Online Shopping Process and Eco-friendly

1st Intan Farahana Binti Kamsin
Asia Pacific University of Technology and Innovation
Kuala Lumpur, Malaysia

2nd Tang Jet Xiong
Asia Pacific University of Technology and Innovation
Kuala Lumpur, Malaysia
intan.farahana@staffemail.apu.edu.my

Abstract—**Greenhouse gases emissions and packaging waste of online shopping pollution in the delivery process getting critical in recent years, especially during the COVID-19 pandemic. To reduce the pollution impact of online shopping on the environment from the perspective of the user, this research was meant to be conducted. Survey methodology is suggested for data gathering in this research follow by stratified sampling to identify the targeted users. In this research paper, the implementation of an eco-friendly online shopping process is justified for discovering the value of the proposed system. The proposed system is to provide an eco-friendlier delivery option to the online shopping consumer and convey the knowledge to support the decision they make. The proposed system was looking forward to being implemented in all e-commerce platforms such as Amazon and Lazada to maximize the value outcome of it to the environment.**

Keywords—Online shopping process, Delivery option, Eco-friendly delivery.

I. INTRODUCTION

Online shopping has archive rapid growth in recent years and this is mainly because it has brought benefits to both consumers and retailers in the manner of saving cost and reduce the dependence on visiting the physical store [1]. Currently, the outbreaks of COVID-19, a novel respiratory disease reported in late December 2019 have affected many countries [2]. To prevent the spread of the virus, many countries are now under lockdown and carry out self-distancing [3]. Therefore, the COVID-19 pandemic pushed the growth of online shopping and internet-based businesses to another high peak due to people changing their consumption patterns and avoiding public spaces such as restaurants, shopping centres, and museums [4, 5]. Therefore, the domino effect also affects the express delivery industry growing relatively [6]. In the process of delivery, the issue of produced municipal solid waste (MSW) [7] and more greenhouse gas emissions per item occurs were known [8]. Hence, this proposal is about the suggestion solution on eco-friendly delivery options into the online shopping platform to reduce the pollution of online shopping with the consideration perspective of the consumer [9].

II. LITERATURE REVIEW

A. Research Domain

1) Eco-friendly: According to Oxford Learner's Dictionaries and Merriam Webster online dictionary, the term "eco-friendly" has a definition of "not harmful to the environment" and "not environment harmful" [14; 11]. The first known use of eco-friendly is in 1989 with the defined meaning mentioned. Eco-friendly point out the practice of green living and reduce the waste of resources such as water and energy to prevent the increase in air, water, and land pollution [6]. To engage more in eco-friendly, habits and practices on using resource need to be more conscious. Eco-friendly can be archived by implementing it into the daily habit and most importantly business aspect, for example the material used, product production, delivery, operation, etc. For following section of this paper will relate eco-friendly habits to the fulfilment process of online shopping.

2) Online shopping process and Eco-friendly: Eco-friendly can be archived throughout the online shopping process by implementing it into the processes of the three components and practices by different perspectives involved. The carry out of eco-friendly in online shopping process has existed for some time, example cases can be present followed by the components of the online shopping process. For interactivity, Amazon as the perspective of online vendor's connection committed and running the data centre with sustainability and eco-friendly. Amazon announced five new renewable energy projects in China, Australia, Ohio, and Virginia in May 2020 which approximately 1.2 million MWh of renewable and clean energy able to be produced and supply respectively for the company's fulfilment networks and Amazon Web Services (AWS) data centre [2]. For the transaction component in the online shopping process, evaluation fact which involved perspective of consumer and vendor implemented the eco-friendly habits in the process of evaluating a product by using Eco-labelling. Eco-labelling on a product able to convey to consumers the otherwise unobservable information about the environmental attributes of the product, as for the online vendor perspective will in-stock more eco-label product because of the shifting demand of consumer towards the eco-labelled products and away from products that are not [5]. For fulfilment component in the online shopping process, from Amazon warehouse and delivery management perspective, implementation of eco-friendly practices by constructing the "Delivering Shipment Zero" programs. Reusable packaging, electric vehicles, aviation biofuels, and renewable energy are used in the fulfilment operations and delivery of the shipment to customers. This program has the goal of power Amazon's global infrastructure including warehouses using 100% renewable energy [7]. In proposal will focus on implementing eco-friendly fulfilment components in the online shopping process.

3) Compare and Contrast Table: Based on Table I, it shows that three similar system reported. Amazon as a large platform, it complies with warehouse and able control fulfilment operation of every item. Refer to table, Amazon [17] systems fulfil some of the features that Tree Tribe and Store Eco Friendly (SEF) not compile with which include no.1 such as normal delivery and fast delivery, no.2, no.3, etc. At the same time, Tree Tribe and SEF system have few same features that Amazon system did not included such as convey information about eco-friendly in the interactivity interface of system to the user, only selling eco-friendly product and able to control the use of packaging for every item in the fulfilment process.

4) Quality Checks: The AI image processing subfield is used in detecting product flaws that are too miniscule for the naked eye to detect. Automated computer vision systems fitted with cameras that are significantly more sensitive than a human eye are used to detect microscopic defects and allows the image processing and recognition of defects for the purpose of marking them for rejection. It is also sometimes combined with the AI subfield of machine learning to enable machines to automatically learn the defects and to accurately classify them for further actions.

5) Failure Modes Prediction: Machine learning is used for predicting product failure modes based on the analysis and learning of historical data generated when products are tested. Using this technology, AI is able to help identify crucial areas that require more attention during tests by modeling the behavior of the products and focus testing on areas that matter most, to ensure that products do not fail after its first use.

6) Environmental Impact: The AI subfield of machine learning can be applied in the optimization of energy consumption and pollutant emission reduction in manufacturing [12]. It also helps improve productivity and handling the problem with scarcity of resources in manufacturing, and thus have the potential to bring about fundamental improvements to the sustainability of the industry, particularly in green manufacturing due to the focus in optimizing the usage of energy and materials. This technology also helps in evaluating and monitoring of the environmental footprint of factories.

7) Big Data Analytics: This area concerns with the AI subfield of machine learning and collectively refers to the variety of methods that big data is used in manufacturing. The huge amounts of data generated by manufacturers that are related to processes, operations and other manufacturing areas are used with data analytics to bring about valuable insights to the organization and help improve its competitiveness in areas such as risk management, sales predictions, supply chain management and prediction of product recall issues.

TABLE I. COMPARE AND CONTRAST TABLE

No.	Criteria \ systems	Amazon	Tree Tribe	Store Eco Friendly
1	Provide Various Delivery Options	/	-	-
2	Track User GPS Location	/	-	-
3	Track Progress of Parcel	/	-	-
4	Allow Users to have Verbal Interaction with Others User Within the System	/	-	-
5	Owned Warehouse	/	-	-
6	Control the Use of Packaging	Only when parcel handle by company warehouse	/	/
7	Convey Information about Eco-friendly in Interactivity Interface	-	/	/
8	Only Eco-friendly Product	-	/	/
9	Contribution to the Environment in every Sale	-	/	-
10	Size of Platform (Traffic)	Large	Medium	Medium
11	Types of Product Available	Any	Sports related	Daily supplies
12	Show Amount of Greenhouse Gas Emissions and Packaging Waste Per Item in Delivery Process	-	-	-

The most important new feature of proposed system – no.12 yet included in any similar system. Besides that, from the analysis of three similar systems can notice the eco-friendly component implemented are mostly related to the seller and warehouse perspective [18]. Therefore, based on this situation shows that there is a need to develop a system that provide eco-friendlier option for user perspective. Due to this, this research takes into consideration on developing the "Green Delivery" and "Shared Delivery" shipment option for user [19].

III. RESEARCH PROBLEM

The pollution impact of online shopping on the environment getting more critical as the numbers of online shoppers in e-commerce platforms breakouts during the COVID-19 pandemic. The total spent of consumers on online retail during COVID-19 from April to May 2020 was higher than the spend during the 2019 holiday season [9]. Sadegh Shahmohammadi, a Ph.D. student in Environment Science at Radboud University point out that more packaging waste will be produce when online purchase more frequently and with the items transfer from different distribution centres to one point, both factors will cause higher greenhouse gas emissions per item [20]. In another way, Dr. M. Sanjayan, UCLA visiting researcher CEO said that only better for the environment if online purchasing consumers do not get rush delivery. All faster deliveries will lead to more trucks on the road and that causing more greenhouse gases. He also mentioned many trucks only half full when delivering the item when most of the consumers chosen fast delivery [19]. Unfortunately, while the numbers of online shoppers increasing in 2020, the statistic graph from Amazon concluded that the highest reason Amazon consumers in the United States in January 2020 shop with Amazon was by the keyword of "Fast, free shipping" [17].

IV. AIMS AND OBJECTIVES.

A. Aim

To developed eco-friendly platform for online shopping process.

B. Objectives

- To design and add-on "Green delivery" and "Share delivery" selection in shipment options in online shopping platform by developing the functions using programming languages and support of AI tech.

- To lift environmental awareness of online shopper through online shopping platform by giving an eco-friendlier suggestion to the online shopper in the delivery process options.

- To reduce wastage packaging and carbon footprint in delivery process from the perspective of user by cooperating with the online shopper on current online shopping platform

V. SIGNIFICANCE OF THE WORK

As the pollution caused by the online shopping situation go on, it will accelerate the crisis of global warming and slowly wipe out the human living environment of humankind [21]. Many companies such as Amazon and Lazada has implemented sustainable operations in their warehouse and delivery services, yet this unable to change the behaviour of online shopper and stop the pollution chain [22][23]. The action and knowledge of consumer are the most important perspective need to be solved. By implementing this proposed system, it able to reduce the release of carbon footprint to the environment and reduce the use of item packaging that harmful to the environment [24]. To archive that, the proposed system will give options and knowledge of eco-friendly in the online shopping process to consumers. Apart from the environmental and consumer benefits, this proposed system also able to reduce the cost for the delivery companies and sellers. This proposed system will reduce the packaging needed for the delivery process and reduce the times of delivery truck need to travel among the distribution centre, in a long term able to save up a massive amount of cost in material fee and fuel fee for the company. Generally speaking, this proposed system is a win-win opportunity no matter to the environment and online shopper or to the delivery company and online vendor.

VI. PROPOSED SYSTEM

This system involved interactivity and fulfilment components of the online shopping process. In this system, interactivity concerns of user interface (UI) design with the add-on of "Green Delivery" feature and user experience (UX) with "Shared Delivery" feature. Implementation of both features will affect the fulfilment component mainly on the packaging and shipment process. Both proposed features are designed to add to the online shopping process as a new interface design and function on the shipment option on the checkout page.

Fig. 1. Green Delivery Features Interface Prototype

The "green delivery" feature is focusing on the changes of interface design in the delivery options page to covey eco-friendly knowledge to the consumer. As mentioned in the problem statement above, greenhouse gases and packaging waste are certainly produced especially when comes to fast delivery. Therefore, this feature is to calculate the greenhouse gas emission and packaging waste per item on every available shipment option and display it to the consumer. Besides that, extra details to support the decision of the consumer will also be written such as the amounts of trees used for packaging, the weight of packaging waste will produce, how many distribution centres it will go by, etc. Fig 1. shows the prototype design of the green delivery interface
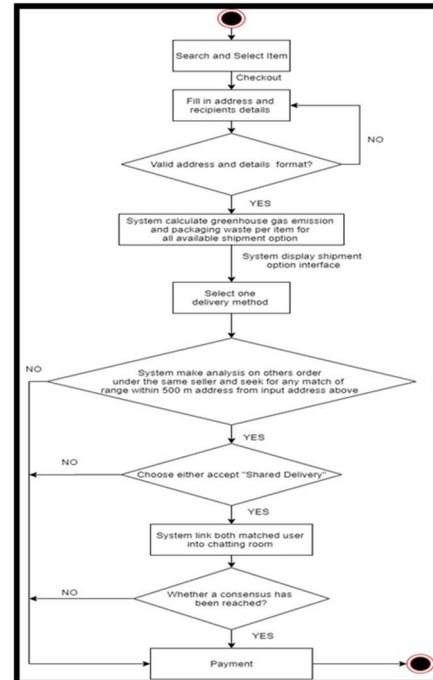

Fig. 2. Consumer Online Shopping Activity Diagram

The "shared delivery" feature focuses on reducing packaging waste by encouraging the consumer to share their delivery. This feature allows the consumer to combine two different orders from the same seller into one parcel and deliver to one of the owner's addresses. Shared delivery will

implement in the shipment option of the checkout process. The system will analyse the delivery address input by consumers and the items they purchase, then the system will seek others order under the same seller and within the range of 500m from the input address. When there is a match, the system informs the consumer and provides the share delivery option before they proceed to payment. After the consumer accepts the share delivery option, the system will link both users to a chatting room for further discussion such as delivery address. After the parcel arrived, in a short distance both consumers able to meet up and pass down the item. This feature will affect the fulfilment process from the seller side in terms of the packaging used and the distances and time of parcel delivered.

Green delivery and shared delivery features will be implemented into the checkout process of online shopping, Fig. 2 shows the activity diagram of the system interactivity process from the perspective of the consumer. Green delivery able to lift environmental awareness of consumers and shared delivery will allow the consumer to own the eco-friendly opportunity from their perspective.

VII. CONCLUSIONS

Throughout this research paper, a better understanding of how the implementation of eco-friendly in the online shopping process is clearly stated. In statement has justified the important perspective of the delivery company and online vendor in maintaining an eco-friendly delivery process. Meanwhile, the role of the consumer was discovered to show a disregard, hence the solution to this issue come out with the proposed system in this research. The proposed system able to lift environmental awareness and information knowledge within the online shopping consumer. Therefore, the involved cooperation of consumers in the eco-friendly process will make a big change to the environment and to the future generation. Yet, the implementation of the proposed system required multifaceted cooperation such as e-commerce platforms and delivery companies and this will be the biggest challenge for the deployment phase of the system.

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