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Investing in sustainability

Information Technology: Software, Media and Telecommunications

Sustainable Development Sector Analysis Framework

January 2018

This is a methodological document aimed at clarifying how Mirova takes into account sustainable development issues in the framework of the environmental, social and governance analysis of each sub-sector of activity.

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Digitalization is the source of this century's disruptions. Whether communicating, socializing, working or consuming, software and the media are increasingly ubiquitous in our daily lives. Although Information and Communications Technology (ICT) present new problems for society, particularly in terms of respect for privacy, its widening use can also be a strong vehicle for sustainable development solutions. ICTs can drive economic development and widen access to knowledge, particularly in developing countries. These technologies also have strong potential for developing ecological and/or social innovations, such as smart cities, smart grids, and smart buildings, all of which are tools that can help us move towards sustainable development in our society.

Sectors: Software development and software as a service, media (advertisers and content providers) and telecommunications operators

Table of contents

Sustainability Opportunities

ICTs for Sustainable Development

ICTs are being used to develop a growing number of tools that can have a positive environmental and social impact. By enabling the emergence of various solutions, ICTs are an essential aspect of sustainable development.

Numerous examples illustrate the capacity of ICTs to offer new solutions to environmental and social challenges. The deployment of intelligent flow management systems, at the crossroads of machine-to-machine communication (M2M) and big data, is a very good example of this. Applied on a large scale in the energy and water (smart grids), transport, agriculture, construction and industrial processing sectors, these solutions account for most of the carbon emissions avoided via the ICT sector. In total, this reduction in global emissions could represent up to 12.08 GtCO2e by 2030, enabling the stabilization of emissions level compared with 2015 (GeSI, 2015).

Other uses of ICTs which carry environmental and social benefits include the development of impact optimization software. This type of solution makes it possible to virtually test products and improve them before prototyping, thus avoiding the multiplication of prototypes, the introduction of defective models on the market and achieving the optimization of products in terms of both the environment and user health and safety.

ICTs are also applied in many different ways in the medical field: in-home medical observation, remote diagnosis, centralized management of patient data in medical institutions, modelling of biological systems, etc. These solutions act as a lever for improving patient care and supporting medical research.

The environmental and social advances made possible by new technologies generate many opportunities in all other sectors, and these represent opportunities for ICT companies that are well positioned in these new markets. This can therefore mean significant financial benefits for companies in these segments.

We favour companies who devote a significant part of their activity to the development of products and services that are sustainable solutions, provided that the environmental and/or social benefits generated can be assessed.

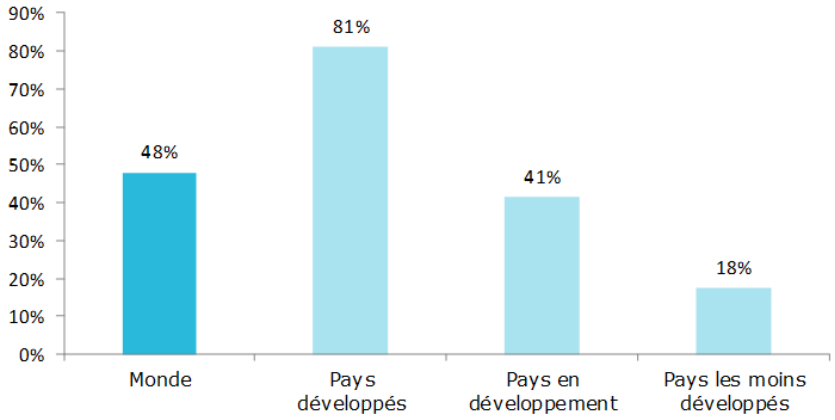
KEY INDICATORS

- Share of revenue generated by products/services dedicated to benefitting from these opportunities
- Environmental/social performance generated.

Access to ICTs

For non-OECD countries, access to ICTs is a major economic and social development issue. In developing countries, nearly 60% of the population still lacks internet access. This figure rises to over 80% in the least-developed countries (ITU, 2017), while the illiteracy rate is still at an average of 12% among young people and 20% among adults (UNESCO, 2012). It is also estimated that a 10% increase in broadband penetration among these populations is accompanied by a 1.4 percentage point increase in GDP (World Bank, 2009).

Figure 1: Share of the population with internet access in 2017



Source: Mirova/ (ITU, 2017)

The digital divide is also an issue in mature economies, although de facto affecting a smaller part of the population. Indeed, rural areas remain poorly connected. 15% of the population does not yet have internet and 5% of internet users have a speed of less than 10 Mbit/s (ITU, 2017). Furthermore, the difficulty of accessing ICTs is an additional disadvantage for the elderly, those on low incomes and those with disabilities.

Solutions for bridging the digital divide and harnessing ICTs for development are multiple. In particular, we encourage the extension of fixed and mobile coverage in less well-fitted areas and the development of products and services dedicated to the needs of the most deprived populations (low-cost offers, mobile banking services, mobile education services, disabled access, etc.). We promote companies that are significantly involved in developing and providing these types of solutions, particularly in developing countries.

KEY INDICATORS

- Share of turnover generated in emerging and developing countries
- Share of turnover generated by products and services dedicated to promoting access to ICTs
- Number of users of the products and services that provide greater access to ICTs

Exposure to Opportunities

	Indicator considered: % of revenues generated in emerging countries % of revenues generated from ICTs for sustainable development % of revenues generated from ICT access solutions	
High exposure	>50%	An analysis of the company's strategy and investments will complement these quantitative elements.
Significant exposure	Between 10% and 50%	
Low or no exposure	<10%	
Negative exposure	No product or service in the ICT sector is currently considered as negatively impacting a sustainable development issue	

Environmental and Social Risk

Privacy Protection

Privacy protection is recognized as a fundamental right by the Universal Declaration of Human Rights, adopted by the United Nations in 1948, but the emergence of ICTs raises new questions about the limits and boundaries of the right to privacy. The ICT industry collects an ever-increasing amount of data on the users of these technologies, a phenomenon which is explained by a double trend.

On the one hand, there is the increasing incorporation of connected objects into our daily lives (smartphones, tablets, smartwatches, etc.), in cars (from GPS to more sophisticated solutions for assisted driving), in buildings (smart meters, censors, etc.), and integration on a larger scale (smart grids, smart cities, etc.). This equipment and the associated software and platforms collect a growing amount of data related to their users (geolocation, consumption habits, personal interests, political inclinations, etc.).

On the other hand, the internet plays an ever more central role in mainstream life and culture. For example, the digitization of payment, of communications and administrative management methods, etc. generate a migration of personal information towards dematerialized media.

In short, ICT companies are the recipients of an exponential mass of information about users of connected products and digital services. The use of such data may pose a risk to privacy, in particular:

Data theft. Companies' responsibility to ensure the security of their users' data lies in the proper training of their employees and the implementation of measures to prevent human error. Certain breaches in databases are due to employees being insufficiently aware of the risks or, less frequently, malicious. However, the vast majority of these breaches result from external attacks exploiting security flaws in companies' hardware and software. Cyber-security is all the more critical as the mass of user data grows exponentially and cyber attacks intensify. In other words, there are more attacks and each attack targets more data than ever before. These attacks are a real risk for companies but also and above all, for users whose data is obtained illegally (moral and/or financial harm). Data security is therefore a prerequisite for privacy. In order to preserve individual liberty, appropriate data security solutions must accompany the development of these technologies.

Abusive use of data by companies. The processing of user data represents a major opportunity for software and media companies. They have the ability to better understand the behaviour of their users and refine their products and services accordingly, but also to monetize this data through targeted advertising activities. Whether for internal use (refining one's own products and services) or external use (data resale or marketing of a targeted advertising service based on this data), data collection has become widespread on websites, applications and connected objects. However, these practices are rarely accompanied by a sufficient degree of transparency towards users. The latter often have only a partial understanding of how their data is used and limited power to act on how data is collected and the use made of it. The risk of invasion of privacy is particularly high among companies that collect a large amount of information (photos, videos, geolocation, etc.) and whose "free" business model relies on the monetization of user data (social networks, mobile video game applications, etc.). It should also be noted that many of these companies still offer only a limited possibility of erasing old data, a problem that directly echoes the subject of the right to privacy and that has given rise to regulatory considerations, particularly in the European Union with the European Data Protection Directive, including the notion of the "right to be forgotten".

Abusive use of data by public authorities. Numerous requests for access to personal data are made by government agencies to ICT companies. These requests are often linked to criminal cases (robberies, kidnappings, etc.), but have tended to increase in number, change in nature and create more tension in the context of the fight against terrorism. ICT companies

must therefore ensure that such requests comply with international conventions and the legal framework before they are acted upon. This problem is particularly acute when demand comes from non-democratic regimes, as demonstrated for example by government repression facilitated by the use of user data during the "Saffron revolution" in Iran in 2007 (Faris, 2012).

Business practices regarding the management of fundamental freedoms are regularly called into question by the general public, while regulatory frameworks develop differently depending on geographical area (more flexible in the United States versus stronger in Europe). It is important that ICT companies address these issues and put in place measures to ensure that the fundamental rights of users are respected. Although there have been a large number of controversies, their financial impact has not been significant. An increasing number of fines and organizational changes are being imposed on internet giants. At the same time, the mass of users and data collected continues to grow, so that companies' revenues are only marginally affected.

In terms of private data preservation, companies are encouraged to detail investments made in cybersecurity, practices put in place and attacks suffered.

With regard to privacy, good practice remains rare. We encourage companies, particularly those that rely on data monetization, to make sure their users are in a position to make a well-informed and proactive choice about the type and use of information collected, as well as having the opportunity to erase any private information about themselves.

The implementation of chargeable alternatives where services are not based on data monetization or advertising provides another possible solution to this problem.

KEY INDICATORS

- Existence of a policy on data security and privacy (type of data and sources of collection, type of use and possible sharing with third parties)
- Investment in and IT teams dedicated to cybersecurity, default opt-out settings for user data collection, setting up a procedure to erase private information
- Existence of chargeable alternatives without advertising
- Periodic reporting on cyber attacks suffered/avoided and their impact, reporting on government requests concerning the transmission of user data

Content and Platforms Responsibility

Internet companies, media, advertisers and game developers have a responsibility to limit the social risks associated with the platforms and content they distribute. This responsibility functions at several levels.

User protection. Companies must be able to protect their users from violent content, predators or indoctrination.

The risk of disinformation. The main social networks and news feeds risk spreading and amplifying false information and thereby participating in users being misinformed. “Fake news" is widely shared through these platforms, to the point that many governments and regulators are concerned about it. This problem also affects more traditional media (television, radio, newspapers), although they are often recognized as reliable sources of information. On another level, search engine and social network algorithms present the risk of skewing their users' access to information and thus distorting their perception of reality. The purpose of these algorithms is to prioritize content according to the data in each profile, with the risk of progressively "locking" the user in a bubble of similar information. This issue echoes the reflections on net neutrality, a concept based on the idea that access to information must be free and unbiased. To limit this risk, companies must limit the prioritization of content to its relevance (language, subject, etc.), without incorporating other factors (profiling of personal

and political interests for example) or, at the very least, allow the user to define the criteria used to filter the content he/she will receive.

The social impact of content. For developers of this type of content (including advertisers or music and series producers), it is above all a question of fighting against the promotion of negative messages: banalization of discrimination, anorexia, sexualization of young adolescents, etc. The aim is to prevent the spread of negative messages. For broadcasters, the key point is the adequacy of content in terms of user maturity. Therefore, children's content must be subject to increased vigilance and advertising practices addressed (directly or indirectly) at this audience should be avoided.

Psychological dependency on media and platforms. On this subject, criticism was directed first at television and later the video game industry. Dependency is mainly linked to the cognitive appeal of media that is all-encompassing (sound/image), and interactive in the case of video games, and that is a vehicle of attractive content (emotional loads, information content, entertainment, etc.). Video games are particularly relevant here because of the continuity of their content, which can reduce awareness of time. The development of online platforms further increases this problem by increasing the accessibility of content via smartphone applications. Users of online social networks are even more exposed to the risk of psychological dependence. In addition to presenting similar factors (interactivity, attractive content, almost uninterrupted accessibility), social networks are also developed on the basis of algorithms that ensure optimal suitability for the user's tastes and accentuate certain dependency-generating social patterns.

The general public regularly raises concerns over ICT companies relating to the social responsibility of their platforms and content. Beyond the problem of reputation, certain controversies such as that of "fake news" or the promotion of extreme thinness in advertising have led some regulators to strengthen their framework, with operational repercussions for the companies concerned. However, these controversies still pose only a relatively small financial risk at this stage.

Companies developing platforms and content must implement appropriate measures to protect their users: automated filtering, flagging options and a dedicated team to process alerts.

The mechanisms to be put in place regarding false information are similar. As far as platform neutrality is concerned, it is important to understand how companies incorporate this problem from the design stage of their algorithms.

Companies are also encouraged to systematize their approach to content's social responsibility and provide appropriate access management tools. Good practice includes proactively limiting advertising directed at children.

Finally, we encourage companies to take into account and act on the risk of psychological dependence when it comes to their platforms and services from the design stage onwards (periodic alerts in video games, prevention messages, etc.).

KEY INDICATORS

- Existence of a systematic approach to the quality of content and platforms
- Establishment of mechanisms to identify and control undesirable content
- Incorporation of the concept of neutrality by design
- Commitments and practices on the social impact of children's advertising content
- Development of signalling and content control tools (PEGI, parental control)
- Incorporation of dependency risk by design and preventive communication

Human Resources

The ICT sector has been the subject of several controversies regarding its human resource management practices: offshoring, working conditions in call centres, burnout, harassment, etc. Telecommunications companies, due to market concentration, have been particularly affected by restructuring in recent years and the consequences of this have been serious.

However, we are witnessing a similar trend within software as a service companies. These companies are driven by technological innovations to adapt their models in order to gain advantages when it comes to new solutions related to digitization.

Controversies related to difficult working conditions in telecommunications have sometimes had a serious financial impact on certain companies. However, outside this specific sector, human resources issues do not yet give rise to significant financial risk.

Faced with these risks, companies in this sector can put in place appropriate policies to ensure that all their employees benefit from good working conditions, and that restructuring is either prevented or at least managed responsibly. We expect to see human resources policies aimed at controlling the age pyramid, supporting the development of employees' career paths and their employability, as well as encouraging social dialogue. Companies are encouraged to create optimal working conditions for the well-being of their employees. During restructuring, it is also important to ensure the quality of support (training, compensation, etc.). Transparent communication is also needed to assess performance.

KEY INDICATORS

- Share of employees located in countries with less regulation and measures to promote fair working conditions
- Number of employees working in call centres and measures to ensure good working conditions
- Annualized attrition rate
- Restructuring: number of people concerned, share of beneficiaries of mitigation measures (early retirement, training and job-search assistance, etc.), compensatory measures, etc.

Environmental Impact of ICT Infrastructure

The widespread use of digital communication modes, the increasing use of online data storage (cloud) and the development of intelligent machines and networks (internet of things, smart grid, etc.) require the deployment of adapted telecommunications networks and imply an exponential increase in the volume of existing digital data. This volume is expected to reach 44 zettabytes in 2020, ten times more than in 2013. This generates a significant increase in the energy consumption of network and storage infrastructure, which is now responsible for increasing CO2 emissions in the ICT sector, faster than the average for other sectors.

For network infrastructure, we favour companies that invest in upgrading their mobile network equipment to optimize energy efficiency and utilization, as well as in the use of renewable energy. With regard to data centres, we promote efforts such as the consolidation of storage centres, measures to improve energy efficiency (free cooling, etc.) and the use of renewable energies.

KEY INDICATORS

- Trends in the energy efficiency of infrastructure
- Share of renewable energy consumed
- Carbon impact

Business Ethics

As with all sectors, business ethics is an important issue and ICT companies must be able to prevent the risk of bad practice (corruption, fraud, etc.).

However, this industry is particularly exposed to competition regulation issues. In a context of concentration of players (telecommunications and the media), and even oligopoly for internet companies, companies are often the subject of controversies related to the infringement of intellectual property rights or the abuse of a dominant position. The emergence of regulations on net neutrality - which diverge from one geographic region to another - further reinforces these tensions. Some companies denounce unequal treatment in access to internet bandwidth or their visibility on search engines.

Because of its strong propensity to generate intellectual property-related revenue, the software and corporate net segment is also subject to particularly aggressive tax optimization strategies. The shortfall for governments is such that regulators are gradually tackling the issue. Despite considerable legislative developments, the sector continues to be very opaque on this issue vis-à-vis other stakeholders.

We encourage companies to detail their business ethics policies. The risk assessment on this subject is essentially based on a detailed analysis of companies' controversies and reactions.

It is also essential for companies concerned to communicate transparently on their tax optimization strategies.

KEY INDICATORS

- Litigation in progress and fines paid
- Significant ethical controversies and corporate responses
- Annual report detailing income earned and actual tax rates by country

Sustainable Development Governance

The integration of sustainable development strategy into governance structure is essential for the ICT industry, which is likely to support the transition towards a sustainable development model for our societies, but which also carries strong risks in terms of social, societal and governance questions.

We encourage companies to set up governance bodies dedicated to implementing corporate responsibility and incorporating the interests of all stakeholders, as well as aligning the interests of executives with long-term business development.

We also pay close attention to companies' approaches to value distribution, which should be carried out in a way that is fair to all of the company's stakeholders.

KEY INDICATORS

- Quality of the sustainable development approach
- A director or board committee specifically responsible for CSR matters.
- Incorporation of non-financial criteria into the variable compensation of executives
- Equity in value distribution

Risk Assessment

	Criteria
Positive	Does not meet the criteria for switching to "Risk" AND - Satisfactory privacy protection policy and reporting - Advanced practices in terms of content/platforms responsibility - Satisfactory human resources management - Comprehensive policy to reduce the environmental impact of network or storage infrastructure.
Neutral	All other cases
Risk	- Practices deemed insufficient and reaction deemed inappropriate in response to controversies over users' privacy OR - Reaction by the company to repeated social controversies deemed insufficient or inappropriate OR - Reaction by the company to repeated ethical controversies deemed insufficient or inappropriate

Conclusion

The ICT sector is a strong vehicle for economic and social development for all populations, particularly those in emerging countries. It is also the breeding ground on which many solutions to the challenges of sustainable development, which concerns all other sectors of activity, are being developed. The players positioned in these markets are therefore favoured within the framework of a responsible investment policy.

Companies are also assessed on their management of the risks inherent in their activities. Typically, for software and communication companies, the following risks are taken into account: respect for privacy rights, responsibility for content and platforms, working conditions and human resources management, reducing the environmental impact of network and storage infrastructure, and business ethics. In the "business as usual" activities (i.e. those not positioned on pre-defined key opportunities), good management of these risks, which guarantee the sustainability of activity, may represent a favourable differentiating criterion.

Conversely, a company presenting opportunities in its business portfolio, but also shortcomings in the management of its main risks, may be excluded from our investments. Finally, a lack of public information on risk management will require us to make contact with the company. A commitment approach will enable us to obtain the information that is lacking in our analysis, or to encourage the company to be more transparent.

Our Approach to sustainability assessment

Acting as a responsible investor requires interpreting the economic world within its social and environmental context. This approach calls for understanding the interactions between different private-public players, small-medium-large companies, developed and developing economies to ensure that each player's growth is consistent with the balance of the rest of the system. It is a long-term approach that guarantees that today's choices will not lead to negative consequences for future generations. Understanding these complex relationships demands:

- Clear understanding of sustainable development issues facing our societies,
- Assessing the possible interactions between the assets of our investment strategies and these sustainability issues.

The SDGs as a Guide

Following the Millennium Development Goals created in 2000, the United Nations set out a new framework for sustainable development in 2015. It contains 17 Sustainable Development Goals (SDGs), broken down into 169 specific targets designed to address the main social and environmental issues between 2015 and 2030. In addition to having been adopted by all members of the United Nations, the SGDs offer several advantages.

First, they establish a comprehensive framework concerning environmental and social issues, applicable to all economies regardless of their level of development. Thus, while some issues such as ending hunger or ensuring access to water for all are often more relevant for low- and middle-income countries, other objectives such as fighting climate change or making cities safe, resilient and sustainable, are applicable at all levels of development.

Moreover, the SDGs can be considered as a frame of reference for sustainable development issues for a variety of actors, from governments to companies and investors. The private sphere is increasingly considering environmental and social issues, illustrating new forms of governance where subjects of general interest are no longer solely the prerogative of the public sphere. Considering the SDGs can help companies to think on how they create environmental, economic, and social value.

Finally, the SDGs help investors to question the long-term resilience of their assets and portfolios to the ongoing transformations. Then, investors can go even further by looking at their exposure to new solutions and economic models that will respond to long-term economic transformations. For example, the targets associated with the SDGs to significantly increase the share of renewable energy and to double energy efficiency by 2030 imply a profound transformation within the energy sector.

We consider the SDGs squarely in line with our mission. As a result, in 2016, Mirova decided to use this framework to define its responsible investment approach.

Figure 2: The 17 Sustainable Development Goals

	End poverty in all its forms everywhere		Reduce inequalities within and among countries
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture		Make cities and human settlements inclusive, safe, resilient and sustainable
	Ensure healthy lives and promote well-being for all at all ages		Ensure sustainable consumption and production patterns
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		Take urgent measures to combat climate change and its impacts
	Achieve gender equality and empower all women and girls		Conserve and sustainably use the oceans, seas and marine resources for sustainable development
	Ensure availability and sustainable management of water and sanitation for all		Protect, restore and promote sustainable use of territorial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
	Ensure access to affordable, reliable, sustainable and modern energy for all		Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		Strengthen the means of implementation and revitalize the global partnership for sustainable development
	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		

Source: United Nations

Assessing Environmental and Social Quality by the SDGs

We believe that the SDGs will transform the economy as we know it. Acting as a responsible investor starts with taking a broader view of the way investors think about the environmental and social profile of the assets they finance. These interactions can be grouped into two categories:

- **Materiality**: how the current transitions are likely to affect the economic models of the assets financed either positively or negatively.
- **Impact:** how investors can play a role in the emergence of a more sustainable economy

We believe that these two approaches are closely linked. Our evaluation methodology thus seeks to capture the extent to which each asset contributes to the SDGs. From our perspective, this approach provides a relevant vision on both the “Materiality” and “Impact” aspects.

A Five-level Qualitative Analysis

Mirova has based its environmental and social evaluation method on four principles:

A RISK/OPPORTUNITY APPROACH

Achieving the SDGs requires taking two different dimensions into account that often go together.

- Capturing opportunities: when companies center their strategies on innovative business models and technologies focused on technological and societal transformation, they can often capture opportunities related to the SDGs.
- Managing risks: by proactively managing risks related to these transitions, companies can reduce and re-internalize their social and environmental externalities, which often takes the form of general management of sustainability issues.

This analysis structure gives equal importance to opportunities and risks. It is the first prism through which we analyze sustainable development issues.

A LIFE-CYCLE VISION

To identify the issues that could impact an asset, the analysis of environmental and social issues must consider the entire life cycle of products and services, from raw material extraction to end-of-life phase.

TARGETED AND DIFFERENTIATED ISSUES

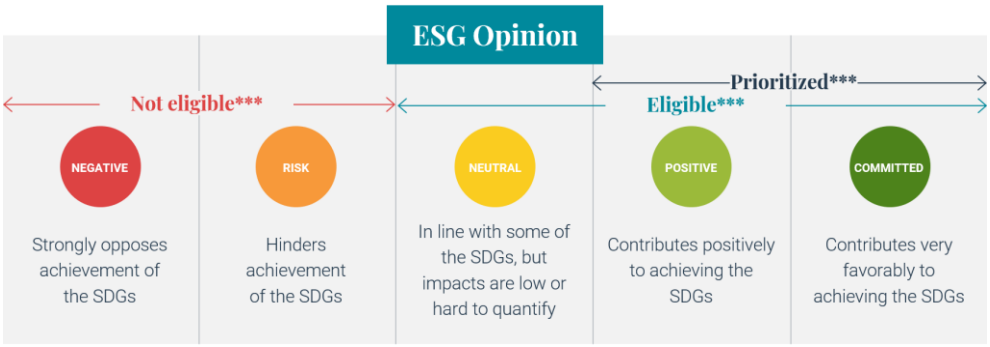
Our risk/opportunity analysis focuses on the elements most likely to have a real impact on the assets studied and on society in general. Additionally, the issues that economic players face

are very different depending on the sector, and can even vary within the same sector[1]. For example, it is important for us to focus on work conditions for suppliers in the textile industry, while for automobile manufacturers, the focus will be more on energy consumption during product use.

So, our analysis focuses on a limited number of issues adapted to the specificities of each asset.

A QUALITATIVE RATING SCALE

Our analyses are summarized through an overall qualitative opinion on five levels. This opinion assesses to what extent an asset contributes to the SDGs.



***[2]

This rating scale is based on the SDGs and their achievement. As a result, opinions are not assigned based on a distribution set in advance: we are not grading on a curve overall or by sector. Mirova does not exclude any industry on principle, and carries out a thorough analysis of the environmental and social impacts of any asset. For some sectors, this analysis may lead to the exclusion of all or some of its actors. For example, companies involved in fossil fuel extraction are considered “Risk” at best, while renewable energy companies are generally well rated.

An indicative grid provides some overall guidelines regarding the links between opportunities, risks and the overall sustainability opinion.

Sustainability Risks Review					
	Positive	Risk	Positive	Positive / Committed	Committed
	Neutral	Negative / Risk	Neutral	Neutral / Positive	Positive / Committed
	Risk	Negative	Negative / Risk	Risk	Risk
		Negative	Low or no	Significant	High
		Sustainability Opportunities Exposure			

1 For every sector, defining key issues is the subject of a specific study. This document is available on Mirova *website.* https://www.mirova.com/fr/recherche/comprendre#vision
2 *** For Mirova’s investments

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