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SHORT COMMUNICATION

A Study of the Guidelines for the Planning and Design of Circular Buildings

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Abstract: Circular building is one of the key turning points in the movement of the construction industry towards sustainable development. It is a "circulation" and "human" idea aimed at balancing the construction and design of the residential environment with the responsibility and values of environmental resources and ecology. This study was focused on the formulation of planning and design guidelines that comply with the current circular building centred economy. Input from industry operatives was collected using semi-structural interviews and a pyramidal approach was employed using logical reasoning to set up planning and design objectives as well as specifications in 4 dimensions covering 12 items. The results provide substantial references for the promotion of current environmental codes compliant with circular building. They can also be used to shape up resource circulation in the construction industry, and help to meet the many needs of sustainable development in the planning and design of circular buildings.

Keywords: Circular building, Sustainable development, Residential environment, Pyramidal approach, Construction industry

1. Introduction

The circular building idea originated from the circular economy model and is now an important part of green economy. The model is in transition and is the turning point towards sustainable development. In this study attention is centered on the circular economy and includes a comprehensive analysis of a circular building environment as well as behavior. The operational factors of circular building have been extracted to create specifications focused on greenhouse gas emission and individual building service life cycles, the reduction of energy mining, and the treatment of waste as a resource. The concept of a circular economy has already penetrated trade and industry. This is especially so for construction where the share of resource consumption accounts for

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more than 60% of all trades combined. The first key issue is to change each type of building into a circular one. The circular building is a multi-resource circulation and integration system which centers on buildings and expands outwards to encompass building structure, construction, and decoration. It employs resources from many supply chains and has a circulation that includes many different industries. A circular building mandates circulation centered building design at the earliest planning and design stage and this plays a key role in the circulation of total environmental resources.

2. Background of the Study

2.1 Circular Building

The practice of circular building involves the application of circular economics from the conception and design stages to the very end of the service life of a building. The realization of a circular economy model resides in the construction engineering do-main. It is an integral part of circular urban development and, directly and absolutely dependent on practice of the circulation model. According to a study on the essence of the circular city there are three key factors involved: a reduction of resource mining, a reduction of greenhouse gas emission throughout the renewal and recycle process, and a maximization of the recycling and reuse of material resources. In other words, waste becomes a resource [1]. Circular building is a sub item of a circular economy and a turning point and transition model from now to the final achievement of sustainable development in the future.

A circular economy changes a wasteful linear model into one with continuous recycling and a circulating supply chain [2]. In a real circular economy scientific and technological means are used to reduce the mining of limited resources to an absolute minimum; use is maximized, and extended use and reuse of resources as well as their renewal is emphasized. In processes involving the making of new goods, or their remaking by degrading, cracking, or reducing recycled resources, the circular economy also requires a reduction of the emission of harmful greenhouse gases, that the set goal of carbon neutrality should be met, and also that all loads on the environment be reduced.

In addition to the well-known green and ecological focus on the saving of energy, water, material, and land as well as the search for ecological balance in circular building, attention is also paid to the effective use of total building materials and minimizing the generation and emission of greenhouse gases, particularly when recycling and renewing material at the end of its service life. This conforms to the directives of carbon reduction against man-made global warming and natural disasters proposed by the Intergovernmental Panel on Climate Change (IPCC) of the UN which covers the carbon emission associated with buildings throughout their service lives.

2.2 Service Life by Building Design

The design and useful age of individual sections of a building are critical assessment factors. This is especially the case with the technology model, maintenance, repair, and procurement of green materials, the relevant integration system as well as construction, because together they determine the useful life of the building and total construction cost throughout its entire service life. Best practices are required at the planning and design stage to set up sustainable operation for the entire service life of the building. Different circulation, operation, and evaluation guidelines are needed to meet the goals of a circular building. In this study the recycling of substances and materials are given full consideration by reference to Stewart Brand building layering and the Locate Architect's building structure design methodology [3].

See Table 1 for useful age estimates of the major sections of a house. The structure one comes with a design age of 60 to 200 years, structural shells at 30 to 60 years, indoor furniture at 5 to 15 years (the shortest). For those with a short useful lifetime, circulation designs for different areas based on use are employed. Regarding building structure planning and design set to 60 years, the useful life of structure and material may be the same, while that of the indoor furniture and decoration may be set at 15 years. As such, the latter may go through 4 cycles of renewal and reuse relative to the building structure life cycle of 60 years. This is a critical assessment criterion for planning to recycle the building resources.

Table 1. Useful life of major building structures

Section	Design age
Stuff	5-15 years
Space plan	5-20years
Services	5-30years
Skin	30-60years
Structure	60-200years

2.3 The Life Cycle of Building Projects and Work

Building work is a unique project with its own definitions, operations and scope at each stage from the beginning to the end. Figure 1 shows the operational scope of the five stages of a green building project [4]. Early stage planning and design are required to identify the

root factors required to meet the conditions of the staged tasks of a circular building project. To meet the circular building goals, it is necessary that the operations relevant to circularity be taken into account. This is especially important with respect to the source and production of the building resources and the methodology, as well as their renewal, disposal, and recycling at the end of their service life. All these are required to conform to circular building conditions and also serve to extract and accumulate circular building specifications throughout the service life of the building.

3. Methodology of This Study

3.1 The Semi-structured Interviews

In this study semi-structured interviews were held with industrial operatives and pyramidal reasoning was used to identify relevant impact factors at each stage of a circular building project for its entire service life based on operation scope definitions and individual cycles. To ensure reliable results short interviews were held and the individual specialists interviewed were chosen for their hands-on and research experience. The interviewees were experts in a range of building related fields that included: ecology, the environment, materials, civil engineering, construction, engineering management, and sustained development. All had 10 or more years of practical experience. See Figures 2 and 3 for the business functions and expertise of the 28 operatives interviewed during this study.

3.2 The Pyramid Principle

The Pyramid Principle is a logic reasoning methodology developed at the McKinsey consultancy by Barbara Minto and is based on the tiered analysis theory of the Pyramid Principle featuring top-down reasoning along a logical line. The argument for the top layer is the effect of the one below, while the lower layer is the cause of the upper layer [5]. This study identifies the planning and design guidelines for circular building by analyzing their requirements in terms of the four elements of the Pyramid Principle: Situation, Complication, Question, and Answer. Individual guidelines of this study were aimed at the core target of circulation and were suitable for "conclusion oriented" logical reasoning and inductive argument. Each dimension was viewed as a system for reasoning. Guidelines were independent from one another. The upper dimension was the inductive conclusion of the one below. The study and analysis process was aimed at identification of the core of the guidelines supporting the dimension to ensure that the reasoning satisfies the nature of circular building with respect to less resource mining and greenhouse gas emission as well as an improvement in the rate of recycling and reuse.

Vertical logic reasoning using the Pyramid Principle was used, as shown in Figure 4. Goals of operation at each layer were the conclusion of arguments of the one below and also supported the layer above. "The essential circular building target" on the top of the pyramid was the final convergent goal of this study and the top-down logic reasoning. Arguments were sorted by logical order and

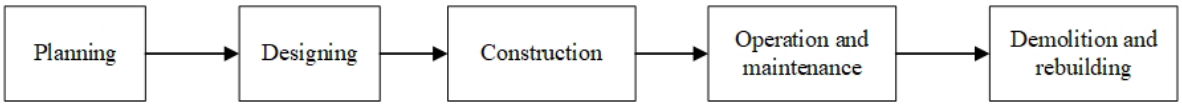

Figure 1. Service life of building work

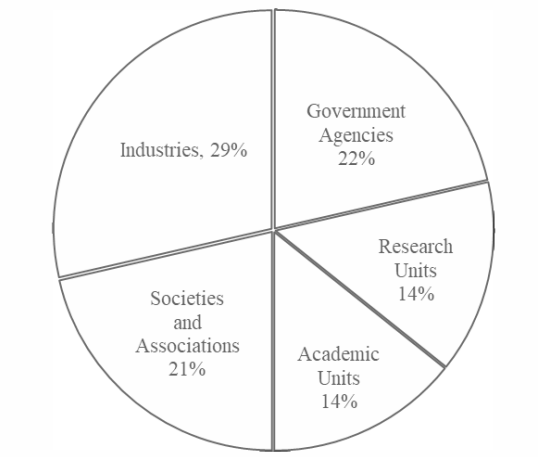

Figure 2. Business functions of the interviewees

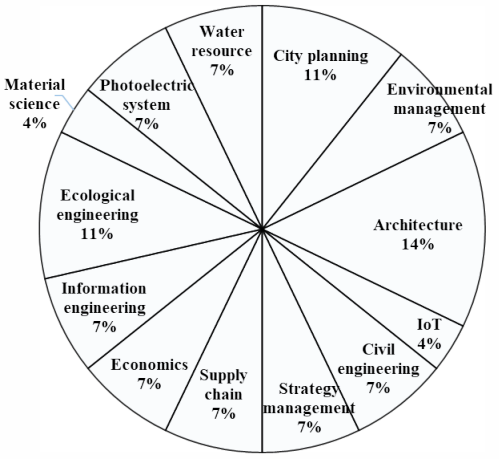

Figure 3. Expertise of the interviewees

type. To support the ultimate goal, the arguments for each layer had to be associated with the essence of circular building and satisfy its root requirements.

4. Study and Analysis

Figure 5 is a flowchart of the implementation of resources suitable for recycling by an analysis of the circulation of materials at individual stages during the service life of a building project. For example, at the operation and maintenance stage, maintenance, servicing, and retrofitting measures can be used to keep resources or equipment of individual building sections at normal operation performance and capacity. At end of their service life, they can be reworked or transferred to other suppliers for re-use or remaking by decomposition, cracking, or reduction through the circulation supply chain. Resources that have reusable value can be sold to second-hand dealers or leasing outlets after being sorted or retrofitted.

The material flow diagram for a circular building is shown in Figure 6. An analysis is shown of the circulation and certification operations carried out at each stage. For example, at the operation and maintenance stage, any materials suitable for recycling, reuse, and renewal can be collected, treated, serviced, and retrofitted for another building. During construction, a circular building requires the use of recyclable and reusable materials as well as the purchase of C2C certified material. The material circulation cycle in circular building construction is aimed at conformance with the circular economy model and at a search for solutions to problems.

After the last stage has been reached the analysis of circular building material flow is used to formulate guidelines for execution. Most operatives interviewed agreed that the planning and design of a circular building project was the key, see Figure 7. Survey and operational

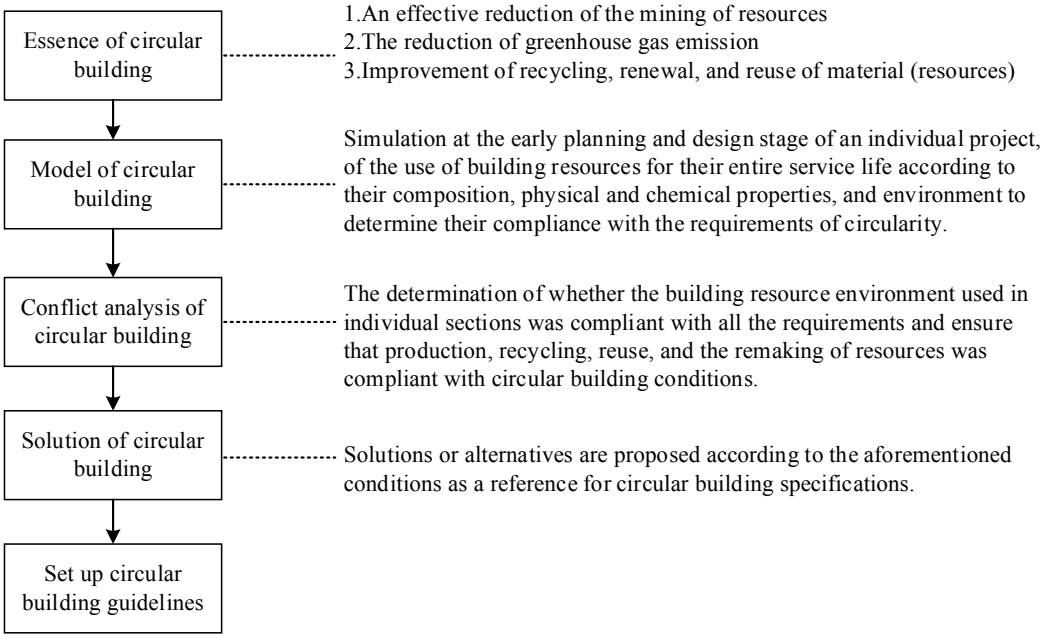

Figure 4. Flow of circular building reasoning

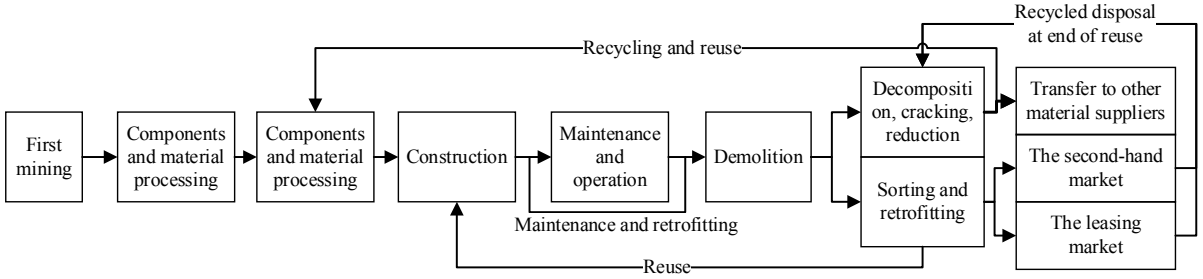

Figure 5. The circulation of building materials

research of the entire building project shows that the indicators A, B, C, and D are the induction and integration goals of the first layer and have a serious impact on circulation. The project construction stage focuses on practice. In addition to adherence to the design guidelines, it is necessary to detail design and construction and to make sure materials used in all parts of the building comply with green production, are durable, can be recycled and reused, and meet the designed useful life of components in each section.

5. Results

This study came up with 12 guidelines based on the Pyramid Principle "conclusion orientation". This was achieved by reasoning from the four indicators A, B, C, and D. See Table 2 for the 12 planning and designing guidelines for circular building.

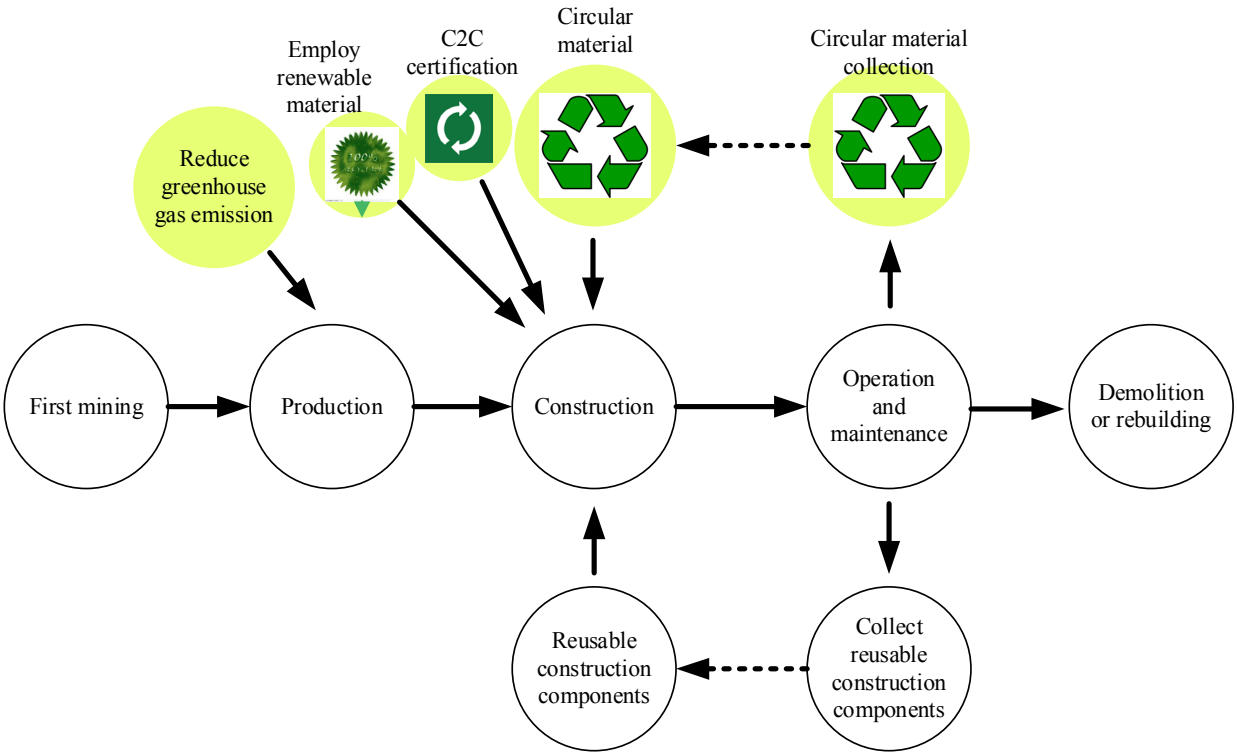

Figure 6. The material flow diagram for a circular building

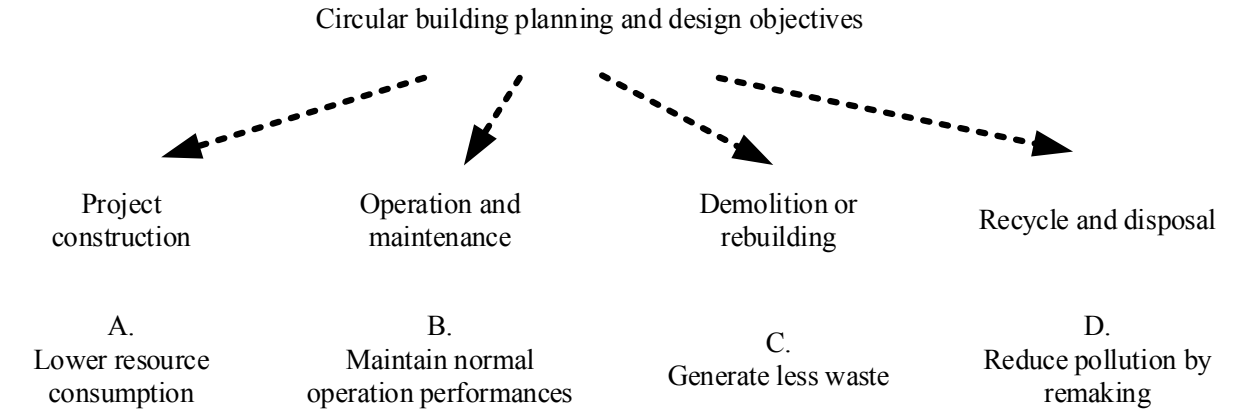

Figure 7. Circular building objectives at the planning and design stage

Table 2. Indicators for circular building at individual stages

A. Reduce resource consumption		B. Maintain normal operation efficiency		C. Reduce waste generation		D. Reduce pollution by remaking	
1.	A1: Use materials from demolished building	5.	B1: Employ extended life design	7.	C1: Reuse communication components	9.	D1: Use processes that need less energy
2.	A2: Use recycled material					10.	D2: Reduce water consumption
3.	A3: Use C2C certified material	6.	B2: Employ flexible space design	8.	C2: Recycle and reuse material	11.	D3: Use processes that require less catalysis
4.	A4: Use bio-material					12.	D4: Use more degradable material

6. Conclusions

Global warming is accelerating climate change far beyond the estimates by scientists around the world. The share of material resource consumption and emission of greenhouse gas by construction accounts for 50 to 60% of the total. This mandates the transformation of conventional buildings into circular ones. A feasible circular building guideline is a must for the construction industry to effectively ease the load on the resource environment. This study presents a set of 12 circular building guidelines with 4 goals based on the definition of the operational scope and the life cycle of a building. In addition, it presents a clear picture of the nature of the circular economy and not only covers the basic operations of resource recycling and renewal, but also focuses on the reduction of resource consumption, greenhouse gas emission, and the chain of resource circulation. The main contribution made by this study lies in the guidelines for the planning and design of a circular building. These are a practical and feasible reference for those engaged in the planning and design, as well as the assessment of circular buildings.

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RESEARCH ARTICLE

The Impact of E-commerce on Consumer Purchasing Behavior for the Coronavirus Disease (COVID-19)

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Abstract: The purpose of this study is to evaluate how COVID-19 is changing consumer behavior and how it is changing e-commerce trends. This study has been conducted through a qualitative approach. The Coronavirus changed worldwide patterns intensively. These differences are caused by the high levels of accidental and secondary funding that this virus reflects. This study showed how e-commerce has grown due to the coronavirus. As individuals deal with their new living conditions, they have changed their shopping behavior to meet their requirements. The COVID-19 pandemic significantly affects many aspects of life, including how individuals deal with their needs and not their needs. The behavior of people, the nature of businesses, and the manner of life have changed. It spreads fears among individuals that they should avoid interacting with. The effect of Coronavirus has transformed the nature of business in the entire e-commerce globe. In particular, COVID-19 has a substantial influence on global e-commerce and in certain cases, has negative consequences, although generally, e-commerce is quickly increasing because of coronaviruses. Moreover, e-commerce businesses confront various problems, including extended delivery times, movement control challenges, social distance, and lock-up or lock-down. The shipping and supply processes are now rather sluggish, yet people are still buying since they do not have any other option. Thus, people move to technology because of coronaviruses. This study has shown the trend of e-commerce in recent times and also shows how consumers tend to adopt e-commerce. There is no such issue in the previous literature. This study fills in the gaps on these issues and also helps to improve the global economy.

Keywords: E-commerce, COVID-19, Global perspective

1. Introduction

United Nations Conference on Trade and Development (UNCTAD) has played a vital role in promoting awareness of emerging crisis possibilities by expanding the use of e-commerce and digital solutions since the emergence of the new Coronavirus Disease (COVID-19). UNCTAD has also expressed worry about the danger of increased digital

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disparities, especially in the least developed countries [1]. The 2020 E-Commerce Week conducted almost exclusively by UNCTAD and E-Commerce partners has offered a unique forum for a wide array of stakeholders to evaluate the consequences of the crisis and examine in-depth important digital concerns in the framework of the COVID-19 pandemic [2]. UNCTAD has evaluated, to monitor the size of the impact, identify important trends and issues facing the e-commerce companies, on the effects of e-commerce enterprises in developing countries and lower developing countries [2].

A coronavirus is a group of viruses that basis minor illness and a certain type of virus can infect the lower airway, and commencing severe illnesses such, pneumonia, bronchitis. People who have been infected with this virus can be contagious in both dangerous and benign ways. Throughout history, many pandemics have altered human existence. COVID-19 began on December 12 in Wuhan, China, and it was discovered that individuals were infected with pneumonia through an illusory link to a business that sells fresh seafood to customers. Millions of individuals in China have been infected with the virus within a week (World Health Organization -WHO, 2019). In addition, 205 nations and their economy are currently afflicted with the virus. It is a worldwide challenge and affects trends in e-commerce [3].

According to WHO (July, 2021), Figure 1 shows that total cases in the United States have confirmed 36,049,015, France 6,178,632, Russia 6,334,195, Brazil 19,986,073, India 31,769,132, Argentina 4,961,880, United Kingdom 5,923,820, and Turkey 5,795,665.

Total Cases (worldwide)

"Total Cases" = total cumulative count (200,304,173). This figure includes deaths and recovered or discharged patients (cases with an outcome).

According to WHO (July 2021) referred the total conformed cases were 200,304,174 worldwide (please see Figure 2) (Source: Worldometer). According to WHO (July 2021) referred that the trend of new cases is higher than the number of recovery cases (Source: Worldometer- Please see Figure 3). This growth rate may change the behavior of people to purchase common goods which can meet the demand of people to purchase goods through e-commerce.

Coronavirus is changing world patterns dramatically. In every business, a fast shift has taken place. The behavior of people, the nature of businesses, and the manner of life have changed. It spreads the fears among individuals that they avoid interacting with. For the above reasons, this study is essential for the buyer and business perspective as well as all stakeholders.

Andrienko, O examined consumer trends on e-commerce where [4] showed e-commerce trends only but they emphasize the on-trend of e-commerce. They didn't refer about how the purchaser's frenzy of behavior. This

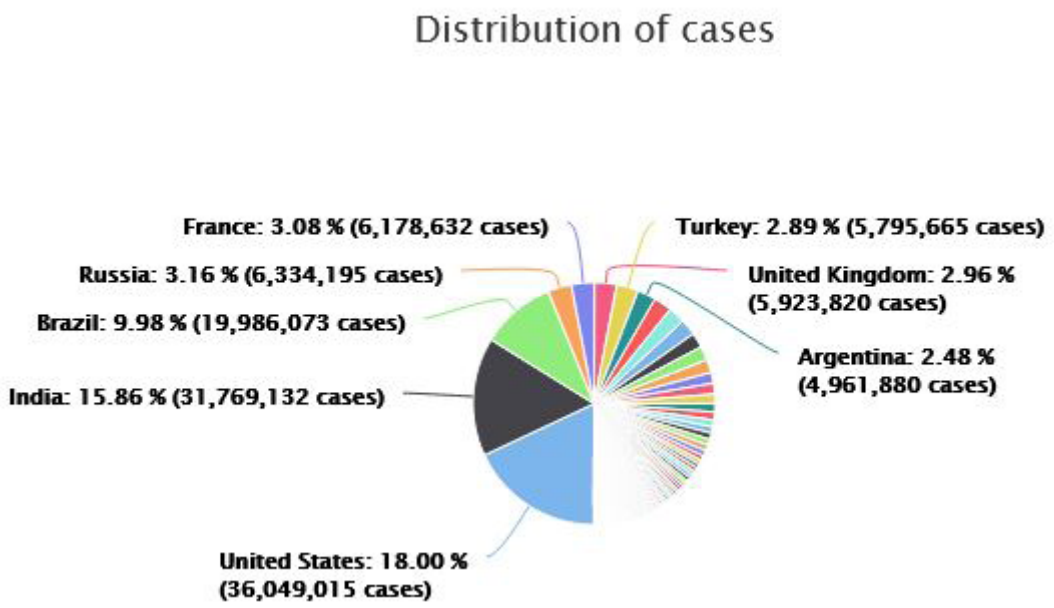

Figure 1. Country cases distribution

Source: Worldometer① - www.worldometers.info

① https://www.worldometers.info/coronavirus/worldwide-graphs

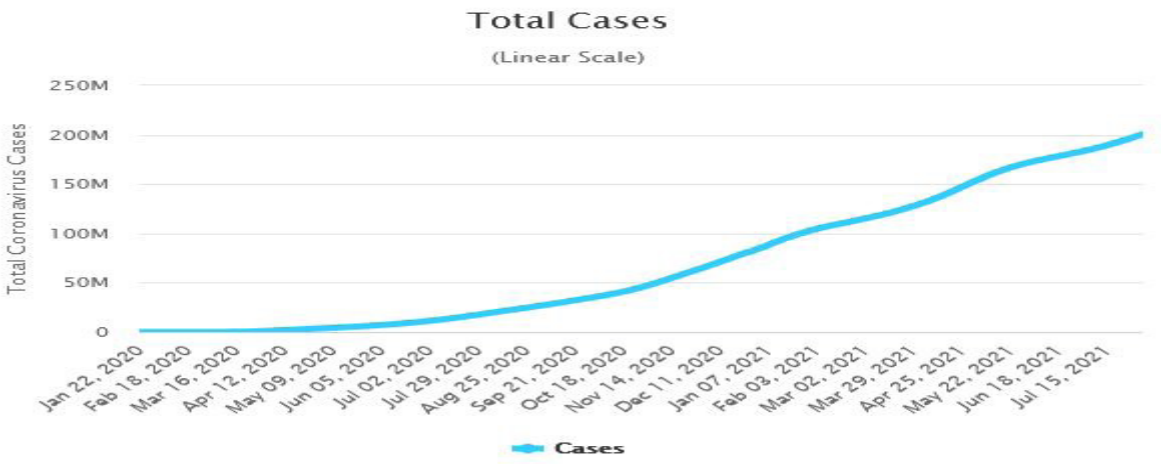

Figure 2. total Coronavirus cases

Source: Worldometer② - www.worldometers.info

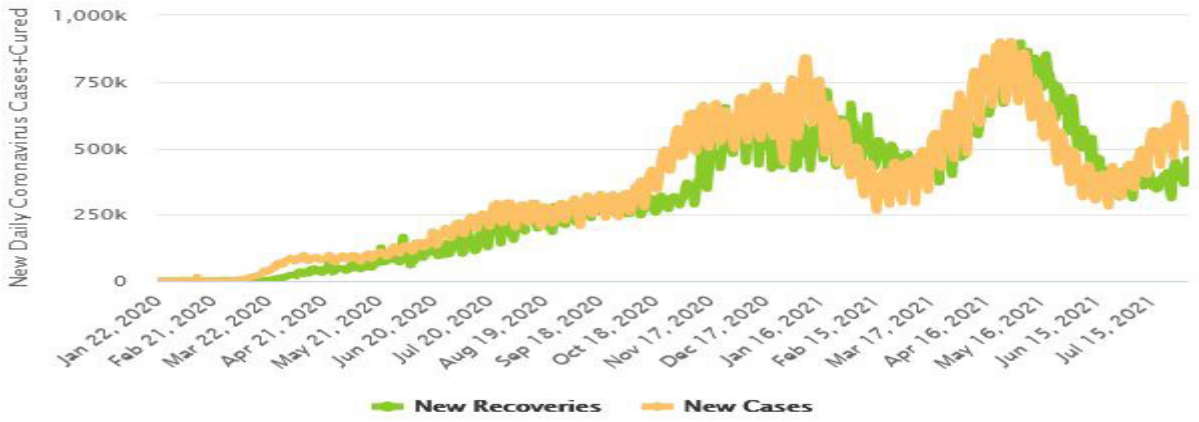

Figure 3. Number of newly infected vs. number of recovered & discharged patients each day

Source: Worldometer③ - www.worldometers.info

was the main limitation of previous studies. This is the research gap in this study. This study emphasis why needs e-commerce is essential in this situation like COVID-19 pandemic. It also emphasizes how people adopted e-commerce and how the purchaser's frenzy of behavior.

2. Effect of COVID-19 on E-commerce

The effect of Coronavirus has transformed the nature of business in the entire e-commerce globe. Research shows that 52% of consumers do not go shopping in brick-and-mortar and congested locations. In addition, 36% avoid brick and mortar until they are vaccinated with coronavirus [4,5]. The varied impact of coronavirus on the various types of products means that COVID-19 has a very high influence on certain items and less impact on some products [5].

Total e-commerce sales rose with this virus, people avoided going out, kept the social distance, and bought from home, and e-commerce work from home as Walmart e-commerce grew 74% [4]. In addition to the rise in media use this time and Facebook, Google updates its functionality so that more individuals may connect on their own, for example, Facebook launches Messenger for 44M people competing with Zoom. Likewise, Google has also released a revised version [4]. The top 10 e-commerce retailers are listed below.

Figure 4 shows the top 10 e-commerce sites worldwide where Amazon.com has taken place in the first position, eBay.com second position, Rakuten.co.jp third position.

② https://www.worldometers.info/coronavirus/worldwide-graphs
③ https://www.worldometers.info/coronavirus/worldwide-graphs

Most of the items you buy during the pandemic include toilet paper, yoga mat, kettlebells, exercise ball, disposable gloves, freezer, bidet, paint by numbers, bread machine, peloton, puzzle, treadmill, air purifier, refrigerator, coloring book, stationary bike, and exercise equipment [5].

However, the COVID-19 (pandemic) has led to mixed fortunes for many e-commerce enterprises, therefore reversing the earnings of companies supplying services for example ride-hailing and travel. According to an estimate in the UNCTAD study released on 3 May 2021, the significant surge in E-Commerce in the face of the mobility constraints caused by the COVID-19 boosted the percentage of online retail sales from 16% to 19% by 2020 (UNCTAD, May 2021). The study was published by UNCTAD and sponsored a two-day e-Commerce and digital economy measurement conference. In some nations, online retail sales rose sharply, the Republic of Korea's biggest proportion being 25.9% in 2020, up from 20.8% in the previous year (Table 1). In the meantime, worldwide e-commerce sales increased 4 percent from 2018 to $26.7 trillion in 2019, according to recent projections. This covers both business-to-business (B2B)

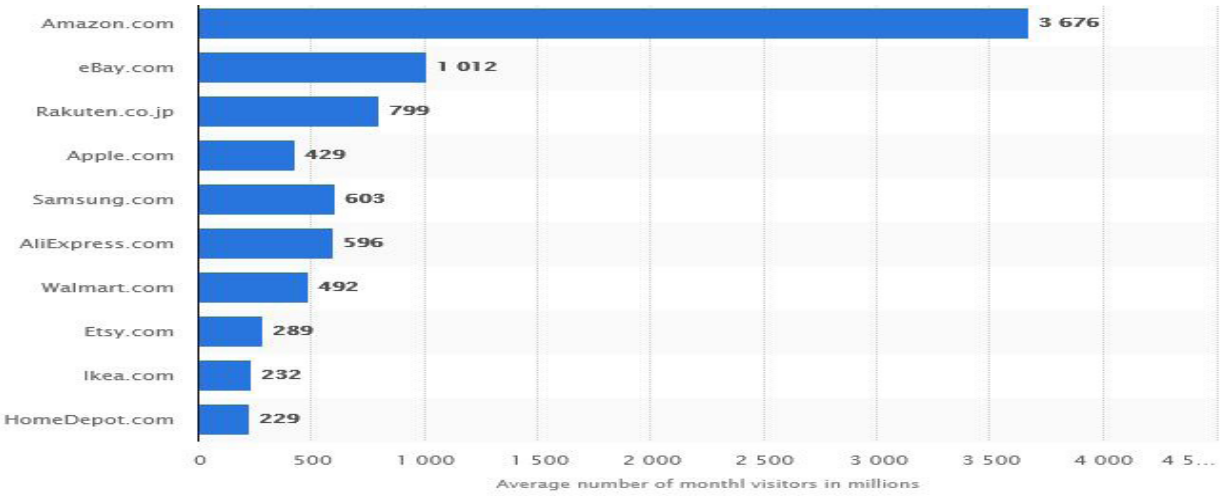

Figure 4. Top 10 E-Commerce site

Source: Statista 2021④

Table 1. Online retail sales, selected economies, 2018-2020

Economy	Online retail sales ($ billions)			Retail sales ($ billions)			Online share (% of retail sales)		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Australia	13.5	14.4	22.9	239	229	242	5.6	6.3	9.4
Canada	13.9	16.5	28.1	467	462	452	3.0	3.6	6.2
China	1,060.4	1,233.6	1,414.3	5,755	5,957	5,681	18.4	20.7	24.9
Korea (Rep.)	76.8	84.3	104.4	423	406	403	18.2	20.8	25.9
Singapore	1.6	1.9	3.2	34	32	27	4.7	5.9	11.7
United Kingdom	84.0	89.0	130.6	565	564	560	14.9	15.8	23.3
United States	519.6	598.0	791.7	5,269	5,452	5,638	9.9	11.0	14.0
Economies above	**1,770**	**2,038**	**2,495**	**12,752**	**13,102**	**13,003**	**14**	**16**	**19**

Source: UNCTAD, based on national statistics offices⑤

④ https://www.statista.com/statistics/274708/online-retail-and-auction-ranked-by-worldwide-audiences/
⑤ https://unctad.org/news/global-e-commerce-jumps-267-trillion-covid-19-boosts-online-sales

and business-to-consumer (B2C) sales and is comparable to 30% of worldwide GDP that year. These statistics (Table 1) demonstrate the rising relevance of internet activity. They also emphasize the need for such information for countries, particularly developing ones, as they rebuild their economy in the aftermath of the COVID-19 epidemic (pandemic).

In emerging nations, including Malaysia, Singapore, Pakistan, & Thailand, others, E-commerce has boosted customers. E-commerce was launched in Pakistan in 2000 but was very bad, just 3% of all Pakistani citizens bought electronically (online) [6-9]. But e-commerce in Pakistan is currently reported to rise by 10% in the daily record and 15% in Internet users. The requests for items rise by 30-40%. To give customers ease, fast service food panda is launched. Pakistan hopes that the e-commerce trend would be on the rise in terms of electronic commerce [10].

2.1 E-commerce is Growing Rapidly and Declining

The COVID-19 pandemic significantly affects many aspects of life, including how individuals deal with their needs and not their needs. The e-commerce business is already flourishing with online retail sales expected at 6.5 trillion dollars by 2023 [11]. Since the epidemic, however, internet purchasing has been overdriven. Even the world's biggest merchants struggle to meet customer demand – but what precisely do consumers purchase? Stack-line has examined e-commerce sales in the U.S. to answer this issue and created an average list of the fastest-growing, falling e-commerce classes (March 2020 versus March 2019) [11].

2.2 The Purchaser's Frenzy of Behavior

As individuals deal with their new living conditions, they have changed their shopping behavior to meet their requirements. While panic purchases in certain nations may have slowed, consumer supplies and "pandemic pantry items" are still in stock. Many customers also take their newly-found time to focus on their health, with 85% of consumers doing social isolation and 40% indicating that when limits are raised, they want to keep it going. The changes in behavior have led to an increase in demand in several categories of products, although many are practical, others are marvelously strange [11].

2.3 Categories of the Fastest Growing

While the following list contains numerous goods with a shelf life, it looks that consumers are taking things into their own hands and shops are selling bread manufacturing machinery in second place & retailers sell out of their top models (Table 2). The list (Table 2) shows that, while individuals are alone, customers contemplate good lifestyle improvements, like exercise, smoking loss,

Table 2. Discover the 100 fastest-growing categories of products below

Rank	Category	% change in March 2020 vs. 2019	Rank	Category	% change in March 2020 vs. 2019
1	Disposable Gloves	670%	51	Incontinence & Tummy	129%
2	Bread Machines	652%	52	Multivitamin	126%
3	Cough & Cold	535%	53	Cat Litter	125%
4	Soups	397%	54	Training Pads and Trays	125%
5	Dried Grains & Rice	386%	55	Juices	125%
6	Packaged Foods	377%	56	Smoking Cessation	122%
7	Fruit Cups	326%	57	Dried Fruit & Raisins	120%
8	Weight Training	307%	58	Salt & Pepper Seasoning	118%
9	Milk & Cream	279%	59	Craft Kits & Projects	117%
10	Dishwashing Supplies	275%	60	Batteries	116%
11	Paper Towels	264%	61	Trash Bags	116%
12	Hand Soap & Sanitizer	262%	62	Nuts & Seeds	116%
13	Pasta	249%	63	Hair Coloring	115%
14	Vegetables	238%	64	Sauce & Gravy	115%
15	Flour	238%	65	Deli Foods	114%
16	Facial Tissues	235%	66	Syrups	114%
17	Allergy Medicine	232%	67	Bread & Bakery	114%
18	Women's Health	215%	68	Minerals	113%
19	Cereals	214%	69	Condiments	111%

Rank	Category	% change in March 2020 vs. 2019	Rank	Category	% change in March 2020 vs. 2019
20	Power Generators	210%	70	First Aid	108%
21	Laundry Supplies	200%	71	Nail Care	108%
22	Household Cleaners	195%	72	Humidifiers	105%
23	Soap & Body Wash	194%	73	Art Paint	104%
24	Toilet Paper	190%	74	Office Chairs	104%
25	Jerky & Dried Meats	187%	75	Deodorant	103%
26	Chips & Pretzels	186%	76	Jams, Jellies & Spreads	102%
27	Crackers	184%	77	Coffee	101%
28	Health Monitors	182%	78	Spices & Seasoning	100%
29	Popcorn	179%	79	Skin Care	99%
30	Computer Monitors	172%	80	Pain Relievers	99%
31	Fitness Equipment	170%	81	Cooking Vinegar	98%
32	Single Vitamins	166%	82	Air Purifiers	97%
33	Nut & Seed Butters	163%	83	Granola & Nutrition Bars	97%
34	Cat Food	162%	84	Pudding & Gelatin	97%
35	Fruit Snacks	162%	85	Toy Clay & Dough	95%
36	Baby Care Products	162%	86	Single Spices	95%
37	Refrigerators	160%	87	Bird Food & Treats	91%
38	Baking Mixes	160%	88	Lab & Science Products	90%
39	Toilet Accessories	160%	89	Eczema & Psoriasis	90%
40	Dog Food	159%	90	Ping Pong	89%
41	Diapers	154%	91	Chocolate	86%
42	Yoga Equipment	154%	92	Baking Ingredients	84%
43	Bottled Beverages	153%	93	Energy Supplements	84%
44	Baby Meals	153%	94	Respiratory	82%
45	Cookies	147%	95	Office Desks	82%
46	Digestion & Nausea	144%	96	Potty Training Supplies	82%
47	Snack Foods	141%	97	Herbs, Spices & Seasonings	82%
48	Herbal Supplements	136%	98	Keyboard & Mice	80%
49	Cooking Oils	135%	99	Body Lotion	79%
50	Water	130%	100	Safes	69%

Source:Jones, K. [11]

and breathing groups all increase.

Interestingly, toilet paper grew more than infant foods, while cured meats grew more than water. While there is a significant surge in demand in certain categories, others are plummeting in the pandemic economy⑥.

2.4 Categories of the Fastest Decline

An unprecedented surge of annulments of events and holidays has a major influence on the items which people consume. For example, luggage and suitcases, cameras, and men's swimwear have all declined in sales. Whatever the list below, it is apparent that the pandemic has had both a beneficial and a bad impact on retailers of any kind⑦.

E-commerce retail sales demonstrate that the influence of COVID-19 on e-commerce is considerable, and its sales are anticipated to exceed $6.5 trillion in 2023 [11]. The virus has been significantly affected by many products, such as disposable gloves, soups, cough and cold, packaged food, fruits cups, bread machine, dried grains and rice, dishwashing supplies, weight training, milk and cream, vegetables, hand soaps, and a sanitizer, pasta, flour, facial tissues, paper towel, and allergy medicine and many more [11]. The products declining in coronavirus on the other hand are luggage and suitcase, gym bags, briefcase,

⑥ https://www.visualcapitalist.com/shoppers-buying-online-ecommerce-covid-19/

⑦ https://www.statista.com/statistics/1109814/fastest-declining-ecommerce-categories-usa/

Table 3. Discover the 100 fastest declining categories of products below

Rank	Category	% change in March 2020 vs. 2019	Rank	Category	% change in March 2020 vs. 2019
1	Luggage & Suitcases	–77%	51	Wine Racks	–40%
2	Briefcases	–77%	52	Men's Shoes	–40%
3	Cameras	–64%	53	Clocks	–39%
4	Men's Swimwear	–64%	54	Baby Girl's Shoes	–39%
5	Bridal Clothing	–63%	55	Bracelets	–39%
6	Men's Formal Wear	–62%	56	Men's Boots	–39%
7	Women's Swimwear	–59%	57	Tapestries	–39%
8	Rash Guards	–59%	58	Camping Equipment	–39%
9	Boy's Athletic Shoes	–59%	59	Men's Bottoms	–38%
10	Gym Bags	–57%	60	Cell Phones	–38%
11	Backpacks	–56%	61	Tool Storage & Organizers	–38%
12	Snorkeling Equipment	–56%	62	Necklaces	–38%
13	Girl's Swimwear	–55%	63	Swimming Equipment	–37%
14	Baseball Equipment	–55%	64	Men's Hats & Caps	–37%
15	Event & Party Supplies	–55%	65	Girl's Shoes	–37%
16	Motorcycle Protective Gear	–55%	66	Industrial Tools	–36%
17	Camera Bags & Cases	–54%	67	Juicers	–36%
18	Women's Suits & Dresses	–53%	68	Desktops	–35%
19	Women's Boots	–51%	69	Classroom Furniture	–35%
20	Cargo Racks	–51%	70	Bar & Wine Tools	–35%
21	Women's Sandals	–50%	71	Glassware & Drinkware	–35%
22	Drones	–50%	72	Musical Instruments	–34%
23	Boy's Active Clothing	–50%	73	Power Winches	–34%
24	Lunch Boxes	–50%	74	Home Bar Furniture	–34%
25	Store Fixtures & Displays	–50%	75	Office Storage Supplies	–34%
26	Automotive Mats	–50%	76	Girl's Active Clothing	–34%
27	Men's Outerwear	–49%	77	Women's Tops	–34%
28	Watches & Accessories	–49%	78	Braces, Splints & Supports	–34%
29	Cargo Bed Covers	–48%	79	Car Anti–theft	–34%
30	Track & Field Equipment	–48%	80	Rings	–34%
31	Ceiling Lighting	–47%	81	Blankets & Quilts	–33%
32	Camera Lenses	–47%	82	Women's Athletic Shoes	–33%
33	Girl's Coats and Jackets	–47%	83	Kitchen Sinks	–33%
34	Women's Hats & Caps	–47%	84	Golf Clubs	–33%
35	Women's Outerwear	–47%	85	Equestrian Equipment	–33%
36	Video Cameras	–46%	86	GPS & Navigation	–32%
37	Wheels & Tires	–46%	87	Recording Supplies	–32%
38	Motorcycle Parts	–45%	88	Home Audio	–32%

Rank	Category	% change in March 2020 vs. 2019	Rank	Category	% change in March 2020 vs. 2019
39	Women's Wallets	–45%	89	Boy's Accessories	–32%
40	Shocks & Struts	–44%	90	Earrings	–32%
41	Transmission & Parts	–44%	91	Dining Sets	–31%
42	Girl's Athletic Shoes	–44%	92	Calculators	–31%
43	Women's Shoes	–44%	93	Boy's Shoes	–31%
44	Telescopes	–44%	94	Volleyball Equipment	–31%
45	Sunglasses & Eyeglasses	–43%	95	Strollers	–31%
46	Men's Tops	–41%	96	Coolers	–30%
47	Video Projectors	–40%	97	Sanders & Grinders	–30%
48	Men's Athletic Shoes	–40%	98	Men's Activewear	–29%
49	Marine Electronics	–40%	99	Living Room Furniture	–29%
50	Hand Tools	–40%	100	Climbing & Hiking Bags	–28%

Source: [11]

cameras, rash guards, men's swimwear, athletic shoes, women swimwear, toys, bridal dress, wallets, men formal dress, boys, lunch boxes, watches, boy's top's and caps, girl's jackets and coats, etc. [11].

3. Discussion

The COVID-19 outbreak and restrictive actions against it altered the global economy instantly. The rapid introduction of digital technology was one of the most essential stages of change. The interruption of freedom of people's movement & social dissociation measures put into effect by several countries drove companies and consumers into a new way of life and to actively use digital solutions to continue to operate remotely [1].

COVID-19 has a substantial influence on global e-commerce and in certain cases negative consequences, although generally, e-commerce is quickly increasing because of coronaviruses. Coronavirus obliges clients to use the web and to use it daily [12]. Moreover, e-commerce businesses confront various problems, including extended delivery time, movement control challenges, social distance, and lock-up or lockdown [13]. The shipment and supply processes are now rather sluggish, yet people are still buying since they do not have any other option. Thus, people move to technology because of coronaviruses.

In addition, there is a strong market demand for some items. Even retailer shops are unable to provide client requirements, including hand sanitizers, toilet tissues, groceries, disposable gloves, and dairy goods. On the other side, COVID-19 has a detrimental effect on tourism, planes have been delayed and foreign trade has been exceedingly slow and stayed in place.

E-commerce in this scenario has grown into a substitute source, and e-commerce supplies items normally bought by consumers in a supermarket. In the meanwhile, this study wants to understand their effectiveness in both costs and benefits for stability and the actions associated with the upcoming arrival.

4. Conclusions

In this research, we have reviewed & deliberately discussed the COVID-19 outbreak in China. This research is particularly interested in the propagation and consequences of coronaviruses on e-commerce not only within China but also worldwide. Awareness about nearly this issue can counteract better information in persons and discussions of how coronavirus-affected e-commerce, business, and economics in countries. How e-commerce offers consumers various ways of satisfying their requirements. E-commerce has been improved by COVID-19. As individuals deal with their new living conditions, they have changed their shopping behavior to meet their requirements. The COVID-19 pandemic significantly affects many aspects of life, including how individuals deal with their needs and not their needs. The behavior of people, the nature of businesses, and the manner of life have changed. It spreads the fears among individuals that they avoid interacting with. The effect of Coronavirus has transformed the nature of business in the entire e-commerce globe. COVID-19 has a substantial influence on global e-commerce and in certain cases negative consequences, although generally, e-commerce is quickly increasing because of coronaviruses. Moreover, e-commerce businesses confront various problems,

including extended delivery time, movement control challenges, social distance, and lock-up or lockdown. The shipment and supply processes are now rather sluggish, yet people are still buying since they do not have any other option. Thus, people move to technology because of coronaviruses. Finally, this study provides a guide for future research. How the coronavirus has affected e-commerce will encourage other researchers to delve more deeply into this issue, for example, e-commerce trends how it has been changed by corona & future trends.

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