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Entrepreneurs, organizations and business models

Abraham Álvarez Martínez

I. Introduction

Now a days, coal still has an important influence as a source of energy worldwide, corresponding to 36% (IEA, 2023). Is in this scenario that Drummond LTD plays an essential role, since it aims at the mining of thermal coal. Drummond LTD is an enterprise who develops their coal exploration activities, production, transportation and exportation from the department of Cesar and Magdalena in Colombia, where the main coal mining mines and is the most important country in South and Central America responsible for exportation, and 6th worldwide (IEA, 2021).

The three mines in Drummond in Colombia are La Loma, El Descanso and El Corozo, all located in the department of Cesar. From these mines, the company carries out a robust logistics process that includes the rail transport of coal to its own port (Drummond Port), located in the department of Magdalena. Through this process, for 2023, the enterprise achieved to produce and export the amount of 29'563,329 tons of Coal (Morales, D. 2024), placing itself for their 8th consecutive year as the company with the most production and exportation of this mineral in Colombia. Being the main supplier for countries like Turkey, United States of America, Netherlands, Israel and Chile.

In addition to the economic side previously noted it, Drummond LTD., was responsible for giving jobs to 5.518 people during 2022 year, which by the way, reassures the positive influence on the economy and labor of the region. Drummond's mission is focused on supplying high-quality thermal coal in a competitive market with sustainability criteria, through research on positive financial trends, ensuring efficiency in production, and promoting the protection of natural resources and cultural diversity around its areas of operation (Drummond Ltd., 2013). The company aims to be more than just a producer, emphasizing the importance of aligning its operational strategy with environmental and social responsibility, protecting people's environment,

health and lives are fundamental pillars of their business strategy (Drummond Ltd., 2021). Their vision goes beyond extracting natural resources, focusing on developing sustainable strategies that minimize environmental impact while contributing to the well-being and prosperity of local communities and its employees.

To this matters, as well as any other company who dedicates to the production of Hydrocarbons, Drummond LTD., has to face a significant amount of challenges, the main being the massive production of this energetic source, is crucial for the sustainability of the whole industry, is also facing a peak demand of extraction, and through time this resources would be more and more limited (Tidd & Bessant, 2021) in addition “World global warming” consequences had been an important factor on the development of this process. For this matter, the global warming and the transition of this kind of energy, the enterprise has begun, between the years of 2021 through 2022, has made and intensive analysis to prepare a strategy, with the objective of maintaining the Coal as the reason of their activities. This effort is complemented with the investment of natural gas protects and the exploration of Renewable Energy, which shows their interest in expanding their sources of energy.

Besides these many challenges Drummond’s is facing, is the strengthening of the relationship with the local communities and the wellbeing of their residents and workers. One more challenge, according to Tidd y Bessant (2021) is to innovate the efficiency of production, with less amount of investment and less costs, which is mainly related to the correct administration of Water Resources, where the company has implemented new policies and processes to optimize the impact on this sector. Finally, one of the more important aspects is to protect biodiversity while maintaining the capacity of production.

II. Main assignment questions

a. Mapping all sustainability impacts

However, to identify the greatest sustainability impacts of Drummond LTD., it was chosen to make a review of its last four published sustainability reports, dating from 2019 to 2022 (the latter, published last year).

Nevertheless, it's crucial to understand and comprehend the meaning of sustainability impact, based on this, we will propose to study the terminology, more exactly, "sustainability problem", highlighting the negative impacts and effects on the social and environmental subject (Jørgensen & Pedersen, 2018). In this order, is fundamental to point out that also this represents positive effects on sustainability, but we will not be focusing on this specific area.

Standing on this statement, Drummond LTD. analyzes and develops solutions and paths on 3 main key principles: economy, society and environment (Drummond Ltd., 2023). The enterprise actively commits to embracing strategies not only for individual growth, but to maintain and incentivize sustainable development for long term, minimizing the negative externalities (Jørgensen & Pedersen, 2018) that could result through the operation.

Therefore, in the social aspect were identify 3 main impacts, respectively: Safety and Health at workspaces. Building a relationship between enterprises and local communities Including the representation, accommodation and security as a compensation for the use of the space due to mining activities done the enterprise. Finally, there an economic impact outside the business, and takes place in the communities around the working areas where there are established communities, this snowball effect produces an increase of the cost of living and compromise the demographic density, causing a loophole on the social security services (Drummond Ltd., 2023).

Moving to the environment portion of the equation, Drummond LTD. embraces and follows preventive measurements, and constantly looks after the correction and compensation of the

negative consequences alongside with the mining operations and its value and benefits. On this matter, 3 impacts were successfully identified on sustainability. Being the first one of them the damage of water resources, that is affected constantly. Besides, there is a higher risk increase of water contamination due to the chemicals used by the enterprise for the development process of mining. Followed by the concerns of environmental damage, biodiversity, the earth, flora and fauna. The harsh treatment of the vegetation and alteration of the soil which causes loss on the wildlife of the areas of extraction and surroundings.

Finally, greenhouse emissions, since open pit mining consumes large amounts of fossil fuels and has tremendous impact on climate change. Each stage of this mining process, including the removal of overburden, transportation, and the use of heavy machinery, significantly contributes to CO₂ emissions and according to literature, machinery used in coal extraction operations, such as large excavators, loaders, and trucks, rely heavily on diesel and other fossil fuels, making these stages particularly carbon demanding (Ivanova et al., 2022). In addition, the processes involved in the removal of soil and rock not only increase energy consumption but also disturbs carbon reservoirs, leading to further emissions, this environmental impact goes beyond CO₂, as large-scale coal extraction also releases methane, a gas with a significantly higher global warming potential than carbon dioxide, thus contributing more intensely to climate change (Kholod et al., 2020).

b. Materiality analysis

Having identified the most important sustainability impacts of Drummond Ltd., the materiality analysis will be carried out, considering that it seeks to determine what are the most outstanding social and environmental problems and prioritize them (Jørgensen & Pedersen, 2018), that is, identify the problems on which it is necessary to set eyes for both the company and stakeholders.

Thus, since 2012 Drummond Ltd. has identified its stakeholders and then developed a materiality analysis, among which, there are employees, suppliers, local communities close to extractive activity, the Colombian state, shareholders and public opinion. In that way, those reports published in the 2019 2020 and 2021 were analyzed, since, in the most recent, the materiality matrix is not

available. However, those published in 2019 and 2020-2021 (are practically the same) allow us to be a mouth opener to discussion, highlighting that for 2019 one of the most important aspects was the management of water resources while for 2021 it was only important, in the same way, although for 2019 the relationship with communities was very important, for 2021 it became an unavoidable impact for the interests of the company.

In this way, with respect to the 6 most important sustainability impacts identified: 3 social and 3 environmental (Figure 1. Materiality Matrix. Allows us to visualize the following paragraphs). The most important for the company and stakeholders is one that is not in any matrix, but in the 2022 sustainability report was added to the list of materiality, the emission of greenhouse gases, which generates global warming and the need for an energy transition. It is fundamental for stakeholders, since they demand renewable energy projects with the purpose of mitigating greenhouse gases, which would allow from a business perspective, new business opportunities diversifying their portfolio, added to the above, when talking about GHG, is the opportunity to develop processes that favor efficiency, (Tidd & Bessant, 2021).

Then and equally important, is the relationship with communities, since in 2023 the highest constitutional instance of Colombia determined that the company Drummond LTD., had violated the fundamental right to prior consultation of the Yukpa indigenous community, which represented before the interest groups an unfavorable matter, since the Magistrates explained that the open-air mines did not keep that Yukpa indigenous people in mind to carry out their extractive activities (Corte Constitucional, 2023). Due to these actions, from the company perspective, represents to restart the dialogues with the pertinent community, so as a monetary compensation. For this matter, this is a key point, as we notice in previous reports, has been increasing and it should continue and improve.

The third impact that becomes symmetrically relevant for both actors (stakeholders and companies) is safety and health at work, which is associated on the one hand with a legal framework and on the other hand, seeks to safeguard or protect dignity, life and guarantee human rights.

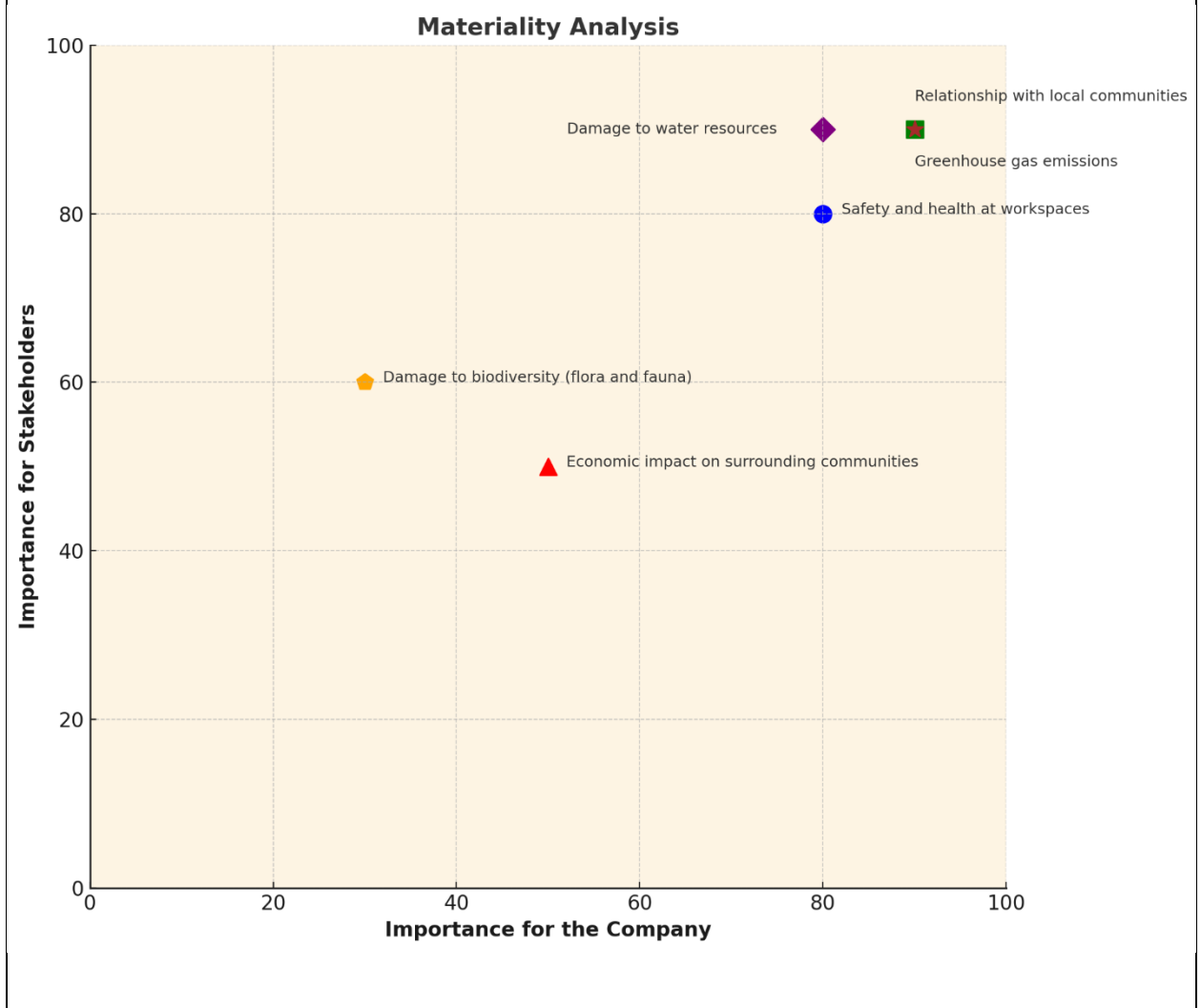
The following is based in the correct administration of water resources, every time the company generates major efficiency on their extraction activities, on the other side the interest groups make sure and pulls to their end to ensure that the water sources, in quality and quantity don't get contaminated and affected.

The sustainability for the local communities is vital and of high importance, although, these parties are in a position of dependency more than influence, for this, the company sees as a medium importance matter (Drummond Ltd., 2021).

Besides, the permanent damage in biodiversity, is the less relevant in the chart of obligations and priorities, but every time the activities affect directly, flora, fauna and soil, the environmental entity who allowed the process of extraction, determined standards and monetary compensations, who had ended in a really successful reforestation program.

In conclusion, Drummond LTD. Faces important challenges of sustainability, with the main focus of social and environmental dimensions. Base on some of their most recent analysis published, the principal focus is on decrease the gas emissions and the energetic transition, next to the proper relationship with the local communities directly affected, damage of biodiversity, even being very crucial, it has a lower importance than the other two main factors.

Figure 1. Materiality Matrix – Personal Construction



c. Padoxes

Given the above, the most important challenges and impacts of sustainability of Drummond LTD have been identified, allowing us to reflect on the tensions that arise when talking about business sustainability, since achieving an economic goal can have detrimental effects on the social or environmental sphere (Hahn, Figge, Pinkse, & Preuss, 2018).

Therefore, in this section, the sustainability paradoxes presented by the company Drummond LTD will be studied with a central paradox that encompasses two interrelated facets: the conflict between the energy transition, economic stability, and environmental preservation. The first facet of this paradox is the tension relating energy transition and dependence on coal. At first, the conflict arises between an environmental claim, which corresponds to the global need to reduce dependence on fossil fuels in the face of an economic claim, since the extraction and export of coal represents Drummond's source of income. Therefore, there is a contradiction between the energy transition and the economic viability of the company. However, if we analyze the situation in detail, there would be not only a tension between the economic and environmental, but also between the social and the environmental, since mining activity increases local incomes and boosts the economy, which is why, trying to reduce such a large source of employment in search of an energy transition would reduce the labor force in an emerging market.

The second facet of this central paradox lies in the tension between the protection of natural resources and mining activity itself. This is because sustainability thinks about the long breath, as it includes the needs of future generations (Hahn, Figge, Pinkse, & Preuss, 2018). Accordingly, mining activity is destructive from an environmental approach, since there is removal of large amounts of soil, diversion of rivers and intervention of local ecosystems, on the other hand, mining activity serves a logic of market and profit, so, even though compensation and mitigation measures are established, land and water will not be the same again.

In this way, Drummond LTD according to Hahn, Figge, Pinkse, & Preuss (2018) has acquired a paradoxical perspective, which allows it to accept the tensions that arise; despite this, work on different sustainability objectives simultaneously, even if they are conflictive.

d. Complexities

Regarding complexities, Nguyen Duc and Leik (2023) have pointed out that complexities in the sustainability paradigm can arise when the social object or project is more focused on the environment and social performance than on profits; on the other hand, Epstein and Rejc (2017)

have indicated that complexities involve the entire value chain of the company, this includes its products, services, processes and even its members.

With this in mind, two complexities involving some stages of the Drummond LTD value chain will be presented below., specifically those corresponding to the management of water resources and greenhouse gas emissions, the complexity with respect to these two elements is due on the one hand, to the implementation of practices and technologies available to on the one hand, optimize the use of water resources and on the other, reduce the carbon footprint of the operation. mining.

About water resource management, by analyzing the last four sustainability reports it is possible to recognize that it has been possible to reconcile operational needs with environmental sustainability, since they have saved more than 1.475.722 cubic meters of water (Drummond Ltd., 2023), by designing and implementing strategies that allow the optimization of the water resource.

However, in relation to the coal footprint, the complexities that understand it are more complicated, since they involve the entire value chain: extraction, transport, processing, management and port operations and export. In this sense, the complexity lies in the limitation of new technologies and processes that allow greater energy efficiency and even in the reduction technology in extraction operations, which as previously mentioned, depend on diesel and other fossil fuels. Therein lies the complexity, in the development of new technologies to solve the sustainability constraints in the value chain of the operation.

e. New and more sustainable business model

Jørgensen and Pedersen (2018) structure the business model into three fundamental parts: value creation, which refers to how the company helps customers solve a problem or perform a task at a certain price; value delivery, which involves the key resources, activities and partners needed to carry out what the value proposition requires; and value capture, which describes how the company generates revenue through a specific revenue model and a defined cost structure. This

conceptualization allows organizations to draw and adjust their strategies to maximize efficiency and effectiveness in achieving their business goals.

Accordingly, a new business model will be suggested that includes the three elements envisaged by Jørgensen and Pedersen considering the following: The current business model of Drummond LTD., focuses on the exploration, extraction, production and transport and export of thermal carbon from the department of Cesar in Colombia. This department has some particularities that favor renewable energy projects (Universidad Nacional de Colombia, 2024); specifically of photovoltaic projects, proof of this is that the largest solar park in Colombia is in that same region and represented by 2020, 80 percent of the installed solar capacity in Colombia (OilChannel.tv, 2020).

Considering that a large part of the thermal coal exported by Drummond LTD is for energy production, the following is proposed:

Value creation: Renewable energy service, specifically, the creation of solar parks in the areas or open pit mines where the company is already based, with the fortune of being in a geographically viable place for the execution of said project. So, they would offer added value by being a sustainable and competitive alternative to coal.

Value delivery: At this point it is important to integrate key resources and for, Drummond LTD., tells the fortune of knowledge and experience of managing large projects; however, the relationship is important, focused on forming strategic alliances with technology development companies in photovoltaics, as it will allow it to be at the forefront in the business of production and commercialization of renewable energy.

Value capture: Drummond LTD., could have as main source of income the direct sale of energy to the national grid; in addition, unlike traditional extractive activities, since it is a business around renewable energy, there are more than twenty tax benefits ranging from the income tax discount to tax benefits with a fifteen-year projection (Ministerio de Ambiente, 2022).

In this way, the new business model aims to break into the energy market, making a transition from traditional extractives models to transform the exploitation of coal to solar parks in those same places, eliminating the constant production of greenhouse gases, including carbon dioxide and methane. In this way, continue with economic development and job creation in Cesar, department of Colombia. However, it is important to recognize the defies around this change of the current business model, highlighting technological integration and initial financing, although the vast experience of Drummond LTD. and the possibility of building strategic alliances allow us to assume the success of this transition.

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