PJC 2018 H2 P2 Question 2:
Industries, from transport to retail, are being disrupted by new technologies and digital applications. Digital entrants are challenging the incumbents and threatening their bottom lines.

a) Explain how advancement in technology may affect a firm's profits. [10]
b) Discuss the extent to which the behaviour of firms is affected by contestability of market. [15]

<u>Suggested answers:</u>

A firm's total profit is derived from total revenue minus total cost. With advancement in technology, it can affect both total revenue and total costs.

Advancement in technology like that of digital applications can disrupt the businesses and reduce their total revenue. Advancement in technology have allowed digital applications like that of rail-hailing booking applications of Uber to be developed. It has reduced the demand of traditional taxi service of Comfort Delgro. At the same time, there are more substitutes available for Comfort Delgro's taxi and its demand will become more price elastic. Thus, Comfort Delgro will see its AR and MR curves shifting downwards and becoming flatter. Since TR = P X Q, a fall in DD will reduce both P and Q and TR will fall.

[students can insert a dd/ ss or cost/ revenue diagram showing the effect on TR.]

As a result, its total revenue will decrease from advancement of technology that disrupt business with digital technologies.

On the other hand, technological advancement can also make a firm's product more differentiated and increases the firm's total revenue. With the development of technology eg with the development of internet and mobile devices, small firms can tap on more low cost avenues to market their products and reach out to their customers. Product information and review can be shared via social media or blog post. Large firms can tap on improvement in technology to conduct R & D on their product, allowing them to design more sophisticated products that improve on consumer satisfaction and stand out from its competitors. These strategies made with advancement in technology can increase demand of the firm's product. At the same time, PED and CED can also be reduced as the firm's product's perceived and/ or actual differences are emphasized. With the firm's demand curve shifted outward and made steeper, the firm will see an increase in total revenue. In addition, the firm can increase the price of its product and the quantity demanded of its product will fall less than proportionately, increasing the firm's total revenue. Even if the price of the substitute product were to fall, the fall in demand for the firm that has tapped on technology to brand its product will be by a small extent. Thus, total revenue can increase if firm position itself well to ride on the advancement in technology by differentiating itself better from its rivals.

Technological advancement can reduce costs of firm. Technology improvement has increases computer processing speed and storage capability eg cloud storage, allowing firm to manage larger amount of information at a much reduced costs. Improvements in communication made possible by the internet and devices like laptops and smart phones has streamline the communication processes firm has within and outside with suppliers and customers. The ability to tap on technology to mass produce has also allow firms to enjoy economies of scale. These can increase its efficiency in work processes and reduce units cost. In addition, technological advancement in the form of automation has reduced the need for labour in manufacturing process; significantly reducing costs for many manufacturing and logistic firms. The firm will see a downward shift of its AC and MC curves.

The firm's supply rise at each output level. Thus, technological advancement can reduce costs for firms in many aspects for firms of all sizes and industries.

For a firm that did not anticipate the disruptive forces of advancement in technology and did not make use of technology to reduce its costs, its total profits will likely fall. On the other hand, a firm that utilize technological advancement to increase its reach to its customers and differentiate its product as well as reduce its production cost will likely benefit significantly from the advancement in technology with an increase in total profits.

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b) Discuss the extent to which the behaviour of firms is affected by contestability of market. [15]

Suggested answers:

Contestable markets are markets dominated by one or few firms which are operating at competitive price and output levels due to the threat of potential competition/ potential entry of new firms. Contestability of market refers to the ease in which new firms can enter and exit the market. Such a market has no/low sunk costs to allow for the ease of exit. Sunk costs are costs that cannot be recovered when firm leave the industry. Behaviour of firms refers to its pricing and non-pricing behaviour. Non-price behavour will include marketing and research decisions. It is too a small extent that behavior of firm is affected by contestability of market as there are many other factors affecting the behavior of firms. The factors include actions of competitors and government regulation.

Behaviour of firms is affected by contestability of market. With low degree of contestability, monopolistic or oligopolistic firm would produce at the profit-maximising output where MR=MC. With high barriers to entry, monopolistic or oligopolistic firm will be able to earn supernormal in the long run. Degree of contestability of market has increased with digital applications and technologies lowering market entry barriers across many industries. For example, in the market of retail, non-traditional retailers have entered the retail markets through e-commerce. The taxi service digital applications that makes it easier to match the demand and supply of taxi services allows Uber to enter the oligopolistic market of ride-hailing. Even in traditionally high barrier to entry banking industry, digital technologies have allowed firm like Haier, which is traditionally a manufacturing firm, to offer convenient finance and payment services through its online platform. The increased market contestability has changed the way firms behave. Even through there might not be increased competition yet, the threat of firms entering the tradition industries will change the way firms behave.

With high degree of contestability, monopolistic or oligopolistic firm may limit its pricing below profit maximizing level in order to ensure that other firms are not enticed by the large supernormal profits and enter the industry. Instead, it will usually set a competitive price close to / at average cost such that it obtains only normal profit. Ie where AR=AC. However, if the digital entrant's AC is way above that of the incumbent firm, then the incumbent firm need not reduce its price all the way to below average cost. When competitors do enter their market, monopolists may take actions such as dumping or predatory pricing to drive competitors out of business despite having to make losses and may even attempt a hostile takeover of a competitor.

On non-price behaviour, incumbent firm may choose to make their product competitive and ensure the firm is efficient before any new competitor enter the market. It may do so through marketing strategies to create consumer loyalty before new entrants come their markets. At the same time, it may invest in R & D to streamline its production and improve their product. This will reduce their unit cost and make their demand price and cross inelastic. In face of potential competition, the incumbent firm will be better able to compete via price when it has kept its cost of production at efficient level. With a product that is unique, the incumbent's demand will fall by less than proportionately when new digital entrant enters the market. As for oligopolistic incumbent, it may choose to collude with another incumbent in the same industry to increase its market share so as to within any increased competition from potential entrant.

For firms in perfect competition and monopolistic competition market, they do not face the threat of contestability as the analysis of contestable markets is not designed for markets with large number of competitors.

Behaviour of firms in monopoly and oligopolistic industries are affected by contestability of market while that of firms in perfect competition and monopolistic competition are not.

Beyond contestability of market, actions of competitor within the same industry can also affect the behavior of a firm. In an oligopoly, a firm's price and non-price behaviour is influenced by the actions of its competitors to a large extent due to mutual interdependence. Increasing price will cause many of its customers to switch to rival firm's products since rival firm will keep prices at current levels. Should the firm lower price, the rival would also decrease it price so as not to lose market share. This would lead to a price war and thus quantity demanded of the firm's product would increase less than proportionately than the decrease in price. Hence there will be price rigidity in the market and the pricing behaviour of the oligopolistic firm is highly dependent on the actions of its competitors. This is especially true when the product involved is homogenous eg oil.

An oligopolistic firm's non-price competition behaviour is affected by the actions of its competitors to a large extent as well. Strategies include product differentiation, where firms aim to emphasize the differences of their products from the competitors'. This will help to build consumer loyalty to that particular firm and reduce the cross elasticity of demand of the firm's product with respect to its competitors. They conduct promotion campaigns and advertising activities and may even invest in research and development in order to develop improved products to gain a larger market share. Apple engages in extensive advertising and R&D to constantly develop and launch new versions of the iPhone to compete in the smartphone industry to gain market share over Samsung and XiaoMi. As Samsung and XiaoMi are continually developing new technology and improving their smartphones, the behaviour of Apple in developing the iPhone 5S with fingerprint recognition and high quality camera and video editing software in response to Samsung's face and eye recognition and waterproof smartphones highlight that in an oligopoly, a firm's non price behaviour is affected by the actions of its competitors.

As for monopoly, being the sole producer, it has no competitor in the market and will be more affected by potential rivals. Firms in monopolistically competitive market seldom take into consideration their competitors actions as each firm has insignificant market power and sells differentiated products. It is too difficult to track the changes in prices and advertising strategies of all the other firms in the monopolistic competitive market. Action of competitors can also affect the behavior of firm. This is evidenced in the case of oligopolistic firms.

The government can also play a part in affecting the behaviour of firms. For a natural monopoly, the government influences the firm's behaviour. A natural monopoly would have no competitors, and are often regulated by the government. Thus decisions made by the monopolist are usually within the limits set by the government to maximize their own profits. One example would be the provision of public utilities like Singapore Power or Public Utilities Board providing piped water to homes in Singapore where prices must be approved by the relevant authorities. To achieve allocative efficiency, government may also imposing MC-pricing to ensure that that monopolist set price and output level that can allow maximum welfare to be achieved in the society. Hence government regulation can also affect a firm's behaviour.

Behaviour of firm is affected by contestability of market to a small extent as there are many other factors that can affect the behavior of firms. Some of these factor include competitors' actions and government regulation. However, firms of larger scale of production in the oligopoly and monopoly market structure are more affected by contestability of market with rising trend of digital disruption. Smaller firms in monopolistic competition and perfect competition are not affected by contestability of market. But they can be affected by other factors. Market with higher sunk costs will also face less contestability and thus contestability of such market will affect the behavior of firms by a smaller extent.