Environmental component of socially responsible policy of multinational companies

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Abstract. The article is aimed at studying environmental responsibility of multinational enterprises in electronics and IT sectors. The main aspects of environmental policy of global business enterprises have been systematized, their characteristics for such high-tech market leaders as Alphabet Inc, IBM and Intel Corporation have been given. Corporate policies have been analyzed and compared in three aspects of environmental activity of the companies selected for this study: waste recycling, energy use and environmental impact. The results of the analysis of eco-responsible companies' practices show that each company forms management style and tools by implementing environmental responsibility, but none of them has managed to hold higher positions in the ranking of business environmental responsibility. Reserves for activating eco-oriented companies' policy in IT sector have been identified.

1. Introduction

Sustainability and sustainable development – are the key categories of economic, environmental and social transformations in the context of social relations globalization. Sustainability in modern realities of greening social and economic systems is understood as nature or characteristic of something that is maintained or works continuously (can be dynamic stability). Sustainable development predetermines public consumption without affecting future generations to meet their needs. It gives opportunity to reconsider principles of business development, to direct it to socially responsible production. Deteriorating ecological state of the environment, increasing consumption and declining natural resources reserve stimulate society for transition to a low-carbon economy and form new business models focused on environmental protection and responsible attitude to it. Necessity to reduce natural resources consumption, economic business management on the basis of environmental responsibility affect peculiarities of multinational enterprises functioning. Environmental responsibility is becoming one of the most significant values and needs being considered for development strategy of international and national producers of goods and services [1, 2].

Because of growing global environmental problems and tendency towards corporate social responsibility and unions between corporations and non-governmental organizations, organizations are developing joint unions in different sectors and countries to address environmental issues. International perspective is required to explain global structure of intersectoral alliance networks and communication divergence or similarity between countries.

Researchers highlight that more and more companies understand significance of corporate responsibility enabling them to operate in different countries, including environmental principles, interconnection between environmental business component and its image in the market [3-10]. MNCs, which actively disseminate environmental responsibility, promote implementing measures to minimize negative impact on environment and support developing green solutions for consumers, increase resource conservation, undoubtedly become leaders and increase their competitiveness in international environment.

International world leading companies give society an example of their attitude towards the environment [11]. In the context of deepening environmental crisis and world economy globalization, it becomes of great importance to study experience and gain from economically developed countries and multinational enterprises about their implementation of environmental innovations [12, 13].

Solving the problems of interaction with natural environment leads to changes in many aspects of business operation, especially electronics and IT sector manufacturers. Environmental friendliness in IT sector is becoming a problem, because to achieve greenery benefits, we should change in thinking [14].

Consequently, researching and identifying peculiarities of caring green eco-responsible practices of global leading companies that operate responsibly in relation to natural environment in the world can become significant information resource, forcing other companies to work for the good of society. It is necessary to study global companies around the world and their experience of environmental responsibility for the society. Therefore, this study presents and analyzes how individual multinational companies operate as an example of companies implementing environmental policy and operating eco-consciously and responsibly in the field of electronics and IT sector.

2. Research methodology

During this study we have identified the content, analyzed and compared selected electronics manufacturers operating in three aspects of environmentally responsible activity: waste management, energy and emissions management, water conservation. Data for studying have been taken from multinational companies' official annual reports, from studies presented on the Internet by individual scholars, specialized companies and agencies.

As information sources we have also used rankings compiled by international agencies, consulting, media and research companies, business media, in particular such periodicals as: "Fortune", "Newsweek", "Barron's", and such companies as: "Corporate Knights", "The Boston Consulting Group", "Interbrand", "Reputation Institute".

Methodological basis for this study includes systemic and comprehensive approaches (while considering corporate social responsibility of multinational companies in a multifaceted dimension), method of generalized independent characteristics (for positioning companies according to business greening indicators based on systematization of information obtained from different sources), method of induction (for identifying general peculiarities and characteristics of multinational companies that operate environmentally responsible and transferring from individual manifestations of conscious resources consumption to systemic corporate responsibility), factor analysis (for identifying factors of corporate social responsibility and studying their interconnection), method of ranking assessment (to systematize positions of multinational companies promoting greenery business and developing corporate social responsibility).

3. Multinational enterprises operating eco-responsibly in electronics and IT sectors

Operation of multinational enterprises manufacturing electronics and developing IT solutions have a significant impact on the environment and are related to a wide range of environmental aspects. Large number of processes, operations and materials used for manufacturing and using electronic devices – are sources for a huge number of substances having adverse effect on humans and biosphere.

Along with that this sector leaders are doing everything possible to ensure that resources used in business, production process, finished products and IT solutions meet environmental requirements, are certified by environmental labels, are safe for human health and the environment.

Studies of multinational enterprises show that the latter standardize various aspects of environmental policy in response to various external stakeholders' pressure. Companies' peculiarities, as well as nature of stakeholders' requirements, their pressure affect diversity of environmentally responsible actions of multinational enterprises.

Due to the fact that environmental policy standardization reduces companies' ability to use interstate differences in environmental norms, self-regulation of companies' environmental behavior is also becoming more standardized [15, 16].

Main aspects of environmental responsibility of multinational companies – manufacturers of electronics and IT sector include [16]:

- compliance with environmental legislation (emissions, waste management, labor safety);
- compliance with clear requirements for quality and environmental safety of raw materials;
- ensuring electromagnetic safety when using devices;
- absence of carcinogenic, mutagenic, toxic substances, heavy metals (lead, mercury, cadmium, hexavalent chromium, etc.) in the products;
- low level of nickel emissions from product surface;
- availability of environmental management system at the enterprise, including environmental policy, environmental protection plan, staff training;
- reducing waste, transferring the biggest amount of production waste for recycling or reuse;
- organizing competent processing and utilization of equipment decommissioned and collected from consumers;
- using packaging material that has been 100% recycled or that can be easily divided into components for further processing.

Further are given some aspects' peculiarities for definite manufacturers of electronics and IT sector. As being a study object we have selected three high-tech companies manufacturing electronics and IT solutions, operating in IT sector and producing mobile phones, TVs and personal computers: Alphabet Inc, IBM and Intel Corporation.

4. Comparative assessment of environmental actions of multinational enterprises in electronics and IT sector

For comparative assessment we have selected multinational companies Alphabet, IBM and Intel because they are the most outstanding and significant companies in the world, took first place in the world rankings (Table 1) in 2009-2021, have a global policy and practice for eliminating harmful chemicals and are responsible for their products used by consumers.

According to the ranking, none of the companies managed to hold higher positions in the rankings. At the beginning of the study green rankings were headed by Intel, but after a while it wasn't included into the rankings at all.

In order to compare environmental activities of studied companies and their counterparties, reporting information about environmentally responsible activities was summarized and presented in Table 2.

Table 1. MNC position in the world rankings in corresponding year for studying period from 2009 to 2021.

Multinational enterprise	Ranking, where the company is mentioned; ranking developer							
	World's Most Admired Companies; Fortune	**Global 100 Most Sustainable Corporations; Corporate Knights**	**The 50 Most Innovative Companies; The Boston Consulting Group**	**World's Most Respected Companies; Barron's**	**Best Global Green Brands; Interbrand**	**Global CR RepTrak 100; Reputation Institute**	**Green Rankings US (100); Newsweek**	**Green Ranking Global Top 100; Newsweek**
Alphabet								
ranking position, year	7 / 2021; 7 / 2020; 7 / 2019; 3 / 2018; 6 / 2017;	90 / 2021; 62 / 2020; 59 / 2019;	2 / 2021; 2 / 2020;	1 / 2017; 9 / 2016.	–[1]	–	–	–
Intel:								
ranking position, year	41 / 2021; 35 / 2020; 40 / 2019; 35 / 2018; 24 / 2017; 32 / 2016; 25 / 2015; 16 / 2014; 6 / 2013; 5 / 2012; 12 / 2011; 15 / 2010; 17 / 2009.	69 / 2012;	8 / 2020; 7 / 2019; 8 / 2018; 10 / 2016; 13 / 2015; 5 / 2014; 6 / 2013; 6 / 2012; 4 / 2010;.	83 / 2017; 63 / 2016; 59 / 2015; 52 / 2014; 10 / 2013; 2 / 2012; 4 / 2011;	25 / 2014; 27 / 2013; 19 / 2012; 19 / 2011;	35 / 2019; 63 / 2018; 17 / 2017; 33 / 2016; 28 / 2015; 19 / 2014; 18 / 2013; 11 / 2012;	1 / 2012; 1 / 2011; 3 / 2010; 5 / 2009;	4 / 2012; 1 / 2010.
IBM:								
ranking position, year	8 / 2020; 46 / 2017; 43 / 2016; 40 / 2015; 47 / 2014; 43 / 2013; 36 / 2012; 32 / 2011; 31 / 2010; 36 / 2009	59 / 2021; 81 / 2020; 26 / 2018; 63 / 2017; 56 / 2015; 14 / 2013; 18 / 2012; 6 / 2011; 39 / 2010;	19 / 2020; 31 / 2018; 40 / 2016; 13 / 2014; 30 / 2013; 19 / 2012; 19 / 2011; 12 / 2010;	21 / 2017; 20 / 2016; 25 / 2015; 21 / 2014; 20 / 2013; 10 / 2012; 17 / 2011;	15 / 2014;	6 / 2017; 10 / 2016; 8 / 2015; 8 / 2014; 7 / 2013; 12 / 2012;	48 / 2016; 71 / 2015; 71 / 2014; 7 / 2012; 15 / 2011; 5/ 2010; 4 / 2009;	91 / 2016; 35 /2012.

[1]Note: «–» indicates absence of information about place and year of the company in rankings presented on the website www.rankingthebrands.com as of 15.03.2021, and means that company is not included in the relevant ranking

Source: formed on the basis of [17-18].

Table 2. Corporate environmental responsibility of leading high-tech multinational companies in IT sector.

Aspect of corporate social responsibility	Multinational company		
	Alphabet	**Intel**	**IBM**
Energy and emissions	Google – the largest corporate buyer of renewable energy and one of the largest corporate investors in renewable energy. Companies transferring to Google's cloud resources are reporting reduction in using IT energy and carbon emissions up to 87%.	CO_2 emissions have been reduced by 31% since 2000. More than 4.5 billion kWh have been saved since 2012. Intel's renewable energy supplies amounted to 37 billion kWh of green energy.	Total energy consumption has been reduced by 4.5%. Energy saving projects prevent from extra energy consumption. Alternative energy consumption (47%).
Water conservation	Reduction of drinking water consumption intensity by 3% (42 million liters).	75-85% of consumed water is returned to municipal treatment plants, remaining 15-25% is used by evaporating or irrigating landscapes. Completed projects restored approximately 730 million gallons in 2019.	Water consumption is reduced by 2% annually.
Waste	100% of deliveries – are carbon neutral. By 2022, 100% Google products will include recycled materials to maximize the amount of recycled content. A device recycling program is open for customers. 76% of landfills are made for these offices worldwide. 15% reduction in landfill waste per employee. Food consumption optimization has prevented more than 1 million kg of food waste in Alphabet Café for employees and visitors around the world.	Recycling 93% of hazardous waste. Zero hazardous waste in landfills. Processing 96% of construction waste. In 2019, 60% of total amount of waste was recycled using closed systems.	Prevention, reuse, recycling, disposal, other land treatment and disposal. Recycling 88.8% of waste. Eliminating plastic in 20 countries.

Source: developed by authors based on studied MNC reports [19-23].

Having analyzed companies' reports, we can say that each company has its own approaches to implementing environmental responsibility. Ways of implementation mostly depend on peculiarities of company's operation and possibility of using certain preventive measures to minimize negative impact on the environment. Multinational companies are the largest in the world, so even minimum percentage of reducing waste, emissions, energy use will have a positive impact on the environment.

For more detailed analysis how multinational companies implement environmental responsibility, authors have made expert assessment to evaluate quality of measures conserving natural resources and energy (Table 3).

Table 3. Expert assessment to evaluate the level of corporate environmental responsibility in studied companies.

Factor of corporate social responsibility	Multinational company			
	Alphabet	Intel	IBM	Assessment of factors' significance
Energy and emissions	8	5	6	0.4
Water conservation	5	8	5	0.3
Waste	8	6	7	0.3

Source: developed by authors based on own assessment of studied MNC reports [19-23].

Estimates listed in Table 3, are mostly based on two factors – quality of implementing environmental responsibility, as well as comparable amount of relevant negative impact on the environment. Compared to other companies, Alphabet is not only increasing environmental responsibility level the most, but also company's operation is less invasive compared to Intel and IBM.

The overall quality of implementing environmental responsibility was assessed considering each factor's coefficient of significance (Table 4).

Table 4. General assessment to evaluate the quality of corporate environmental responsibility in studied MNCs.

Aspect of corporate social responsibility	Multinational company		
	Alphabet	Intel	IBM
Energy and emissions	3.2	2	2.4
Water consumption	1.5	2.4	1.5
Waste	2.4	1.8	2.1
Total	7.1	6.2	6

Source: developed by authors based on own assessment of studied MNC reports [19-23].

Summing up the review of studied three leading multinational companies operating in electronics and IT sector, we can note the growing efforts of these companies to reduce environmental impact on the environment not only from their own activities, but also encourage their customers, suppliers and consumers around the world to do so.

5. Conclusions

All three companies under study have strong impact both economically and environmentally, so they require strong monitoring to minimize negative impacts. Each company does its best to implement corporate environmental responsibility policy, to improve overall environmental situation in many countries.

A comparative analysis has been carried out for companies positions in the world rankings during the period from 2009 to 2021. According to the ranking, none of the companies managed to hold higher positions in the rankings. At the beginning of the study green rankings were headed by Intel, but after a while it wasn't included into the rankings at all.

Ways of implementation mostly depend on peculiarities of company's operation and possibility of using certain preventive measures to minimize negative impact on the environment. These companies are the largest in the world in terms of their operating scale, so even minimum percentages of reducing waste and energy emissions have a positive impact on the environment. Identified practices of green innovations implemented by global corporate leaders can be an important example for other companies.

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