Auto 4: Auto versus Mobility … or Boxes versus Triangles

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Abstract

Both, Automotive and Mobility, engage in traditional business functions like marketing, sales, and product development. As both businesses make money differently, these functions behave differently. This is illustrated using Peter Drucker's emphasis on customer centricity.

Introduction

In 2013, when we launched the first Drucker course on Data Analytics, MGT 505, the focus of our inaugural class was "Smart Mobility & Auto." At that time the popularity of digital technology (the "smart" part) was seen as firstly, transforming the car into a connected, electrified, and possibly autonomous vehicle. Think of the founding of Google's Waymo in 2009 after winning the 2005 DARPA driverless car challenge with its Stanley autonomous car lead by Stanford University's Sebastian Thrun; and of course, the launch of the Tesla S sedan in 2012. Then secondly, digital technology was seen kickstarting the growth of new, connected mobility services. Think of the launch of Uber and its 2011 $11 million Series A round as well as the launch of its competitor Lyft in 2012 (see also our "Auto 1" story). Figure 1 illustrates how a new service business is spawned from car manufacturing to increase consumer mobility choices of getting from point A to point B. While ultimately catering to the same or very similar basic consumer need there are important differences. So, let's delineate and clarify.
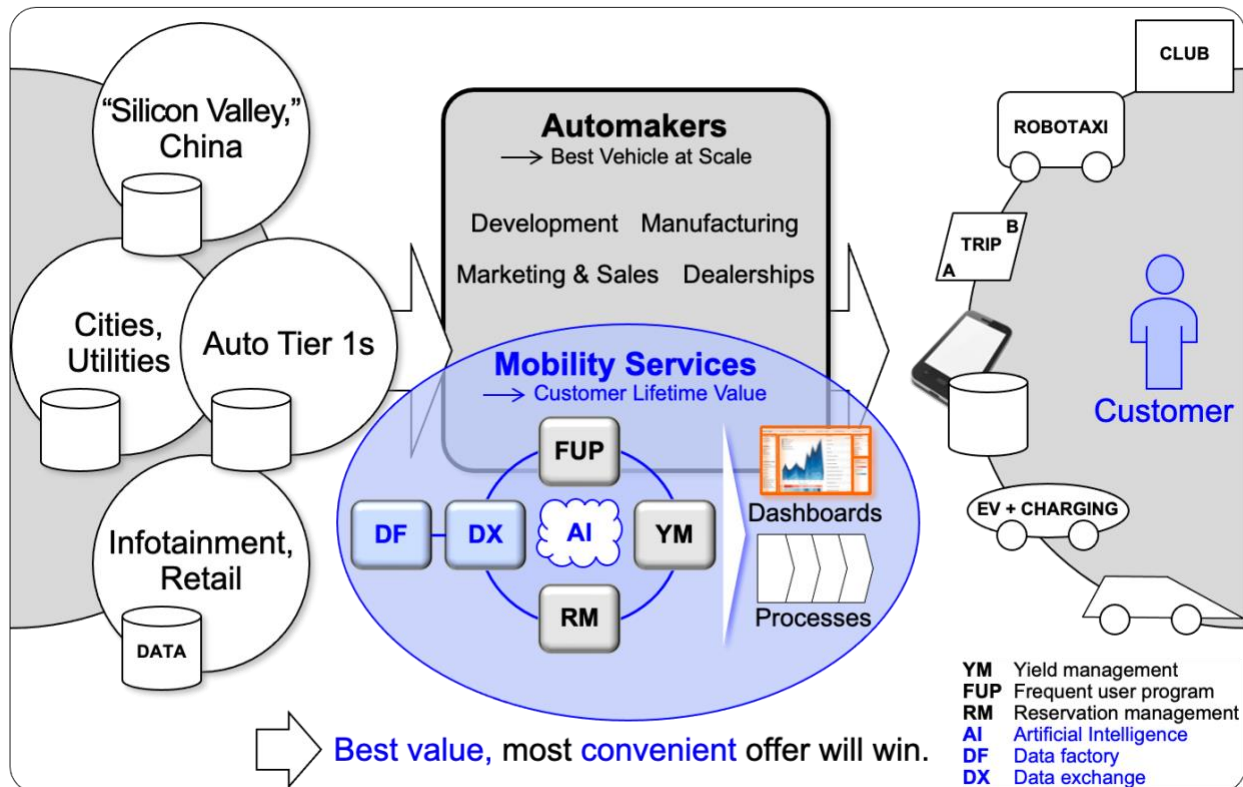

Figure 1: Shift to data-science-driven optimization and personalized services

Auto is hardware, mobility is a service

What is the difference between automotive and mobility? To put it simply, the automotive industry makes vehicles, while mobility vendors utilize vehicles to get someone or something from A to B. Automotive relates to manufacturing, and its product is a physical object made of hardware (HW) and software (SW). Mobility is a service, which generates value for the user, and needs SW automation to scale. The government sorts them into different categories: car manufacturing under NAICS code 336111, while mobility providers, such as Uber or Lyft, fall under 4853, taxi and limo services (link). Both engage in traditional business functions, such as marketing, sales, and product development, etc. This is where the confusion often starts - both businesses exhibit the same functions despite being very different.
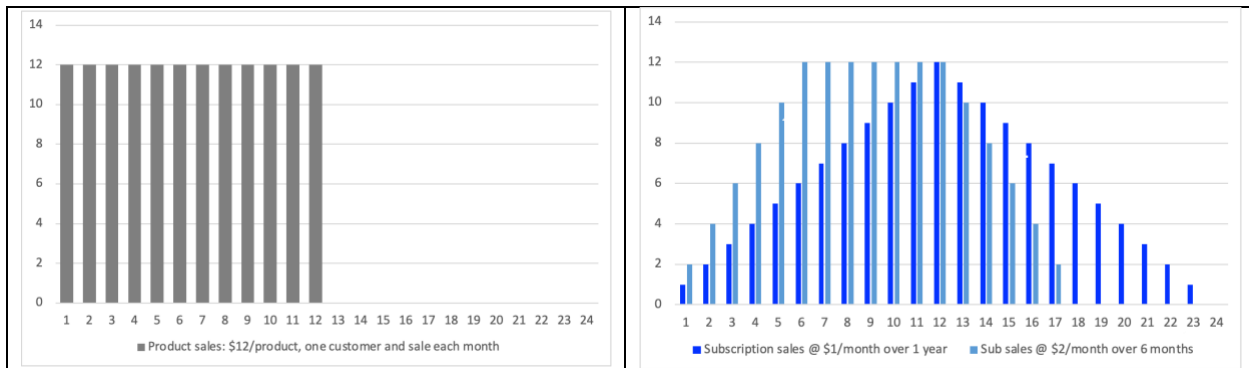

Figure 2: Product versus service sales or "boxes" versus "triangles"

Follow the money: Box versus triangle

If you aren't fully convinced, look at the results, or how the money is made: "Show me the money" is now even an iconic movie line. In the 1996 movie "Jerry Maguire," Tom Cruise portrays sports agent Jerry Maguire who is reminded by his last client that all he needs to retain him is results: "Show me the money" (link). Starting with results is a proven trick for success in business, as demonstrated by many business gurus including Peter Drucker and Stephen Covey, for example (see Covey's "The Seven Habits of Highly Effective People," link). By following the money a stark difference in business models is quickly becoming apparent: the automotive industry makes money selling vehicles, unit by unit; the mobility industry sells a service in much smaller increments, from single tickets to subscriptions. Therefore, as any CFO, would attest to, the revenue functions are strikingly different: a box versus a triangle. In the automotive industry, a sale is a one-off transaction resulting in a large amount of revenue. If one vehicle is sold in each period, the revenue function looks like a box with the same revenue column for each period. When it comes to services, each transaction is significantly smaller but continues for the duration of the subscription, creating a thin stream of recurring revenue. As a new subscriber is added in the next period, another thin subscription revenue stream is stacked on top of it, which over time forms a stepped incline as more and more subscribers are added to

the service. As subscriptions expire it begins to trend downwards, creating a triangular shaped revenue curve. Revenue goes up incrementally as new subscribers are acquired and declines incrementally as subscriptions expire. Figure 2 illustrates the two revenue functions with product sales on the left in gray and service subscription sales on the right in blue. On the left, annual sales revenue is the results of selling one product to a new customer each month or a string of monthly one-off sales. With a product unit price of $12, the total annual sales revenue is $144 - to keep the math simple, the values have been selected for illustration purposes. On the right, the diagram shows the results of selling those 12 customers a subscription instead. Two subscription scenarios have been constructed to achieve the same total revenue of $144. The first scenario, shown here in dark blue, charges each customer a monthly subscription fee of $1/month for a subscription period of 12 months. For 12 months each month a new customer is adding $1/month for a duration of 12 months, which creates the distinctive triangular service revenue function. With an average revenue of $1 per month per user (ARPU) and a churn rate of 100% it takes 23 months, nearly double the time to achieve the same total sales revenue of $144 as in the business selling products, shown here in gray. The second subscription scenario, on the right and colored in light blue, is on a compressed subscription schedule of just 6 months at an increased, doubled subscription fee of $2/month. It achieves $144 in 17 months. It also moves the subscription deal closer to a one-off deal, and it is easy to see how the overall revenue function is visually becoming boxier. This simple example highlights the general attractiveness of a subscription-based service business. Firstly, it is easier to sell something for a low price than with a big price tag. Secondly, it lowers the barrier to entry making a product more accessible, which in turn increases the market potential. Thirdly, the more useful the service, the lower the churn. Our example of 100% churn was chosen for illustration purposes only - the reality is very different. Many services enjoy high retention rates. According to Statista consumer retention rates are typically between 50% to 80% (see Figure 3, 2018, link).
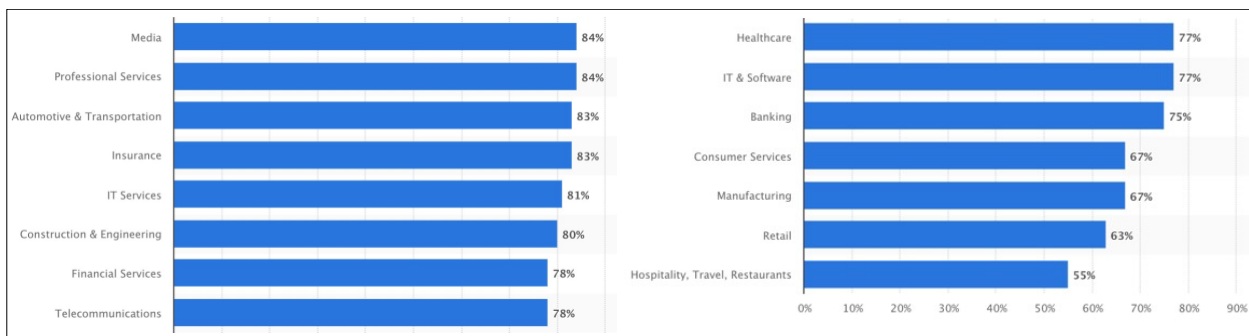
Figure 3: Consumer retention rates by industry (Statista 2018)

Po-tay-to, po-tah-to: Customer centricity is different

This difference in cash flows triggers variations in management priorities, and therefore, in key performance indicators (KPIs) and everything that follows, such as management incentives, business processes and policies, and information systems. Consider customer centricity and loyalty. Long ago, the founder of modern management and our school, Peter Drucker,

advocated that customer centricity is job number one: "if there is one purpose in business it is to create a customer" (Drucker 1954). In a service business, the need to keep a customer "hooked" for the next period creates a real pressure that can be felt immediately. In the automotive industry this is different: consumers typically only purchase a car every other year. This means that if you sell one car today, the next sale will typically be a few years in the future This purchasing cycle can easily exceed the tenure of sales executives who have little incentive to spend their money today planting a seed that may facilitate a sale for somebody else in the future. As a result, customer centricity takes on a different meaning in both kinds of business, which then translates into different requirements for their business strategies and operations. Regulators are paying attention to this, too. Figure 4 shows the author testifying before the California Air Resources Board (CARB, link) on behalf of the Peter Drucker School for adequate recognition of customer centricity in the creation of guardrails and infrastructure for the electrification of mobility, such as locations for charging stations and compatibility of charging connectors (testimony, link).

Figure 4: Prof. Langdon testifying before CARB on Drucker's customer centricity for e-vehicles

Automotive: How do you generate sales revenue? Product!

The key question that drives the automotive industry is how to win a customer. The answer, the formula for success, can be summarized in one word: product. A great product is what wins the customer over (see Bob Lutz, for example, link). Therefore, customer centricity translates into creating a killer product. The pinnacle of achievement is discovering an entirely new product category or white spot opportunity and delivering the defining product. Memorable examples include British Motor Corporation's Mini, Chrysler's minivan … Daimler's CLS four-door luxury sports coupe, BMW's X6 SUV coupe … and the recent all electric Tesla Model S sedan. Product is all important, and therefore, customer centricity requires world-class product development capabilities. Consequently, for automotive clients we have delivered data-science-driven optimization and corresponding decision support systems for the Product Development function (see a disguised screenshot here, "Calculator powered by ML: Auto Interior & UX", link)

Service: How do you secure revenue? Retention!

In a service business the main question is how to secure revenue. The answer can be summarized in one word: retention. For one, the business shrinks with each and every customer lost (see the downward sloping side of the revenue triangle in Figure 2). For another, it seems to be easier to retain customers than to win new ones. The cost of gaining a new customer dwarfs the expense of holding on to one (Gallo 2014, link) – this has a disproportionate impact on profits. In financial services, for example, the literature reports that a 5 % increase in customer retention produces more than a 25 % increase in profit (Reichheld 2001, link). Therefore, customer centricity translates into fighting churn; making sure that the service experience remains valuable (balancing price with service attributes) and convenient. Convenience is *not* the same as ease-of-use, however. Car developers and their UX experts strive for ease-of-use so that a potential customer's - or car reviewer's - interaction with a new product, be it in the showroom or during a test drive, is as straightforward and intuitive as possible with good looks, a big screen, easy buttons, and as few clicks as possible, to make the prospective customer feel comfortable and in control. With a service it is all about forming a habit, making service consumption captivating, and engaging, or "sticky," so that it feels, or actually is, difficult to disconnect from it (Eval & Hoover 2014, Duhigg 2012, Lally et al. 2010, Wood & Neil 2009). Economists call this the "switching cost" (Tirole 1988). Retention is typically dealt with in the Marketing & Sales department, not in the Product Development unit. Consequently, for mobility services we have created our data-science-driven optimization dashboards primarily for Marketing & Sales (see a disguised screenshot here, "Calculator powered by ML: Mobility-as-a-Service", link).

Adding behavioral psychology

Now in the digital age of 2020, the best customer centricity requires a combination of data-driven marketing, behavioral science, and computational economics. In "Best Face Forward" our Drucker Customer Lab co-founder, Bernie Jaworski, has been a pioneer in translating his marketing science of market orientation (Kohli & Jaworski 1990, Jaworski & Kohli 1993) into digital services. Together with his co-author Jaffrey Rayport at Harvard, he developed key service design guidelines, first in a paper, then in a management book (Rayport & Jaworski 2004, 2005). My former colleagues across town at the Marshall School of Business of the University of Southern California in downtown LA have added findings from behavioral science to further enhance the service experience (Chase & Dasu 2001). This application of the principles of behavioral science to guide the design of customer interaction is seen by consultants McKinsey & Company as "a simple, low-cost route to improved customer satisfaction" (Bhattacharjee et al. 2016):

1. Break up pleasure and combine pain to create overall more positive remembrances
2. Pull pain forward and get over it early to focus on the positive subsequent parts
3. Finish strongly, since how it ends will stick around longer in our minds
4. Give customers choice, since this makes us feel in control and positive
5. Let customers stick to their ingrained habits as we don't like to be confused with change

Some of the underlying behavioral theory, in turn, was created by psychologist Mihaly Csikszentmihalyi, who works at our own Claremont Graduate University, just across the street from the Drucker School of Management. His investigation of the "optimal experience" lead to "Flow "(Csikszentmihalyi 2008, link), his seminal book which laid the foundations for the field of Positive Psychology.
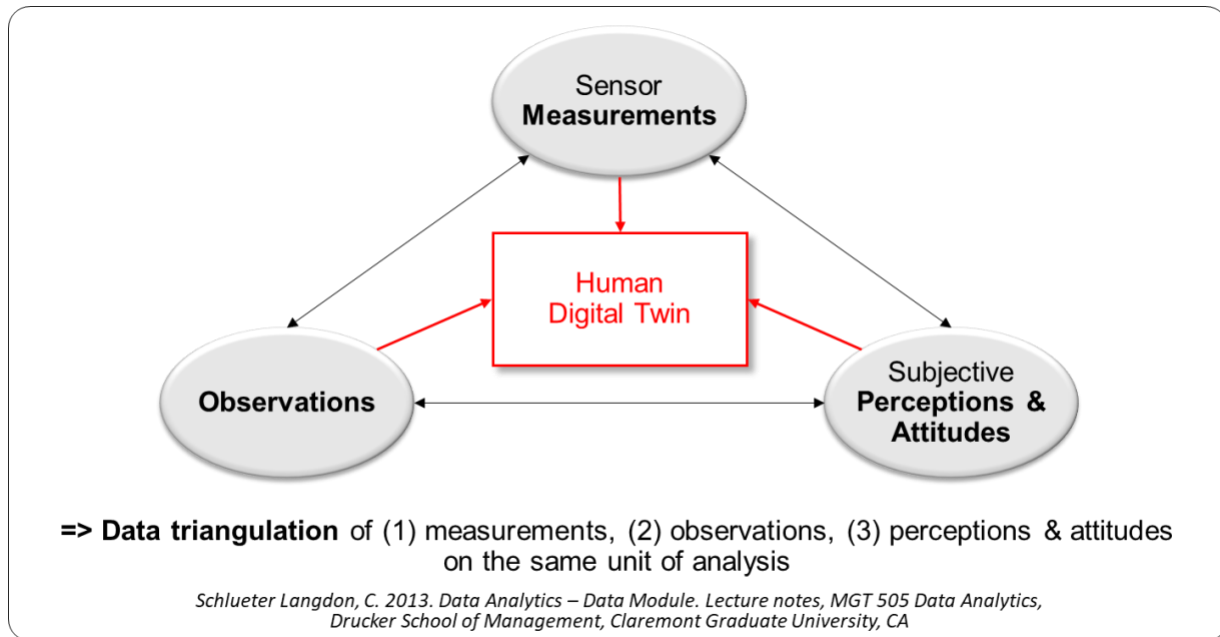

=> **Data triangulation** of (1) measurements, (2) observations, (3) perceptions & attitudes on the same unit of analysis

Schlueter Langdon, C. 2013. Data Analytics – Data Module. Lecture notes, MGT 505 Data Analytics, Drucker School of Management, Claremont Graduate University, CA

Figure 5: Data triangulation

Evolving toward human digital twins

With more data, better data science and more powerful computers customer centricity can be turbocharged and driven beyond customization to personalization at scale (Flavin & Heller 2019). These advances in computational analytics would ultimately help implement Peter Drucker's vision of a marketing function focused on aiming "to know and understand the customer so well that the product or service fits him and sells itself" (Drucker 1973). In essence this is about creating human or consumer digital twins with computational means. The arts are typically seen as a leading indicator of societal trends, pointing to a possible, probable or preferable future of mankind. One example is the human clone, cyborg, or avatar. These were all invented or foreshadowed by Hollywood a long time ago. Examples range from the dark to the mysterious, from director David Cameron's 1984 "The Terminator" featuring the T-800 cyborg portrayed by Arnold Schwarzenegger … to director Spike Jonze's Samantha, an artificially intelligent virtual assistant, played by Scarlett Johansson, in the 2013 movie "Her." Now serious scientists and leading innovators around the world are working on implementing this in the form of human digital twins. We are involved in one such project entitled DaWID, which stands for "data-centered value-added platform for interactive, assistive service systems" (Schlueter Langdon 2020). A key differentiation of this project is its explicit recognition of data

privacy and the protection of data sovereignty to allow for citizens to live a self-determined life in a digital world (Otto & Meister 2019). Europe is known for pioneering stringent data protection rules, with examples including GDPR, the General Data Privacy Regulation ("Complete guide to GDPR compliance," link), as well as the proposed DGA, Data Governance Act ("Proposal for a regulation on European data governance," link). DaWID is exploring end user and business opportunities to be compliant in this context. The project is funded as part of the Digital Platforms Program run by the German Federal Ministry of Education and Research (BMBF). It is led by the Fraunhofer Institutes (link), the Karlsruhe Institute of Technology or KIT (link), and idigiT, the Institute for Digital Transformation in Healthcare GmbH, an expert in healthcare affiliated with Uni Witten/Herdecke (link). The author is involved as a scientist and principal investigator for Deutsche Telekom, which is providing its Telekom Data Intelligence Hub (link) as a computational environment for laboratory experiments in a Platform-as-a-Service (PaaS) setup ("A human digital twin with data sovereignty: Say hello to DaWID", link)

Avatars and Apple cars?

In keeping with its tradition of innovation, the automotive industry has been a pioneer and early adopter of behavioral variables and first "avatars." In the early 2000s, we had the opportunity to get involved when it started with the construction of behavioral variables (Hoffmann 2020). The game changer was new raw data, specifically *product usage measurement* data obtained from on-board sensors or electronic control units (ECUs), the microcontrollers or special purposed minicomputers that run your power windows, seat adjustments, and air conditioning unit, for example. From this data we were able to extract the information required to construct new variables that describe how actual customers are using their vehicle and onboard features in real life. For example, how many phone calls do they make, do they dial via keypad or voice control, and where are phones located and charged? Over the years, data extraction, variables and measurement concepts have been continuously refined to arrive at a best practice for data triangulation, the fusion of data coming from different sources with different information content and properties but all based on the same unit of analysis, in this case the driver and/or passengers (see Figure 5):

1. Engineering or telemetry data from onboard sensors
2. Video footage from in-car cameras
3. Supporting attitudinal and subjective user feedback from surveys

This data triangulation has emerged as a gold standard because it delivers the most truthful and reliable results for managerial decision-making. Survey-based research on its own is often inherently flawed because it differs what humans (1) do, (2) experience, (3) remember experiencing, and (4) say (see Nobel prize-winning research by Kahneman, e.g., Kahneman & Krueger 2006). For the first time, results allowed for a truly customer-centric and data-science-driven optimization of new vehicles features (in Product Development) as well as the customization of early connected in-car apps (typically in the Marketing & Sales department), such as weather reports and live traffic updates, forerunners of today's new, connected mobility services. It allowed for a deeper customer-product and customer-seller relationship – and even

customer involvement (Schlueter Langdon 2006, Schlueter Langdon & Hars 2007). This strategy refers to the extent to which a customer is engaged as a participant in a business operation, such as service delivery and even service production. Back then, first business concepts emerged, such as functions on demand (Crosby & Langdon 2014): "Imagine testing new features in a customer's car while it's in operation ("Your car has downloaded a new feature that may be useful given how you use your car") or upselling features for the next vehicle ("Your car usage suggests the following features for your next vehicle")." This customization of the in-car and overall mobility experience (user interface options for minimalists versus heavy users) can be evolved toward true 1-to-1 personalization using customer digital twins, which will have strategic implications for the future of the automotive business. For one, personalization will blur the boundaries between traditional automotive and mobility services, since any mobility service will require vehicles (hardware) to be integrated into the overall customer experience; and the more seamless and convenient the customer journey, the better (see Figure 1). For another, new entrants may emerge that are already experts at doing this. For example, "Apple is first and foremost a customer-focused company that uses technical know-how to develop products physically made by contractors like Foxxcnn. It just happens that deep technical expertise is how it realizes its […] vision" (Mims 2021). Using Apple as an example illustrates how automakers need to expand their capabilities. Today, automakers are shifting their emphasis to software. From a data analytics and customer centricity perspective it would be prudent to invest in a data value chain that includes data productization, data factories and data sharing capabilities, as well as data-driven service design.

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