

China's Environmental Threats of Internet Shopping Packaging Wastes

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Abstract

Internet retailing is a B2C E-commerce mode that is significantly contributing to China's economic growth. In fact, online retailing in China has developed so rapidly that as of 2014, the country ranks first globally, accounting for 34% of the world's Internet retailing market share. Along with its financial windfall, however, Internet shopping also brings with it some serious environmental issues. This article will focus on online shopping packaging garbage, which is an aspect of Internet retailing that has not yet received enough attention from either the Chinese government or Chinese consumers. Approximately 14 billion online shopping parcels were shipped in China in 2014, an increase of 52% over 2013. If this trend continues, the waste generated from these shipments will become a massive environmental problem. Excessive packaging and packaging garbage are not only a huge waste of resources, but they also endanger human health and the ecological environment. Internet retailing is important for developing China's economy, but the development of the Internet economy should not be made at the expense of the environment. China's regulation and disposal of online shopping packaging waste has important reference values for other countries that are developing an Internet retailing economy.

Keywords: Internet shopping packaging wastes; Environmental pollution; Internet shopping; Excessive packaging

Introduction

Due to significant improvements in Internet technology, online payment security and express delivery systems, Internet shopping is a booming global industry that is fast becoming a preferred mode of consumption [1]. In China, online retailing surpassed 1.85 trillion yuan (\$297 billion) in 2013 [2] and 2.82 trillion yuan (\$447 billion) in 2014, an increase of 49.7% year on year [3]. Globally, the online retailing market total reached 1.316 trillion dollars in 2014, with China accounting for 34 percent of the gross. In fact, as of 2014, China's online retail market has become the largest in the world [3]. It is expected that the total size of this market will top 4.2 trillion yuan (\$678 billion) by 2020, which is the total sum of the current online retailing market size in US, Britain, France, Germany and Japan [4].

Despite its positive economic impacts, Internet shopping can be a double-edged sword. Internet shopping has become an effective way of boosting an economy by increasing domestic demand, expanding consumption and promoting employment, but some researchers have instead focused on studying its environmental impacts. By analyzing different logistics networks and assessing different delivery systems, Matthews et al. [5] found that Internet shopping has environmental benefits and cost advantages. However, in tracing the complex transport relationships involved in online shopping, Ref. [6] concluded that online retailing might not be environmentally friendlier than traditional shopping. Ref. [7] suggested that both home delivery and conventional shopping have no absolute CO₂ superiority in general, but that the former is more likely, on average, to produce less CO₂ than the latter. Ref [1] study investigated the influence of carbon dioxide (CO₂) emission caused by Internet retailing in 77 countries during the period of 2000-2013 and found that while it was reducing in developed countries, it was increasing in developing ones. Thus far, however, studies on Internet shopping excessive packaging and packaging wastes pollution are still lacking.

In China, Internet shopping packaging waste has grown hand-in-hand with the development of the Internet shopping and express-mailing industry. In 2013, there were 9.2 billion shipping packages from

online shopping, which included 2.5 billion cartons and hundreds of tons of scotch tape, bubble bags, and other plastic packaging materials [8]. Online shopping shipping packages increased by 52% percent in 2014 [9], which means even more packaging materials were created and discarded. However, the final destination of most packaging materials is the garbage dump, as very little of it is reused or recycled. This enormous and sudden influx of products into the permanent waste stream has a profound effect on the environment and, by extension, on human health and safety. Yet despite the seriousness of this ever-worsening environmental threat, it receives almost no attention in China. Therefore, focusing on and solving the problem of China's enormous Internet shopping packaging waste is an urgent task that needs immediate attention.

China's Internet Shopping Packaging Waste

The reasons for China's internet shopping prosperity

In today's hectic and fast-paced world, people never seem to have enough time for relaxing, shopping, traveling, etc. A sample survey in 2013, directed by the China Internet Network Information Center (CINIC), investigated the shopping habits of Chinese online consumers. The report showed that 83.2% of online consumers spent time online during their leisure hours at home, 60.2% did so after meals, and 55.6% browsed and shopped during meal times. Mobile devices such as smartphones and tablets offer an even more convenient ways for busy consumers to shop online by helping them make full use of fragmented

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time, i.e., the time before sleep, on a bus, during a meal, in a queue, and before getting up in the morning [10]. From this, we can see that PC and mobile devices offer busy consumers the most options for buying what they need online.

At the same time that people are seeing their leisure time shortened by increased work demands, poor air quality (especially severe haze episodes caused by $PM_{2.5}$) is prompting people to choose to minimize the time they spend on outdoor activities such as shopping, exercising or traveling. Studies have shown that during China's severe haze weather days, online shopping transactions reflect an upward trend [11]. Shopping websites provide a variety of online stores for consumers without time or space limits. Moreover, Internet shopping, with its bountiful selection of merchandise, lower prices and excellent customer service, is fast becoming the favorite shopping option of consumers [12].

The cause of excessive packaging in internet shopping

Absence of regulation: Although excessive packaging is inseparable from the business of online retailing and the express delivery industry, there are no set standards for packaging, just as there is no authority to oversee compliance if there were any standards. Unified national industry standards on excessive packaging management are almost non-existent in China [9]. The industry does not currently have any clear regulations about what constitutes "over-packaging" or how to package a product in an environmentally-friendly way [9]. Based on this lack of packaging laws and regulations, online retailers and parcel-delivery companies have chosen to overwrap their items to ensure the transportation safety of the goods.

Evaluation model of shopping online: The impact factors that will ensure the survival of Internet shopping businesses are innovation, cost-efficiency, convenience and attentive customer service. Along with these touchstones are consumer repurchase and loyalty, and the ability to attract new customers [12]. Among these important factors, the most critical one is service quality.

In China, an Internet retailing store's reputation depends on specific shopping evaluations done by online consumers. A survey entitled "China's online shopping market research report in 2013" by CINIC showed that when buying goods online, shopping decisions were dominated by the shopping evaluation. Specifically, 37.5% of online consumers mainly considered the shopping evaluation in decision-making involving goods they had not purchased before, and 25% relied on the shopping evaluation for familiar online goods. Other factors included in this evaluation were website visibility and word-of-mouth [10].

Delivery service is a significant factor which affects service quality and a retailer's credibility on shopping web sites. The successful delivery of an undamaged product to the customer forms the major evaluation criteria for Internet retailing shops. To online retailers, excessive packaging is part of a strategy to prevent product damage in transit and guarantee packing integrity. Hence, the parcels are generally packed in a hard carton and wrapped with plenty of tape to ensure the products will not be damaged during the transport process.

Online shoppers: Very few online consumers are concerned about whether this excessive packaging waste pollutes the environment; their concern is whether or not their goods arrive on time and meet their requirements. When online shopping goods are shipped to consumers, packaging materials are usually discarded without a second thought. One example of this lack of care for excessive packaging is the "11.11"

online shopping festival, which was originally introduced by TaoBao in 2009. The "double 11 festival" is celebrated on November 11 every year and provokes a frenzy of online buying and shipping. After the festival, express companies have no space available and delivery personnel are extremely busy. The delivery of a massive amount of consumer goods is accompanied by a huge amount of online shopping packaging waste discarded by consumers.

Excessive Packaging as a Serious Waste of Resources

The prosperity of the packaging industry is due in large part to the massive growth in Internet shopping. This can be seen in how the original carton retailers on TaoBao mall are now managing their own carton plants. Packing materials used for online shopping are usually several times the normal packing requirements and include wood cartons, bubble bags, tape, glue, etc. Making these shipping cartons requires an immense amount of wood, straw pulp, and waste paper. According to some estimates, about 5 million trees or 4 million tons of straw or 1.25 million tons of waste paper are needed to manufacture 2.5 billion cartons. Setting an average length of about one meter tape for each package, the total length of tape for 14 billion packages can circle the equator 350 times. From this alone, we can see that excessive packaging is a serious waste of resources (Figures 1-3).

Impact on the Environment and Human Health

Wood is the main raw material used to produce the cartons. The recent surge in carton production means that a large amount of natural vegetation is being destroyed. Meanwhile, the main raw material for tape in China is PVC (Polyvinyl Chloride), which takes at least 100 years to degrade in soil and seriously pollutes the environment prior to degradation [13]. Moreover, glue damages human skin and respiratory tract because of the formaldehyde and benzene used in its ingredients.

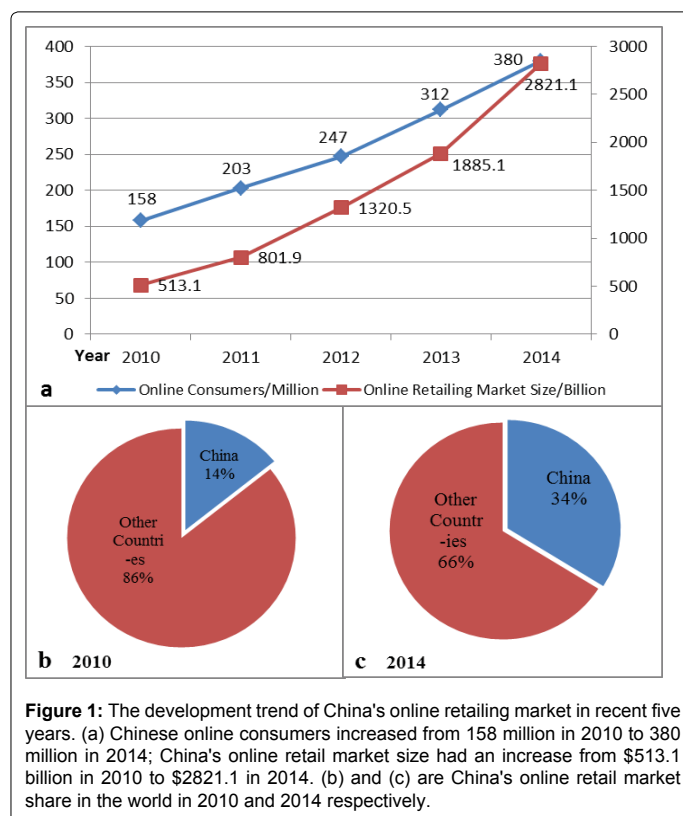


Figure 1: The development trend of China's online retailing market in recent five years. (a) Chinese online consumers increased from 158 million in 2010 to 380 million in 2014; China's online retail market size had an increase from \$513.1 billion in 2010 to \$2821.1 billion in 2014. (b) and (c) are China's online retail market share in the world in 2010 and 2014 respectively.

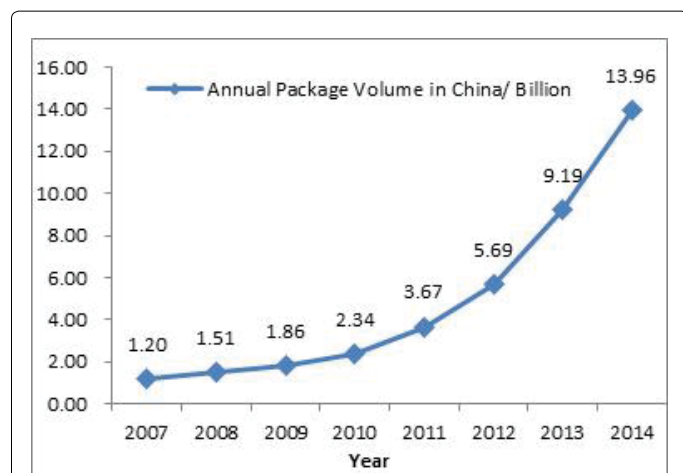


Figure 2: The growth trend of online shopping shipping packages from 2007 to 2014 in China.

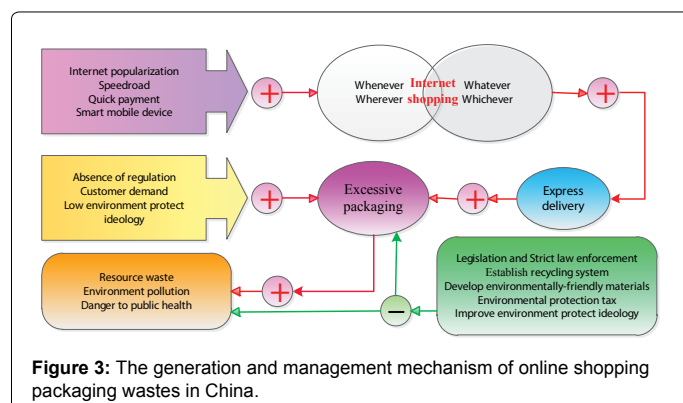


Figure 3: The generation and management mechanism of online shopping packaging wastes in China.

Landfills containing these packaging wastes will lead to environmental issues such as land occupancy and soil contamination, and the incineration of the wastes will release toxic substances, such as dioxin, which can cause air pollution [14].

Despite these issues, China does not yet have a feasible environmentally-friendly replacement for PVC tape, meaning that this pollution will continue indefinitely and in tandem with the rapid development of the express-mailing industry. Such an enormous amount of packaging being produced and thrown away without any treatment will seriously impact the environment as well as human health.

Conclusion and Policy Recommendation: Save for a Rainy Day

Our society has a tendency to pursue immediate gains and ignore considerations about possible long-term adverse effects. Given this tendency, we often do not think about environmental problems until they have reached such an advanced stage that a serious environmental event occurs. Such events include the U.S. black storms of 1934, the London photochemical smog incident of 1952, the recent PM_{2.5} pollution in China, and ongoing issues around global warming. Despite the seeming diversity of these events, they all have one thing in common: damage to the ecological environment had already surpassed the upper limit of the ecological carrying capacity threshold prior to the event occurring. The breaching of this threshold – even temporarily

– can seriously deteriorate the ecological system structure and thus threaten both regional and global ecological security.

The packaging materials used in China's Internet shopping market are in great demand and will remain in great demand for the foreseeable future. We are concerned that if such vast amounts of online shopping packaging wastes in China cannot be effectively treated and disposed of in time, an ecological environmental disaster with the same impact as those referenced above will inevitably occur. Overpackaging is not only a waste of resources, but it also pollutes the eco-environment and threatens human health. Given that China is now the largest online retailing market in the world, the Chinese government should pay close attention to the problem of online shopping packaging garbage and take preventive measures.

With the ripe of the Internet shopping conditions, online shoppers can buy whatever they want with no limit of time and places. The prevalence of online shopping promotes the development of express industry and packaging industry. Due to China almost does not have unified and detailed national industry standards on excessive packaging and transportation safety, and the low consciousness level of environmental protection among online shoppers, Internet shopping has caused serious excessive packing problem. Large amounts of packaging wastes have generated problems, such as a serious waste of resources, environmental pollution, and potential hazards to human health. To avoid a serious environmental event occurs, China should do the following steps, including formulate clear legislation on packaging industry standards and take appropriate measures to enforce the law, establish a government-led recycling system, develop environmentally-friendly materials and additives, confiscate environmental protection tax from Internet retailing shops and improve people's environmental protection consciousness and action.

Government legislation and strict law enforcement

Many countries already have legislation and regulations concerning the technical standards of commodity packaging. In Britain, packing materials must meet the health and safety standards of goods and not add too much packaging. Otherwise, consumers can make a complaint and local governments can intervene. According to statistics, packaging materials have shrunk as much as 40% over the past 20 years in the UK [15,16]. South Korea has made detailed regulations named "Standards of all kinds of products packing methods", which stipulates that if manufactures do not reduce the ratio and layers of packaging materials in accordance with government provisions, they can be fined up to 3 million KRW [17]. Likewise, European Union and Japan have also passed packaging standards.

At present, China has only one national specification in the packaging industry called "The express business operating guidelines", which is set by the State Post Bureau [9]. It simply stipulates that wrapping for express deliveries should be in accordance with national and industry standards on express packaging materials, and should fully consider the relevant safety factors. However, the guidelines do not expressly stipulate how a package should be wrapped. In this regard, industry standards on excessive packaging in China are essentially non-existent.

The key to solving this problem is having the Chinese government formulate clear legislation on packaging industry standards and take appropriate measures to enforce the law. Accordingly, China must establish a national unified standard of packaging industry, including

specific and clear rules on packing materials, packing weight, packing volumes, and so on. As well, the government should strictly enforce the laws, with zero tolerance for violations.

Establish top-down recycling system

Beyond government interventions, a useful way to view the problem is to think there is no rubbish in the world, just misplaced resources. Developing a circular economy is one way to achieve sustainability and build an environmentally-friendly society. Within this framework, Internet shopping packaging materials can be collected and recycled, and then sent back into the industrial chain. China needs a government-led recycling system along with heightened consumer awareness in order to substantially increase recycling efficiency.

As a first step, China should impose garbage sorting and recycling, and set garbage classification rules. This involves putting garbage into different trash receptacles so that they can be remade into new resources through different ways of classifying, cleaning, shipping and recycling. Most of the Internet shopping packaging wastes are cartons and plastic packaging materials that are recyclable. However, once this recyclable garbage is mixed with non-recyclable waste, it is no longer usable, which results in a waste of resources.

Meanwhile, shopping web sites could also provide a platform of incentive mechanisms, where consumers could receive credits through returning their cartons to shopping web sites. The credits could then be used to buy goods, participate in draws, exchange for rebates, and so on. This would not only achieve the goal of recycling packaging materials, but would also increase customers' shopping opportunities.

Confiscate environmental protection tax from internet retailing shops

The Chinese government can use economic means to prevent excessive packaging in Internet retailing and at the same time indirectly achieve the goals of protecting the environment. What is required here is for China to ascertain the various sources of online packaging waste as well as the relevant online shopping packing industry. Once these sources have been ascertained, the government needs to impose a green tax on them so that operators can form industry self-discipline mechanisms and also make a habit of Frustration-Free Packaging. This will help them achieve the aim of reduced pollution and resource saving. In addition, the money earned from green taxes can be used in packaging recycling, pollution control and research development of environmental protection packaging materials, etc.

Develop environmentally-friendly materials and additives

In addition to formulating standards and enforcing legislation, the Chinese government should encourage investment and research in environmentally-friendly packaging materials to directly reduce the harm to human health and the environment. Environmental protection packaging materials should be reusable, renewable, degradable or natural paper materials.

Recently, goods exported from China to Japan and some other countries have been packaged in fabric materials as well as wicker, rattan, etc. These packing materials not only upgrade the image of the products, but they can at the same time transmit and reflect Chinese traditional culture and customs, and can also be used repeatedly. To solve the packaging wastes problem around resource waste and environmental pollution, new packaging materials should be non-toxic, light and practical.

However, even though all-natural packaging materials are non-polluting, the business costs involved in producing them are very high, and they are an inefficient use of resources. In contrast, compound environmental protection material is low-cost, non-polluting, and easily recycled. This form of material will likely become the mainstream of future environmental protection packaging, so it is imperative to study compound environmental protection materials.

Improve people's environmental protection consciousness and action

Through proper packaging, online goods can be made more attractive. However, most consumers are still more interested in the product itself, rather than the packaging. Although China's worsening environment has given rise to sporadic environmental civilian activism in which some people spontaneously defend their right to a healthy environment [18], overall public awareness of environmental preservation is still at a very low level in China [19]. To put an end to excessive packaging, the Chinese government should vigorously promote the principle of moderate packaging to enhance consumers' sense of social responsibility through extensive advocacy of green consumption. In tangent with the premise of meeting people's desires to improve their living standards, consumers need to form scientifically-based consumption ideas in order to save resources and protect the environment. Meanwhile, Internet retailers should be made aware that business competition ultimately depends on high quality goods rather than fancy packaging.

Only when the majority of people support and participate in environmental protection activities can these activities be carried out effectively and thoroughly. China should begin by directing public attention to the issue of online shopping packaging wastes, informing citizens of the serious future repercussions of overpackaging and showing them how to avoid excessive packing in daily life. China's online consumers should take immediate action by doing what is in their power to do: foster green consumption ideas, boycott excessive packaging of Internet shopping, and join recycling environmental activities.

Currently, the first priority of Internet shopping packaging waste management in China is to minimize the environmental impact and resource consumption, including the manufacture, distribution, use, collection and recycling of the packaging.

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