Starbucks Deep Brew AI solution effect on long-term strategy implementation

Overview

Starbucks is a publicly traded world-known international chain of coffee-shops. It operates on a highly competitive market across 80 countries. Starbucks competes in a coffee retail sales industry both with giant international chains and with small local coffeehouses. Its key competitors worldwide are McDonalds and its chain of coffee shops McCafe, Dunkin' Donuts, Tim Hortons Peet's Coffee, Costa Coffee, Coffee Bean and Tea Leaf, and independent coffeehouses. Starbucks follows the heavy-chain strategy with its 38.038 stores in 2023. 52% of them are company-operated and 48% licensed. (Starbucks 2023 report). These directly operated stores create the majority of revenue despite high operational costs and delivers 81% of net revenue in FY 2023. (see Figure 3: Revenue Breakdown). The company's value proposition is to deliver its customers the best quality coffee drinks with outstanding customer experience so that they feel themself like at their Third Home. Despite aggressive pricing strategy Starbucks remains the biggest coffeehouse chain worldwide. What helps the company to successfully compete with others?

The purpose of this paper is to explore how IT helped to Starbucks retain leadership on the market in the last 5 years, and what IT solution affected the company operational efficiency, speed of opening the new coffee-shops and the level of customer service.

The characteristics of Starbucks

Starbucks' organizational culture is a key factor in its success, impacting personnel and business performance through values, norms, traditions, and behavioral expectations. This culture is particularly evident in its coffeehouses, where staff interact with clients in a warm and welcoming atmosphere. Despite challenges like economic fluctuations and

industry trends, Starbucks' corporate culture supports its mission statement, vision, and goals for brand development and global expansion. The company's organizational structure allows for effective implementation and observance of this culture across its franchisees and licensees.

Starbucks aims to inspire and nurture the human spirit, prioritizing experience over just supplying beverages. They envision using "AI for humanity" to foster human interactions and connections. Starbucks does not aim to replace human employees or automate its supply chain, but explores automation of non-value-added operations. They aim to design technology that respects each location's uniqueness and integrity.

The Starbucks Culture types are:

- **Servant Leadership:** Starbucks employs a servant leadership strategy, which describes the behavioral manifestations of the company's organizational culture among leaders, including corporate and team leaders. Leaders, managers, and supervisors use this technique to stress assistance for subordinates, ensuring that every employee advances throughout the company organization. This aspect of the company culture translates into an employee-first approach, which is consistent with the human resource development objectives tied to Starbucks' corporate social responsibility strategy and corporate citizenship goals.

- **A Relationship-driven Approach:** Starbucks has an organizational culture that encourages warm and pleasant interactions. For example, in the company's cafés, baristas form warm and cordial ties with one another. Customers are handled with kindness as well, which is a hallmark of the company's corporate culture. This work culture improves corporate competitiveness and key capabilities, as stated in Starbucks Coffee Company's SWOT analysis.

- **Collaboration and Communication:** Starbucks' business culture emphasizes collaboration through efficient communication. Baristas at cafés interact clearly with one another to execute requests. They also work as a team to make the order fulfillment process more efficient. Thus, the organizational culture promotes efficiency in business processes and the efficacy of Starbucks' operations management.

- **Openness:** Starbucks' company culture includes ideals such as openness. In the company's early years, employees had a typical and old-fashioned work culture of hesitancy in standing up to their bosses.

- **Inclusion and Diversity:** Starbucks has an anti-discrimination policy that influences its workplace culture. This policy bans discrimination based on gender, color, ethnicity, sexual orientation, religion, age, cultural background, or life experiences. Starbucks' corporate culture encourages information exchange, strong relationships among employees, and innovation based on various ideas. This cultural facilitation improves worker motivation and reduces turnover. This part of the company's corporate culture also makes consumers feel welcome in Starbucks cafés. This expansion of the work culture to include consumers demonstrates corporate initiatives that prioritize consumer preferences and the corresponding sociocultural trends mentioned in Starbucks Coffee Company's PESTEL/PESTLE report.2

The problem

In the highly competitive world of retail, where customer experience and operational efficiency are paramount, the 'made-to-order' nature of Starbucks business faced a common challenge for the industry: optimizing staff allocation, resource allocation, anticipating the customer journey experience to ensure excellent service while reducing operational costs and maximizing revenue. Historically, all these areas were heavily reliant on the intuition of

in-store managers, often resulting in overstaffing, customer dissatisfaction, and loss of revenue. World digitalization in the mid 2010-s set up new trends and rules of the game:

1. **Customer experience digital transformation**: with the growing trend of mobile usage by customers, their behavior and user experience dramatically changed and the necessity to stay close to customers online became essential for the company positions on the market. Therefore, already in 2011 a Starbucks mobile app was launched in aim to provide convenience, personalization, and efficiency in ordering system and customer retention, which later became one of the cornerstones of Starbucks IT strategy.

2. **Operational efficiency**: The supply chain and inventory management work with tremendous amount of shops required huge manpower resources to ship, track the item, and deliver it to the customer. The company required the unified solution for all its diverted IT systems to optimize resource and staff allocation among thousands of its stores and locations.

3. **Data driven insights**: Starbucks had manual data and it was very difficult to manage and get insights from. By leveraging data of in-store operations and customers, the company could easily make informed decisions from inventory to targeted customer offerings and get an unbeatable competitive advantage.

The situation became even more threatening when the major competitor McDonald's acquired the company Dynamic Yield in 2019, that was aimed to bring reinforcement learning and machine learning to the fast-food place in McDonalds restaurants.

Therefore, to the end of 2010-s, Starbucks urged for the solution which would allow company to tie together all the data that company collects from its stores to make data-driven operational, marketing and customer-oriented decisions strategically and directly in its

coffee-shops. This solution should also organically connect in-store operations with the front-line interactions with customers.

Is Starbucks Overteched?
Starbucks Technology Solutions: Challenges and Resolutions
by
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An Overview of Starbucks

Starbucks is a well-loved beverage retailing company, in the food service industry, across the world which every coffeephile knows of. Its mission: to inspire and nurture the human spirit – one person, one cup and one neighborhood at a time. (Starbucks, 2024). Given Starbucks' popularity and global reach, it has churned enormous amounts of coffee beverages since its inception in 1971. It boasts of 36,000 stores in 84 markets across the globe (Starbucks, 2024). Starbucks is reputed by GlobalData to have a listed market capitalization of USD 104.5B as of January 2024 and reported a net income which is 25.7% higher in 2024 versus 2023. Its total revenue in 2024 is USD 36.0 B which is 11.6% higher in 2024 compared to 2023 (Global Data PLC, 2024).

Starbucks' "Deep Brew" Technological Solutions

Laudon and Laudon writes that in the United States there is a heavy reliance on information systems for conducting daily business operations which are not just crucial for day-to-day business activities but also essential for achieving strategic objectives. There is an emergent interconnectedness between company proficiency in using information technology and its capability to implement corporate strategies to attain corporate goals. In this wise, businesses make substantial investments in information systems to accomplish six strategic objectives: operational excellence, innovation in products and business models, fostering intimacy with customers and suppliers, improving decision-making processes, gaining a competitive advantage, and ensuring survival in the competitive business landscape (Laudon & Laudon, 2014). As such, in 2019 Starbucks prefaced massive technological solutions housed in a mobile application driven by the impetus towards a digital personalization of its handcrafted beverage offerings. At the very core of this immense move is geared towards a personal, seamless customer experience in Starbucks stores by implementing advanced technologies, ranging from cloud computing to blockchain (Sokolowsly, 2019). For this, the annual ICT spending of Starbucks was estimated at $618 million in 2021. A major share of this spending is earmarked for acquiring software, hardware, and ICT services from vendors. Starbucks tapped into advanced technologies -AI, machine learning, big data,

analytics, and IoT to achieve digital transformation and improve both customer experiences and operational efficiency. The company launched an internal AI platform called **Deep Brew** which utilizes machine learning to customize the drive-thru experience for customers and automate tasks like inventory management and preventive maintenance through IoT-connected machines. Additionally, Starbucks has collaborated with Microsoft to integrate blockchain technology, enabling customers to trace the journey of coffee beans used in their drinks. This strategic adoption of cutting-edge technologies reflects Starbucks' commitment to enhancing various aspects of its operations and customer interactions (Warnick, 2020) (Global Data PLC, 2024). The Starbucks mobile app highlights marketing and customer service through technology integration. Amid a trend of businesses investing heavily in extensive marketing campaigns, embracing technology offers a viable alternative. This shift not only potentially saves significant resources but also opens avenues for directing funds toward employee development, product innovation, external funding, and more. Recognizing the broader perspective is key to making a meaningful impact (Kesavan, 2021).

The Problem: Is Starbucks Overteched?

In light of the advancements in technological solutions it appears that Starbucks has a tenuous balancing act of maintaining 'nurturing the human spirit' as its mission vis-à-vis the impetus towards digitalizing its business solutions. After all, Starbucks' food service business is still driven by humans. It appears to certain business analysts that Starbucks may have gotten waylaid from its original brand DNA in light of its huge embrace of technology. While the Starbucks's app has improved the coffee giant's financial health, it has come at the expense of its culture, cafes, and even its brand identity. In a nutshell, the foremost question is whether or not Starbucks has gone "overteched." This was countered by then CEO Kevin Johnson, who in 2021, stated that strategic plans, established long ago, were accelerated to align with the current circumstances. Johnson's approach has been to uphold the mission, values, and attributes shaping the distinctive Starbucks experience while simultaneously undertaking bold reinventions for the future (Rainey, 2022). Johnson has since retired in 2022 and replaced by Laxman Narasimhan (Starbucks, 2023).

Hitches and Glitches in the System

In June 2022, Starbucks was hit with a system glitch when mobile ordering, credit-card processing outages affected cafes for a week. Starbucks' patrons encountered longer waits for frappuccinos, cold brew and other items as cafes faced what the company said were technical problems with online orders (Haddon, 2022). Again, in 2023, Starbucks coffee shops were suddenly unable to accept credit or debit cards, or other contactless forms of payment (Pothen, 2023). In July 19, 2023, Starbucks email-blasted a "Your order is ready!" message to its mobile application users sent in error. Starbucks said that such error was occasioned by partial outages. It was not the first time that the Starbucks app crashed (Dawson & Luna, 2023).

Finding Solutions

Starbucks must have contingency plans and alternative solutions to minimize customer inconvenience. Here are some technological solutions and best practices that Starbucks or any business can consider in a situation where they are 'hijacked' by technical glitches or power or system outages. The proposed solutions are as follows:

Provide offline payment options where an offline payment system can temporarily store transactions locally when the connection to the central server is lost. Historically, offline payments were perceived as transactions recorded offline and processed later. However, determining the criteria for classifying a payment as offline is more complex than it appears. Some experts describe it as a transaction between users without an internet connection, encompassing payments via non-internet servers like telecom servers. Conversely, opposing views suggest that a transaction is genuinely offline only if it takes place without any connection to an external power source, non-internet server, or general ledger (Samuelsson, 2023).

Allow and Install Cash Handling. Train staff on manual cash handling procedures in case electronic payment systems are temporarily unavailable. This ensures that customers can still make purchases using cash. At the end of the day, cash still is king (Amoussou, 2022).

Establish communication channels through the Starbucks app, website, or social media to inform customers about the technical glitch, alternative payment methods, and any ongoing efforts to resolve the issue (Gamson, 2015).

Encourage customers to link multiple payment methods (mobile wallet backup) including backup cards, to their mobile wallets or the Starbucks app. This allows for seamless transitions in case of a technical glitch with one payment method.

Have a robust customer support system in place to assist customers experiencing issues with payments. This may include a dedicated helpline, online chat support, or in-store assistance. Effectively meeting contemporary customer expectations in the digital era necessitates personalization. Going the extra mile in this manner underscores your dedication to placing the customer at the forefront of your business (eSoft Skills Editorial Team, 2024).

Conduct regular testing of payment systems to identify and fix potential glitches before they impact customers. This can include both internal testing and simulation of real-world scenarios. By implementing these solutions and best practices, Starbucks can enhance its resilience to technical glitches in payment systems, ensuring a smoother experience for customers and minimizing disruptions to business operations (Todd, 2023).

Technology Integration. Implementing and integrating new technologies, such as point-of-sale systems, mobile apps, and online ordering platforms, can sometimes lead to inefficiencies, especially if not seamlessly integrated or if staff members are not adequately trained. By implementing these solutions and best practices, Starbucks can enhance its resilience to technical glitches in payment systems, ensuring a smoother experience for customers and minimizing disruptions to business operations.

Conclusion

In summary, protecting against technical issues in payment systems is crucial for businesses like Starbucks to ensure customer satisfaction and operational stability. The comprehensive array of technological solutions, including offline payment options, backup processing providers, and effective communication channels, forms a robust framework for managing disruptions. The emphasis on customer support, system redundancy, and proactive measures like offline modes and regular system testing further enhance a business's ability to navigate unforeseen challenges. By prioritizing the customer experience and anticipating technical issues, businesses like Starbucks demonstrate their commitment to customer-centricity, ensuring a smooth operational flow, minimizing inconveniences, and safeguarding their reputation in an ever-changing digital landscape. Adopting these measures becomes imperative for businesses aiming to thrive and provide a reliable and secure payment environment for their customers. In the end, Starbucks should remind itself that technology may be imperfect, especially in the food service industry. After all, coffee is still made by humans.

The Solution and High Level Concept

The cornerstone of the implemented solution is the ML/AI integration into the Starbucks IT infrastructure (Vish Subramanian, 2020), aimed to access and collect data, create models and productionize them for making data-driven business decisions throughout the business of Starbucks:

As a part of this shift, In 2017 Starbucks announced the strategic digital transformation goal, called "Digital Flywheel". It consisted of 4 strategic digitalization directions, which were implemented by different solutions around them:

1. **Mobile Order & Pay:** Allowed customers to place their orders in advance through the Starbucks mobile app according to their location, drinks customization, and mobile payments. This saves time by reducing waiting in line and provides convenience to customers.

2. **Rewards Program:** Incentivizes customers to make repeat purchases. By incorporating the rewards program into the digital experience, Starbucks encourages customers to engage with the mobile app and increase their loyalty to the brand.

3. **Personalization:** Starbucks leveraged customer data and preferences to offer personalized recommendations and promotions. The enables Starbucks to track customer purchase history, tailor offers based on their individual preferences, and send personalized notifications and rewards to app users. This level of personalization enhances the customer experience and fosters stronger customer loyalty.

4. **Payment:** The digital flywheel included various digital payment options, such as mobile wallets and the Starbucks mobile app. Customers can link their payment methods to the app, making transactions quick and seamless. Additionally, Starbucks has introduced features like "Starbucks Card" and "Starbucks Pay" to further streamline the payment process and offer added convenience to customers.

While the Digital Flywheel can be seen as a "data generation initiative", providing data from customers and coffee-shops, another solution - Deep Brew (See Fig 6: Deep Brew

architecture) builds AI applications based on that data and helps to make data-driven decisions. It is a project encompassing artificial intelligence (AI) to drive the brand's personalization engine, optimize store labor allocations, and drive inventory management in stores. Deep Brew is working in tandem with IoT technologies, in what some might see as a counter-intuitive flip where data-driven AI is not only streamlining operations, but actually helping to humanize the customer experience.

The third - BrewKit (See Fig. 5: BrewKit Architecture) ties The Customer Digital Flywheel and the Deep Brew together by providing infrastructure for data access and model productionization.

Starbucks' Digital Edge: Key Technologies Explained

Starbucks' Deep Brew AI technology and Digital Flywheel approach improve operational efficiency, customer service, and customer experience using several technologies. Among these technologies:

Cloud Computing

Crucial for the storage and analysis of vast quantities of data produced by Starbucks' worldwide activities and consumer engagements. Cloud systems offer the necessary scalability and adaptability for conducting data analytics and training and deploying AI models (Subramanian, 2020).

Machine Learning and Artificial Intelligence

Deep Brew utilizes these technologies to analyze consumer data, improve labor allocations, manage inventory, and personalize customer experiences. AI algorithms aid in forecasting client preferences and enhancing business operations (Subramanian, 2020).

Data Analytics

The integral process of converting unprocessed data into practical and useful insights. Starbucks use data analytics to comprehend customer behavior, preferences, and trends, hence guiding corporate decisions and strategy (Hyperight, n.d.).

Mobile Technology

The Starbucks app, which is a component of the Digital Flywheel, enables customers to conveniently place orders, make payments, and participate in loyalty programs, so boosting customer engagement and convenience (DigiRupt, n.d.).

Internet of Things (IoT)

Starbucks stores utilize Internet of Things (IoT) devices to gather up-to-the-minute information on consumer preferences, retail conditions, and inventory levels. This data is subsequently employed to make informed operational choices and tailor the customer experience accordingly (Subramanian, 2020).

Personalization Engines

These employ artificial intelligence to customize recommendations and offers for each consumer by analyzing their past orders and preferences, hence improving the customer experience (Subramanian, 2020).

Conclusion

In conclusion, the adoption of AI technologies, particularly the Deep Brew solution, has significantly advanced Starbucks toward its objective of establishing itself as a data-centric and self-sustaining entity. This strategic move empowers Starbucks to harness

the wealth of data it accumulates, enabling well-informed decision-making for sustained business growth.

The incorporation of AI-driven solutions like the Digital Flywheel and Deep Brew not only streamlined operations but also liberated Starbucks staff and partners to concentrate on the core aspects of their business—providing exceptional coffee experiences for customers. The time-saving capabilities of AI have been pivotal in allowing human connections to thrive, aligning with Kevin Johnson's vision that technology should complement rather than replace the human touch in customer interactions. (Jon Quast. 2022)

Starbucks' success in delivering radically personalized and thoughtful product choices has created a warm and personalized experience for customers, reinforcing their sense of connection with the beloved coffee brand. This aligns with Starbucks' identity as a lifestyle brand, emphasizing the importance of customers connecting with the brand image, not just the product itself. If it were just about coffee, then Starbucks' competitors should have similar results. Dunkin' Brands has a similar menu, and McDonald's is cheaper. And it's probably more convenient and cheaper to just buy Starbucks' ground coffee to brew at home. Yet Dunkin' only had 1.5% comps growth in its third quarter, compared with 7% for Starbucks in the third quarter. McDonald's, though larger than Starbucks, only grew its store count by 2% over the past 12 months in 2019. (Jon Quast. 2022)

Even more, in the following years, Despite similar offerings and potential cost advantages, Starbucks has demonstrated higher growth rates, even during challenging periods such as the 2020 pandemic (Starbucks Annual Report, 2023). Starbucks demonstrated sustainability and later a more optimistic revenue growth trend than its biggest competitor McDonald's (Trefis Report) (See Fig. 1) This sustained success underscores the unparalleled competitive advantage and exceptional company sustainability achieved through the strategic integration of IT. Starbucks stands as a vivid example of navigating Black Swan events through the synergy of technology, business strategy, and customer-centric practices.

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Appendix

Table 1: **Starbucks Corporation Consolidated Statement of Earnings.** *(unaudited, in millions, except per share data).*

|	Year Ended			Year Ended	
	Oct 1, 2023		Oct 2, 2022	% Change	Oct 1, 2023	Oct 2, 2022
					As a % of total net revenues	
Net revenues:						
Company-operated stores	$ 29,462.3	$ 26,576.1	10.9%	81.9%	82.4%
Licensed stores	4,512.7	3,655.5	23.4	12.5	11.3
Other	2,000.6	2,018.7	(0.9)	5.6	6.3
Total net revenues	35,975.6	32,250.3	11.6	100.0	100.0
Product and distribution costs	11,409.1	10,317.4	10.6	31.7	32.0
Store operating expenses	14,720.3	13,561.8	8.5	40.9	42.1
Other operating expenses	539.4	461.5	16.9	1.5	1.4
Depreciation and amortization expenses	1,362.6	1,447.9	(5.9)	3.8	4.5
General and administrative expenses	2,441.3	2,032.0	20.1	6.8	6.3
Restructuring and impairments	21.8	46.0	(52.6)	0.1	0.1
Total operating expenses	30,494.5	27,866.6	9.4	84.8	86.4
Income from equity investees	298.4	234.1	27.5	0.8	0.7
Gain from sale of assets	91.3	—	nm	0.3	—
Operating income	5,870.8	4,617.8	27.1	16.3	14.3
Interest income and other, net	81.2	97.0	(16.3)	0.2	0.3
Interest expense	(550.1)	(482.9)	13.9	(1.5)	(1.5)
Earnings before income taxes	5,401.9	4,231.9	27.6	15.0	13.1
Income tax expense	1,277.2	948.5	34.7	3.6	2.9
Net earnings including noncontrolling interests	4,124.7	3,283.4	25.6	11.5	10.2
Net earnings attributable to noncontrolling interests	0.2	1.8	(88.9)	0.0	0.0
Net earnings attributable to Starbucks	$ 4,124.5	$ 3,281.6	25.7	11.5%	10.2%
Net earnings per common share - diluted	$ 3.58	$ 2.83	26.5%		
Weighted avg. shares outstanding - diluted	1,151.3	1,158.5			
Cash dividends declared per share	$ 2.16	$ 2.00			
Supplemental Ratios:					
Store operating expenses as a % of company-operated store revenues				50.0%	51.0%
Effective tax rate including noncontrolling interests				23.6%	22.4%

Figure 1: McDonalds vs Starbucks revenue comparison

MCD Revenue History & 3Y Forecast (5% cumulative growth)
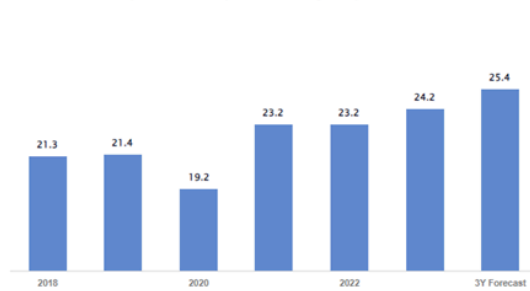
SBUX Revenue History & 3Y Forecast (17% cumulative growth)
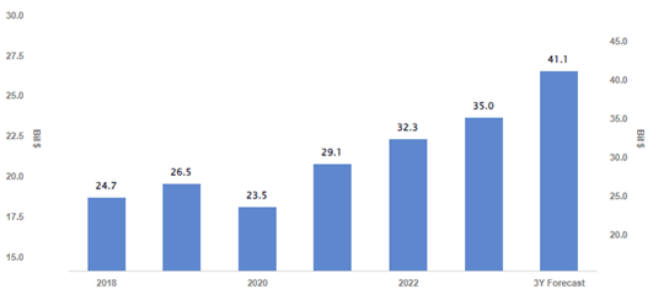
Note: The years shown in the charts above are fiscal years.
=> For MCD, FY2022 refers to the fiscal year ending Dec 31, 2022
=> For SBUX, FY2022 refers to the fiscal year ending Sep 29, 2022
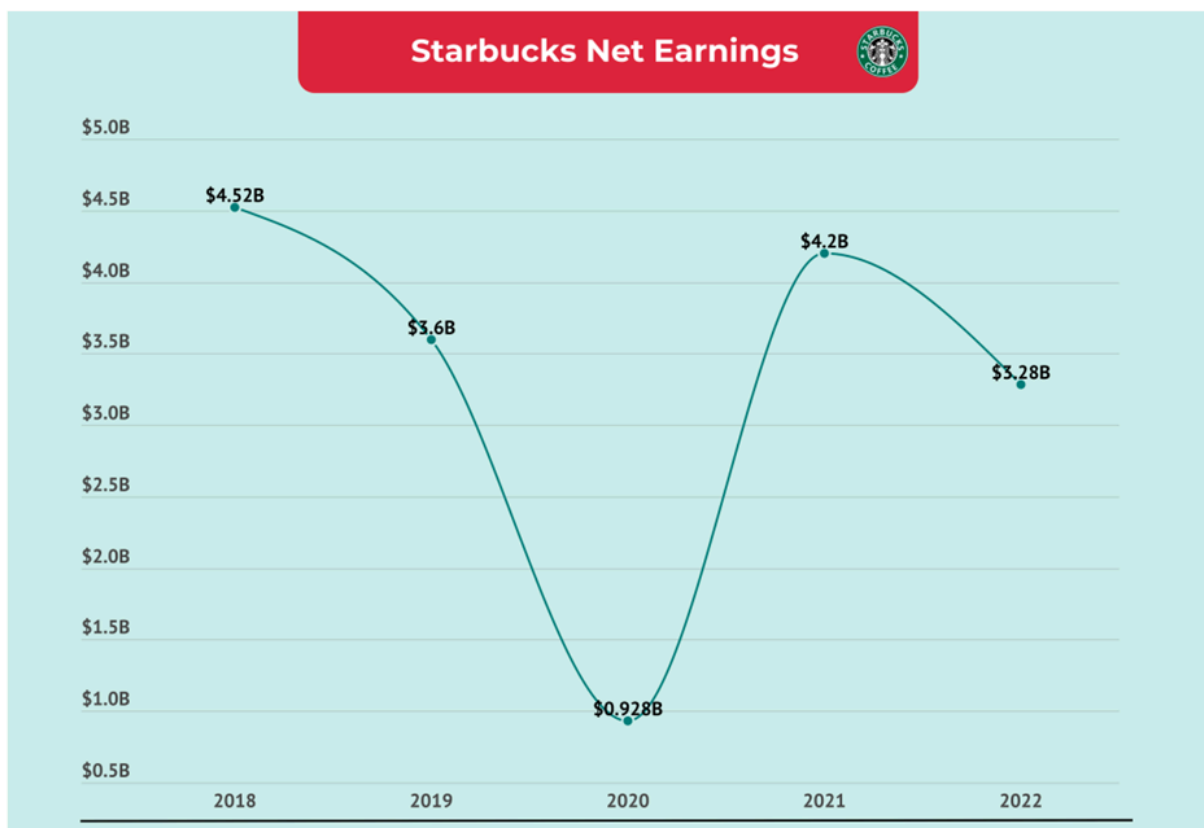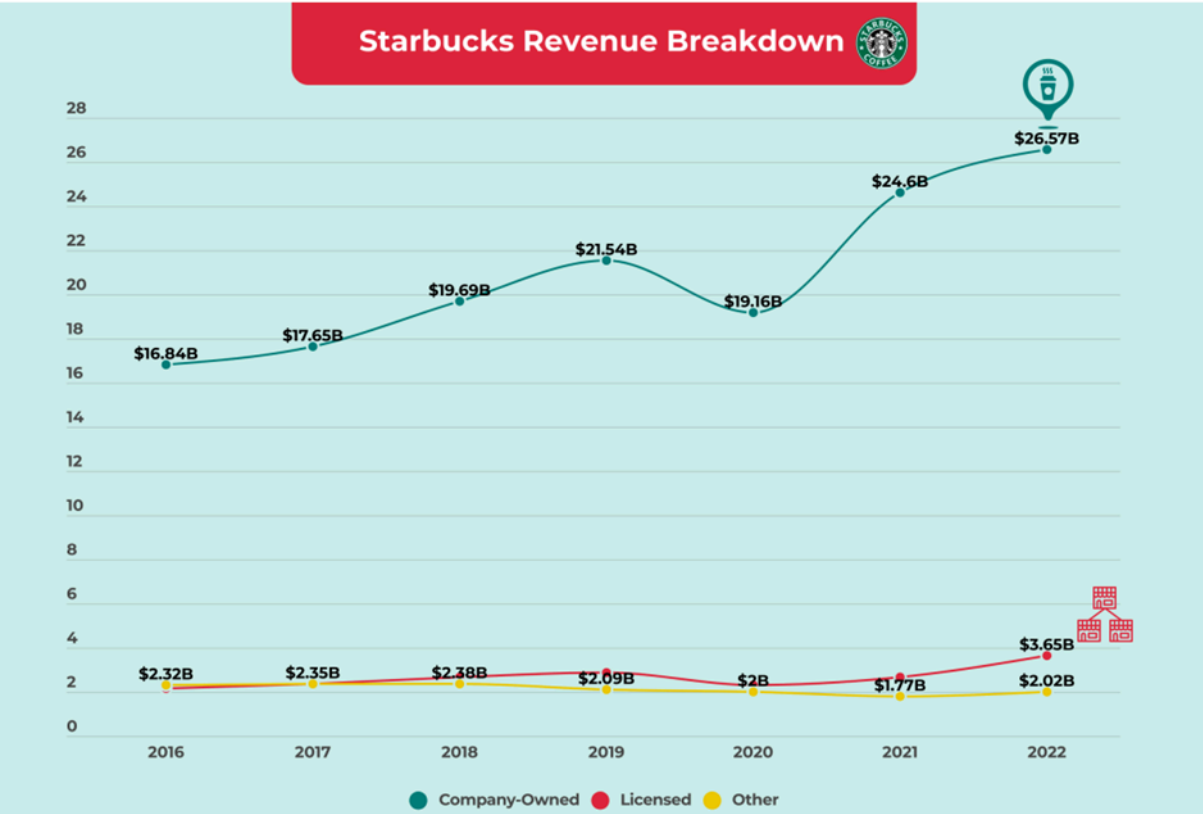
Figure 2: Net earnings 2018-2023.

Starbucks Net Earnings

- 2018: $4.52B
- 2019: $3.6B
- 2020: $0.928B
- 2021: $4.2B
- 2022: $3.28B

Figure 3: Revenue Breakdown

Starbucks Revenue Breakdown

	2016	2017	2018	2019	2020	2021	2022
Company-Owned	$16.84B	$17.65B	$19.69B	$21.54B	$19.16B	$24.6B	$26.57B
Licensed / Other	$2.32B	$2.35B	$2.38B	$2.09B	$2B	$1.77B	$3.65B / $2.02B

Figure 4: Store Opening strategy

Starbucks Store Strategy

	2016	2017	2018	2019	2020	2021	2022
Company-Operated	12,711	13,275	15,341	15,834	16,637	17,133	18,253
Licensed	12,374	14,064	13,983	15,422	16,023	16,700	17,458
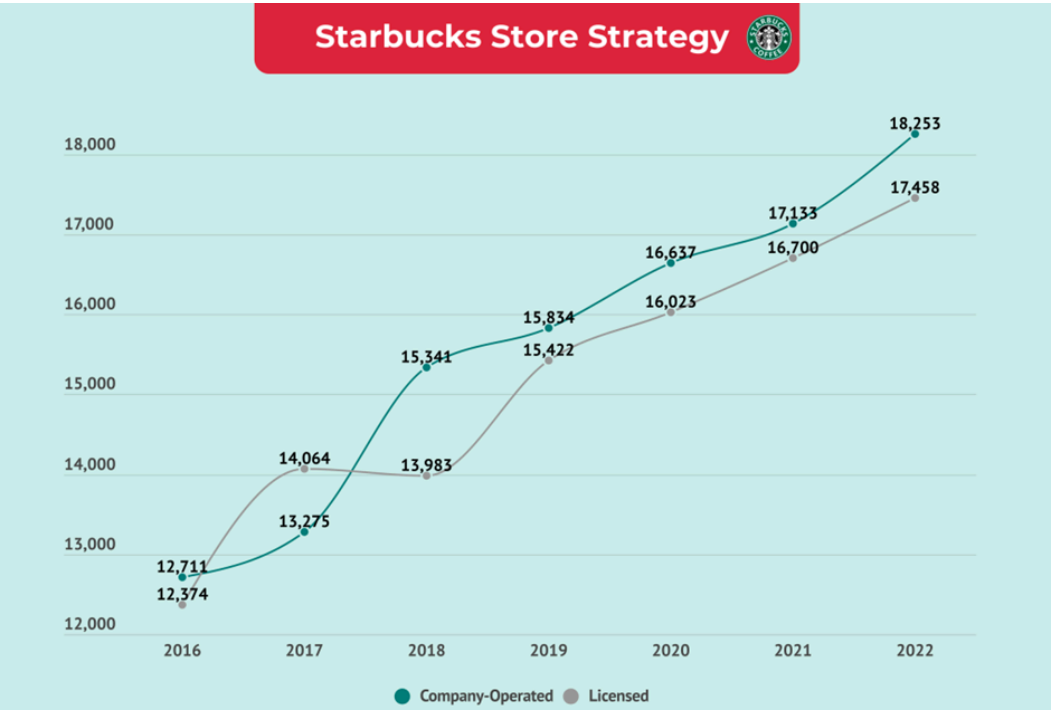
Figure 5: BrewKit Architecture
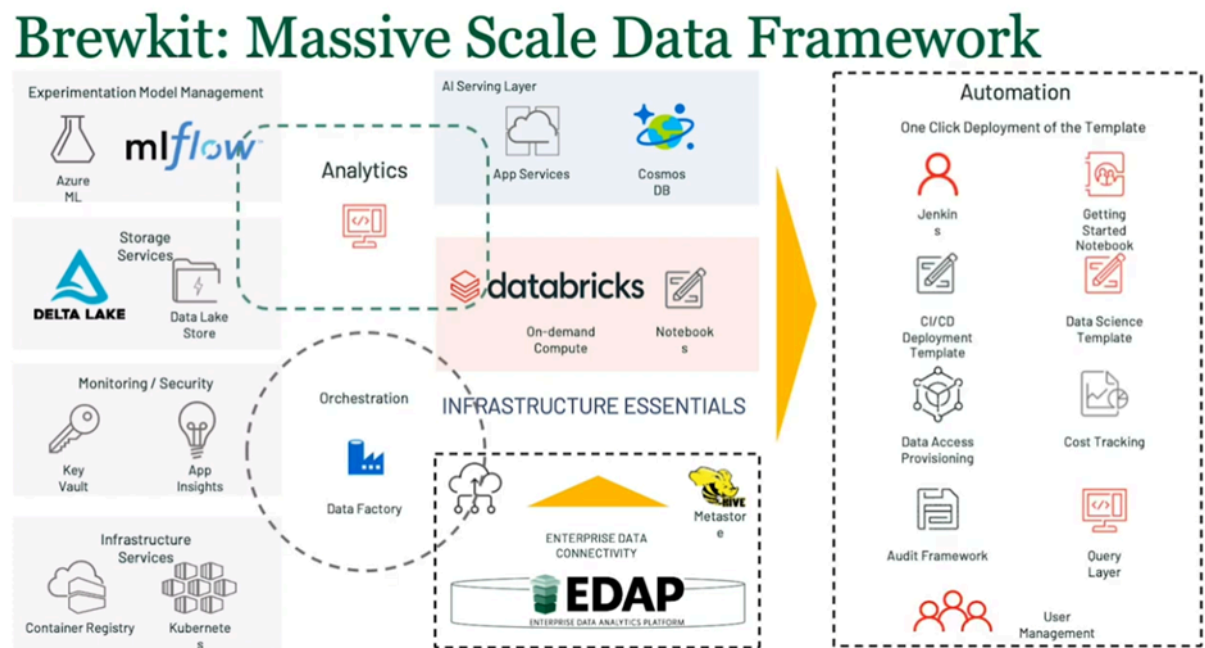
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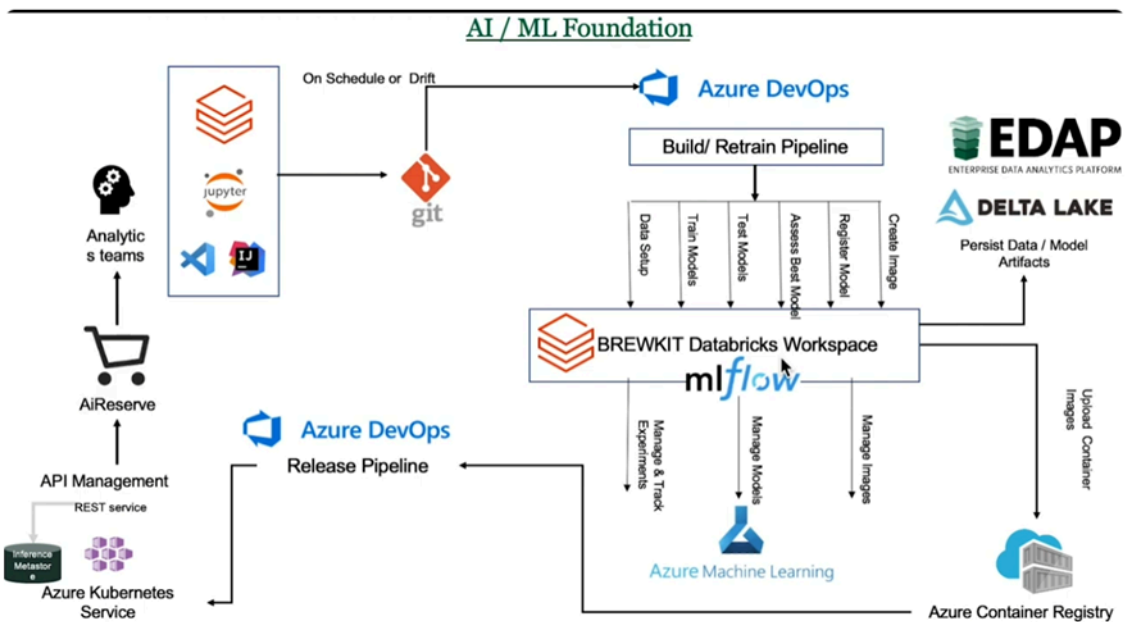
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4. The purpose of this paper is to begin exploring how information systems are used to improve operational efficiency. This paper will include the following 5 sections addressing the initial phases of understanding the problem and how the organization's environment will shape possible solutions.

Select an organization that you feel could benefit from an improvement in some area of its operations or delivery of its services
(publicly traded companies are better as there is more information available).
Define the basic characteristics of the organization (size, industry, annual revenues and profit, competitors, and any relevant regulatory issues).

State the inefficiency/deficiency you seek to improve.
Characterize the problem in a quantifiable manner. This means that you should be able to describe the impairment in terms of production inefficiencies in units, number of customers served in each period, amount of revenue lost or unrealized etc.

Describe your proposed solution.
Your description should be in sufficient detail that the reader doesn't have to ask, "how are you going to do that".
For each portion of the proposed solution you should describe the changes to the organization and the existing process that will need to be made.

Describe each of the underlying technologies your proposed solution will require.
As an example, if you were solving a supply chain issue and trying to speed up a receiving process, you may use bar code scanners and/or RIFD transmitters/receivers to more quickly ingress the received items into inventory. You would also need to discuss the technologies that would allow the data to be stored, retrieved, and the physical infrastructure and network elements that would allow this to happen.

Provide a conclusion that summarizes the previous 3 sections.
The conclusion should recap the company, problem, and the proposed solution ending with a quantifiable benefit as the result of the proposed solution. This benefit should be in terms of not only production/service metrics, but also extrapolated into a revenue/profit increase. As an example, if your solution reduced supply receiving time by "X" percent, that percentage would be deducted from the

total man hours needed in a shift/day. Those man hours multiplied by the prevailing rate for that labor would give you an hourly savings, which would then be multiplied by however many units of the selected time measurement occur in a year.

The purpose of this paper is to begin exploring how information systems are used to improve operational efficiency. This paper will include the following 5 sections addressing the initial phases of understanding the problem and how the organization's environment will shape possible solutions.