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A Short Review on Greenwashing: General Terms, Certifying Organizations and Emerging Technologies

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Abstract Due to the increase in environmental issues and public awareness, many stakeholders including consumers, investors, governments, and corporations, are demanding green (eco-friendly) products. This is putting pressure on many companies to make green products and disclose their environmental performance. Greenwashing is a marketing strategy used by some companies to make their products or services appear more environmentally friendly than they really are. This can mislead consumers into making more sustainable choices. However, these terms are not known or heard much by customers, other employers, or the public. Hence, this short review aims to i) provide a general introduction to greenwashing, ii) introduce some terms such as green hushing and green marketing, iii) discuss the impacts of greenwashing on business and environment, iv) explore green certifications and regulations by countries, and v) explore the various challenges, recommendations and future directions.

Keywords Greenwashing, Green hushing, Artificial intelligence

Introduction

Consumer needs for green products are tremendously increasing day by day. This is due to consumer awareness of health issues along with environmental concerns. Beyond this, changing climatic conditions and the emergence of natural disasters are prime factors[1,2]. This is driving an alarming increase in the need for greener innovation and environment-friendly approaches[3]. Hence, companies provide brand names that suggest eco-sustainability, including compostable, sustainable, green, eco, organic, natural, bio, and zero impact[4]. In addition to naming, it plans to attract consumers' attention by providing images of greenery. Another strategy is to use a green-based color scheme in advertising and claim eco-friendly attributes. This process is known as greenwashing, first coined by Jay Westerveld in 1986[4]. Greenwashing is an unsubstantiated claim to consumers that a company's products are inherently green, with no negative impact on the environment and humans[5,6].

About 90% of consumers are interested in brands that prioritize demonstrating green technology, as suggested by the research by Dentsu International and Microsoft Advertisement. Many companies also have embraced greenwashing as their marketing strategy. According to a report by the European Commission (2023)[7,8], about 53% of green claims provide vague or misleading information, and about 40% of them have no evidence to support them. In addition, about half of the green labels provide weak or non-existent validation. In the EU itself, 230 sustainability labels and 100 green energy labels have diverse transparency.

Definition of terminology

1. Greenwashing and green hushing

Greenwashing and green hushing are very different terms that are very often confused. Green hushing intentionally communicates the company's sustainable practices, which are the exact opposite of greenwashing[9,10]. However, neither term is true for aspects related to sustainability. Some of the reasons behind the purpose of greenwashing are mentioned in Fig. 1. To avoid public scrutiny, many companies hide environmental claims as a survival strategy. In general, smaller companies are more likely than larger companies to adopt green hushing

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Fig. 1. Reasons behind greenwashing.

practices. Additionally, it is very difficult to identify and categorize green-hushed products without a brand name. The best way to identify these kinds of practices is with third-party certifications or labels. However, in the case of organic laundry, in most cases, such certification is not obtained. Most consumers today prefer organic products with or without labels. Most of these organic products are not certified by any certification system. Companies or agencies provide many advertising captions for greenwashing as shown in Fig. 2.

2. Green marketing

Green marketing is entirely different from all the terms discussed above. Green marketing, also known as eco-marketing or sustainable marketing, can be described as a business or organization that sells products or services based on legitimate environmental positives[11,12]. These practices are generally honest and transparent and must meet the following criteria:

- All the products are manufactured in a sustainable way
- Products or their services will be free of toxic materials or chemicals
- All the products will be recyclable or made from recycled materials
- Renewable are not made will be used as raw materials for manufacturing new products
- Products are not made from threatened or endangered species or their areas
- Focused on reusable or repairable material rather than disposable
- Excessive packaging should not be used
- All the workers will be paid fairly

The goal of green marketing is to increase consumer awareness and demand for products and services that are better for the environment, promote the conservation of natural resources, and reduce pollution and waste[13,14]. Green marketing can take many different forms, such as promoting the use of renewable energy sources, reducing the use of hazardous chemicals, promoting the use of recycled materials, and encouraging sustainable production practices[15,16]. The main reasons for adopting green marketing are opportunities or competitive advantages, corporate social responsibility, government pressures, competitive pressures, and cost or profit issues (Fig. 3). Companies can also use eco-labels and certifications to communicate their commitment to sustainability to consumers. However, green marketing has also been criticized for misleading or not fully informing consumers about the environmental benefits of products or services. Therefore, it is important for businesses to be transparent with their green marketing claims and to ensure that their environmental practices are truly sustainable.

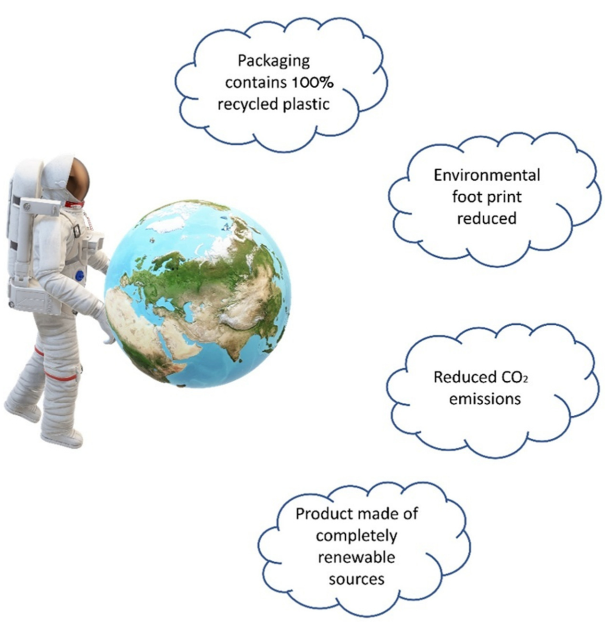

Fig. 2. Typical advertising slogans for greenwashing.

Fig. 3. Reason behind the adopting green marketing.

Green registration marks are now being rejected by many authorities. For example, the United States Patent and Trademark Office (USPTO) refused to give cement as Green cement. Many other products were also rejected, such as key cards (Green Key), natural fibers (Carbon negative fiber), and clothing (Zero waste tee). The primary goal of organizations such as the U.S. Federal Trade Commission (FTC) is to protect consumers by enforcing laws designed to ensure competitive and fair markets. The criteria for distinguishing real green products from greenwashing are as follows:

· Packaging and advertising should strictly explain all the claims related to green in plain language and in readable type within close proximity to the claim.
· The claim regarding the environment should clearly specify whether it refers to the entire product or just a portion of the packaging.
· Marketing claims about products should not overstate directly or by implication about environmental attributes to benefit
· If a product claims a benefit compared with the competition, then the claim should be substantiated.

3. Impacts of greenwashing on business and environment

According to a report by Cortnell[17], there are 7 sins of corporate greenwashing and they are as follows:

· The sin of hidden trade-off: This term can be used to describe the condition where the products or services appear to be environmentally sustainable in one aspect, but it is harmful or have a negative impact in another way.
· The sin of no proof: Many products are claimed as green without much evidence of sustainability or certifications.
· The sin of vagueness: Many environmental claims used for marketing lack specificity, which can be problematic and lead to misunderstandings that products are sustainable with green certifications. They may provide all the terms and slogans related to environmental sustainability.
· The sin of worshipping false labels: Providing false labels or certifications can mislead the consumers. To avoid these things, customers and employers should know about the actual certifications as well as logos or labels.
· The sin of irrelevance: Sometimes they may provide irrelevant product descriptions which may contain details related to already banned products.
· The sin of lesser of two evils: It is used to describe the environmental benefits of similar products, which have no environmental benefits. However, it may be morally justifiable to choose the option, which is a comparatively lesser impact.
· The sin of fibbing: This term may be used to describe environmental claims that are deliberately false.

The practice of greenwashing should be avoided as it has many negative impacts on humans and the environment[18]. Even though everyone knows the negative impacts of greenwashing, there is no real motivation to deal with this issue. The major negative impacts of greenwashing on business include as follows:

· Undermines brand image
· Adverse environmental impacts
· Lose consumer's trust
· An independent investigation will be initiated due to the misleading marketing claims.
· Misleading environmental claims will end up getting sued for the damages caused by them
· Reputational damage and partnership-related issues
· Financial loss and investment risk due to misleading environmental claims
· Green hushing (under-reporting and hiding)
· Negative media attention
· Greenwashing will create a negative effect on innovations and healthy competition

Many companies engage in greenwashing through advertising and press releases. However, they make no truthful commitments to achieve green initiatives or their accomplishments. If a company's green marketing is found to be false, the company may be prosecuted and fined for greenwashing, which will affect the company's reputation and ultimately affect their sales targets and product commercialization[19]. For the safety of consumers and investors, the UN High-Level Expert Group on Net Zero Emissions Commitments of Non-State Entities has set preventive measures to avoid being undermined by misleading claims, ambiguity, and greenwashing. The major principles to reduce greenwashing are as follows:

· Stay updated with the latest and best sustainability practices that show sustainable development and eco-friendlier nature
· Internal practices and policies should be matched with environmental claims
· Environmental claims should be more specific and clearer without using vague language or broad statements
· Impacts, plans, policies, and progress should be transparent
· Align commitments with actions and investments

It is very difficult to rely on environmental claims in packaging or other systems. Many such claims are also not trusted by consumers. The European Commission has set new standards to prevent companies from making false claims about the environmental impacts of their products and services. The main objectives of the green claim proposal are as follows:

· To make the green claim reliable, comparable, and verifiable across the EU
· To protect the consumers and others from greenwashing
· To create a circular and greener EU economy by enabling consumers with proper information while making purchase decisions

- To help to establish a level playing field

In March 2022, the EU endorsed a new proposal for a Directive on Green Claims to empower consumers in green translation. Later in March 2023, the EU adopted another proposal for a Directive on Green Claims. This offer aims to provide consumers with reliable, comparable, and verifiable environmental information. The proposal is as follows:

- Provided clear criteria on how companies should prove their green claims and labels
- Green claims and labels should be checked by an independent and accredited verifier
- New rules for environmental labeling schemes to ensure reliability and transparency

4. Certifications and regulations against greenwashing

4.1. Green certifications

Green certification or ratings are programs that help companies demonstrate sustainable products, services, and practices to customers, employees, and investors. Green certification is granted to many products and organizations such as food, buildings, and other operations[20]. The main goal of these certifications is to prevent greenwashing in environmental sustainability. Companies can demonstrate green practices after receiving green certification from an authorized certification body or system. Government organizations and many trusted third-party organizations are at the forefront of green certification listings. Upon the type of business, green certifications are classified into commercial Green Building certifications [BREEAM, LEED], Green Business certifications [ISO 14001, B Corp, Green Business Bureau's, Fair Trade USA Certified], Green product certifications [Safer Choice, Green Seal, Energy Star, Rainforest Alliance], and organic and sustainable food certifications [USA Organic, SIP Certified, Non-GMO project][21]. Some certification organizations, logos, and their website links are provided in Table 1.

4.2. Regulations by countries

Advertising the environmentally friendly attributes of a company's products through slogans, trademarks, performance claims or other marketing strategies is a strategy undertaken by investors for product marketing. Eco-advertising and green marketing campaigns are the most common marketing strategies for companies with a lot of investments. However, the credentials associated with it are still questionable. Many government organizations in countries have set up their methods to restrict or regulate Greenwashing.

For example, China does not support many of the strict laws regulating greenwashing activities, but instead regulates them through advertising laws, consumer protection laws, trademark laws, and anti-unfair competition laws[22]. Among these, the Advertising Law states that advertisements must not contain misleading or false environmental claims about quantity, quality, ingredients, production process, performance, expiration date, origin, and producer type.

The UK's Competition and Markets Authority (CMA) has issued a Green Claim Code and related guidelines to help businesses make environmental claims to comply with consumer protection laws. Under the Code, environmental claims must include as follows:

- Be clear and unambiguous
- Be truthful and accurate
- Not omit or hide material information
- Only make fair and meaningful comparisons
- Consider the full lifecycle of the product or their service
- Be substantiated

The Canadian government has many laws that prohibit false or misleading environmental claims, such as the Federal Competition Act, Trademarks Act, and Consumer Packaging and Labeling Act. All of these laws were enacted to prevent misrepresentation of the green claims.

- Federal Competition Act: This law prohibits the misleading representation of performance, efficiency or length of products that are not based on proper standards and testing.
- Trademarks Act: Prohibits misleading environmental claims like composition, quality and quantity, performance, and geographical origin.
- Consumer Packaging and Labeling Act: The entire aspect of packaging and labeling should not contain any misleading green claims and can be found in the link provided here [URL: https://www.canlii.org/en/ca/laws/stat/rsc-1985-c-c-38/latest/rsc-1985-c-c-38.html)].

However, the Singapore government has introduced some general laws to curb greenwashing. However, it's the right of consumers to choose the right things, which is often a burden for consumers[23]. The general laws are as follows:

- The Consumer Protection (Fair Trading) Act (CPFTA): These laws prohibit unfair business practices like making false claims, misleading claims, and gaining advantages without letting the customer know the judicious consequences of the transactions.
- The Misrepresentation Act: This law allows consumers to regain compensation due to misleading business transactions.
- The Singapore Code of Advertising Practice: All advertisements should be legal, honest, and decent.

The Indian government has adopted several laws to regulate misleading environmental claims including as follows[24]:

- Bureau of Indian Standards (BIS): Developed standards for eco-labeling of products and services named IS/ISO 14024: 1999. This standard provides proper guidelines and criteria for using eco-labels for companies to make environmental claims.
- The Consumer Protection Act, 2019: Established a central

Table 1. Represents the sustainability certifying organizations, programs, logos and their website link

Certifying Organization	Certification programs	Certification Marks/Logos	Website
Marine Stewardship Council (MSC)	Used in conveying seafood and fish have been harvested in accordance with MSC standards.		https://www.msc.org/
Leadership in Energy and Environmental or LEED certification mark	Used in the building and construction industry to specify best practices in sustainable building.		https://watershed.pro/leed-certification/
BREEAM (Building Research Environmental Assessment Method)	Validation and certification systems for a sustainable built environment.		https://bregroup.com/products/breeam/
Rainforest Alliance	Creation of a sustainable world by using various forces (social and market) to protect nature and to provide better lives for farmers and forests.		https://www.rainforest-alliance.org/business/marketing-sustainability/using-our-logo-and-seal/
Green Seal	Mission is to transform economy for a healthier and greener world (sustainable commercial products)		https://greenseal.org/splash
SIP Certified for vineyards and wineries	To ensure the sustainability of vineyards and wineries		https://www.sipcertified.org/
GreenCircle Certified	Analyze and provide independent verification and certifications to the sustainability of product and services (sustainability of recycled content, closed-loop product, energy savings, biobased content and recyclable materials).		https://www.greencirclecertified.com/product-certifications
GreenStep	Single use plastic free certification		https://www.greensteptourism.com/single-use-plastic-free-certification/
EU Ecolabel	Official EU voluntary label that certifies products independently-verified low environmental impact.		https://eu-ecolabel.de/en/

Table 1. Continued.

Certifying Organization	Certification programs	Certification Marks/Logos	Website
Eco-Management and Audit Scheme (EMAS) (EU)	It is a management tool for organizations and companies to evaluate, report and for improving their environmental performance.	EMAS	https://www.ecologic.eu/791
Green Business Bureau (GBB)	GBB provides online solutions to certify green initiatives through online tools like EcoAssessment™ and EcoPlanner™		https://greenbusinessbureau.com/
B Corp	Also known as B Lab is the nonprofit network transforming the global economy to benefit all people, communities, and the planet. The entire social and environmental impact will be measured.	B Lab Global	https://www.bcorporation.net/en-us/
U.S. Department of Agriculture (USDA) Organic	Provides strict standards to farmers and business for growing, processing and handling of products. USDA Organic certified product contains 95 % or more than organic content and not produced from genetically modified organisms (GMO's).	USDA ORGANIC	https://www.usda.gov/topics/organic
ENERGY STAR	ENERGY STAR certified buildings save energy and money and help to protect the environment by making less greenhouse gas emissions than typical buildings.	energy ENERGY STAR	https://www.energystar.gov/buildings/building_recognition/building_certification
Global Reporting Initiative (GRI)	To empower sustainable decisions to create sustainable future enabled by transparency.	GRI	https://www.globalreporting.org/
Excellence in Design for Greater Efficiencies (EDGE)	International Green building certification systems that empower developers and builders to quickly recognize the cost-effective strategies to lessen the use of energy, water and embodied energy in materials.	Edge	https://edge.gbci.org/
Fair Trade USA Certification	Fair Trade Certified™ certifies the sustainability of live hoods, safe working conditions, environmental protection and strong transparent supply chains.	FAIR TRADE CERTIFIED	https://www.fairtradecertified.org/about-us/who-we-are/

Table 1. Continued.

Certifying Organization	Certification programs	Certification Marks/Logos	Website
Green America	To provide clean energy, fair labor, responsible finance, justice for all, and good food and to create an environmentally sustainable society.	Green America	https://www.greenamerica.org/green-america-green-business-certification
1% for the planet	To thwart greenwashing, certify reputable giving and provide accountability	1% FOR THE PLANET	https://onepercentfortheplanet.org/

consumer protection authority to regulate unfair business practices.

- Ministry of Environment, Forest and Climate Change (MoEFCC): Launched the "Green Good Deeds movement" program to encourage individuals and organizations to put forward regulatory actions to reduce the environmental impact.
- The Environment Protection Act, 1986: To prevent and control environmental pollution by imposing penalties for the violation of policies.
- Advertising Standards Council of India (ASCI): This organization has set a code of self-regulation for advertising in India.
- Green Rating Project (GRP): It is an initiative by the Centre for Science and Environment (CSE) that rates the environmental performances of companies.
- Indian Green Building Council (IGBC): For promoting sustainable building practices

In France, greenwashing is regulated and restricted by several legal mechanisms. French Consumer Code prohibits misleading commercial practices by imposing several penalties. Violators of these laws face up to two years in prison with a fine of €300,000[25].

In Korea, the Ministry of Environment (MOE) and the Korea Environmental Industry & Technology Institute (KEITI) announced a guideline for eco-friendly management activities to prevent eco-friendly disguised advertising (Greenwashing) on October 31, 2023. The guideline presents eight basic principles of eco-friendly management activity labeling and advertising: truthfulness, clarity of expression, specificity of target, significance, spontaneity, completeness of information, relevance, and verifiability. The eight basic principles presented in the guideline are the same as the basic principles stipulated in Article 16-10 of the 'Environmental Technology and Environmental Industry Support Act' and the 'Notice on the Management System for Environmental Labeling and Advertising', but the guideline added some specific explanations and examples in terms of eco-friendly management activity labeling and advertisin[26].

5. Challenges, Recommendations, and Future Directions

Inaccurate assessment of green claims by environmental, social, and governance (ESG) factors has led many companies to provide misleading information and bogus environmental claims. The major challenges in detecting greenwashing are the lack of reporting standards, transparency, limited consumer awareness, and inefficient detecting tools. The major recommendations for attaining sustainability are as follows:

- Companies should provide greener markings as per proper certifications.
- Sustainability practices, policies, and claims should be cross-checked by government or third-party certifications
- Customers should share with others if they found a sustainable brand that can trust
- Transparency can bridge the gap between artificial and genuine concern related to environmental claims
- Third-party certifications should be initiated for all products regardless of their origin (small-scale or large-scale)
- Be transparent, specific, and authentic with environmental claims and stay up to date with the best practices having proper certifications
- Consumer and investor awareness programs should be conducted by authorized authorities through media or other public platforms
- Computational as well as artificial intelligence (AI) and Natural language processing (NLP) based approaches can have great promises and should be promoted to analyze and detect greenwashing

5.1. Emerging technologies for eliminating greenwashing

Innovative and emerging technologies such as internet of things (IoT), artificial intelligence (AI), and blockchain can be effective tools to support and achieve the United Nations Sustainable Development Goals (SDG) action plan[27-29]. Among them, IoT cloud computing and big data analytics can be very important in eliminating Greenwashing. However, the biggest challenge in improving the quality of sustainability reports is the lack of methodologies to analyze (reliable and valid measurements) the latest social, environmental, and economic variables.

5.2. Artificial intelligence (AI) versus greenwashing

Artificial intelligence can be used to identify greenwashing in a number of ways. One approach is to analyze the language used in marketing materials and product descriptions to identify misleading or exaggerated claims[6,30,31]. Natural Language Processing (NLP) algorithms can be trained on a corpus of marketing materials and product descriptions to identify common phrases and language patterns associated with greenwashing[32]. Another approach is to use computer vision algorithms to analyze images and videos related to products or services to identify environmentally damaging activities such as excessive energy consumption, pollution, or destruction of natural habitats. Machine learning algorithms can also be trained on large data sets of information on environmental impacts and sustainability practices to identify products and services that are truly environmentally friendly, and to flag those that are likely to be greenwashed[6,33].

Natural Language Processing (NLP) is a powerful and sophisticated technology that enables computers to effectively recognize and automatically analyze human language in written or spoken form[34-36]. For example, ClimateBert is a deep neutral language model created by Swiss and German Academics to analyze corporate reporting and disclosures. This AI-powered tool has been trained to understand thousands of sentences related to climate risk disclosure. Another example is Task Force on Climate-related Financial Disclosures (TCFD) AI model, which effectively collects selective reporting and non-material climate risk information. Extended versions of these tools are also in development and will be effective for analyzing greenwashing[37]. However, both have inherent limitations as some steps in the analysis require human intervention. The most significant limitation is the lack of accuracy due to insufficient training data[38]. Some reports suggest that AI's global carbon footprint could be equal to that of the aviation industry[39]. Additionally, the energy consumption of AI-based tools is potentially high, and they would be better off if fully dependent on renewable energy sources. Overall, AI has the potential to be a powerful tool in identifying greenwashing, but it should be kept in mind that it is no substitute for critical thinking and research. Consumers still need to research and exercise caution when making decisions about the environmental impact of products and services.

Conclusion

The growing interest in greener technologies has led to a rise in the development of green-washed products. Besides, inadequate assessment of green claims by environmental, social, and governance factors built the resources and the emergence of green-washed products. Several certifications and public awareness programs are available from the government and other sectors, but they are not sufficient to identify and classify most green-claimed products. In the future, computational programs such as artificial intelligence and natural language processing tools may hold great promise in the early detection of greenwashing and their green-washed products. In addition, government authorities should implement and authorize third-party certifications and policies, along with public awareness programs to convey misleading environmental claims and should ensure the reachability of these initiatives.

Declaration of competing interest

The authors declare no competing financial interest.

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