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The rise of Green E-Commerce: Trends, Best Practice, Innovation Technologies & Forecasts

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Table of Contents

Executive Summary

This C-Suite report analyzes the sustainability trends and best practices of green e-commerce while also identifying the different retail innovation technologies that have a positive impact on e-commerce sustainability for both consumers and businesses. All future projections and action plans of businesses regarding the viability of business and the world are presented. The purpose of the report is to provide business decision makers, company owners and investors with strategic information on the benefits and importance of environmental sustainability in e-commerce for both business operations and consumers' perceptions of the brand. The paper also, analyzes all the best practices that a company should follow and incorporate into its marketing policy in order to achieve a successful sustainable marketing mix and fulfill corporate sustainability goals.

Green business is growing massively. Consumer spending worldwide, overpassed the USD 8 billion on reusable water bottles in 2018, whereas the Global Sustainable Fabrics Market (including materials such as bamboo fibre and organic cotton) was valued at USD 58.3 billion in 2018 and is expected to be worth around USD 93 billion by 2025. By the same token, the green packaging market is set to reach the amount of USD 242 billion by 2021. A number of global surveys reveal that over 2 out of 10 consumers are examining the sustainability track record of a company and almost the same percentage strongly believe that firms should help to improve the environment. Additional survey shows that 63% of consumers prefer to buy goods and services from businesses that stand for a purpose that reflects their personal values and beliefs, and avoiding the products of their counterparts who do not. Millennials (85%), followed by the Generation Z (80%), are the spearhead of sustainability initiatives saying that it was "extremely" or "very" important that companies act toward this direction. However, it does not only concern their present-time pattern of behaviour, 72% of consumers asserted that they are currently buying more environmentally friendly products than they did five years ago, and 81% said they are planning to buy more over the next five years. According to global surveys, consumers around the world are very aware of the environmental issues and thus, 73% of them said that they would considerably change their consumption habits and behavior to reduce their environmental negative impact. More specific, 66% of consumers around the world said they would be “happy” to pay extra for products from a business which is considered as environmentally friendly, and also 41% of consumers consider organic products (such as paraben-free or preservative-free) as very important and therefore, they are willing to pay extra for it. Additionally, 38% are willing to buy in a higher price product made with sustainable materials (such as reusable or compostable packaging) and 30% are keen to purchase products delivered on socially responsible claims (such as free range).

Businesses are also making significant efforts to meet customer needs and trends setting sustainability targets and applying various tactics and strategies to implement them. More specific, 65% of managers of companies from a variety of industries around the world, believe that climate-related actions to are very important and 53% consider that equally important are actions related to the promotion of a responsible consumption. Although companies are aware that being

eco-friendly is very important for customers and operations, they try different approaches that often prove unsuccessful. For example, about 70% of businesses are supposed to recycle paper, in fact only 7.5% end up in some recycling facilities and sites, resulting in 25% (80.6 million tonnes of paper) of normal waste being actually recyclable. But it does not end here, although 40% of packages consist air, companies use standard boxes for their products, no matter the size, for cost-saving reasons even though it proved failure financial-wise. E-commerce sales has a return rate of 30% and due to the lower price compared to the original, over 50% of the return products are sold, retailers may end up losing 10% of their sales. Brands though, are feeling more optimistic since new technology advancements have proved that sustainability goals can be accomplished. Electric cars, the evolution of GPS and the rise of internet and social media and increasingly larger adoption of new technologies such as Artificial Intelligence, Augmented Reality, Virtual Reality and Internet of Things can fulfil customer expectations and bring companies one step closer to their goals.

Other Key Findings

- 69% of the customers said that it is an extra motivation for them to proceed in a purchase if a retailer follows sustainable practices
- 85% of consumers maintained that they would opt for slower delivery, if it was clearly communicated within the website
- 83% of consumers believe that it is “important” or “extremely important” for companies to design products that are meant to be reused or recycled, eventhough price and quality are still a focus.
- 77% of responders perceive plastics to be the least environmentally friendly packaging material
- Consumers in the age range of 18-24 years old adopt more environmental habits, with over half of them (53%) planning to use alternative delivery methods than the direct home delivery, compared to the 29% of the consumers in the age range of over 45-year-old.
- 40% of shoppers are buying multiple items online with the intent to return all except their favorite items
- 60% of customers miss the first delivery attempt and have to ask for a re-arrangement
- 70% of consumes responded positively on receiving a financial incentive to choose a slower delivery option
- 90% of Americans are more likely to buy from brands that support social causes

Introduction

Since its introduction as a transaction means, e-commerce has become a well-established retail channel across different industries. Globally, e-commerce is rising and earning returns three times more than expected with consumer online spending reaching USD 3.46 trillion in 2019, USD 530 billion more than the previous year (approximately 18%), according to Internet Retailer forecast. [1] This unexpected growth is driven by smartphones which are sold in a very low price and in combination with the high internet penetration make the transaction easy anytime, from anywhere. This unexpected growth is driven by smartphones, which are sold in a very low price and in combination with the high internet penetration, making the transaction easy anytime, from anywhere. In order for the e-commerce to continue to grow, retailers and merchants will have to follow the increasingly frequent shifts in consumer needs, habits and trends.[2]

In previous years, companies that produced eco-friendly products and adopted green policies had high costs and no significant benefits. Presently, in view of the strong consumer trend and the significant benefits in terms of operating costs, branding and greater consumption, businesses are actively integrating green practices and sustainability proposals into all of their departments and operations. [3] Sustainability can be defined as “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs”. Sustainability has three main areas of influence, **environment, economy, and society**. Driven by consumers increasing awareness and sensitivity about sustainability issues, businesses (mainly e-commerce companies due to their large share of spending) are urged to adopt sustainable solutions. [2]

Retailers, manufacturers, logistic service providers and other intermediates, consumers and society are asked to abide to sustainable regulations, which are increasingly becoming crucial for the world as a whole. Businesses operating in the e-commerce industry are urged to focus on the above-mentioned dimensions and improve financial, social, economic, and environmental performance. Although there is no universal, standard way of incorporating sustainable e-commerce into a business strategy, companies are challenged to successfully integrate it in a way that suits their model, and to overcome a complex socio-economic and political environment, where multiple regulations apply for every country. Therefore, manufacturing companies, logistic service providers, retailers, and

[1]Young, J. (2019). Global ecommerce sales to reach nearly $3.46 trillion in 2019. Retrieved from https://www.digitalcommerce360.com/article/global-ecommerce-sales/
[2] Oláh, J., Kitukutha, N., Haddad, H., Pakurár, M., Máté, D., & Popp, J. (2018). Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs. Retrieved from https://www.mdpi.com/2071-1050/11/1/89/htm
[3] Robinson, D. (2018). How eco-friendly can be profit-friendly: The benefits of green e-commerce. Retrieved from https://www.ns-businesshub.com/science/benefits-of-green-e-commerce/

consumers must team up to enable e-businesses to adopt and apply sustainable solutions in processes such as manufacturing, packaging design and transporting. They are also required to collaborate to reduce shipment returns, and hence to ensure that companies operations do not result in the ecological degradation through the depletion and destruction of natural resources such as air, water and soil. Moreover, collaboration between different parties will eliminate the operational expenses and goods, shipment and recycling costs. It will also increase financial returns to all stakeholders. [4]

According to the most recent studies by Unilever, almost 33% of customers now choose to buy products which have a positive social and environmental impact, [5] Making sustainable shopping has become a priority to the millennials, the green generation. [6] Consumers are now shopping with their emotions and values instead of their wallets only. One in five customers claim they would choose a brand if their credentials for sustainability were clarified on packaging or in marketing. Some businesses have attempted to be socially accountable through smart marketing campaigns without incorporating the cause into their company ethos. [7] On the other hand, brands like The Body Shop and TOMS have always highlighted their ethical values as a cornerstone of their business. However, as consumers demand more transparency, brands who are less forthcoming will no longer be able to get away with hiding any sketchy business practices or environmentally unfriendly operations. [8]

The more people become aware of the environmental issues and decide that they want to spend their money in a more planet-friendly way, the more companies introduce greener marketing practice to be competitive and meet customer needs. Green marketing is the marketing of environmentally friendly goods and services. It may involve a number of various things affecting the 7P`s of Marketing (Price, Product, place, Promotion, Processes, People, physical Evidence), such as creating an eco-friendly product, using eco-friendly packaging, adopting sustainable business practices, or focusing marketing efforts on messages that communicate a product's green benefits. [9]

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[4] Oláh, J., Kitukutha, N., Haddad, H., Pakurár, M., Máté, D., & Popp, J. (2018). Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs. Retrieved from https://www.mdpi.com/2071-1050/11/1/89/htm

[5] Unilever Official Webpage. Report shows a third of consumers prefer sustainable brands. Retrieved from https://www.unilever.com/news/press-releases/2017/report-shows-a-third-of-consumers-prefer-sustainable-brands.html

[6] Nielsen. (2015). Green Generation: Millennials Say Sustainability Is a Shopping Priority. Retrieved from https://www.nielsen.com/us/en/insights/article/2015/green-generation-millennials-say-sustainability-is-a-shopping-priority/

[7] KPMG. (2019). Retail trends 2019. Retrieved from: https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/02/global-retail-trends-2019-web.pdf

[8] Johnson, T. (2019). 10 Innovative Retail Trends to Watch in 2019. Retrieved from https://www.cpcstrategy.com/blog/2019/01/retail-trends-2019/

[9] Shopify. Green Marketing Definition - What is Green Marketing. Retrieved from https://www.shopify.com/encyclopedia/green-marketing

Section 1 | The Sustainable Ecosystem

1.1. Level of Adoption in E - Commerce

More companies are managing sustainability to improve processes, pursue growth, and add value to their companies rather than focusing on reputation alone. BSR conducted a survey among members of its network to focus on practices of companies within the sustainable business community. The survey takes a look at the future milestones around which companies are planning their sustainability strategies. [10]

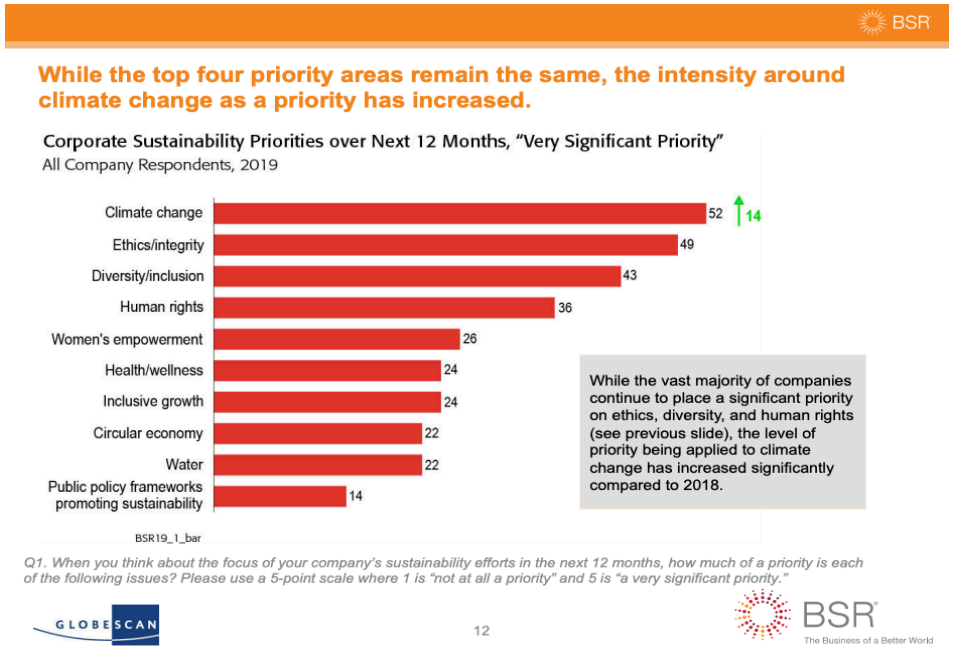

Figure 1: Corporate Sustainability Priorities 2019. Retrieved from [10]

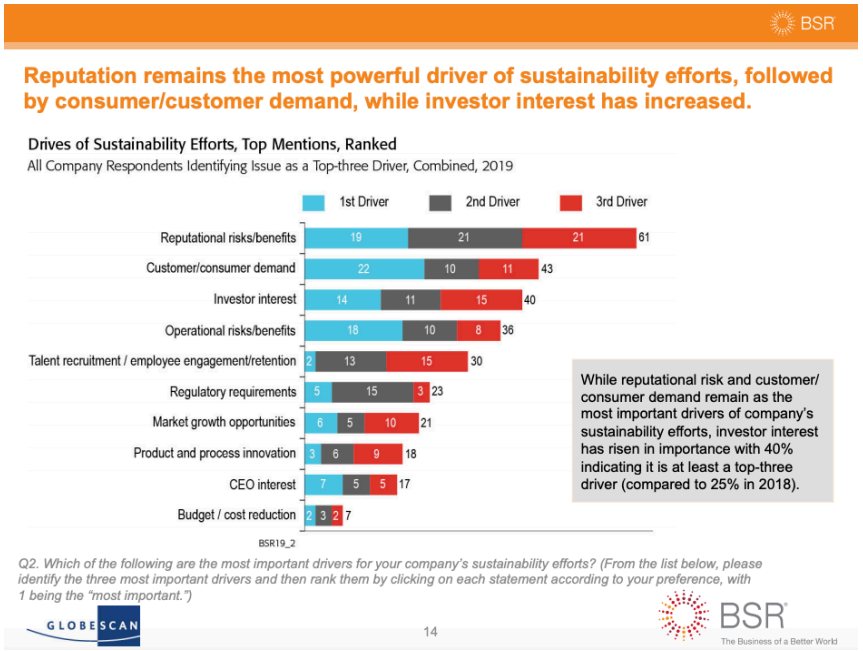

Figure 2: Drivers of Sustainability Efforts 2019. Retrieved from [10]

[10] BSR. (2019). The State of Sustainable: Business 2019. Results of the 11th Annual Survey of Sustainable. Business Leaders 2019. Retrieved from https://www.bsr.org/reports/BSR-Globescan-State-Sustainable-Business-2019.pdf

According to data, companies have historically reported that climate change is one of the top three priorities for the 2020, along with issues such as ethics/integrity, diversity/inclusion, and human rights, while reputation risks and customer/consumer demand continue to be identified as the most important drivers of company`s sustainability efforts. [11]

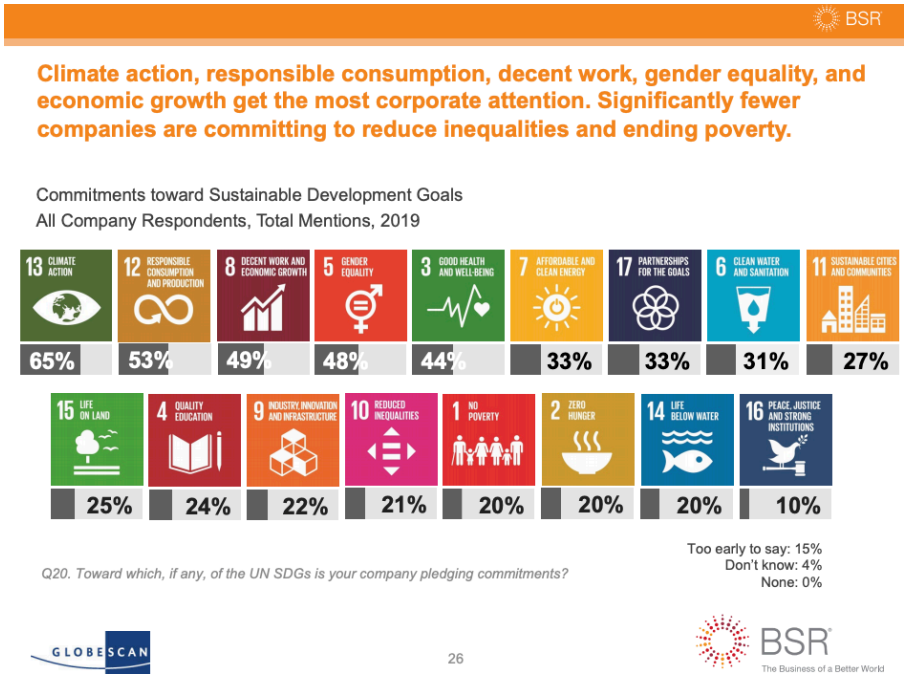

Figure 3: Commitments toward their sustainability goals. Retrieved from [12]

While the majority of firms continue to deem as a significant priority ~~on~~ areas such as ethics, diversity and human rights, the level of priority being applied to climate change has the highest increase from 2018 (14 percentage points). Despite Climate Change ranking as a top priority, there has been minimal movement in the number of companies setting an internal price on carbon. More specific, companies that estimated that they currently do have a price on carbon is a 17%, only 2%, more that 2 years ago. Another finding came up from the survey is that despite continued CEO focus and rising investor interest, the level of self-reported integration of sustainability into the core of the business has changed only 1% since 2016 which is significantly small percentage.

Finally, during the survey, responders reported also the commitments toward their sustainability goals. The majority of them mentioned as “very important” actions related to the climate (65%) and the “responsible consumption” (53%). [12, 13]

[11] BSR. (2019). The State of Sustainable: Business 2019. Results of the 11th Annual Survey of Sustainable. Business Leaders 2019. Retrieved from https://www.bsr.org/reports/BSR-Globescan-State-Sustainable-Business-2019.pdf

[12] Globescan (2019). The State of Sustainable: Business 2019. Results of the 11th Annual Survey of Sustainable. Business Leaders 2019. Retrieved from https://globescan.com/wp-content/uploads/2019/11/BSR-GlobeScan-State-of-Sustainable-BusinessSurvey-FinalReport-12Nov2019.pdf

[13] BSR. (2019). The State of Sustainable Business 2019. Retrieved from https://www.bsr.org/files/BSR-Globescan-State-Sustainable-Business-Infographics-2019.pdf

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Section 2 | Green Trends and Best Practices for Successful Green Commercial Strategies

With growing environmental awareness, hundreds of bigger and smaller companies are incorporating to their strategy sustainability goals while environmental sustainability and carbon footprint occupies an increasingly important position on the corporate agenda around the world. Companies in order to achieve their sustainable targets apply green marketing mix strategies (7Ps) such as green product and place strategies, green pricing and promotion strategies, but also green people, physical evidence and green process strategies. The reduction of element such as waste and emissions, the optimization of energy efficiency and productivity and the elimination of practices that may adversely affect the utilization of natural resources by next generations, are the most significant ingredients that will bring environmental sustainability. Pollution prevention, energy efficiency, eco-friendly design, recycled or reused materials for the creation of the products, sustainable products with green labels and organic products production are emerging as top priorities for businesses across all industrial sectors. Water, waste, packaging, energy and transport are being integrated into mainstream operations to facilitate sustainability. [14] In order to achieve their goals, companies make efforts to promote sustainable awareness among consumers by organizing events for them spreading the message among them about the benefits of environmental-friendly products, and educating them through the packaging labels but also within their e-shops. Additionally, companies create an eco-friendly culture within the organization by rewarding employees for their sustainable actions, motivating and educating their workforce to behave sustainably in the working environment.

2.1 Green Logistic Strategy (P – Place)

Researchers in previous studies have proved that e-commerce growth has both advantages and disadvantages on the environment. It is important for e-companies to create sustainable culture within the organization in order to positively result in. For businesses to be more environmentally friendly should reduce transport journeys which cause pollution, emissions, and congestion, which would cause a negative impact on the environment. To achieve this significant sustainable goal, they should focus on green shipping and delivery strategies, reduce product returns and eliminate shipping materials, and number of

[14] Zafar, S. (2018). Trends in Environmental Sustainability. Retrieved from https://www.ecomena.org/environment-csr/

shipments. In reality, the solution in all negative impacts is the careful selection of the type of delivery method by collaborating with green partners who are using an alternative transport system and delivering customer multiple orders at once creating economy of scales. [15]

Collaborating to Drive Sustainable Solutions

Talking about deliveries, nothing is more important than choosing the right shipping strategy and the right delivery partner. Businesses are partnering with forward-thinking logistics providers to reduce negative impact and improve operating efficiencies. A green collaboration can ensure a retailer/manufacturer that there would be no caused damage until the product arrives at the final destination and also that online stores' greenhouse emissions are reduced by using electric vehicles.[16]

A very good example of a green partner is UPS with its services. UPS My Choice and UPS Access Point allow customers who are waiting for an order to modify their delivery times and locations, as well as providing access to a big network of alternative location from where consumers can receive their delivery. Pick up points are very important to environmental sustainability especial for deliveries in urban arias. These sustainable delivery options intend to reduce wasted trips caused by multiple delivery attempts due to missed deliveries.

Reduce Product Returns

Due to e-commerce growth deliveries at home have been increased and so the number of damaged goods. Poor packaging can dramatically increase the number of product returns and its additional transportation to replace them. However, data analytics can improve product return rates by monitoring the flow of goods throughout the entire supply chains. Logistic service providers who are gathering, analyzing and utilizing data can provide useful insights into customer preferences and trends, learn about hidden issues (e.g., ineffective processes or packaging) and make the delivery process more sustainable to eliminate returns in the future. [17]

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[15] Oláh, J., Kitukutha, N., Haddad, H., Pakurár, M., Máté, D., & Popp, J. (2018). Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs. Retrieved from https://www.mdpi.com/2071-1050/11/1/89/htm

[16] Shiptimize. (2019). Digital Delivery Management Solution. Retrieved from https://www.shiptimize.me/sustainable-ecommerce-is-it-possible/

[17] Chain Store Age. (2017). Can E-Commerce and Sustainability Co-Exist? Retrieved from https://chainstoreage.com/news/can-e-commerce-and-sustainability-co-exist

- **Last-mile deliveries**

The demand for speedy delivery and returns means that medium- and heavy-duty trucks are doing last-mile deliveries and many times are not full, which increases the carbon footprint of each individual item you buy or return. Same vehicles, previously were delivering products to clusters of malls or shopping centers, but now they are now going back and forth to residential addresses.

- **Damaged return products**

A significant cost of returning goods is due to the fact that many items are being returned because they delivered damaged or they are getting damaged or some parts are missing while the return trip. This means that companies cannot resell them. Same thing is possible to happened if the return process takes too long that other consumers may no longer be interested in buying the item. [18] E-commerce sales has a return rate of 30% and due to the lower price, than the original, over 50% of the return products are sold, retailers may end up losing 10% of their sales.

- **Free returns**

Environmental issues are increasing as e-commerce activity grows. In order to become more competitive and reduce disadvantage over its physical stores that consumers cannot see and touch the product, e-businesses have established free shipping. Consumers, in turn unaware of the negative environmental impact of returns, order various products without the intention of keeping them all. In fact, 40% of shoppers are buying multiple items online with the intent to return all but their favorite item. [19] Five billion pounds of returned goods end up in US landfills each year (with UPS only picked up 1 million return packages every single day during the Christmas period) and online shoppers are expected to send back even more purchases next year. Trains, planes, and or even medium- and heavy-duty trucks leave a trail of emissions for each returned box they carry and return back to the seller. [20]

[18] Segran, E. (2019). Your online shopping has a startling hidden cost. Retrieved from https://www.fastcompany.com/90301638/your-online-shopping-has-a-startling-hidden-cost
[19] TruleSolutions. (2017). Environmental Impacts on Product Returns. Retrieved from https://medium.com/@TruleSolutions/environmental-impacts-on-product-returns-e91d2cdf630d
[20] Calma, J. (2019). Free returns come with an environmental cost. Retrieved from https://www.theverge.com/2019/12/26/21031855/free-returns-environmental-cost-holiday-online-shopping-amazon

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Section 3 | Innovation technologies in Green E – Commerce

As the challenge of global warming is posing a serious threat to the environment, many tech entrepreneurs are coming up with concepts focused on sustainability and with social media, Internet of Things (IoT), Artificial Intelligence (AI), Augmented Reality (AR), Virtual Reality (VR) and other technologies become more widespread, it is expected to see companies increasingly investing in them and incorporating them in all processes, departments and applications of the organization intending to meet consumers' needs and demands and take the advantage of them. This section is analyzing some of the most common and popular technologies impact a company's green marketing strategy such as, the rise of social media, logistics advanced technology (GPS, automated vehicles and electric cars), the importance of VR, AR and AI in customer experience and its impact in the logistic sector and finally the environmental impact of the IoT applications in the workplace.

3.1. Internet and Social Media for Delivering Information and Awareness

Recent research stating the average internet user now spends 2 hours and 22 minutes a day on social and messaging sites. This proves the power social media have today. People using a smart device can connect anytime and anywhere, which has had a huge influence on the ecommerce industry. Consumers through social media find new eco-friendly brands and engage with e-companies regularly. E-companies have recognized how vital for many reasons social media are and so they try to exploit them in order to communicate and create environmental awareness with their customers and potential customers all around the globe. [21] Social media, such as Facebook, Twitter and blogs, are the most commonly used tool for promoting fast and effective communication, as well as the platform for spreading information to a broader public. On the other side, the popularity of social media can be exploited within schools and universities to raise the awareness of younger generations. Higher education is responsible for shaping students and staff with respect to environmental awareness and shifting future generations ' attitudes towards the value of protecting the natural environment. The use of social media for environmental sustainability can be used as a form of educational tool that complements classroom teaching and learning, as well as engaging the students in environmental causes on an ongoing basis. [22]

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[21] Oláh, J., Kitukutha, N., Haddad, H., Pakurár, M., Máté, D., & Popp, J. (2018). Achieving Sustainable E-Commerce in Environmental, Social and Economic Dimensions by Taking Possible Trade-Offs. Retrieved from https://www.mdpi.com/2071-1050/11/1/89/htm

[22] Hamid, Suraya & Ijab, Mohamad & Sulaiman, Hidayah & Anwar, Rina & Norman, Azah. (2017). Social media for environmental sustainability awareness in higher education. International Journal of Sustainability in Higher Education. 18. 474-491. (PDF) Social media for environmental sustainability awareness in higher education. (2017). Retrieved from https://www.researchgate.net/publication/316632009_Social_media_for_environmental_sustainability_awareness_in_higher_education

3.2. Logistics Advanced Technology Contributes in Reducing of Global GHG Emissions

Sustainable urban logistics has attracted a lot of interest in recent years due to the continually increasing volumes of freight in e-commerce. The transport industry actually accounts for 18 per cent of global GHG emissions. Pollution is becoming a global challenge, particularly in urban areas, and is increasingly affecting the quality of life of urban residents. At the same time, sustainability is becoming increasingly important for the customer. Most companies focus on internal process development and resource utilization in order to achieve their sustainability goals. The use of new power train innovations (such as recent technological advances in automotive electrification and GPS technology) and the incorporation of all supply chain members by joint projects are two important levers for addressing the challenges of e-commerce in urban areas. [23]

- **The Evolution of GPS technology and its impact in Logistics**

Fleets should focus on strategies to reduce fuel consumption and pollution to minimize their environmental impact, which in turn would support their social standing in the community ~~and economically~~ as well as their business. The Global Positioning System (or GPS) has hugely improved the logistics industry as it can assist companies monitor fuel consumption, identify the source of the unnecessary fuel consumption and costs and optimize other key performance indicators (KPIs) that help companies meet their environmental sustainability goals. Many GPS tracking providers offer reports monitoring emissions of GHG (greenhouse gas), so a company can track its progress. A GPS tracking solution is also programmed to alarm company when vehicles are due to oil changes, smog inspections, air filter changes or any other form of preventive maintenance that will allow the fleet to run better and lower atmospheric GHG emissions. [24] In addition to the offer of the above KPIs, GPS provide drivers and automated vehicles real-time directions to drop off and pick up points which has made the flow of goods quicker, easier and more efficient while reducing their carbon footprint. [25]

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[23] Schöder, D., Ding, F., & Campos, J. K. (2016). The Impact of E-Commerce Development on Urban Logistics Sustainability. Retrieved from https://www.scirp.org/journal/PaperInformation.aspx?paperID=64089&

[24] GPS insight. Use GPS Tracking to Achieve Your Fleet's Sustainability Goals. Retrieved from https://www.gpsinsight.com/gps-tracking-benefits/use-gps-tracking-to-achieve-your-fleets-sustainability-goals/

[25] Kovacevic, A. (2019). How Has Technology Benefitted The Eco-Logistics Industry? Retrieved from https://blueandgreentomorrow.com/features/how-has-technology-benefitted-eco-logistics-industry/

Delivery service providers has already started using ~~of~~ analytics to boost their operations. For instance, they use fuel consumption analytics to enhance driving efficiency and GPS technologies to eliminate waiting times by real-time allocation of warehouse bays. Courier companies started to route door to door deliveries to consumers in real time based on the geo-location and traffic data of their truck. UPS, for example, has been developing its On-Road Integrated Optimization and Navigation system (Orion) to optimize the 55,000 routes in the network expecting to save USD 300 to USD 400 million per year. [26]

- **The Integration of Autonomous Technology (such as Drones)**

Although the integration of autonomous technology is still in progress, most logistics industry experts are expecting it to completely change the way the industry operates. It is expected from the self-flying objects to deliver packages in 30 minutes or less. Not only would this make deliveries faster than ever, it would also "increase the overall safety and efficiency of the transportation system". This improved efficiency result in reducing waste and carbon emissions. [27] Although drones consume less fuel, and consequently have a smaller impact on the environment, their full life cycle assessment should still be evaluated to comprehensively understand their environmental impact. Talking about Life-cycle assessment (LCA), means the entire environmental impact associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, use and the possibility of a reuse or the level of life extension. According to DHL, electrical drones, although they are in early stages, expecting to be the most promising type of drone for the deliveries of the online orders within short distances such as in urban areas. In rural area, on the other hand, they are expected to contribute to infrastructure challenges replacing road deliveries. [28]

[26] McKinsey & Company. (2016). Big data and the supply chain: The big-supply-chain analytics landscape (Part 1). Retrieved from https://www.mckinsey.com/business-functions/operations/our-insights/big-data-and-the-supply-chain-the-big-supply-chain-analytics-landscape-part-1

[27] Kovacevic, A. (2019). How Has Technology Benefitted The Eco-Logistics Industry? Retrieved from https://blueandgreentomorrow.com/features/how-has-technology-benefitted-eco-logistics-industry/

[28] Muralikrishna, L. V., & Manickam, V. (2017). Life Cycle Assessment, Environmental Management, Science and Engineering for Industry, 57-75. Retrieved from https://www.sciencedirect.com/science/article/pii/B9780128119891000051

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Section 4 | Forecast Data

4.1. Comparison between the sustainability of E-Commerce and Traditional Commerce

Many researchers and experts in the field have tried many times, so far, to compare the environmental benefits of e-commerce compared to traditional commerce and conclude to which of the two is more sustainable. In fact, due to the variety of factors and different elements that play a role in the degree of environmentally sustainable a process is, its measurement is still a challenge to tackle. In particular to evaluate traditional commerce it is important to know:

- Will consumer use online research to search the product or visit different stores
- How many routes will the consumer take to buy the product he / she is interested in
- How far will one point of sale be from another?
- What means will the consumer use (bicycle, car, electric car, public transport or other)
- Will the product be returned after the purchase?

On the other hand in order to be able to evaluate e-commerce and how sustainable it is comparing to the traditional commerce, it is valuable to know:

- How much environmentally friendly is the logistic service provider (i.e. what vehicles or delivery methods does he use to deliver the products? How environmentally friendly are they)?
- The consumer will receive the product on the first attempt or the truck will need to make a second trip to the same customer.
- If the first attempt is unsuccessful, there are pickup points from where he will be able to receive the package at the desired time; And if so, how long is it? The consumer will use a means of transport to reach the pickup point or go on foot. And if he gets some means of transportation, will he choose one that is environmentally friendly such as bike or an electric car or not;
- In addition, as we have seen in a previous section, refund rates are at very high levels. With this as a condition, will it have to return the product received by the consumer or keep it?
- How full was the truck when it left to deliver the order?

These and many other factors and combinations affect the outcome of the comparison between the two forms of commerce.

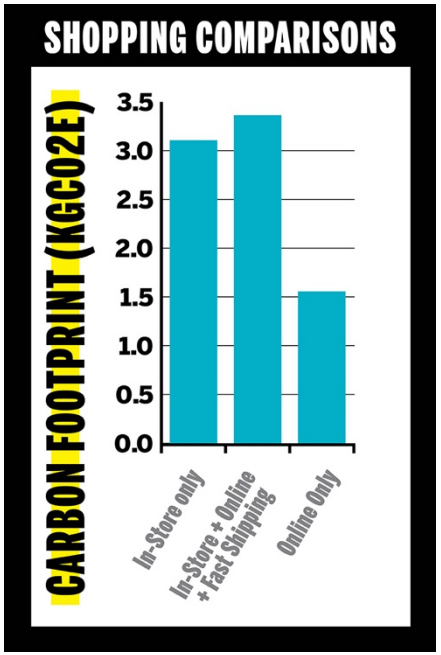

Figure 10: Carbon footprint of various types of shopping. Retrieved from [164]

In a research conducted by the MIT Center for Transportation & Logistics, found that buying online can actually be better for the environment than traditional shopping, which involves the consumer driving from store to store. In fact, traditional shoppers have more than twice the carbon footprint as online-only customers. Josue Velazquez, director of the Sustainable Logistics Initiative at MIT, explained why e-commerce is eco-friendlier than traditional commerce. More specifically he supposed that when customer shop online, the company after receiving all the orders can put them all in truck. Therefore, in one single route, all items of all customers can be delivered to their final destinations. Instead of multiple (consumer) vehicles going to one location (the physical store), there is one vehicle (company's or logistic service provider truck) going to multiple locations (each customer's home). He noted, also, that certain factors such as whether the environment is urban or suburban, the distance to stores or the method of pickup, can change the dynamic accordingly. [29] It is true that e-stores take less space and use less energy since everything is stored in one central warehouse. [30] But this is not the only important element in the whole process, in the entire Life Cycle Assessment. The absolute worst-case scenario for environment is when customers search for merchandise in-store, driving from one to another, and then complete the purchase and return online with fast shipping. On the other side, of the best-case scenarios could be, if a consumer order online, the package will be delivered by an efficient logistical partner [31] and consumer collect it from a local pickup point using a sustainable way such as bike, foot or even an electric car combining it with other outdoor activities.

[29] Bell, J. (2019). Why Online Shopping Is More Eco-Friendly Than Traditional Retail? Or at Least It Was. Retrieved from https://footwearnews.com/2019/business/retail/online-in-store-shopping-impact-environment-1202788336/
[30] McNally, S. (n.d.). Is Online Shopping Really More Eco-Friendly? Retrieved from https://www.readersdigest.ca/culture/is-online-shopping-really-more-eco-friendly/
[31] Kamst, A. (2019). Sustainability sells, but how environmentally friendly is our e-commerce? Retrieved from https://www.thehouseofmarketing.be/blog/sustainability-sells-how-environmentally-friendly-is-ecommerce-digital

MIT Center for Transportation & Logistics is not the only organization that tried to investigate the specific major issue. The Organization for Economic Cooperation and Development supported the two engineers, Scott Matthews and Chris T. Hendrickson, who conducted a study aiming to find out which of the two forms of commerce is more sustainable. Matthews and Hendrickson assumed, for their study, that a customer wants to buy a book and they analyzed two scenarios, in the first one consumer buy the book from a physical store and in the second scenario they assumed that consumer buy the same product, online. They calculated shipping distances, emissions released from individual vehicles, the demands of retail space, airfreight transport vs. local truck delivery and the resources used to return goods.

According to their findings, shopping from physical stores is more expensive than shopping online. The advantage of quick service is immediately covered by the extra costs and the additional fuel spent when unsold products are returned to the manufacturer. E-commerce tends to have a lower return rate and this makes it eco-friendlier. The carbon footprint ~~is~~ created by all those individual consumer cars driving to the mall is greater than the one is generated by the delivery of the packages on individual home addresses. Again, e-commerce is greener in this area, particularly since companies are acting more sustainable and are switching to electric and hybrid vehicles. In the end, the two researchers concluded, “E-commerce sales have a cost advantage and environmental benefits.” [32]

Type of retail channel, young people, consider as greener

In a study conducted, 215 undergraduate business students from the University of Verona were asked by researchers which retail channel (brick and mortar stores or e-commerce) they consider as greener. More than 60% of respondents cited e-commerce as the greenest one while only 35.8% said that they consider traditional stores eco-friendlier than the online ones. They were also asked to explain and summarize the reasons why they perceived e-commerce or brick and mortar channel to be greener, compared to each other and their results are shown in the figures 11 and 12. [33]

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[32] McNally, S. (n.d.). Is Online Shopping Really more Eco-Friendly? Retrieved from https://www.readersdigest.ca/culture/is-online-shopping-really-more-eco-friendly/

[33] Brunetti, F., Russo, I., & Confente, I. (2018). (PDF) How Environmentally Friendly is E-Commerce? An Exploration into Young Shoppers' Perceptions and Preferences. Retrieved from https://www.researchgate.net/publication/331088705_How_Environmentally_Friendly_is_E-Commerce_An_Exploration_into_Young_Shoppers'_Perceptions_and_Preference

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