to learn more about the process of data oil, lies in enabling the comprehension of how the social organization and the institutional fabric shape technological advancements and the consequent expansion of datafication. Through the use of the oil industry as a backdrop, readers can appreciate the interconnections between the "data world" and the "real world" and comprehend how they interact and influence each other. Thus, the interdependent relationship between society, science, and technology is a source of inspiration for STS researchers, who can draw from the innovative angle of this book to enrich their own research.

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References

Gitelman, Lisa (ed.) (2013) *"Raw Data" Is an Oxymoron*, Cambridge (MA), The MIT Press.

Kitchin, Rob (2014a) *Big Data, new epistemologies and paradigm shifts*, in "Big Data & Society", 1(1), 2053951714528481.

Kitchin, Rob (2014b) *The Data Revolution: Big Data, Open Data, Data Infrastructures & Their Consequences*, Thousand Oaks, Sage Publications.

Kitchin, Rob (2021) *Data Lives: How Data Are Made and Shape Our World*, Briston, Policy Press.

Szczepański, Marcin (2020) *Is data the new oil? Competition issues in the digital economy* [Briefing], European Parliamentary Research Service (EPRS).

van Dijck, José (2014) *Datafication, dataism and dataveillance: Big Data between scientific paradigm and ideology*, in "Surveillance & Society", 12(2), pp. 197-208.