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THE POTENTIAL CHALLENGES OF DIGITAL TECHNOLOGY MARKETS TO HONG KONG'S COMPETITION LAW (OR THE OTHER WAY AROUND)

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INTRODUCTION

When Octopus was jointly introduced in 1997 by the 5 largest transport operators in Hong Kong, MasterCard and VISA International had already been pushing their respective Mondex and VisaCash cards into the hands of consumers. The use of the cards, however, required contact with their readers. This technical inconvenience coupled with mal-coordination amongst the banks that adopted these cards afforded the contactless Octopus card a clear technical advantage. Consumers flocked to use the Octopus card because of the technical advantage, but also partly because they were much coerced by the Mass Transit Railway Corporation (MTRC) (the local metro system operator) which withdrew its existing payment system at around the same time. At first merely a common transit payment solution, its range of uses have now expanded to payment for parking meters, food and retail, access control for buildings, attendance taking for schools and more. The comparative ubiquity of the Octopus eventually rang the death knell for Mondex and sent VisaCash to its demise.

If the Hong Kong competition law, which is now in the process of being legislated, was enacted in 1997, could MasterCard and VISA International have asked the competition commission to pursue the 5 transport companies? Were the transport companies leveraging their market power in transport to dominate the e-currency market?

Now that MasterCard and VISA International are making a comeback with their new PayPass and payWave cards, these questions become even more pertinent to Octopus Cards Limited (OCL). Does OCL have a substantial degree of market power? In

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1Legislative Council Secretariat Research and Library Services Division, ‘Information Note: Operation of the Octopus Card in Hong Kong’ (IN08/06-07) 1.
which market? What must it (not) do to avoid being seen as abusing its market powers?

The cross-sector Competition Bill (Bill) attempts to answer these questions, but as admitted by the Administration, competition law is a new and difficult area of law.\textsuperscript{6} It must be applied in the circumstances, which is why under the Bill a specialised Competition Tribunal (Tribunal) would be established to allow it to accumulate experience and expertise. Guidelines would be issued by the Competition Commission (Commission) to give the specifics to the operation of the law, while simultaneously remaining flexible and adaptive.\textsuperscript{7}

The aim of this paper is to apply and test the second conduct rule of the Bill and its provisional guidelines against digital technology markets (DTMs). The second conduct rule concerns the abuse of a substantial degree of market power. DTMs, on the other hand, are markets that consist of a combination of economic characteristics that make them a unique subject matter distinct from typical markets.

The argument of this paper is that such combinations are a minefield for the competition law, with its Bill and provisional guidelines in their current form regrettably inadequate to regulate digital technology businesses. This is because Hong Kong's Bill mirrors those from foreign jurisdictions which have neglected in their design the economic characteristics unique to DTMs. If the Bill is forcibly applied, the only result would be detriment to consumers which is hardly conducive to promoting the spirit underlying competition law.

To make this argument, this paper will in the first part give an overview of the Bill itself. The second part briefly explains some of the more important economic characteristics of DTMs. An understanding of these economic characteristics are important because as will be seen in the third part, the interaction of these characteristics in combination will show the inadequacy of the current Bill and its provisional guidelines.

\textsuperscript{6}Bills Committee on Competition Bill, 'Overview of Major Components of the Competition Bill' (CB(1)320/10-11(02, para 10.

\textsuperscript{7}Bills Committee on Competition Bill, 'Minutes of fourth meeting on Tuesday, 30 November 2012, at 4:30pm in the Chamber of the Legislative Council Building' (CB(1)1039/10-11) as per Administration's response to Ms Miriam Lau.
I. THE HONG KONG COMPETITION BILL

Currently with 176 clauses, the Bill is rather long. The thrust of the Bill encapsulated in the three competition rules, however, are simple and short. The first conduct rule prohibits anti-competitive conduct by way of agreements, decisions or concerted practices. The third conduct rule is the mergers rule and is used to prevent anti-competitive mergers and acquisitions. Neither rule is discussed in this paper.

What remains to be discussed is the second conduct rule. The second conduct rule of the Bill is the prohibition on undertakings with a substantial degree of market power from abusing their market power. The purpose of the second conduct rule, and to a greater extent, the purpose of the whole Bill is ‘to prohibit conduct that prevents, restricts or distorts competition in Hong Kong’. Anti-competitive conduct' and 'abuse' are oft-used phrases to carry this purpose concisely. Market competition, and the preservation of it, is seen as central to 'Adam Smithian' economic theories. This paper is not to discuss whether any branch of these theories should be subscribed to and in turn endorse the notion that the maintenance of a level of competition is necessary. Instead, it must be recognised that Hong Kong, considered the freest economy in the world for 18 consecutive years, operates very much on such modern orthodox economic theories. It is only in light of this situation that this paper simply assumes that market competition is a good cause to protect. It also assumes that a certain degree of government intervention through this Bill is necessary (despite that some purist flavours of orthodox economic theories entirely reject any form of government intervention).

The second conduct rule is contained in Part 2 of the Bill comprising just clauses 21 to 23.

8Legal Service Division, 'Report on Competition Bill' (LS93/09-10) para 1.
21. Abuse of market power

(1) An undertaking that has a substantial degree of market power in a market must not abuse that power by engaging in conduct that has as its object or effect the prevention, restriction or distortion of competition in Hong Kong.

(2) For the purpose of subsection (1), conduct may, in particular, constitute such an abuse if it involves—

(a) predatory behaviour towards competitors; or

(b) limiting production, markets or technical development to the prejudice of consumers.

(3) The prohibition imposed by subsection (1) is referred to in this Ordinance as the “second conduct rule”.

22. “Object” of conduct

(1) If conduct has more than one object, it has the object of preventing, restricting or distorting competition under this Ordinance if one of its objects is to prevent, restrict or distort competition.

(2) An undertaking may be taken to have engaged in conduct that has as its object the prevention, restriction or distortion of competition even if that object can be ascertained only by inference.

The brevity and abstractness of clauses 21 and 22 are not very helpful to determining whether there has been a violation of the second conduct rule.\footnote{Bills Committee on Competition Bill, 'Minutes of Seventh Meeting on Tuesday, 25 January 2011, at 4:30pm in the Chamber of the Legislative Council Building' (CB(1)1504/10-11) as per Mr Paul} In response, the
Administration has provided provisional guidelines to elaborate on the second conduct rule based on guidelines from other jurisdictions.\textsuperscript{12} Because the Commission has to draw up its own actual guidelines as part of its duty under the Bill, these provisional guidelines may not necessarily be the actual guidelines that the Commission would adopt.\textsuperscript{13} Of course, as this paper will argue in detail below, the provisional guidelines are flawed. It is precisely because the actual guidelines have yet to be drawn up that this paper's take on DTMs would hopefully be useful.

In contrast to clauses 21 and 22, clause 23 is actually quite clear in conveying the point that the Bill is to have wide geographical application.

\textbf{23. Territorial application of second conduct rule}

The second conduct rule applies to conduct that has as its object or effect the prevention, restriction or distortion of competition in Hong Kong even if—

(a) the undertaking engaging in the conduct is outside Hong Kong; or

(b) the conduct is engaged in outside Hong Kong.

The wide geographical application is significant for DTMs. But for clause 23, not too many DTM players would be covered by the Bill in Hong Kong under the second conduct rule. This is because most of the major DTM players are enterprises headquartered in foreign locations, with probably only a regional or local office in Hong Kong.\textsuperscript{14} Clause 23 operates to make the location of both the undertaking and the engagement of the conduct irrelevant as long as the conduct was abusive and anti-
competitive in Hong Kong.

The Bill and these three clauses have come a long way since former Governor of Hong Kong Chris Patten pushed for a comprehensive competition policy in 1992.\(^\text{15}\) It was almost 20 years before a draft Bill was put forward to the Legislative Council in July 2010.\(^\text{16}\) Now in 2012, this cross-sector Bill is still being debated, albeit with most of the focus on the extent of penalties, definitions of de minimis and other technicalities, and also the effects of competition law on small-medium enterprises.\(^\text{17}\) Unfortunately, hardly any attention has been given to special markets like DTMs. As shall be seen, DTMs in foreign jurisdictions have in fact caused much controversy over whether their respective competition laws continue to remain relevant.

With the Bill being drafted with much reference to competition laws from foreign jurisdictions, especially from the European Union (EU) and the United Kingdom,\(^\text{18}\) these controversies and problems will likely arise in Hong Kong as well. Therefore, Hong Kong DTMs should be given the attention they deserve before everything is settled into law. The newer EU competition laws and their revised guidance papers are modelled upon an 'effects based approach' (also known as 'rule of reason analysis'). Perhaps fortunately, Hong Kong's Bill and its provisional guidelines have adopted this approach.\(^\text{19}\) The effects based approach was devised because the old EU competition laws were criticised as being too legalistic.\(^\text{20}\) The new approach lays out the analytical framework and gives an aim to competition law instead of relying on too many formalities. The goal is to prohibit conducts from dominant undertakings that would


restrict competition that are harmful to consumers.\textsuperscript{21} The aim for Hong Kong's Bill is not made clear like it is in the EU, but it should be safe to assume that the purpose would not be too different.

Unfortunately, all good things can be misused. The adoption of the effects based approach has only allowed the EU Competition Commission to be even more stringent on DTM undertakings. In recent years, there have been quite a number of high profile cases involving DTM giants like Microsoft, Google and Intel.\textsuperscript{22} A record breaking fine was imposed on Microsoft, only to be broken soon after by another record breaking fine imposed on Intel.\textsuperscript{23} Whether all this can be attributed to the effects based approach in principle is, however, questionable. Firstly, although the stated goal is to protect consumers, the EU guidance papers in substance do not reflect that goal.\textsuperscript{24} Secondly, many of the high-profile cases were probably politically and ideologically influenced, displaying signs of Ordoliberalism and pan-Europeanism.\textsuperscript{25}

It must be questioned whether these ideologies are compatible with those that Hong Kong is founded upon, namely the Chicago School of economics, 'laissez-faire' positive non-intervention, 'big market, small government' and the like. It must also be questioned whether competition authorities should be allowed to manipulate the effects based approach for their own secondary causes at all.

Therefore, while the adoption of the effects based approach in the provisional guidelines should be by and large welcomed, it must be applied with great caution. The effects based approach is after all abstract by nature. This paper will highlight some of the problems, difficulties and uncertainties users of the provisional guidelines

\textsuperscript{21}Opinion of Advocate General Kokott delivered on 23 February 2006 for British Airways plc v Commission of the European Communities [2007] European Court Reports, I-02331, para 86.


may encounter in adjudicating cases involving DTMs. It is recommended that Hong Kong authorities should reduce reliance on foreign cases, and be very careful when referencing foreign cases from the US and the EU cannot be avoided, even though most of the competition law and provisional guidelines were derived from the EU. The Tribunal should also be very careful in setting case precedents, and should take into account the economic characteristics and market structures particular to DTMs, which are explained in the next part.
II. COMPETITION ECONOMICS PERTINENT TO DTMS

As competition is largely an economic matter, legal competition analysis cannot go without an economic analysis of market structures. Usual market characteristics of typical markets are not difficult to understand, but the market structures of DTMs are different and may be less familiar to many. This difference is significant because arguably, the Bill was designed with just typical market economics in mind. This paper will therefore turn to the second part now to briefly mention select competition economics (also known as 'antitrust economics' in the US) pertaining to DTMs. It is essential that these economic characteristics are understood here. This is because the interaction of all of these characteristics will in the end assist in the explanation in the third part of the paper of why the Bill is inadequate for DTMs.

Until now, DTMs have not been fully introduced. 'Digital technology markets' (DTMs) is an umbrella term for markets for software (or software-incorporated hardware) products or services that have particular combinations of economic characteristics listed below. In the last decade, the number of such characteristics has increased as DTMs have become increasingly sophisticated. For example, when Microsoft was accused of antitrust conducts in the United States in 1999, the characteristics of network effects, restricted interoperability, and low marginal costs were placed in the lime light. Each of the following economic characteristics are themselves not unique to DTMs; it must be re-emphasised that it is the combination of these characteristics that define DTMs.

Network effects

Network effects is the phenomenon where the value of a product to a user increases when the number of users using the same product increases. The classic example is

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in the telecommunications industry. In the early days of telecommunications, the more telephones there were in the network, the more people each telephone user could dial up and the more useful the telephone was as a means of communication. This is known as direct network effects.\(^{30}\)

In Hong Kong, mobile carriers charge users for inter-network sending of Short Messaging Service (SMS) texts while intra-network SMS texts are sent free of charge. If considering this factor alone, for any non-profligate texting user, the more friends the user has on a particular carrier network, the more savings the user can extract from using that network. This increases the value of that carrier network as a choice for the user. If the savings are big enough, it may outweigh any increase in the monthly plan cost relative to competing carrier and the user may still find higher value for that carrier network. This is known as induced network effects.\(^{31}\)

'Tipping' in the market is one of the consequences of network effects in DTMs.\(^{32}\) To demonstrate with a hypothetical case, assume there is a duopoly in a software market subject to network effects. Both market players have equal footing, their products have equal features and there is equal demand for both products. Consumer 1 comes along. Since everything is given as equal, it does not matter at this stage which product consumer 1 picks. As a result, he picks product X.

Afterwards consumer 2 comes along. Consumer 2 is oblivious to what consumer 1 has chosen, so consumer 2 happens to pick product Y. As consumer 3, 4, 5 … repeat what consumer 2 does, theoretically, product X and product Y would have sold equal amounts and neither is tipping the market. Since no one is told of what they others have bought, network effects have not come into play yet.

Now consumer 10 comes. Consumer 10 is told of consumer 1's choice. Because consumer 10 is consumer 1's friend, or because product X was better marketed, or


because of some other asymmetrical factor, consumer 10 chooses product X. At this stage, product X has one more user. From this point on, as long as interaction with others through the software is necessary and information of which product has more users is freely provided, network effects would operate to dictate that consumers 11 to 99 and beyond would find product X's value to be higher than product Y. The market has thus tipped to the company producing product X, creating a natural imbalance in market share.

Statistically, once the market has tipped, one undertaking will have a huge market share (and usually large sales) while subsequent undertakings will see their respectively market shares to be exponentially less until the market share is negligible for probably the fourth or fifth undertaking.\footnote{33} Tipped markets can usually sustain no more than four or five undertakings because extra competitors in the market will find their market share to be so small that it is not worthwhile to stay in the market anymore.

The Octopus system represents a slightly more complicated variation of network effects where there is more than one variable. To a Hong Kong consumer, the more supported types of payment and the more Octopus card readers there are around Hong Kong, the greater the value of obtaining and using an Octopus card. For the transport company or the retailer, however, the value of installing and subsisting a card reader in turn depends on the number of card holders willing to use the card in Hong Kong. The result is a chicken-and-egg type of network effect in which neither consumers nor retailers are willing to commit to a product until their counterpart would first adopt it.\footnote{34}

\textit{Network effect threshold}

It should be noted at this point that both the unilateral type of network effect in the


SMS example above and the bilateral variation in the Octopus example require a
threshold to be exceeded before the network effect is capable of being sustained and
propagated. The threshold size depends on a collective perception of the minimum
number of users a product needs before it is worth adhering to.\textsuperscript{35}

The importance of overcoming the network effect threshold can be demonstrated by
the case of Google's Wave communications platform. When it was introduced,
Google Wave was positively received by users and coders alike for its technological
innovativeness.\textsuperscript{36} As was customary for Google, the product was initially released to
consumers only through 'invites' to a technical preview which eventually lasted a
year.\textsuperscript{37} During this time, demand for the platform was great. In fact, demand was so
great that it supported a market for trading 'invites'.\textsuperscript{38} Yet, Google Wave turned out to
be a flop.\textsuperscript{39} Though it is not this paper's purpose to perform an autopsy on Google
Wave, the point that must be made is that the restricted access during the prolonged
technical preview stage meant many users were unable to find enough other users to
communicate with on the communications platform. The inability of Google to meet
demands in time proved fatal to overcoming the threshold for sustainable network
effects.

Therefore, in DTMs, whether an undertaking will make it or break it will depend a lot
on its ability to amass and sustain network effects early on. Undertakings striving to
achieve this are often easily confused with attempting to disrupt competition in the
market. This is partly due to the undertaking's dominant size and tipped market after
gaining network effects. This is also partly due to the illusion of foreclosure to other
undertakings that may also be disadvantaged, albeit naturally, because of the first
undertaking's existing network effects.

\textsuperscript{35}G Villasis, 'The Process of Network Effect' (2008) <www.degit.ifw-
\textsuperscript{36}'Strong Reception for Google Wave' BBC (1 June 2009)
\textsuperscript{37}Batool, 'What is Google Wave?' (ixibo.com, 9 November 2009)
\textsuperscript{38}M Taylor 'Google Wave Invites for Sale on eBay' The Wall Street Journal (1 October 2009)
\textsuperscript{39}M Helft, 'Facebook vs Google: The Battle for the Future of the Web' CNN Money (29 November
accessed 21 April 2012.
Returning to the Octopus system, MTRC was likely to have been aware of the chicken-and-egg problem in overcoming the network effect threshold. This was probably why the Octopus system was created as a concerted effort from the 5 largest transportation companies to ensure broad support. The Octopus system was also more successful than Google Wave because it was pushed into the market within just a 3-month transition period from the old magnetic ticket payment system.

Even more complicated situations with more variables can arise. In social networking platforms such as Facebook, there can be network effects between users and other users, between users and developers and between users and advertisers all at the same time and mutually influential.

**Large economies of scale and low marginal costs**

The computer hardware assembly industry, despite carrying the name 'computer', is more of an industry catering a typical market than a DTM. This industry sources chips and components, assembles them, slaps on a brand name, and sells the finished laptop or microcomputer (also known as desktop computers or more generally as personal computers) to consumers as a standalone good. There are generally no network effects involved, and on the whole, is not so different from the industries manufacturing bread, teddy bears or even aircraft.

Canonical economics preaches that in these sorts of typical markets, there are fixed costs and variable costs. Fixed costs do not change with the production quantity.\(^{40}\) Factory rental costs, costs of marketing campaigns and depreciation of manufacturing equipment are examples of fixed costs.\(^{41}\) Variable costs include costs that vary with production quantity, such as increasing labour costs, or costs of additional raw materials or intermediary products when greater production quantity is desired.\(^{42}\)

Relative to typical markets, DTMs have very high fixed costs and very low variable

DTMs have high fixed costs because most of the costs in developing digital technologies are incurred in research and development (R&D) and the setting up of infrastructure (such as server rooms, or the initial mass installation of card readers for OCL).\textsuperscript{44} These types of fixed costs are usually sunk costs. Sunk costs are historical, so they are not supposed to affect current business decisions, but they do represent exit barriers for the incumbent and entry barriers for a market entrant.\textsuperscript{45} If venture capitalists had funded the sunk costs of a DTM start-up, the start-up is of course expected to recoup these costs as much as possible through selling its product, and a reluctance to leave the market before that may become an exit barrier.

Variable costs are low for DTMs because it is an inherent characteristic of software products that there are almost non-existent marginal costs involved in producing and providing to the consumer another copy.\textsuperscript{46} The marginal cost is the difference in the average total costs (the sum of fixed cost and variable costs divided by the production quantity) for producing a given quantity of units and producing an extra unit over that given quantity.\textsuperscript{47} Unlike in typical markets, hardly any additional raw materials are consumed in the process of making a digital duplication.\textsuperscript{48} Especially with contemporary over-the-air methods, the only marginal costs involved in software distribution are probably the electricity costs in serving the data from the server to the client.

If the high fixed costs and low variable costs are re-examined in the long run where all fixed costs are by definition variable costs, it is then possible to compare typical markets and DTMs in terms of their economies of scale. An undertaking is said to enjoy economies of scale if the (long run) marginal cost is lower than the (long run) average total costs.

\textsuperscript{44}S I Cohen, Microeconomics Policy (Routledge, New York 2001) 37.
\textsuperscript{45}D Besank, D Dranove, M Shanley and S Schäfer, Economics of Strategy (5th edn, John Wiley and Sons, Hoboken 2009) 20
\textsuperscript{47}W A McEachern, Microeconomics: A contemporary Introduction (9\textsuperscript{th} edn, Cengage Learning, Mason 2012) 154.
\textsuperscript{48}P D’Anieri, International Politics: Power and Purpose in Global Affairs (2\textsuperscript{nd} edn, Cengage Learning, 2011) 311.
In DTMs, as the (long run) average cost now consists of both the low variable costs as well the high fixed costs (which are now part of the variable costs), the average cost is very high, while the marginal cost remains very low. Thus, DTMs generally enjoy huge economies of scale.  

One consequence of low marginal costs is that it facilitates stronger network effects. Without needing to incur much cost in providing clients and consumers additional instances of products or services, there is almost no hindrance to scaling the business. Other consequences of low marginal costs, to be discussed below, include the fact that low marginal costs enable low or no pricing and that bundling is promoted, both of which may be superficially considered as conducts of abuse.

**Low/no pricing**

As just discussed, the software component of a product has minimal marginal cost because minimal raw material is consumed in the process. While this was already true at the time of the Microsoft case in 1999, Microsoft still charged consumers around USD200 for retail copies and around USD50 for Original Equipment Manufacturer (OEM) copies of its Windows 98, both significantly higher than the near zero marginal cost. In fact, its business model of selling software was like those for typical market products. The model remains roughly the same today (for Windows 7) and in the foreseeable future (for Windows 8).

However, beginning with free email services at the end of the last millennium, many developers of software products, especially web services, have since capitalised on the fact of low marginal cost. With near zero marginal costs, it is possible for

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developers to give away their products for free and still be able to make money off donations or income from advertisements generated from usage of the software or simply a visit to the downloading site.

Low or no pricing is not limited to just software. There are examples of hardware products that despite the consumption of raw material are still lowly priced. Such cases are considerably rarer, but the quintessential example can be found no further than Hong Kong’s Octopus card. Save for special edition Octopus cards, the overwhelming majority of Octopus cards are merely on-loan from OCL.53 A soon-to-be adult loanee has to fork out HK$150 before a card is issued. This ‘payment’ includes an initial stored value of HK$100 and a HK$50 deposit.54 Upon return of the card to OCL, any remaining positive stored value of the card plus the deposit is refunded.55 If the card has negative stored value, the HK$50 deposit will be refunded less the negative value.56

OCL states that the cost of the card is $30, which is included in the HK$50 deposit.57 This cost can be seen as roughly the actual marginal cost of the producing each additional Octopus card.

While the above software and hardware examples share a common theme of low or no pricing, they have different reasons. In software, the low marginal costs are supported by the inherent fact of low duplication costs for software. In hardware, there is a higher marginal cost, but unlike in markets for selling automobiles, electrical appliances and other typical market products, the Octopus card can be nil priced here because it borrows from complex market structures more usually found in software

product and service markets. As further discussed below, card users are not charged because OCL generates its income from transaction fees and royalties (paid by retailers) and returns from investment of deposited money.

One of the consequences of low or no pricing is that in a market where the products have already fallen upon an equilibrium price, the introduction of a new product substitute of such disparately low pricing is bound to significantly disrupt the market. Original players of the market may be driven out of the market to be replaced by the new player providing the ultra-cheap product. Even if the original player then comes up with its own free card, network effects for the new player's product may have already taken place. Interoperability issues and switching costs for consumers would prevent the original player from gaining the necessary foothold in the market to build up its own network effects. On one side of the coin, this may perfectly well be innovative business practice that is effecting the displacement. On the other side of the coin, this may be seen as an abuse distorting competition in a market.

Another consequence of low or no pricing is that it contributes to 'purer' network effects, especially in markets where most products are already similarly lowly or nil priced. As the pricing in DTMs becomes less significant, potential digital technology users will instead naturally place more weight on network effects and product quality. This hastens and consolidates any tipping in the market.

**Complex market structures**

Traditional market models define most of the market structures in typical markets and also a handful of DTM markets. Traditional market models focus on producing or adding value to products which are then sold to clients or consumers at a profit margin. There is usually a vertical chain of production from raw material to physical finished product. Microsoft and Apple are both examples of DTM companies continuing to operate on traditional market models. Both companies invest in human resources to code and aim to make profit from consumers who are willing to purchase

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their outputs.

Modern market models, on the other hand, often do not require profiting directly from consumers. DTMs are capable of capitalising on these modern market models because the DTM characteristics listed above enable them to do so. Unlike in typical markets where a business model will mostly be applicable from one product to another, DTM business models tend to be more exclusive to a particular category of products, or even a single particular product.

OCL, for example, derives its main income from transaction fees. Yet, OCL also supplements its income generation with a model that is quite unique and may not be easily duplicated elsewhere. As explained earlier, with the exception of special edition cards, Octopus cards are provided to users on an on-loan basis and a card deposit is collected at the time of issue of the card. In 2009, the amount of card deposits amounted to HKD696,139,000 and the interest income was HKD29,276,000, which amounted to around 10% of the total income. Although transaction fees are now the main source of income for OCL, the interest generated from the card deposits deposited with financial institutions and invested in financial instruments would have greatly contributed to the viability of OCL in the early days when network effects had just begun to gain traction for the Octopus system.

More generally for other types of DTMs, two of the more noteworthy categories of business models are advertisement-supported business models and freemium models.

*Advertisement-supported*

Undertakings running on advertisement-supported models often depend on the low marginal costs so that they are able to provide their products or services to as many people as possible without incurring much cost itself. Each extra unit that the undertaking is able to provide translates to a greater audience to advertise to. This represents an extra unit of profit when marginal costs are at the same time kept low.

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Since advertisements are supposed to reach as many people as possible (even if there is a specific target audience), the presence of network effects also contribute greatly to the success of advertisement-supported market models.

The world’s most popular social networking website Facebook has 845 million active users, but sign-up for its services is free and none of its users have ever paid for continued access to the site. Facebook, however, was estimated to have made around USD 3 to 4 billion in 2011, with the bulk of its revenue generated from advertisements known as Facebook Ads. Facebook Ads is an automated system that would automatically pick and display ‘personalised’ advertisements to user demographics according to user usage behaviours and interests on the site. The more targeted results increases the chance that each advertisement is acknowledged (or even clicked on). In a way, Facebook has the alter ego of being a platform for advertisements. Facebook’s true clients are really those companies who are seeking a place with good traffic for advertisement while the consumers are more like a resource being exploited. The marvel of this business model is that consumers still feel that they are the ones being served, which is true but not entirely true.

**Freemium**

A lot of the apps on the respective app stores of Apple iOS and Google Android (both smartphone and tablet computer operating systems) are offered through the freemium model. Freemium is the portmanteau of ‘free' and 'premium'. Usually part of the

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product is freely given away as a free or lite version.\textsuperscript{67} Sometimes the free (or lite) version is advertisement supported too.\textsuperscript{68} Alternatively, the full product is given away but only for a trial period, after which the software or service will automatically cease or become limited in functionality.\textsuperscript{69}

The freemium model is attractive to consumers because they can enjoy the services for free for portions of the program. The model is also attractive to developers because they often get 'free' publicity in return, in particular by word of mouth.\textsuperscript{70} When a consumer is offered 2 similar products, one of which is a paid program and the other is free, even if the paid program is superior, the free option will nevertheless be more attractive at first sight. This is especially important for products subject to network effects because the number of users of a product is itself a factor of attraction for new users.

The freemium model never expects all consumers of the free or lite version of a product to upgrade to the paid version.\textsuperscript{71} A successful freemium product must provide enough useful functionality before it is even worth approval and publicity from consumers. This also means that some users will be sufficiently satisfied by the free version already. Thus, it is often the case that developers depend on a small percentage of users who are willing to upgrade to recoup costs or sustain further development.\textsuperscript{72} This model is usually feasible because marginal costs for the product is low.\textsuperscript{73}


Even where marginal costs are not low, a number of DTM companies like Dropbox from the online storage / data backup market have still managed to thrive on freemium.\textsuperscript{74} Dropbox is a service where its registered users can access their allocated storage space from any personal web-access-enabled digital device for the purpose of storing or retrieving their personal files.\textsuperscript{75} In providing users with storage space in the cloud (online), Dropbox incurs substantial marginal costs in providing users with storage space (outsourced from Amazon S3, an upstream cloud storage provider) and access systems.\textsuperscript{76}

As the freemium model would dictate, there are 2 types of registered users of Dropbox: free and paid.\textsuperscript{77} Free users get 2 gigabytes of storage space for free. Paid users would get substantially more storage space depending on how much they pay. Once again, only a portion of the free users would eventually become paid users as not all users need more than 2 gigabytes.\textsuperscript{78} As a bonus, there is also a user-referral scheme in place that would give both the referrer and referred extra storage space to keep permanently.\textsuperscript{79}

Incidentally, Dropbox is also another example of a situation of complex network effects. The user-referral scheme gains significance in this sense in that users who are already friends would find greater value in the service when they would like to share files amongst themselves through Dropbox (which would not have been the case if the increase in number of users were all strangers). The greater network of familiar users will help the snowball to roll larger until developers of other various software find that there is value in integrating with Dropbox through their software. This has already begun to be the case, with developers allowing product files and preference files generated from their software to be able to synchronise across devices through

\textsuperscript{75}About Dropbox’ <https://www.dropbox.com/about> accessed 23 April 2012.
Dropbox. The final effect is that Dropbox becomes a *platform*, and once that is achieved, the possibilities for Dropbox are enlarged. Not only would users and developers be intertwined on the platform (so as to be ‘passively’ locked in), but Dropbox's status could then be influential and potentially leverage-able.

**Restricted interoperability / Incompatibility**

Restricted interoperability is not an economic characteristic of DTMs, but is nonetheless an important characteristic of DTMs that will find relevance when entry barriers and refusals to supply are discussed in the third part.

There are mainly two sources of restricted interoperability. The first is through the enforcement of intellectual property rights. Intellectual property rights are imperative to the viability of contemporary DTM industries because DTM products are usually ideas and concepts that can be easily duplicated. Most of the cost, as explained above, is in the R&D stage. So, for there to be incentive to invest in R&D, protection for the fruits from R&D have to be guaranteed so that DTM players may recoup their costs if they wish. If DTM players do intend to recoup costs, they may then do so by the enforcement of their intellectual property rights, requiring competitors or other dependants to pay royalties for licences or otherwise have interoperability hindered or prohibited.

The second source of interoperability is technological incompatibility. This notion of interoperability has been around even before the advent of DTMs. It used to be (and still is) the case in typical markets that products would only work with compatible complementary products. Vacuum cleaners would only work with a particular shape and size of dust collection bags, usually manufactured by the same company that produces the vacuum cleaners. Safety razor manufacturers in particular are famous for their bait and hook business models (as distinguished from bait and switch tactics).

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82 Jonathan Zittrain, *The Future of the Internet and How to Stop It* (Yale University Press, Donnelley 2008) 58.
They sold their razor handle dirt cheap while making money off men who are expected every so often to replace razor blades with compatible ones manufactured by the same company making the razor handle. In the context of typical markets, the factor of interoperability is used to keep users staying in the same product eco-system.

In the context of DTMs, the use is more extensive. Not only is it desired for consumers to stick with the digital technology product and its subsequent reincarnations, but it is also the case that network effects are usually initiated, with tipping as the result. This is because most products in DTMs are concerned with the manipulation of data. Interoperability thus means the ability for two digital technology products to operate or exchange information reciprocally. Conversely, restricted interoperability, or incompatibility, would mean consumers are 'locked in' to supporting a particular product because of the lack of reciprocal use or exchange of information. With the lock in in place, other consumers who have to interact with the locked in consumer will also have to adopt a compatible produce in order to access the exchanged data. The result of this is the propagation of network effects for the compatible product.

III. APPLICATION OF DTM COMPETITION ECONOMICS TO THE BILL

Having explained DTM competition economics, it is now possible to actually apply these economic characteristics to the Bill. It is argued here that the application of many sections of the Bill and its provisional guidelines to DTMs will be a clumsy operation. As will be shown, there is great uncertainty over how both a substantial degree of market power and an abuse of that market power can be found. This uncertainty may in many cases product unfavourable and unfair results for DTMs.

So, imagine that the Commission is intent on investigating OCL after receiving complaints. Or imagine that OCL would like to make sure that it conforms to legal requirements. The thing that needs to be done in the preliminary stage even before investigation commences is to check if OCL falls into any of the exclusions or exemptions provided for in the Bill. Obviously, there is no need to worry about the rest of the Bill if an undertaking is excluded or exempted.

Exclusions

The general exclusions are contained in Schedule 1 of the Bill. There are three general exclusions.

The first exclusion concerns agreements enhancing overall economic efficiency. This is relevant only within the domain of the first conduct rule. The second exclusion allows conduct in the second conduct rule to be excluded provided that it is for complying with a legal requirement in force in Hong Kong, including national laws applicable to Hong Kong. The third exclusion applies to undertakings entrusted by the Government with the operation of services of general economic interest. This means the conduct rule will not apply to the extent where it would obstruct the performance of the particular tasks assigned to it by the Government.

Exemptions

Unlike exclusions where undertakings are automatically excluded from the purview of
the Bill, exemptions require the Chief Executive in Council to take positive action by
publishing orders in the Gazette. These orders may be based on public policy grounds
or the need to align with international obligations.

Statutory bodies

The conduct rules do not apply to statutory bodies unless they have been specified, or
engage in specified activity. The Administration has provided on 14 February 2012 a
list to specify which statutory bodies have been exempted.84 Out of 581 statutory
bodies, only 6 statutory bodies are suggested as not meeting the criteria for exemption.
None of them are DTM undertakings.

It is unlikely DTM players (such as OCL) would fall into these exclusions or
exemptions. It is therefore necessary to explore the substantive part of the second
conduct rule.

There are 2 limbs to finding a violation of the second conduct rule:85

1. An undertaking must be found to have a substantial degree of market power in
   a market; and
2. The undertaking abused that market power by engaging in conduct that had as
   its object or effect the prevention, restriction or distortion of competition in Hong
   Kong.

Substantial degree of market power

The use of the first limb is to filter out all undertakings without substantial degree of
market power from the purview of the second conduct rule, even if these undertakings
engage in anti-competitive behaviour. The rationale is because undertakings without
much market power are unable to significantly distort competition and harm the

84 Bills Committee on Competition Bill, 'Exemption Arrangements for Statutory Bodies under the
Competition Bill' (CB(1)1031/11-12(02), 14 February 2012).
85 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 2.1.
welfare of consumers.\textsuperscript{86} This does not mean conversely that undertakings with a substantial degree of market power would necessary contravene the second conduct rule; there is nothing illegal \textit{per se} in an undertaking being dominant or having substantial degree of market power.\textsuperscript{87}

In applying the first limb, it must be understood what market power and a substantial degree of it means.

\textit{Market power}

The assumption of the Bill is that in a competitive market, all undertakings within it are mutually constrained, whether in pricing, output quantity, output quality, or commercial acts.\textsuperscript{88} On the other hand, one or more undertakings may not be sufficiently constrained in a non-competitive market. In such case, market power arises. An undertaking with market power is able to dictate pricing, output quantity, output quality, or commercial acts without regard for other market players or consumers. With market power, the undertaking will be able to perform anti-competitive acts.

\textit{Meaning of substantial degree of market power}

In jurisdictions such as the EU, UK, US, Singapore and Mainland China, the first limb is based on the notion of 'dominance' instead of 'a substantial degree of market power' to be used in Hong Kong.\textsuperscript{89} Both concepts share the idea that market share is not the only factor to consider when determining an undertaking is dominant or has a

\textsuperscript{86}Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 2.3.
\textsuperscript{87}Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 1.1.
\textsuperscript{88}Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 2.2.
substantial degree of market power. The similarity ends, however, in that foreign jurisdictions still place more weight on market share by allowing through case law and guidelines a (rebuttable) presumption of dominance once an undertaking exceeds a specified percentage or range of percentages.

Under 'a substantial degree of market power' there is no presumption. To DTMs, this is a welcome difference. If Hong Kong also operated upon dominance, it would mean that DTM players who due to market tipping are especially prone to having large market shares would have to bear the onus of proving their own innocence. Now that 'a substantial degree of market power' is looked at, the onus is at the very least nominally gone. Yet, this does not mean DTM players are in a significantly better position. DTM players are still prone to being caught by the Bill as having a substantial degree of market power due to the natural consequences of network effects and market tipping.

**Market share**

Market share is nevertheless regarded more or less the foremost indicator of market power of undertakings in markets with existing competitors. Market share is to be observed by way of historical analysis, to see if an undertaking has been enjoying a persistently high market share for a length of time. The length of time is undefined and varies from case to case. The purpose of this is to respect that some markets are dynamic in nature. There would be misinformation if market shares fluctuate significantly in a market and only a snapshot at an arbitrary moment is taken.

All of this is understandable from the perspective of typical markets, but for DTMs,
network effects naturally causes markets to tip. This means that undertakings are able to maintain not only a high market share, but also a persistent market share over time. Their competitors by the same logic stay in exponentially weaker positions. The unfortunate conclusion is that there will always be an undertaking in each DTM that holds market power.

*Successful innovation*

Perhaps a little thankfully, market share while important, is not the only factor considered. 'Successful innovation' is a factor listed in the provisional guidelines that practically acts as an exception to finding market power because of a persistent high market share. It provides for the possibility that a persistent high market share may also merely be because of persistent successful innovation rather than because of any act of anti-competition.

The concept of successful innovation is nice. The problem, however, is that innovation is hard to define. Whether something is an innovation is a subjective matter. Thus, it should not be the role of the Tribunal or Commission to invite a few panel members and have them tell the world what is an innovation or not.

It would not help better the situation even if it can be assumed that the panel members are perfectly objective in their assessment of innovation, that is, by gauging the reaction of the general public in relation to the product. The presence of successful innovation is found because the product is popular with the general public. The product is known to be popular because it has persistent high market share. Persistent high market share is known because successful innovation is present. Obviously, this is circular in logic.

The result is that the Tribunal would always find a justification for persistent high market share in DTMs, which defeats the purpose of having any competition law in place. Or the more probable and realistic alternative is that this factor of successful innovation will never be seriously taken into account, meaning that it is redundant in

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95 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 3.3.
the first place and misleading to DTM players who seek to rely on this factor.

Entry barriers

Another factor to consider apart from market share and successful innovation are entry barriers. Entry barriers are relevant for the assessment of market power in markets with existing competitors and potential entrants. Entry barriers are obstacles that potential entrants to a market must overcome. The provisional guidelines equate low entry barriers with sound competition. The rationale is that even if there is an undertaking with a large market share, the low entry barriers will allow new entrants to easily enter to countervail the undertaking with market power.

However, if a market consists of network effects, restricted interoperability, low marginal costs, high sunk costs and large economies of scale, all of these would collectively help raise entry barriers. An undertaking with a large market share may then be seen as protected from competition and thus holding significant market power. For example, the EU Microsoft case had relied on Microsoft's strong network effects in the PC operating system to find Microsoft as dominant.

The paper observes that many DTMs are established in two stages. The first stage is the beginning when network effects have not started propagating significantly. The market has not yet tipped. None of the products have a significant abundance of extra users to initiate network effects. The entry barriers are low because consumers have not become attached to any particular product. Of course, this is usually aggravated by restricted interoperability which, as discussed before, is the norm in many DTMs to differentiate their product. All undertakings already existing with a product in the market are wary of giving their competitors an advantage to which their competitor

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96 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 4.1.
97 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 4.1.
98 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 4.1.
can utilise to initiate network effects. Like in a typical market, they are all mutually constrained and will therefore act competitively in this stage.

A real-life example would be the format wars between Sony and Toshiba for their respective Blu-ray and HD DVD, a case of complex network effects. Blu-ray and HD DVD were basically platforms over which film and television studios would be able to release their next generation, high definition audio and video. Sony and Toshiba themselves made money from selling the disc drives that could play the discs of the respective formats. The choices of the film studios on which format to release their films would influence which format consumers were more inclined to buy. The number of consumers already committed to the format also affected on which format films would be released and whether committed film studios would jump ship.

Of course, the reason why there could be a format war at all was because the discs and players were incompatible between the formats. The incompatibility in this case was a very technical one.\textsuperscript{101} Blu-ray and HD DVD used lasers of the same wavelength, but different sized pickup apertures were used for the differing track pitches. Blu-ray discs had tighter track pitches for holding more information per disc, but that also caused their discs to be more expensive because special treatments were required during the manufacturing process.

It is interesting to note that during this first stage, the two companies were highly competitive (a situation which the Competition Bill is trying to promote), yet the competition was in effect a game of attrition for everyone.

Film studios in alliances supporting either camp were unable to reach consumers on the other camp because of exclusive agreements.\textsuperscript{102} The risks were large because they would lose large inventories of discs if the market tipped to the disfavoured format. Even for film studios without such obligations, there were increased costs in supporting and releasing discs in both formats.


The disc drive manufacturers themselves were in no better position. At one point, Toshiba had to cut prices for HD DVD players by half in a (futile) attempt to restart the network effects for the format.\textsuperscript{103}

Nor did consumers benefit from the competition. If they had committed to one of the formats, and that format turned out to have lost the format war, consumers would then find the discs and players obsolete overnight. If they then wished to purchase new releases, they would have to reinvest in new players. Therefore, they were generally reluctant to commit themselves to either format, which meant that the immediate effect was loss in sales for either format camp, loss in sales for film studios, and loss of enjoyment for consumers.\textsuperscript{104}

In the second stage, network effects mature and market tipping would have taken place. The market in which Blu-ray and HD DVD were competing in eventually tipped in 2008 when Toshiba lost support for HD DVD from Warner Brothers, which at the time was the largest player in the global home entertainment market.\textsuperscript{105} Entry barriers are deemed to be high in this stage simply because once the market has tipped, a new entrant with a product, even if incrementally better or more innovative than the original, would now have to justify to consumers why they would want to overcome the switching costs in using the new product. The switching costs exist because users may now have become accustomed to using a certain product, or have been trained to use a certain product, or because they have already brought other compatible products to work in conjunction with the said product and using the new product would break compatibility.

Although the high entry barriers thus caused would according to the Hong Kong Bill find Sony to have market power, the whole industry and consumers are generally better off because they no longer have to take risks in adhering to another standard;


there is just one major standard.

**Scope of a market (market definition)**

Generally, there are no clear cut, predetermined categories of products, and without such categories, all products seem mutually unconstrained and anticompetitive. In a supermarket, diverse goods are sold. It is uncertain whether milk and yoghurts are under the same market category of diary products, or conversely, whether milk should be differentiated into local and imported milk each with their own separate market.

In light of this, the provisional guidelines use an approach called the 'hypothetical monopolist test' to identify the scope of a market.\textsuperscript{106} This is also the approach used in EU anti-competition and US antitrust guidelines.\textsuperscript{107} There are 2 dimensions to the hypothetical monopolist test, the product market and the geographical market. The product market is usually defined first.

The test begins on the demand side. If in the eyes of buyers or consumers that a product can be a substitute of the focal product (the product under investigation), then that product will be included in the investigation. Once all these substitute products are identified, the test can move on to the supply side to reveal all the sellers or potential sellers of the substitute products.

At this point, the hypothetical monopolist comes on stage to find the relevant market. The hypothetical monopolist represents the seller of the focal product where the seller is able to profitably sustain prices usually 5 to 10% above competitive levels. The percentage is known as the 'small but significant and non-transitory increase in price' (SSNIP).\textsuperscript{108} The percentage cannot be so large that it causes a shift in demand that is too substantial because otherwise the market would be so wide that market shares are for certain not indicative of any market power. The purpose of the hypothetical

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\textsuperscript{106} Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.1-2.10.


\textsuperscript{108} Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.1-2.5.
monopolist with its SSNIP is to find the relevant market over which the hypothetical monopolist can exert its control.\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 3.3.}

The first scenario is where the hypothetical monopolist cannot sustain the SSNIP over a candidate product group. In that case, the market definition is said to be too narrow and unsatisfactory because it is likely that products that are actually able to constrain the focal product have yet to be included for comparison.\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.6.}

The second scenario is where the hypothetical monopolist can sustain the SSNIP. Then it is to be estimated whether a significant number of consumers would switch to the first best substitute. If they do, then the test has to be repeated to see if an SSNIP above the focal product plus the first best substitute would cause consumers to further switch to the second best substitute. The test is repeated until the consumers no longer switch, and the relevant market would then consist of the focal product plus all the next best substitutes up till the point consumers no longer switched. This is the relevant market where the hypothetical monopolist could control the market and sustain a profitable significant increase in price. If consumers do not switch even for the first best substitute, then the relevant market consists of only the focal product.

The provisional guidelines are quick to emphasise that the hypothetical monopolist test is merely a conceptual framework that is not to be applied mechanically.\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.11.} It is stressed that analysis should be performed on a case by case basis. Even so, the hypothetical monopolist test is the agreed test to be used even if just as a framework. Therefore, this paper must make an examination of the test. The problem with the hypothetical monopolist test is that the test is price based. This becomes problematic where the price of a product is zero. Assuming demand side substitution is performed without a hitch and a candidate product group with their sellers is identified, the next step in applying the SSNIP becomes problematic. Of course, the most obvious problem is how to multiply 0 with 5 to 10%.

\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 3.3.}
\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.6.}
\footnote{Bills Committee on Competition Bill, 'Guidelines on Market Definition' (CB(1)2420/10-11(03)) para 2.11.}
Yet, even if this is disregarded, and a SSNIP is attached to the product anyway, the most likely result is that any price-setting above free would be an overly substantial increase. In typical markets where the products do not have low marginal costs and are not distributed freely (free as in free beer), there is a typical demand curve of a certain elasticity where an increase in price would result in a decrease in quantity desired. This is the usual source for identifying whether a significant number of consumers would move to a substitute. In DTMs where there are low marginal costs and undertakings are able to distribute their products for free, consumers develop a habit of expecting the products to be free such as to cause the demand curve to be highly elastic. Even though the difference between free and $1, and $10 and $11 is just $1, the increase as perceived by a consumer is much greater in the former than in the latter. For example, the provision of consumer end-user email services has been provided for free for so long that consumers expect email services to be free and no email provider providing similar services for a price is likely to survive in the market for long.\(^{112}\) An increase in price when the curve is near perfectly elastic will cause such substantial shifts in demand that the scope of the market then becomes meaningless. Thus, in view of this formulation the hypothetical monopolist test in being price based does not apply satisfactorily in DTMs with no pricing.

In other contexts, such as when there are network effects and restricted interoperability, switching costs can be very high for consumers relative to the value of the product. Most of the time in this case, the differentiation between products in DTMs are independent of price. Substitution is thus impeded. Interestingly, this means that the demand curves for DTM products are in this context highly inelastic.

Therefore, it can be seen that DTMs tend to go to extremes in conventional economic theories. The hypothetic monopolist test is quite inadequate when dealing with DTMs.

**Abuse of marker power**

The second limb is about the abuse of a substantial degree of market power. It has

\(^{112}\)'Free Mail vs Paid Mail: Competition in Chinese Email Market' (*China Education and Research Network*, 15 September 2001)  
been shown that due to network effects and tipping, DTMs are prone to having a substantial degree of market power. Although it is perfectly legal to have a substantial degree of market power, it does mean that most DTM players are (quite unreasonably) seen as capable of distorting competition and harming the welfare of consumers. It means that DTM market players have to be careful with their acts and commercial decisions to an extent greater than players of typical markets.

In fact, upon examination of conventional business practices of DTM players, it is found that even these practices themselves are precarious against the notions of abuse as suggested by the Bill and the provisional guidelines. So, coupled with the fact of commonly having a substantial degree of market power, DTMs are almost certain to be caught contravening the prohibitions of the Bill.

*Notion of abuse in terms of object and effect*

Clause 21 of the Bill mentions abuse as 'engaging in conduct that has as its object or effect the prevention, restriction or distortion of competition in Hong Kong'. A distinction is made between 'object' and 'effect'. 'Object' here means the *purpose* of the undertaking's conduct is to prevent, restrict or distort competition. 'Effect' on the other hand means the undertaking has *actually* prevented, restricted or distorted competition, regardless of whether it was direct or indirect or otherwise. The relationship between 'object' and 'effect' is an 'or' relationship, so it is not necessary for both to be satisfied as elements. It is possible to find that the purpose of a conduct is abusive without actually finding that the conduct has already caused a harmful effect to market competition.

Interestingly, the concepts of object and effect in the EU actually only appear in article 101 of the Treaty on the Function of the European Union (TFEU, formerly article 81 of the EC Treaty, which is equivalent to the first conduct rule).113 Article 102 (formerly article 82 in the EC Treaty, equivalent to the second conduct rule in Hong Kong) is instead based only on the concept of abuse without reference to object

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and effect. Nevertheless, the principles for applying the concepts of object and effect under the Hong Kong Bill is essentially the same as in TFEU article 101, namely, that the object of the conduct should be assessed first. If the object can be established, then it is simply presumed that restrictive and distortive effects are also present.

The assessment of the object (or purpose) of a conduct is to be done objectively within the economic context and market setting. Under clause 22(1) of the Bill, it does not matter that there may be multiple other objects. The rationale is clearly to eliminate undertakings that have any malicious intent at all. Yet as indicated above, incompatibility is a very prevalent issue in DTMs. This is not to say that DTM undertakings would never have malicious intents. But through clause 22(2) which makes it possible for the object to be inferred from the conduct, it is of concern whether it would often be deemed that acts of innovation are in reality an effort to exclude the competitor. The undertaking may be seen as utilising incompatibility to strengthen its network effects to the exclusion of its competitor.

If the object is still indeterminate, the effect will then be considered to assist in determining whether there has been an abuse. In other words, the effect is only supplementary to the purpose. While it is not necessary to consider the actual effect when relying on the object to find a contravention, the expected effect from the object should be appreciable and should not be de minimis. One of the suggested methods from the Administration to make this assessment is by comparing the counter-factual to the factual. That is, to compare the anticipated market conditions where the conduct in question was absent to the actual market conditions as it stands with the conduct present. If it is decided that but for the factual, the counter-factual situation would not have suffered the adverse effects, then an abuse may be found.

The term 'anticipated market conditions' is quite flexible. If properly construed by the relevant authorities, the Bill will be able to fulfil its objective in having cross-sector application. The fear throughout this paper, however, is that in light of the confused

115 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 7.7.
experiences from foreign jurisdictions with regard to DTMs and the lack of attention given to DTMs in Hong Kong, 'proper construction' remains at the level of being theoretical (if not a fiction) than being aligned with reality.

The height of the confused experiences is again best represented by the commentary surrounding the 1999 US Microsoft case. White in particular defended the antitrust laws and rejected the claims that DTMs had special characteristics by saying that antitrust problems were not new and could be found in typical markets (or what he termed smokestack industries).\footnote{L J White, ‘Microsoft and Browsers: Are the Antitrust Problems Really New?’ in J Eisenach and T Lenard (eds), \textit{Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace} (Kluwar Academic Publishers, Boston 1999).}

It should be noted that vertical markets are only half the story in DTMs. It is understandable that he restricts his arguments to vertical markets because his focus was on the Microsoft example. But to extend from that and conclude that the antitrust issues derived from the Microsoft case were existing issues and were no difficult to understand, White seems to be taking his arguments a bit too far.

White used railroads as he did in several of his previous papers to represent network industries. That is difficult to agree with. Railroads may be physically connected in networks, but each passenger does not gain value from the next passenger using the railroad. It may even be the case that the less fellow passengers there are in a carriage, the higher the value the train ride is for each passenger (because each passenger has more legroom). These are hardly the effects that correspond to a network industry.

White also sidestepped the issue when he contended that the network attributes were not important for vertical issues. First, although this paper has already shown above that it is doubtful whether operating systems and web browsers are really products in two separate vertical markets, even if it is assumed the Microsoft case did involve vertical issues in two separate markets, network attributes would still be important to the case. White's use of the railroad parable would of course lead White to reduce the significance of network attributes in the Microsoft case. But as just explained, railroads themselves are not a network industry. White's conclusion is thus incorrect.
Second, network attributes were actually important to the Microsoft case (and to vertical DTMs) simply because the more users there were using the vertical combination of an operating system plus a browser, the more content and interaction there could be on the internet, which in turn increased the value of using the web browser for each participating user. As it technically still is the case, a web browser has to run on an operating system. So, a web browser on an operating system would increase the value of the operating system. Reciprocally, the usage of the operating system that includes a web browser would also encourage the uptake of the web browser so that more users could contribute to the internet. All of this is absent in railroads in a vertical market. Either or both vertically dependant railroad lines would only have either of their value decreased from increased passenger numbers due to crowdedness or even undesired competition between passengers for a limited amount of seats.

*Bundling/Tying*

Bundling and tying are related concepts. Tying is when consumers must buy product Y (the tied product) in order to buy product X (the tying product). Product X is said to be sold conditional upon the purchase of product Y.117

Bundling, on the other hand, is where two or more products are offered as a bundle. Sometimes only the bundle is offered and its components are unavailable for sale separately. This is known as pure bundling.118 In other cases where the components could be sold separately, but the purchase of the bundle is cheaper than the sum of the prices of the separate components, it is called mixed bundling.119

The problem with applying bundling and tying to DTMs are two-fold.

Firstly, in the 1999 US Microsoft case, one of the issues in court was whether

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117 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 8.7.
118 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 8.7.
119 Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 8.7.
Microsoft was bundling the web browser ‘Microsoft Internet Explorer’ with the ‘Microsoft Windows’ operating system. Underlying this issue, however, was the more fundamental question of whether 'Microsoft Internet Explorer' was a computer application like its main rival product 'Netscape' that existed in a separate market from the operating system market, or instead merely an integral component (a mere feature) of the 'Microsoft Windows'. Only when the products exist in separate markets can there be any case of bundling or tying.

Computer operating systems are made up of numerous components. For some families of operating systems, for example Linux, many of its distributions are just varying selections of components developed by many different developers and are highly substitutable even by the consumers themselves. Basically, the only component that makes a Linux distribution a Linux distribution is the Linux kernel. All other components can be reconfigured and compiled at will. Most of these components are under open source licenses that permit commercial distribution and can be sold independently. Would this mean, however, that because each of these components could be separately sold and substituted, the court or the Tribunal should find that each of these components as belonging to separate markets?

The issue is in essence even more basic than finding the relevant market. Market definition and the hypothetical monopolist test is of assistance only to the extent of establishing the relevant market, provided that distinct products are already known. Here, the question is what constitutes a free standing, distinct product. The answer from the US is to use a demand test. A product is two distinct products if it is efficient for the undertaking due to sufficient consumer demand to provide the product separately.120 The EU has an additional supply test that asks whether there are other competitors providing the product as one product or separately as two products.121

In the US Microsoft case, the District Court found in the end that Internet Explorer was a separate product from Microsoft.122 At the same time, Internet Explorer had arguably been technically integrated into Windows by sharing libraries with the

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Windows shell and directory browser Windows Explorer. Moreover, it has become expected of operating systems (no matter proprietary or open source, from computer to smartphone operating systems) to provide a web browser. In principle, there is not too much discrepancy between a web browser and a directory browser, both of which can be used to view files, the former from web servers, and the latter from local storage drives. So if the directory browser is considered essential for the operating system, there is no reason why the web browser should be treated differently. Also, with the benefit of hindsight, web browsers have proven to be more of a standard feature in operating systems than a separate product, and is no less important a component as the X11 windowing system is to graphical Linux distributions. Therefore, not only is there difficulty in categorising a digital technology product, there is also difficulty in determining at which point a digital technology product is to be considered an individual product at all for the purposes of bundling and tying.

The second aspect of bundling is that it is a reasonable consequence of low marginal costs. Superficially, it would seem that an undertaking would benefit most if it sold each of its products separately as it could earn the profit margin for each of them. However, this is to neglect the fact that consumers do not have uniform demand for all the products of the undertaking.

Bakos and Brynjolfsson have done extensive research in this area. They observed that the reason why products like Microsoft Office hardly ever sold their Office components as stand-alone products was because of this uneven demand for the components. If the components were stand-alone, and consumers valued the components differently, for Microsoft to gain maximum profits at the optimal price, Microsoft would have to sell the product at the lower of the valuations from consumers. If instead Microsoft bundled the products, by the law of large numbers, it could charge them for the sum of the value of the separate products or a little less than the sum and be able to gain a higher optimal price for higher overall profits. Of course, all this possible only because the low marginal costs allows Microsoft to incur

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insignificant costs in forming the bundle in the first place

Bundling is not just all about economic efficiencies for the undertakings, it is also important for innovation as well. This is especially so since some innovative products may have a learning curve or require the user to form a habit into using it. By bundling the products together, it is more likely a user is willing to try out the other products as well because the user has paid for the bundle already and incurs no extra marginal cost to use the bundled product. If the product has network characteristics, it may also help the product gain network effects through mutually increasing the value of the product and ultimately bring the test innovation to the mass market.

*Predatory behaviour*

To briefly return to the example of Dropbox mentioned in the second part of this essay, there are many contenders to Dropbox in the online storage arena, and Dropbox was certainly not the first to come up with the idea of providing storage in the cloud (not even remotely the first batch).\(^{125}\) One of the reasons why Dropbox could stand out from the rest of the many similar services, however, was because it was generous in giving out the free storage space where other services were more wary of doing so. After all the marginal costs were not especially low for this market. When Carbonite (an older online backup service) was still based on older 'pay for your product' business models and traditional conceptions of marketing through advertisements and radio on-air endorsements,\(^{126}\) Dropbox was already providing their services free to most users. The incorporation of the user referral scheme made Dropbox's marketing more cost-effective than Carbonite's while actually achieving satisfaction for both Dropbox (in terms of being able to attract more potential paying users) and its users (who get the bonus storage).

With just 10.41% market share,\(^{127}\) Dropbox may not be a dominant undertaking in the

\(^{125}\)D Cahill, 'The Economics of Carbonite, or lack thereof' (26 May 2011) &lt;http://wikibon.org/wiki/v/The_Economics_of_Carbonite_or_lack_thereof&gt; accessed 23 April 2012.


\(^{127}\) 'Security Industry Market Share Analysis' (OPSWAT, December 2010)
eyes of the US antitrust law, but as Hong Kong uses 'a substantial degree of market power', other factors are considered with equal weighting. The fact that Dropbox has gained complex network effects and evolved into a platform may be a reason for the Hong Kong Competition Bill to regard it as having a substantial degree of market power because it now commands influence over various other software products and services.

With a substantial degree of market power (which may have been less likely satisfied if the standard was on dominance instead), Dropbox may also satisfy the second limb of the second conduct rule. Firstly, not all its competitors are providing free storage space (Carbonite is a fully paid service after a 15-day trial period).\(^\text{128}\) Secondly, the provisional guidelines presume the presence of predatory behaviour when pricing is below the average variable cost, unless some objective justification is given.\(^\text{129}\) Dropbox by pricing the majority of its services at free, which is obviously below the average variable cost, will then be unduly presumed to have foreclosed its competitors and abused its substantial degree of market power. In fact, all freemiums will automatically fall into the presumption.

The provisional guidelines list 2 legitimate commercial reasons as examples of objective justifications.\(^\text{130}\) The first is short-run promotions where a product is sold below average variable cost for only a limited period of time, probably for the purpose of promotion where the product is new. The second is loss leading where the undertaking sells a product under average variable cost so as to boost sale of its other products. Freemiums may or may not fall into this category. In the case of Dropbox, its user referral program where storage space is given out for free for users to permanently keep may still be seen as a predatory act so that it can gain platform status and charge higher prices once users are too dependent on the system through network effects.

\(^\text{129}\)Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 8.4.
\(^\text{130}\)Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)) para 8.4.
In any case, whether freemium, advertisement-supported or otherwise, modern DTM market models are often priced below average variable costs (to the extent of being free), but this does not mean they are anti-competitive in nature. It is hoped that the Tribunal will recognise these market models as a legitimate commercial practices rather than abuses.

Refusals to supply

The provisional guidelines provide that a refusal to supply would not normally be an abuse because undertakings should be free to decide with whom they would like to deal or not deal with.\textsuperscript{131} This is a reasonable restraint on the part of the government to prevent excessive intervention.

Yet, the guidelines are also quick to provide that a refusal to provide access to an essential facility is an example of abuse.\textsuperscript{132} A facility is considered essential if it is indispensable to competitors in the market. The facility is essential where duplication or substitution is difficult or impossible because of constraints.\textsuperscript{133} Such constraints would include \textit{inter alia} restricted interoperability and intellectual property rights.

It is argued here that restricted interoperability is often times necessary in DTMs. Users benefit from technical incompatibility because if the developer is not required to ensure interoperability, the developer can truly innovate and add new features. A fine example is the Python programming language\textsuperscript{134} where backwards compatibility of Python 3.0 was intentionally broken with Python 2.x.\textsuperscript{135} The move meant that existing code in Python 2.x either became obsolete or required quite some effort on the part of the coder (the user) to port the code to Python 3.0. However, the change

\textsuperscript{131}\textit{Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)), para 8.13.}
\textsuperscript{132}\textit{Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)), para 8.15.}
\textsuperscript{133}\textit{Bills Committee on Competition Bill, 'Guidelines on the Second Conduct Rule' (CB(1)2618/10-11(01)), para 8.15.}
\textsuperscript{134}Python is a popular, cross-platform, general purpose dynamic computer programming language, see \texttt{<http://python.org/about/>} accessed 17 April 2012.
also allowed the language to become more simplified and consistent which in the long run means it is easier and more efficient to code in.

The case was similar when Apple Computer Incorporated (as it then was) decided to move its flagship operating system from Mac OS 9 to Mac OS X. There was a transition period as Mac OS X progressed through its minor revisions, but compatibility was eventually broken and only Mac OS X applications could be run. There was surely inconvenience for the users and conspiracy theorists may cry that Apple was just trying to squeeze profits by forcing users to upgrade. From the perspective of Apple, there was also a break in the network effects for the operating system because the newer Mac OS X was competing for users and software developers from its predecessor. However, the value of breaking compatibility proved to be worthwhile when the technical improvements translated into increased uptake of the operating system by consumers.

The moral of the story is that innovative unique features and full compatibility are by definition mutually exclusive. Interoperability issues are prevalent throughout DTMs and are simply the nature of these markets. The two examples above show that compatibility with existing products is willingly sacrificed for innovation even when the existing product is from the same company. Not all restrictions on interoperability have underlying evil intentions. Instead, many cases have a justifiable need for the restriction.

Following from that, a finding of a refusal to provide access to an essential facility will then be inevitable in DTMs. Once again, network effects causes one and usually just one undertaking producing the prevailing product to unavoidably have a substantial degree of market power and influence. Due to incompatibility, it is then a matter of course that competing products wishing to gain interoperability with the prevailing product will find the prevailing product an essential facility, because there is no substitute to interoperate with other than the prevailing product. If the market in question has a complex market structure and the prevailing product is serving as a

platform product, interoperability becomes even more critical from the perspective of the weaker competing products. Therefore, these combinations of DTM characteristics not only cause DTM players to be prone to having a substantial degree of market power, but they also cause products to easily become regarded as essential facilities.

In the context of intellectual property rights, there is also the question of whether enforcement of intellectual property rights will be seen as a refusal to supply. There is also the deeper question of whether intellectual property rights are conceptually (in)compatible with competition. In foreign jurisdictions, there was a time when they were seen as mutually incompatible because intellectual property rights were by nature exclusive rights and were essentially granting monopolies. Modern views, however, have been able to reconcile the two legal branches by finding that both are means to the same end, namely the promotion of competition and innovation, albeit at different stages. Intellectual property rights encourage competition before, say, a patent is granted, because companies must race to come up with the idea first. Competition law, on the other hand, encourages competition afterwards.

This paper agrees that both legal areas share similar goals, but that does not automatically mean that conflicts between the two areas disappear overnight. It is unavoidable that either intellectual property rights or competition laws would have to take precedence. In the US, the method to resolve the conflicts in the past was to have intellectual property rights take precedence. An undertaking holding intellectual property rights would be immune to antitrust investigations in front of the courts. In recent times, the US courts have espoused the newer 'shared goal' viewpoint, and have reduced the scope of immunity provided by intellectual property rights. Now, it is possible for the use of intellectual property rights to become an abuse of competition in the form of a refusal to supply.

EU courts seem to have taken an even stronger stance in liberally denying substantive use of intellectual property rights. Part of the EU Microsoft case was on the refusal to supply to competitors interoperability protocols for its work group server operating systems. Microsoft had entered the server operating system market with a high degree
of compatibility with industry standards at the time. However, as Microsoft rooted itself in the market, it gradually added 'enhanced' support for the industry standard protocols. This meant Microsoft's systems were compatible with industry standards, but the converse was not true because the 'enhancements' were not standard. The enhancements were only supported by other Microsoft server and personal computer systems, the latter of which Microsoft was dominant in and could by the network effects between personal computer and server systems further leverage Microsoft into the server operating systems markets. This was the same strategy used in the US Microsoft case where Microsoft developed 'enhanced' proprietary Java Virtual Machine for its Internet Explorer web browser.

Countering the (EU) Commission, Microsoft argued that there was not a refusal to supply because it had already supplied the means for interoperability which were available to any developer requiring support for 'Microsoft platforms'. The (EU) Commission was not satisfied. In its decision, the (EU) Commission required Microsoft to 'provide specifications of the relevant protocols, that is to say, technical documentation'.

The problem is, why was Microsoft obliged to provide technical documentation to competitors? Microsoft argued that to force it provide the technical documentation was in essence forcing it to license its intellectual property rights to competitors. The (EU) Commission was however unsympathetic to this and decided that the

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141 Microsoft Corp v Commission of the European Communities (Case T-201/04) [2007] European Court Reports, II-03619, para 763.
exercise of intellectual property rights was no objective jurisdiction when consumer interest was harmed. It stated 'that the Decision might require Microsoft to refrain from fully enforcing any of its intellectual property rights, this would be justified by the need to put an end to the abuse.' The harm on consumer interest was based on the (EU) Commission's speculation that were the competitors to have access to the withheld information, they would have been able to provide new and enhanced products to consumers.

The future Tribunal and Commission in Hong Kong should take caution in following this case. Firstly, the (EU) Commission did not provide any evidence for the counterfactual analysis for the harm on consumer interests. In contrast, the 'enhancements' from Microsoft could be said to benefit consumers because they could enjoy more features without sacrificing the ability to unilaterally interoperate with other systems. As mentioned above, incompatibility can be justified for the sake of providing innovation. If undertakings were not allowed to break compatibility as Microsoft did with its 'enhancements', then innovation is likely to be stifled (which would then be truly harmful for consumers).

Secondly, the Tribunal should consider carefully whether it would want to tread on intellectual property rights in like manner as the (EU) Commission. After the EU Microsoft case, Neelie Kroes, the former European Commission Competition Commissioner in charge of overseeing the fining of Microsoft, stated openly her endorsement for open source and open standards while rejecting anything proprietary. Although this paper also endorse the use of open source software, it does not mean that Hong Kong should also follow this policy of superficially allowing intellectual property rights, and yet discourage undertakings from ever actually enforcing them for some non-legal justification. Government policies not endorsed by legislation should not be allowed to override legal property rights.

148 This very paper was researched with and drafted on open source software.
CONCLUSION

At the end of the day, how would OCL fare under the Bill? As stated in the first part of the paper, the Bill and its provisional guidelines are based on the effects based approach. This approach encourages competitive analysis to be flexible and operate on a case-by-case basis. The result of the Octopus card case would depend on the particular facts of the case, which are of course unknown here because the case was hypothetical.

That said, the Bill and the provisional guidelines are still there for a reason – to make the case-by-case analysis more certain and consistent. However, as this paper has sought to describe at length in the second and third part, the Bill and provisional guidelines have confused rather than clarify the competition analysis for DTMs. To summarise the problem, although the target of the Bill is against supermarkets and oil companies etc, DTMs are collaterally harmed in the sense that DTMs have a combination of economic characteristics that are different from those pertaining to typical markets. The Hong Kong Bill, made with much reference to foreign legislation, has disregarded these differences. Yet, as demonstrated above, experiences from abroad have shown that there is much difficulty in applying their legislation to DTMs.

As might be expected, there have also been counter-viewpoints from foreign jurisdictions suggesting that there is nothing wrong with their legislation because DTMs are in essence not too different from typical markets. This paper has already addressed this and has explained why that contention is not true. Therefore, there is no reason for Hong Kong to mindlessly follow, warts and all, the foreign legislations which were designed in bygone eras where there were different conceptions of economics.

To illustrate one last time, if the Bill which is based on conventional economics is hypothetically applied to OCL, the first problem encountered would be with regard to the market definition. As explained, due to network effects and restricted

\[\text{\footnotesize\cite{Bills Committee on Competition Bill, 'Minutes of Nineteenth Meeting on Wednesday, 20 July 2011, at 8:30am in the Chamber of the Legislative Council Building' (CB(1)178/11-12) as per the Hong kong Business Community Joint Conference.}}\]
interoperability, switching costs are high. The hypothetical monopolist test may then not be an efficient way to find the scope of the market that the Octopus card is actually in.

Assuming the market is somehow defined, then the second problem would be that OCL would likely be found with a substantial degree of market power because its economic characteristics once again easily contribute to high entry barriers (unless particular facts of the case would show otherwise). With a substantial degree of market power, OCL may then be found as abusing its market power, say, if it refuses to allow or hinders interoperability for PayPass and payWave with Octopus card readers, just like in the Microsoft server case. This is an absurd result, but this is what the Bill and the provisional guidelines in their current form may cause.

If OCL is found to have abused its market power, it may have no choice but to comply with any penalties imposed on it. It must be appreciated, however, that most DTM undertakings with business operations in Hong Kong are not local undertakings like OCL. To these large multi-national DTM undertakings, Hong Kong is but a very small market. Hong Kong itself is highly technology dependent, but the converse is not true. Most DTM undertakings are not headquartered in Hong Kong, nor are they dependent on Hong Kong. Disincentives stemming from the forthcoming competition law could easily outweigh any incentives for DTM undertakings to persist in the Hong Kong market. For example, if DTMs were forced to release their intellectual property rights like EU had forced Microsoft, any DTM with business sense would quickly abandon Hong Kong's market to protect its rights. The consequence is that both businesses and Hong Kong's technology dependent consumers would have to suffer.

Clearly, this effect is not what was intended of the Bill. It is therefore suggested that if the Bill passes, the guidelines should be drafted carefully. It should be wary of relying too much on foreign legislation and case law, such as the EU, where there may be different motives, goals and industry policies. Finally, the Tribunal and Commission, when making any cross-sector competition policy, should not forget to take into account the particular modern economics of DTMs and the status of Hong Kong. It is imperative for the on-going welfare of Hong Kong consumers that DTM businesses
are not ill-treated.
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