

## The Evolution of the Automobile Industry: Innovations of a Few and Subsequent Oligopoly Formation

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During the early 1900s the automobile industry was rapidly evolving into one of the premier organizations of the time. This development can be accounted for by the increases in technology and innovations in the logistics of the business, as well as increases and changes in consumer demand. Consequently, the development of the automobile industry led to a select few firms that were in control of the market or in other words an oligopoly.<sup>313</sup> The development of the automobile industry truly shaped the American economy and has had a lasting impact on our culture.

Automobile makers were once among the most profitable and cost efficient companies in existence. They perfected the art of specialization and have influenced a number of technological advancements in their industry and throughout the business world. However, the business layout that many of the top automotive makers follow was not always the norm. In the early stages of the industry it was commonplace for the same company to manufacture the car and then turn around and sell it to consumers directly off of the production line.<sup>314</sup> This concept seems peculiar compared to the way business is done today, but this goes to show the process of producing and distributing automobiles has evolved tremendously since its conception in the early 1900's. Some of the most important changes to the business models included: manufacturing processes were consolidated and perfected, logistics of the business shifted, executives instituted improvement processes, and the consumer preference changed. The ones that were in a better position to adapt to the changes in the market thrived and those that did not or could not suffered. This led to another major development of the auto industry: the creation of an oligopolistic system among the three major producers, General Motors, Ford, and Chrysler.<sup>315</sup> This paper will delve into the specific changes that occurred during the development of the industry that were economically driven as well as the pros and cons of the oligopoly that resulted.

The automobile industry in its early stages was primitive compared to the complex system of manufacturers and dealerships that exists today. Hochfelder and Helper examined the shifts that occurred in the early 1900s that eventually led to the vertical integration of the industry.<sup>316</sup> In the beginning, the design of the cars being produced was handled primarily by those in charge of the physical car company; however these companies did not have the necessary machinery or parts to construct their designs. The common practice was to hire machinists to produce the key components of the car such as the, "motor, carburetor, transmission...and axles."<sup>317</sup> Cars and their necessary mechanisms were in their early stages of development. Luckily, the creativity of machinists and fabricators made it possible for the logistics of the car to become a reality.<sup>318</sup> Without innovations in the components the automobile would not have been able to be produced

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<sup>313</sup> An oligopoly is a situation in which a select few firms dominate an industry, hold a large portion of the market share of the industry, and make it difficult for new firms to enter the industry.

<sup>314</sup> Marx 1985, 465.

<sup>315</sup> Bresnahan 1987, 457.

<sup>316</sup> Vertical Integration is a situation when a firm expands its operations to include the manufacture of the supply inputs needed to produce their final product.

<sup>317</sup> Hochfelder and Helper, 1996, 42.

<sup>318</sup> Ibid, 39.

economically. Once the technology advanced, it spread throughout the fabricators of the time and became common knowledge. It is only after this point that the relationships between designers and manufacturers began to change, becoming “short-term contracts [with] their respective responsibilities... spelled out on a single page.”<sup>319</sup> With only a certain number of skilled machinists and only a few methods of production, it was nearly impossible to produce a unique automobile. This made it difficult for the products of one company to stand out compared to their competition, as Hochfelder and Helper cite from the trade press of the day.<sup>320</sup> The limited number of fabricators also introduced another problem: the absence of mass production. When outsourcing all of the labor for machining essential parts for automobiles, it becomes challenging to maintain a steady supply for a rising demand.<sup>321</sup> These issues led the pioneers of the industry to race towards a more economical method of production, vertical integration.

The explosion of the market in the early 1900s forced automakers to change their approach to production. Automobile production in the United States went from 4,000 units in 1900 to almost two million in 1920.<sup>322</sup> Sloan argues that automakers were constantly trying to evolve and strived to achieve, “a closer corporate relationship.”<sup>323</sup> This increase in demand pushed automakers to become more efficient; one way of doing this was to vertically integrate their systems. Obtaining the machinists and fabricators became necessary for producers such as Ford and General Motors in order to be successful. It became a situation of survival of the fittest, and only those companies large enough to buy out the companies producing the essential parts would be able to produce the cars. The market that this created, an oligopoly, will be addressed later in the paper. Before the inception of vertical integration, it was possible for producers, “with little knowledge of automotive design to bring their cars to market.”<sup>324</sup> However, according to Hotchfelder and Helper the increases in demand and the number of machinists being bought out made it more difficult for small producers to enter the market. Producers who placed the supply chain of their parts into their company profile were able to match the demand of the consumer and further developed the industry.<sup>325</sup> After automakers addressed the issue of increasing demand in the market by introducing the machinist into their companies a new issue arose, logistics.

Before 1929, car makers’ main concern, according to Marx was production but that quickly shifted to distribution once, “[p]roduction capacity...exceeded demand.”<sup>326</sup> Producers rushed to meet the consumer demand for “greater vehicle performance, comfort, and reliability.”<sup>327</sup> This led to advances in technology and a more improved automobile, but also a surplus of older models that were traded in. Consumers who had purchased automobiles in the early stages of production wanted newer and more improved models, as a result a supply of used cars flooded the market after they traded in their older models for the newer. This led to what Marx refers to as the creation of the franchise system in place today. The automobile producer grants access for a retailer to market and sell their cars on their own property, commonly referred to as a dealership. Manufacturers found it necessary to acquire a middleman because “consumer demands became

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<sup>319</sup> Marx, 1985, 466.

<sup>320</sup> Hochfelder and Helper, 1996, 39-43.

<sup>321</sup> Marx, 466.

<sup>322</sup> Ibid, 469.

<sup>323</sup> As cited in Hochfelder and Helper, 1996, 46.

<sup>324</sup> Hochfelder and Helper, 49.

<sup>325</sup> Ibid, 49.

<sup>326</sup> Marx, 470.

<sup>327</sup> Ibid, 471.

harder to predict, especially by those removed from the immediate consumer contact.”<sup>328</sup> The acquisition of the supply chain by the designers, the need to keep up with changing consumer demand, and the influx of used cars created a two-sided system that consisted of manufacturers who create all of the parts and produce the vehicle and distributors who deal with the sale of new and used cars. This system made it easier for automakers to supply their products to consumers, improving the logistics of the business.

Another area that further developed the industry was that of innovations in the logistic and technical processes that automakers such as General Motors and Ford established. Economic managers of the industry attempted determine the consumer demand and matching their supply and price in a manner that maximizes profits. Henry Ford is revered as one who ingeniously changed the manufacturing process of automobiles to a way that made mass production possible. Raff credits Ford with abolishing the artisanal method, where parts are specifically made elsewhere and shipped in to be assembled. He states that Ford’s development of the assembly line effectively created the need for parts to be made in the factory and to be semi-universal so that a limited number of machines were required to fit all of the parts of the car together.<sup>329</sup> Raff states this assembly line mentality also made workers more productive since “wandering around the plant” was no longer necessary.<sup>330</sup> The introduction of the assembly line and the resulting focus around efficiency streamlined the production process and made it easier for firms to keep up with increasing consumer demand.

The other way producers improved their overall profitability was through their managerial approach, in particular the way the firms gather and interpret information on the supply and demand necessary to turn a profit. Knight argues that determining this information is directly associated to “the existence and the size of firms.”<sup>331</sup> One way that Norton found firms, in particular General Motors, gain a competitive advantage is by forecasting. Williamson argues that “information impactedness (sic) problem...observational economies...the convergence of expectations...and veracity risk,” are issues that firms should focus on when determining the economics of their business.<sup>332</sup> Williamson suggests that if a company is effective in forecasting that in turn they will “increase profits.”<sup>333</sup> Norton focuses on the changes that Alfred P. Sloan introduced into General Motors’ business model in order to better forecast the automobile market. Essentially the reforms that Sloan introduced can be summarized as better forecasting in terms of rates of return and market share, inventory, synchronization, and retail demand changes. Through forecasting, Sloan and General Motors were able to determine that there was a lag time between when the firm discovered the consumer preference and when they were able to create a product to match. In order to account for this, Sloan adopted a multi-divisional corporate organization in which different departments were in charge of different aspects of the business. Norton suggests Sloan founded the idea that firms should monitor the consumer demand in the market and adjust the business accordingly, a revolutionary business idea for the automobile industry. These changes propelled General Motors into one of the top car producers of the mid-1900s.<sup>334</sup> Norton states that, “GM achieved one of the most remarkable performances in the annals of American enterprise.”<sup>335</sup>

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<sup>328</sup> Marx, 473.

<sup>329</sup> Raff, 1991, 726-727.

<sup>330</sup> Ibid., 728.

<sup>331</sup> As cited in Norton, 1997, 246.

<sup>332</sup> As cited in Norton, 1997, 246.

<sup>333</sup> Ibid., 247.

<sup>334</sup> Norton, 1997, 248-259.

<sup>335</sup> Ibid., 258.

Norton proposes the idea that Sloan used a basic economic theory, supply and demand, to transform the business practices that car producers used to maximize their efficiency and in turn, their profits.

The processes that the executives of both Ford and General Motors implemented were not “the product of a grand plan;” rather, they were responses to the ever-changing American economy and consumer market regarding automobiles.<sup>336</sup> The early changes regarding vertical integration and franchise development, the process improvements of assembly lines and forecasting, and everything in between can be traced to one common factor: consumer demand. Before World War II, the norm for automobiles was big and luxurious and in turn expensive. However, Lawrence White points out that, “[f]or the entire post-war period the subject of small cars...[had] been one of active concern to the American automobile industry.”<sup>337</sup> American’s became less concerned with the size of the car and more with the cost of the car after the Second World War. White explains that the consumer demand was shifting towards a smaller more cost effective car, to the dismay of the automakers of the time.<sup>338</sup> They were using the forecasting techniques set forth by General Motors to try to meet the demand for the smaller more economical car; however this proved more difficult than anticipated. White describes the issues faced by the producers as essentially a time lag, which was still an issue even with the introduction of Alfred Sloan’s innovations. By the time the automakers detected a change in the demand for small cars it was too late due to the fact that designing and producing a car to fit the consumer demand immediately was not feasible. By the time they had a design produced, the demand had shifted back away from the smaller cars, frustrating the developers; this issue is one of the reasons they were hesitant about entering the market.<sup>339</sup> The big three automakers (Ford, General Motors, and Chrysler) did not want enter the small car market because they saw smaller cars as less profitable.<sup>340</sup> This leads to one of the most intriguing aspect of the development of the automobile industry, the formation of an oligopolistic system.

This shift towards a market where only a small number of sellers control the market can be traced back to the formation of the auto industry itself. Hochfelder and Helper’s article on the development of vertical integration makes it clear that the firms that had sufficiently large amounts of capital to acquire the machining firms for their own uses thrived. They were able to “establish great control over price, quality, and delivery of important parts.”<sup>341</sup> Smaller firms that did not have the necessary capital or power to influence the machining firms suffered losses and were dissolved from the market. The power of the oligopolists was even further extended with the introduction of the process improvements of the major firms. Raff substantiates this claim when explaining Chrysler’s strategy, stating that they (along with Ford and General Motors) were able to adjust to the changing consumer demand while the smaller firms with less forecasting power could not keep up. This resulted in even fewer firms able to compete in the automobile market.<sup>342</sup> White argues one of the reasons that the big three car companies were hesitant to enter the small car market was that they each wanted to ensure that “the market was large enough to support *all three* producers profitably.”<sup>343</sup> This corresponds with one of Bresnahan’s explanations of the

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<sup>336</sup> Marx, 1985, 472.

<sup>337</sup> White, 1972, 179.

<sup>338</sup> White, 184.

<sup>339</sup> Ibid., 185.

<sup>340</sup> Ibid., 180.

<sup>341</sup> Hochfelder and Helper, 1996, 49.

<sup>342</sup> Raff, 1991, 724.

<sup>343</sup> White, 1972, 179

“1955 price war” among the automakers: they were engaging in “collusive behaviors.”<sup>344</sup> Such behavior is a defining characteristic of an oligopoly, when a select few firms that are not necessarily working together, but do have control of the market because of competitive advantages. Bresnahan does not confirm that there was in fact collusion among Ford, General Motors, and Chrysler but he does note that General Motors, in particular “enjoyed either a cost or quality advantage.”<sup>345</sup> It is reasonable to assume that that advantage was shared (perhaps to a lesser extent) by both Ford and Chrysler to form an oligopoly.

Bresnahan does not conclude that an oligopoly, by its strict definition, was in place in the automobile industry during its time of development in America. However, it is evident that there were barriers to entry for smaller firms; the big three firms had the capital to control the machining firms, and their executives developed forecasting methods that gave them a competitive advantage.<sup>346</sup> The barriers to entry are easy to detect from the beginning of the automotive market and the common processes and improvements that the big three shared resulted in the profitability and sustainability of their companies. This is not suggesting that it was impossible for smaller firms to do business in the marketplace, but it is reasonable to conclude, based on the evidence, that the big three automakers shared common business practices that made it difficult for other companies to become profitable.

The automobile industry is constantly evolving and adapting to consumer demands. Hochfelder, Helper and Marx all addressed the ways the business practices of production and distribution have drastically changed. Automakers are constantly shaping their manufacturing and business processes to more accurately fit the market as well as reduce costs and maximize profits.<sup>347</sup> White’s article suggests that they adapted to the consumer demands of the time, and shifted their production in order to secure the market. General Motors, Ford, and Chrysler did this more efficiently than the competition and reaped the benefits.<sup>348</sup> However, in the process of doing so, they created an oligopoly that discouraged competition through barriers to entry, argued implicitly by nearly all the authors cited in this paper. This paper has delved into the economic reasoning behind the motives of the automotive industry’s changes and adaptations. Further research could better address additional sources of the oligopoly formation, or whether or not there is truly an oligopolistic system in place. Raff references a famous quote by General Motor’s Alfred Sloan, that they would create a “car for every purse and purpose.” This captures the mentality behind the development of the automobile industry.<sup>349</sup> After its inception, the automobile industry exploded and not only had a lasting effect on the American economy, but also on how business is conducted in America.

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<sup>344</sup> Bresnahan, 1987, 458.

<sup>345</sup> Ibid., 477.

<sup>346</sup> Bresnahan, 1987, 477-479.

<sup>347</sup> Norton, 1997, 278.

<sup>348</sup> White, 1972, 191.

<sup>349</sup> Raff, 1991, 742.