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How can small companies have sustainable growth in the market--learning from Coca-Cola and Pepsi

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Abstract: This paper focuses on the development of small companies from an economic perspective by using examples from Coca-Cola and Pepsi. To explain the strategies adopted by Coca-Cola and Pepsi, game theory has been used. Several processes contribute to different outcomes. This paper will demonstrate how other market structures influence supply and demand differently. As a result of the unpredictable variables in the market, determining a price becomes a reactively complex process.

Keywords: supply, demand, game theory, monopoly, monopsony

1. Introduction

The free market is unfriendly to small firms all the time. Small and medium-sized enterprises have weak market development ability and difficulty expanding their business due to insufficient self-owned funds, difficulty obtaining loans, and lack of financing channels. In foreign trade and global operations, the problem of financing has led many small and medium-sized enterprises to stay away, hindered the development of enterprises to a large extent, and has become a significant factor restricting the level of international competitiveness of small and medium-sized enterprises. The problems of low production technology and low product level of small and medium-sized enterprises have seriously prohibited the improvement of economic benefits for small and medium-sized enterprises to enter the international market.

Because of these reasons, the government subsidizes small and medium companies gradually. For example, the SBA received supplemental appropriations of $760.9 billion in FY2020 and $378.5 billion in FY2021 to assist small businesses adversely affected by the COVID-19 pandemic [1]. However, even under government help, over the last 25 years, about 7–9 percent of small firms close yearly. So, capital is not the only or the main element to sustain in the market. I will use Coca-Cola and Pepsi as examples to answer which factors are essential to keep in the market and how to have sustainable growth in this paper.

2. Market Determinations

2.1. The Purchasing Powers

Buying powers could influence the demand curve a lot. Buying power is the ability to generate a flow of money. A transaction, either purchase or earning, is expressed as a flow [2]. So, recall the formal MV=PY, M indicates money supply, V is the velocity of money flowing, P is the price level,

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and Y is the total output. If we keep the M and P constant in the short run because, in the modern economy, a bank cannot increase the money supply immediately, and the price is locked on account of the long-term contracts, menu costs, etc. Then if the velocity of money flowing increases, which means the purchasing powers rise, the total output will also increase so that the demand curve will shift out. The buying power increases because of the wage of household increase. The critical element causing household wage rise is the government and the institutions encouraging women to attend college and passing legislation that protects pregnant women from losing their jobs after having a break. Technological innovation allows them to do the same housework in a shorter time, so the opportunity cost of education is lower than before. As a result, the real wage of women increased a lot [3].

2.2. The Price of Related Goods

In the market, there are complements and substitute goods. Introducing a compliment may increase sales of a target product or make it more suitable for more applications than previously [4]. Therefore, classifying types of goods is necessary for the market. For buyers, categorization simplifies information processing/decision-making and facilitates interpersonal communication. From a seller's perspective, categorization speeds up individual buyers learning about new products and diffusion and promotion through word-of-mouth among potential buyers [4]. The distinction between complements and substitute goods is the cross-elasticity of demand( ) which is equal to the percentage change in the quantity demanded of one good and dividing it by the percentage change in the price of the other good. If is navigated, those two products are complements. On the other hand, they are substitutes.

2.3. Changes in Tastes and Preferences

A knowledge of preference trends for various population groups is precious because of the increasing emphasis on market segmentation and targeted marketing [5]. The consumer's behavior or belief reflects the tastes and preferences, so the demand will change significate when the priorities change. Companies must understand who their consumer is and what are the consumer's preferences. A consumer can search for quality as well as price. A consumer trying on a dress differs from a consumer determining the price of a dress only because the time required to try on a dress is longer [6]. So, consumer preference is too complex to capture. Even though companies cannot satisfy all the consumers in the market, they should try their best to match the requirement of the market.

2.4. Price Expectations

The consumer could have different expectations for the same good. Expectations are commonly considered extrapolations, weighted averages of past values of the variable under consideration [7]. As Kenneth said, future price expectations are based on past or today's deals. After analysis of consumer behaviors, future price concludes that if the buyer's price expectation elasticity is greater than 1, an increase in the spot price will lead to a rise in demand; if the elasticity is less than one or negative, an increase in the current price will lead to a decrease in order; if the elasticity is equal to 1, a change in the current price does not affect demand at all.

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3. Small Companies Could Learn from Coca-Cola and Pepsi

3.1. Background of Coca-Cola and Pepsi

Coca-Cola was the first coke company built in 1888; because Coca-Cola was the first coke company, it had monopoly power in the market. Moreover, in the 19th century, there were not as many beverages as today, and the only drink was coke. As a result, Coca-Cola made lots of profit in the monopoly period. Five years later, Pepsi saw this opportunity, which developed into the market in 1893. The book "The Temperance Beverages" mentions that Americans adopted soft drinks as one of their favorite beverages, and they remain so today [8]. As shown in the below graph, Coca-Cola maintains a dominant market share of around 40%.

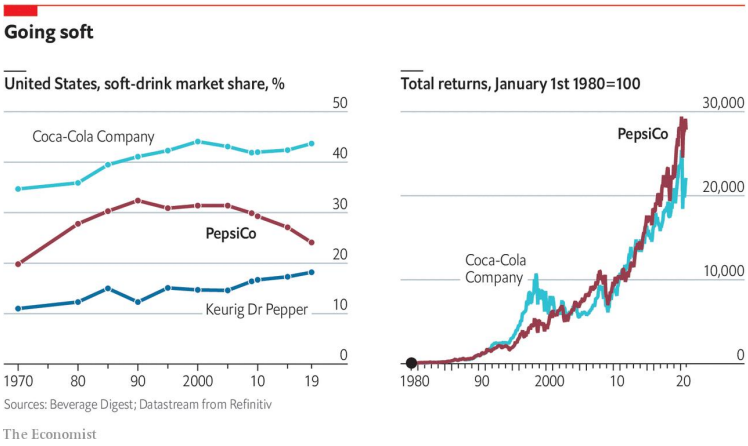

Figure 1: market share.

Because Coca-Cola was the earliest soda industry, it had enough time to innovate machines or methods to cut costs. For a small company, the cost of each bottle of coke must be higher than Coca-Cola. Let us assume the cost of small coke company A for a bottle is 3.5 cents, and when it sets the price at 5 cents, which is equal to Coca-Cola, it will sell 1000 bottles per month. So, the net profit formula of company A is $p = 1000*5 - 1000*3.5$ which equals 1500. However, if company A sets the price at 4 cents a bottle, which is lower than Coca-Cola, and sells 200 more bottles per month, then the formula will be $p = 1200*4 - 1200*3.5 = 600$, less than the original profit. Because company A does not have as many customers as Coca-Cola has after it changes to price, the customers will not increase a lot, so the best solution for company A is to set the same price as Coca-Cola. We can assume that the long-run average cost of Coca-Cola is lower than the LRATC of firm A, which means firm A has a higher LRATC curve, and the market price is Pm. As recall that profit $(\pi) = (p - ATC) * Q$, if firm A sets the same price with Coca-Cola, LRATCA>Pm So the profit is negative for firm A.

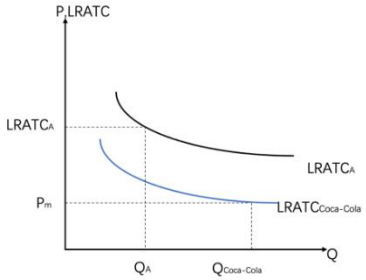

Figure 2: long-run total cost.

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The only way for small firms can compete with large firms is the protection by the government, which is called the Infant industry argument. In 1815, the price of imported manufactured goods from British was lower than U.S. producers because of British dumping. To protect domestic production, the government set tariffs.

The protection buys the U.S. industry time to grow larger and learn by doing, so in the end, the LRATC curve of the USA will shift downward. However, the government did different things with the coke issue. So, the small firms did not receive protection from the government. Nevertheless, Pepsi's first strategy was a lower-price sale. Coca-Cola set the price at 5 cents per bottle, and Pepsi sold at 5 cents for two bottles. Caleb Bradham, the original owner of Pepsi, decided on a lower price for two reasons. First, he used to have the largest candy company in the U.S., so he had a considerable customer base. Second, he chooses a perfect time. In 1930, the U.S. underwent the Great Depression. Few segments of the economy were unscathed. Personal and firm bankruptcies rose to unprecedented highs. In 1932 and 1933, aggregate corporate profits in the United States were negative. Some 9,000 banks, with $6.8 billion of deposits, failed between 1930 and 1933 [9]. Pepsi and Coca-Cola are substitutes which are two goods that are used in place of each other. When Pepsi has a lower price than Coca-Cola, most consumers will choose to buy Pepsi, especially at that hard time. In the graph, when the price is 5 cents in the market, the demand for Coca-Cola is in Q1, and Pepsi is in Q3. After Pepsi decided to decrease the cost to 2.5 cents a bottle because of the Great Depression, the demand moved significantly, and the market quantity moved to Q4. Accordingly, the demand curve of Coca-Cola shifted to lift, and the quantity demand decreased in Q2. So, because of the lower price, Pepsi caught its first group of customers and let more people know about it.

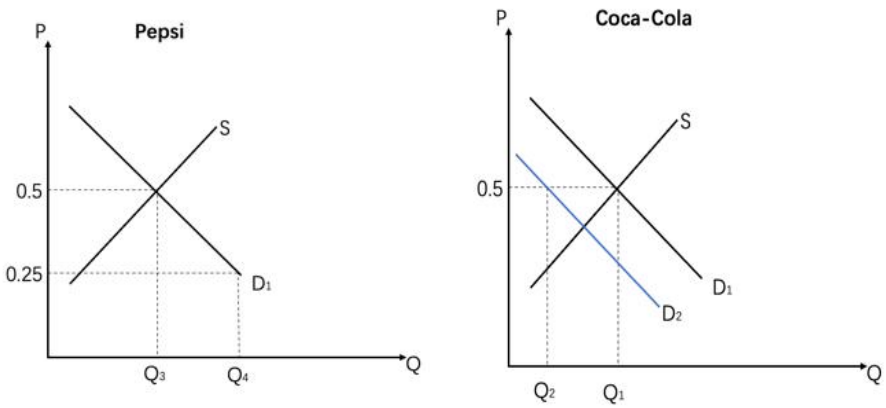

Figure 3: substitution good.

So, as an infant period of a company, seizing the opportunity at the right time is essential. If Pepsi had reduced its price at another time rather than during the Great Depression, the demand wouldn't increase significantly. Ultimately, Pepsi could not win the price war and would have the same outcome as other broken companies.

3.2. Why the Pepsi and Coca-Cola are the Same Prices Nowadays?

The action of two big companies set at the same prices tends to be a cartel. However, I think they are impossible to be a cartel because, first, it is illegal according to the Sherman Act and Clayton Acts. Next, the cartel is brutal to maintain. Because there is a chance for cheating, for example, assume Pepsi and Coca-Cola decide together to set the price at $3/bottle; if Pepsi defects the fee and sets a lower price, then the consumers will buy more Pepsi since they are substituted goods. This

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situation is called the prisoner's dilemma in game theory. Assuming that the payoff of both colludes for a high price is 1 for each, and if one is defective, the fix for the lower price is two, and the higher price is -2.

In this dilemma, both companies always choose to defect because they can get a higher payoff if the other choosing colludes, so the result is (Defect, Defect), which means both of them are losing profit. Nevertheless, they cannot be a cartel; in other words, they were not sitting together and signing a price contract.

Table 1: game theory of collusion dilemma.

		Coca-Cola	
Pepsi	Collude	1,1	-2,2
	Defect	2,-2	-1,-1

3.3. Game Theory

There are three reasons cause the same price. First, the customers are changed. As long the development of the U.S., the GDP Growth Rate in 1930 was -8.5% and now is 5.7%. The Growth Rate of the Great Depression was even lower than Covid-19, which was -3.4%. Recall that elasticity(η) is equal to the percentage change in quantity divided by the percentage change in price. If η<1, the consumer is not very sensitive to an increase in price. So, the customers do not have very much sensitivity with 1 or 2 dollars. For most consumers, coke is an inelastic product; the demand will not change whatever the price changes. So, if the price is inelastic, they will not decrease the cost because the market will not change much at a lower price. So, the total revenue maybe even drops after cutting the price. They will not increase the cost either because, let's assume that Pepsi raises its worth, it must face three conditions. First, if Coca-Cola does not change the price, Pepsi's price will be higher than Coca-Cola's, and the demand for Pepsi will decrease. Second, if Coca-Cola reduces its cost, Pepsi's price will be much higher than Coca-Cola's, and the need for Pepsi will drop a lot. Third, if Coca-Cola increases its price too, the need for both may fall. However, in these three conditions, Pepsi is the passive one. Coca-Cola can make the strategy after Pepsi. In this tree graph, the tree is defined by nodes and branches. Nodes represent places where something happens in the game, and branches indicate the various actions that players can choose [10]. The capital N means that it does not increase the price. I suggest an increasing cost, and D means decreasing cost. Pepsi decides to increase the price first constantly. After Pepsi made the decision, Coca-Cola had three strategies, as I mentioned. The payoff of strategy (N, D), which means Pepsi chooses no change in price and Coca-Cola determines to decrease price is (0,2) because when Coca-Cola reduces the cost, the demand will increase, and profit will increase too. On the contrary, the payoff of strategy (N, I) is (2,0). The payoff will be the same when both do not change the price (2,2). When Pepsi chooses to increase its price, the gain of strategy (I, D) will be (0,3) because Coca-Cola decreases its cost while Pepsi increases. The demand for Coca-Cola will increase significantly. It is the same result with (I, N), except the payoff of Coca-Cola is 2. The yield of (I, I) will be (1,1) because if they increase the price together, the demand for both will decrease. In the standard form of this game, each player, Pepsi, and Coca-Cola will choose the highest payoff of each strategy. So, Pepsi will choose (N, N) and (N, I), and Coca-Cola will choose (I, D) and (N, N). The Nash equilibrium, in which players are best responding in a setting of strategic certainty (Joel) of this game, is (N, N), so the best response of this game is not to change the price. It will be the same if Coca-Cola increases its worth in the first place. So, both of them will not change the price in the first place, and the price will not change. When you are researching your competitors, your

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competitors are researching you too. This action is uncertain because you are easy to have the wrong information. The incorrect information will get in two ways. First, you have inaccurate data from your competitors. Second, if your competitors dope out you are researching them, they will create wrong statements. So, not being passive is the way to survival. As I analyze why Coca-Cola and Pepsi do not change their price nowadays, small companies should do more. The market is ruthless; if you are in a passive position, other competitors will aim at your decision to destroy you.

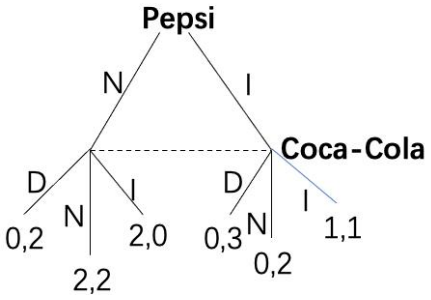

Figure 4: payoff tree.

Table 2: Game theory of Coca-Cola and Pepsi Coca-Cola.

		D	N	I
Pepsi	N	0,2	2,2	2,0
	I	0,3	0,2	1,1

3.4. Improvement of Market

The second reason is that the power of Pepsi and Coca-Cola is decreasing. In the 19th century, coke was the only soda drink on the market, so Coca-Cola and Pepsi had no opponents. Contributed to the improvement, the monopoly in the output market and monopsony in the labor market are reducing enormously. Trust means that there is only one seller in the market. For example, back in 1886, Coca-Cola had monopoly power in the output market because it was the only company to sell soda. So, overall, there was a market failure when markets did not deliver an efficient outcome. In the graph, monopoly firms produce quantity where marginal revenue equals marginal cost to make a profit (the rectangle between Pm and Pc). However, for society, monopoly creates deadweight loss (the sector above the MC curve and below the Demand curve). After government acts antitrust laws to restore competition, more and more beverages appeared on the market, such as Lipton, so opponents are increasing. The limitation of labor market monopsony also is a big shock for Coca-Cola. Opposite to monopoly, monopsony is when the market has only one buyer. In this case, the only buyer is the firm that demands time and effort from laborers.

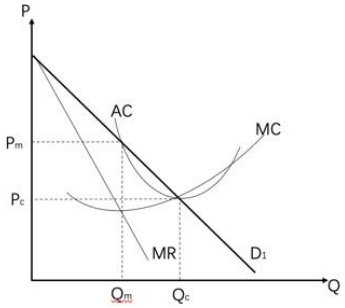

Figure 5: monopoly.

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In the graph, as the monopsonist hires more labor, it must increase the wage, so the cost incurred from hiring an additional labor unit rises faster than the wage. According to that, the MLC curve is steeper than the Labor supply curve. The monopsony will employ the amount of labor where MLC=VMPL. As a result, monopsony hires less labor than the competitive labor market. The monopsony pays a lower wage, and workers are exploited, which means the Wm<VMPL. As the monopoly, monopsony also is inefficient because the blue area in the graph is deadweight loss. Even though the labor market in the 19th was not a pure monopsony, it was not a competitive market either. Back then, workers faced information & migration costs because the technology was not advanced, the cost of searching for information was higher than today, and the transportation costs were relativity high. Hence, workers accepted to get a lower wage rather than move to the next opportunity. Because of the development of technology and government, the monopoly and monopsony power are weakened, so the big firms cannot make as much profit as before literally since the price in the market is decreasing, and the wage for workers is increasing.

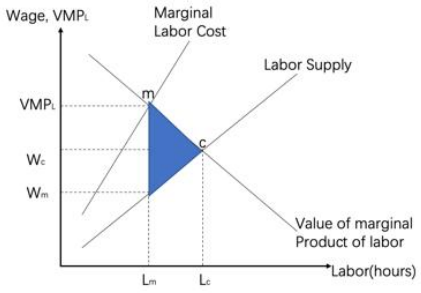

Figure 6: Monopsony.

3.5. The Brand Cultures

The last reason is that they rely on something other than lower prices. Both were already established their brand image. Coca-Cola supplied coke to the army in World War II, so it used the military to propagandize and make an intimate relation to patriotism and family. Let some soldiers far away on the battlefield drink Coca-Cola and immediately feel at home. So, those who came from the battlefield and their families will be diehard fans of Coca-Cola for the rest of their lives. After World War II, the American government encouraged people to have more babies, so the number of teenagers increased significantly during that baby boom period. Pepsi saw the opportunity. It invited many celebrities or movie stars familiar with young people to shoot advertisements. As long as those movie stars influenced many young people, Pepsi created a term called "Pepsi Generations" that let people think that drinking Pepsi is a very young, energetic, rebellious, and free image. Coca-Cola used a painful lesson to tell us not to change anything about the brand easily. Pepsi made a video called Pepsi Challenge, which took the form of a single-blind taste. Many people choose Pepsi rather than Coca-Cola because people always like the sweeter one for the first several bites. However, Coca-Cola overlooked the theory, and it seemed people wanted a sweeter drink. So, Coca-Cola made an awful decision that changed its flavor. After that, the demand dropdown dramatically because consumers considered that Coca-Cola betrayed them.

In the end, Coca-Cola changed the flavor back. These stereotype of the two brands continues to this day. So, the factor that attracts consumers is the culture rather than the lower price. The premise of boosting customer service is already grasping customers. In an era of prosperity, price is not the one that can impress customers. However, the culture, image, and thought are. Even though Coca-Cola and Pepsi produce coke, and the flavor is similar, why do they have many loyal customers? Is the difference in customer service? No. Because they have different cultures, Coca-Cola attracts

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traditional and patriotic customers, and customers who are great-hearted and creative will choose Pepsi. They have an opposing culture which is not conflicting, so their product is a substituent good, but maybe in the customer's mind, they pay more emphasis on culture rather than a product. So, building the brand culture must be ahead of boosting customer service.

4. Conclusion

In this essay, using the game theory and analysis of the market development to learn from Coca-Cola and Pepsi, small companies can get three skills that help their growth. First, they should be susceptible to opportunities. Next is that do not become the passive one. The last is that culture is more important than a lower price. Of course, there must be more stuff to learn from Coca-Cola and Pepsi, but these three things can encourage more small companies to stay in the market.

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