

# Convolutional Neural Network for Solid Waste Segregation and Management

Tze Chin Ong<sup>1,2</sup>, Mun Geet Ow Yong<sup>1,2</sup>, Norhoneydayati Abdul Manap<sup>3,4</sup> Farhah Abdullah<sup>5,6</sup> & Tze San Ong<sup>7,8</sup>

<sup>1</sup> Faculty of Business, Communications and Law

<sup>2</sup> INTI International University, Nilai, Malaysia

<sup>3</sup> Faculty of Islamic Studies

<sup>4</sup> Universiti Kebangsaan Malaysia, Bangi, Malaysia

<sup>6</sup> Universiti Teknologi MARA, Dengkil, Malaysia <sup>7</sup> Faculty Economics and Management

<sup>8</sup> Universiti Putra Malaysia

tzechin.ong@newinti.edu.my, mg.owyong@newinti.edu.my, norhoney@ukm.edu.my,  
farha523@uitm.edu.my, tzesan@upm.edu.my

## Abstract

*E-commerce creates its own borderless market with advance technologies and availability of vast information, which generated significant harms to consumers. The technologies driven, borderless context of e-commerce seems to create a perfect competition of market structure. In fact, e-commerce that creates its own market and regulates its own game is an anti-competition practices, which directly interfere with domestic market. E-commerce markets obtain strong economies of scale and scope in order to provide low marginal cost and in returns for data provided by consumers. E-commerce has disrupt the market equilibrium creating segregate wide margin of producer and consumer surplus directly affecting consumers economic and welfare. In many instances, data provided by consumers were sold for other purposes without the knowledge of consumers. The issue of e-commerce platforms that is capable of exploit their market power to increase profits and for its own gain is of alarming issues in encouraging a fair competitive market. This paper provide analysis of e-commerce market power of consumer sale of goods in the context of competition perspective in Malaysia. Qualitative research by employing content analysis, this paper aims to analyses the market power of e-commerce consumer sale of goods and the issues arising in the technologies driven market structure for a deeper understanding of competition perspective in Malaysia*

**Keywords:** Market Power, E-Commerce, Consumer Sale of Goods, Competition

## 1. Introduction

The new emerging E-commerce has change the traditional distribution chain of goods in a form of simplicity, by passing the intermediary, creating e-retails, which directing the manufacturer as seller to the buyer as consumer (B2C), in some cases the consumer as seller to another consumer as buyer (C2C). There are many definitions of e-commerce from various perspectives; e-commerce refers to the activities of buying and selling products online (Murray, 2016). According to World Trade Organization (WTO), e-commerce refers as transections among others including businesses, individuals, governments and other public or private organizations. E-commerce is also the production, distribution, marketing, sales or delivery of goods and services by electronic means ([https://www.wto.org/english/thewto\\_e/minist\\_e/mc11\\_e/briefing\\_notes\\_e/bfecom\\_e.htm](https://www.wto.org/english/thewto_e/minist_e/mc11_e/briefing_notes_e/bfecom_e.htm)). On the other hand, Organization for Economic Co-operation and Development (OECD) refers e-commerce as all business activities occurring over electronic networks, including the sale of goods and services, the transfer of funds, online marketing activities and the collection and processing of data (Dunne, N., 2019). European Union refers e-commerce as sale or purchase of goods or services, whether between businesses, households, individuals or private organizations, through electronic transactions conducted via the internet or other computer-mediated (online communication) networks

(<https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:E-commerce>). In ASEAN perspective, e-commerce refers as cross-broader e-commerce transactions or electronic trade (ASEAN Agreement on Electronic Commerce, 2018) at <https://asean.org/asean-economic-community/sectoral-bodies-under-the-purview-of-aem/e-commerce/>). Despite the wide definition of e-commerce, this paper is focusing on e-commerce consumer sale of goods, which is commonly known as on-line shopping between business to business and business to consumers. The analysis of this paper is based on the focus of e-commerce consumer sale of goods with the nexus of market structure and power of the platform providers.

The large increase of e-commerce in global trade have become one of the emerging economy, particularly in consumers' economy. In Malaysia, the high rate of e-commerce usage amount 15.3 million online shoppers (50% of the population). Revenue in the E-commerce market amounts to US\$3,751 million in 2019 (<https://www.export.gov/apex/article2?id=Malaysia-E-Commerce>). Besides the positive prospect of economy growth, e-commerce also create a dynamic market that brought along many issues, in particularly the competitive issues for the economic. This paper concentrate in analyzing the market structure of e-commerce consumer sale of goods in search of a radical theoretical framework in providing better understanding of competition issues of e-commerce consumer sale of goods.

## **2. Methodology**

The methodology employed in this paper is qualitative research methodology based on content analysis to identify and analyses the issues arising in competition laws in the context of e-commerce consumer sale of goods. This paper engaged content analysis of the literatures and legislature involved in competition law issues to identify the characteristics of market structure and power of e-commerce consumer sale of goods (Chatterjee, 2000). Content analysis also served to analyses the qualitative aspect of the competition perspective regarding to e-commerce.

The approaches employed in this research are descriptive, explanatory, analytical and critical (Anwarul Yaqin, 2008). To determine the issues involving competition perspective in e-commerce consumer sale of goods, descriptive approach is employed to explain the underlying issues of competition perspective in the context of e-commerce market structure. Besides that, an explanatory approach is engaged to explain the relation between e-commerce and anti-competitive practices. To further examine and evaluate the relation of competition law and e-commerce, analytical approach is used to draw inferences from the understanding and explanation of the e-commerce market structure and its power entailed. This research also employed critical analysis approach to make judgments and form opinion of the competitive issues regarding to e-commerce consumer sale of goods. Analytical and critical approaches were also engaged in forming conclusion in suggesting whether a necessary theoretical framework governing e-commerce consumer sale of goods is much needed.

## **3. The Concerns of Competition Law in E-commerce Consumer Sale of Goods**

Consumers are contented to the convenient and easy access of e-commerce as consumers can buy anything at anytime from anywhere without physically going to the store (Naemah, & Roshazlizawati, 2013). The transaction of selling and buying completed at the fingertips with the help of the internet has become a part of the modern life style. The concept of bringing stores to shoppers as compare to shoppers to the stores (Parsons, 2002) has well received and adapted by e-consumers. However, there are many issues derived from the e-commerce consumer sale of goods, in particular, the issue arising from anti-competition practices.

The transformative changes of bricks to mortal retailer to e-retailer has raise growing concern about the power of a small number of firms to control and influence billions of lives (Morton, at el, 2019). The gaining market power of e-commerce platforms provider is a key concept in anti-competition practices (Park, 2009). Further, the notable effects of the growth in importance of e-

commerce markets has been caused the re-emergence of vertical restraints as a pressing concern of competition law (Dunne, N., 2019). There are other anti-competitive risks arising from the harvesting consumers' data by e-commerce. When e-commerce platforms cooperate to extract data from individuals and promote asymmetrical information flows to foster behavioural exploitation, while simultaneously competing among themselves over consumer surplus are among others the anti-competition risks in e-commerce (Ezrachi, & Stucke, 2016). E-commerce even exploit their position in re-selling consumers data for its own gain or other purposes without consumer knowledge (Dunne, N., 2019). Consumers often do not realise their data value and the mechanism governing profit driven e-commerce. The zero price services provided by e-commerce are not really gratuitous but traded in exchange for consumers' attention and data. Uniqueness of the e-commerce market structure has a tendency to produce winners from the incumbent platforms. One market power is gained, these platforms has the leverage to dictates various vertical agreements with upstream and downstream entities that are potentially anti competition.

The growth of e-commerce has contributed towards the boom of third party logistics providers in Malaysia (OwYong., & Syriac, 2018), due to their symbiotic relationship. However, this relationship may cease as emergence of dominant platforms with leverage over outsourcing of large volume of transportation needs enabling it to extract economies from the delivery sector (Khan, 2017). Empirical analysis of trade credit practices in Malaysia conducted by (OwYong et al, 2019) suggests that unfair terms may be the result of size leverage between a seller and its buyer. Another anti competition practice is forced free-riding. This practice is introduced by Shelanski (2013) as “when a platform appropriates innovation by other firms/ third party that depend on the platform for access to consumers”. This occurs when an e-commerce platform engages in activities that identify and copy innovation of their third party, for example introducing the same product as competition.

E-commerce that based on theory of trust has consumer trust by harvesting and re-selling consumers' data for its own gain and other purposes (Ramnath & Paul, 2002). Misused of consumers data have since lead to more serious issues such as legal, political and social issues. The used of consumers' data by the e-commerce platform to predicts and provide surprising insights of consumers' behaviour has begun to influence consumers' social behaviour in life including, relationship, education, law enforcement, voting and many others. The implication of big data and big analytics for the sellers and the consumers raise competition issues that whether such data is used for the incentives of the providers which are aligned with the consumer interests or it is only merely accommodating certain market characteristics that possess potential risks to consumers (Ezrachi, A., & Stucke, M. E., 2016).

Policy development over process of evaluating “object” of vertical agreement is an ongoing debated, arguable still at the theoretical level (Dunne, N., 2019). However, Malaysia's e-commerce industry has already reached RM24.6 billion in 2017 (Star, 2017). This figure is expected to grow as Lazada Malaysia achieved 100% year-on-year growth in sales in 2017 (Edge, 2018). A study by iPrice that compares number of searches among platforms painted worrying of competition trend (Digital News Asia, 2017). The alarming phenomena is exacerbated by vertical integration between China's e-commerce giant Alibaba with Lazada Malaysia in 2018. The lag of competitive policy development during the rise of e-commerce is not an option.

In Malaysia, competition law is provided under Competition Act 2010 and Malaysia Competition Commission (MyCC) is the key enforcement agency. Competition law is unique in terms of its heavy emphasis on economics (Lee, 2014). However, there are other legal theories that governing the competition law, therefore over emphasis on economic theories might not provide a holistic viewpoint of the anti-competition practices in e-commerce. This research is aims to explore other legal theories that might provide some insight in governing the e-commerce consumer sale of goods. Theory of harm in competition law analysis might be to provide broader

explanation on anti-competition practices of e-commerce. Theory of harm may be interpreted as harm to the competitive process and consumers. It may also be interpreted as harm to market mechanism or the ability to compete. (Rahman et al, 2017). Besides the terms used in e-commerce platforms contract may be use as an indication of the unfair trade practices that in breach of competition law. E-commerce platforms often adopted most-favoured-customer clauses (MFC) guarantee that a supplier will treat the platform as favourably as the supplier's most-favoured-customer concerning price, availability and similar terms of a given transaction (Akman, 2016). These MFC clause trigger competition issues such as potential abuse of dominant position in the market and it may also be a mechanism that facilitate price fixing and collusion, as well as the foreclosure of the market due to the impossibility of entrants agreeing better deals than the deal an incumbent has in its contract with an important input supplier containing an MFC clause (Akman, 2016).

#### ***4. Theoretical Framework of Competition Law Perspective for E-commerce Consumer Sale of Goods***

Competition law theory provide that in order to achieve economic equilibrium, where enough competition will equilibrate the market. Equilibrium adjustment supposed to self-correct the market situation (Elhauge, E. & Geradin, D., 2011). In economic point of view, lower price with quality products is desirable to achieve a perfect market. Economics prediction that e-commerce that encourage competition would create a perfect market (Dunne, N., 2019). In reality, only a few large scare e-commerce platforms provides have been dominated the market, which acquire significant market power (Park, 2009). E-commerce is also capable of abusing its dominant power by harvesting and re-selling consumers' data for its own gain.

The purported free market creates by e-commerce is not free in reality, in fact its create conditions and barriers to entry (Morton, F., et al, 2019). E-commerce operates in 24 hours borderless market, arguable limited only by its capabilities to fulfil demand. From economic perspective, a vast consumers base enables enormous economic surplus be derived from operational efficiency (Yang, Z., et al, 2016). Nonetheless, there is a pre-condition to achieve network effects with many participants from both supply and demand chains and scale economics, a large combination of upfront capital investment and on-going incremental innovation fixed cost in order to scale up operational capabilities to align with demand which create barriers to entry for new players (Niamh, 2018).

Consumers are subjected to e-commerce platforms unfair, unclear and ever-charging terms and conditions upon entering the market. In order to use the services provided, consumers are exchanging their valuable big data to the platforms' providers without realizing (Colangelo, G. & Maggiolino, M., 2018). Besides, consumers are subjected to the setting of the platform and unable transfer their data to another platform by their choice. (Colangelo, G. & Maggiolino, M., 2018). Similarly, these also applied to the manufacturers/sellers that chose to participate in the e-commerce markets.

The conventional anti-competition concept in determine a relevant market share for the inference of a degree of market power has failed to provide rational explanation on the unique e-commerce market. E-commerce that create its own market structure and subject to its own rules that are not capable to self-regulate by using the economic theory. Therefore, a contemporary radical underlying theory is needed to explain the e-commerce market in consumer sale of goods taking into account various perspective including the algorithmic of data with artificial intelligent and e-commerce advance technologies.

Besides, e-commerce marketplace feature multisided platforms, uniting diverse retailers/sellers try to find for buyers, buyers seeking for competitive products or pricing, advertisers seeking for attentions (Niamh, 2018). The multisided platforms with the connections of different parties in the different supply and demand chains are interdependent which means that a price increase or quality decrease for one group of the participants may cause feedback effects to the others

participants in the platforms (Niamh, 2018). According to OECD Competition Division (2018) multisided platforms usually involved cross-subsidies between participants, one group of the users enjoy zero/close to zero price while other participants are charge in order to subsidize the other group. The conventional competition approach in determining the market power is unable to assess multisided e-commerce platforms.

There are many competitive issues arising in e-commerce consumer sale of goods, which pose the doubt on the conventional economic theoretical framework that governing e-commerce. Therefore, this paper is seeking to propose a potential framework that complement the current underlying theory of competition law. The complimentary framework of competition law in e-commerce consumer sale of goods includes three main areas, which are competition law, consumer welfares and e-commerce. As discussed above, the current underlying competition law theory is solely based on economic theory hence there are many issues in providing some indications of the unique market of e-commerce for consumer sale of goods. This paper explore the possible framework with the combination of consumer welfare and e-commerce in the framework in assessing anti-competition practices. Using consumerism that is based on consumer welfare which emphasizes on social justice and equity. The interrelated principles of social justice, equity, access, participations and rights need to be taken into account as complimentary theory of competition law together with pure economic theory. Besides, consumer welfarism with the core value to promote equal distribution of wealth is also highly associated with economic theory of welfarism (Brouwer, W.B.F., et al, 2008). Furthermore, pure economic theory has long recognition that it is inadequate and far in advance from the legal theories (Wright, D., 1951). According to Wright (1951), pure economic theory and approach do not differentiate the problem arising out of geographical, different circumstances and nature of the issues, which is often derived from the market and organisation business model. Hence, the justification of a new framework in the context of e-commerce consumer sale of goods is valid and require in depth and careful consideration. Consumer welfarism is recommended to consider as the yardstick in accessing competition law perspective of e-commerce consumer sale of goods taking into account consumer behaviour.

The most crucial aspect of e-commerce system, process and structure, which are aid by the highly sophisticated technology innovation from all the process of supply, distribution, information sharing towards the demand chain which is the consumers. As discussed by Molla and Paul (2001), there are multi-dimensions with distinguish players and actors in different levels to facilitate, support, perform and generate different revenue of e-commerce. Therefore, understanding of e-commerce system, process and structure are of significant in theory and of in practice to provide a complimentary framework in competition law perspective.

Figure 1 below illustrated the theoretical framework of competition law perspective in the e-commerce consumer sale of goods:

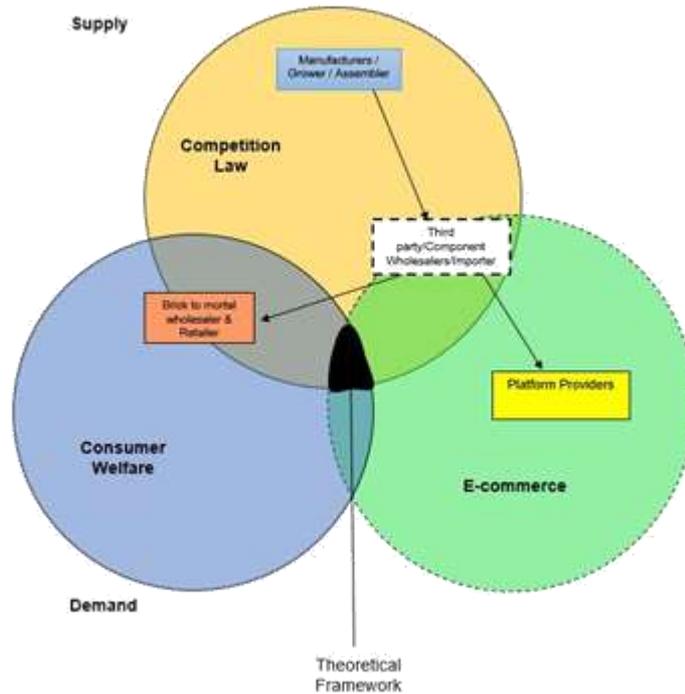


Figure 1: Theoretical Framework of Competition Perspective on E-commerce Consumer Sale of Goods

As illustrated in Figure 1, this paper explore the complimentary framework of competition perspective on e-commerce consumer sale of goods. This paper suggest that there are more than just pure economic theory that need to be considered in understanding the competition perspective. A framework that are workable in theory and in practice should encompass the supply chain, which is the competition law theory that inclusive of economic and legal theories. On the other hand, for demand chain, the consumer should be the yardstick in assessing the competition perspective. Furthermore, the e-commerce system, process and structure are of paramount important in considering the competition perspective. The understanding of the e-commerce system, its market structure would inevitably aid in a radical framework in assessing competitive perspective of the platforms which cut across and intertwined with the different dimensions of the e-commerce consumer sale of goods.

### ***5The Market Structure of E-commerce***

The dynamic structure of e-commerce has create four basic dimensions which include the nature of the network archetype, the application solutions, the business functions performed or supported and the parties involved in the electronic relationships (Molla, A., & Paul, S. L., 2001). As Molla and Paul (2001) illustrated a framework for the four dimensions of e-commerce system that e-commerce used internet through World Wide Web to perform one or more business functions including information provision, communication, advertising, buying, selling, distribution, customer service, delivery and payment processing among producers, suppliers and their customers.

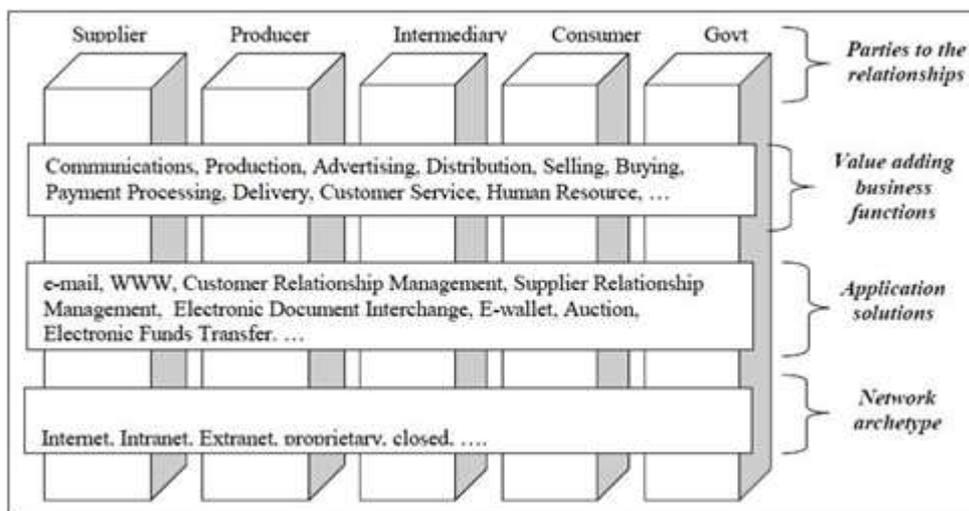


Figure 2: A framework for Classifying E-commerce Views

Source: Molla, A., & Paul, S. L., 2001

These multiple dimensions of e-commerce involve many different parties to the relationship of the transactions as actors, role players and revenue stream (Molla, A., & Paul, S. L., 2001). As such e-commerce supply chain too involve many different parties in the up-stream and down-stream form the supply chain to the demand chain intertwined or inter-related with different level of interest and relationship being economic, legal, political or social related domain and issues. As Ong et al (2019) stated the parties or entities convoluted in e-commerce include both supply and demand chains. For the supply chains includes manufacturer of goods, retailers selling their products via platform and third parties as sellers in platform. For the connections or communications platform providers that connect sellers to consumers, data center and internet service provider providing data transmission and data storage services and many more. For payment purposes includes financial entities facilitating transactions as well as offering fund, in some circumstances platforms that also provide financial services, electronic fund transfers etc. For storage and delivery, the parties involve warehouse services for storage of the goods, logistics firms that facilitating transaction via parcel transportation and storage services and shipping company and many others. The dynamic market structure of e-commerce with multiple dimensions raise the issue of liabilities, obligations and responsibilities of the parties involved (Ong et al, 2019).

The unique market structure of e-commerce operating with the aid of strong network effects with many different parties to the relationship playing different roles dampen competition among platforms (Morton, F. S. et al, 2019). Network effect occurs when the perceived value of a platform is increased as participant of its ecosystem increases. These effects can be explained from the perspective of the platform participants. From a manufacturer, retailer or third party seller perspective, which aim to reach as many potential consumers as possible, the perceived value of a platform is increased, if it has a large pool of active registered consumers. The similar affect would occur from consumers' perspective, who aim to compare offer from as many sellers as possible. In this regard, an incumbent platform with large pool of sellers and buyers would seems formidable for an entry platform, hence dampening entry and ultimately dampening competition within the industry. The upper hand incumbents of the platforms that enter into e-commerce market enjoy the network effects (Morton, F. S. et al, 2019). This is because the platforms which enter into the market first with its advance technological innovation already have a vast amount of data from its participants from both the supply and demand chains, even directly from the consumers. The role of the data with the aid of artificial intelligent analysis with access to data provided by the participants are used at the advantage of the incumbent platforms. These would weaken the new players enter into the same market. As such, as reported by

Chicago Booth Stigler Center, Committee for the Study of Digital Platforms (2019) that such market structure are prone to tipping.

In economic perspective, when equilibrium arrives where everyone only participate in only few e-commerce platforms, the market is called ‘tipped’. The market structure which prone to tipping toward competition ‘for’ market rather than ‘in’ the markets (Park, S., 2009). It is likely to produce dominant e-commerce players in the long run. Consumers can only benefit for the short run, because eventually a few large dominant players would dominate the market which drive out the new entries. Besides, tipping had been evident by PC software operating system that rely on the large number of availability on the PC and more commonly, what others are using. The switching cost, lock in and tipping raise high possibilities in e-commerce, particularly the platform providers. In addition, incumbent e-commerce platforms could solidify their dominant position by harnessing insights from data mining on consumers’ data which they already obtained and will remain with them. This is a recognized problem of e-commerce platforms.

Apart from that, securing a large pool of consumers as buyers, is itself a form of competitive edge (Morton, F. S. et al, 2019). Among the host of tools to achieve this competitive edge is targeted marketing. Target marketing is an age-old tool. However, promoting the right product, via the right medium to the right consumers at the right time is now more effective and efficient due to computer algorithm and availability of consumers’ behavior data. Every actions data (log-in time, browsing history, purchasing history) of a registered consumer can essentially be recorded. The larger the pool of data as well as the wider the dimensional of these data would enable algorithm to produce effective target marketing, hence increasing the probability of a transaction. In this regard, it is easier for the incumbent platforms to retain consumers since its target marketing is made more efficient by the large pool consumers’ data set which it already recorded. Besides, consumers’ behavior that is less likely to switch from one-trusted platform to another increase the possibilities of target marketing.

### **6Conclusion**

The growth of e-commerce in providing convenient to consumers, easy access, availability of more choices, facilitate innovation and goods distribution is not without harms. Therefore, policy makers should be more aware of the potential harms that might bring. In order to increase competition in e-commerce and enhance consumer welfare, competition law should be more flexible in adopting other complementary framework in assessing competition practices. Malaysia, as a developing nation, the market players and consumers are more susceptible to market capture by the incumbent upper hand. The dominant in the market, eventually ‘winner’ of e-commerce should won on merits of its product, minus the use of any anti-competitive practices. There must be allowed domestic e-commerce entries for a fairer and more competitive market, which propelled the winner to innovate and upholding consumer welfare. The concerns of lack of a framework or assessment tools to identify the anti-competitive practices employed by e-commerce, domestic e-commerce venture might not have an equal playing grounds as compare to the incumbent e-commerce platforms.

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