# INFO 6780: SYSTEM ANALYSIS, DESIGN & IMPLEMENTATION

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# ABOUT

T-Mobile, a pioneering telecommunications company set up in 1994, has become an important player in the field of mobile communications. T-Mobile, known for its disruptive 'uncarrier' approach, challenges the norms of industry with transparent pricing, innovative services, and a customer centric ethos. T-Mobile increased its reach and competitiveness by investing heavily in network infrastructure and 5G technology, including the impact of an important partnership that had just been concluded with Sprint. Its market value and reputation as a world leader in this field were helped by its commitment to excellent customer service and the development of technology.

# 1.0 INTRODUCTION

T-Mobile US, Inc. is an American cellular network provider with offices in many locations. The global telecommunications firm Deutsche Telekom AG is the largest stakeholder holding the highest interest rate in the company by April 2023. T-Mobile US ranked third among wireless service providers in the country.

T-Mobile was first titled as voice stream wireless PCS by “Western Wireless Corporation”. Deutsche Telekom purchased voice stream wireless for $35 billion in 2001 and renamed it T-Mobile on September 2, 2001. In 2013, T-Mobile & Metro PCS finalized a merger of the two companies which started trading as T-Mobile U.S. (Lisa, 2013)

On October 3, 2012, Metro PCS Communications reached an agreement to merge with T-Mobile USA. Metro PCS shareholders hold 26% of the stake in the company formed after the merger. While the new company was the fourth-largest carrier in the United States, the acquisition gave T-Mobile access to more spectrum and financial resources to maintain competitiveness and expand its LTE network. (B, 2022)

Metro PCS shareholders approved the merger on April 24, 2013. The combined company went public on the New York Stock Exchange as TMUS and became T-Mobile US Inc. on May 1, 2013. (Lisa, 2013)

In March 2013, T-Mobile introduced a plan called "The Un-Carrier". A contract-free pricing structure in which a phone's cost is paid over a two-year financing plan (Chen, 2013). These moves come as part of a new CEO John Legere to help revitalize the business as it improves its network quality (Chen, 2013).

On June 28, 2013, T-Mobile purchased wireless spectrum for the Mississippi Valley region from its competitor U.S. Cellular for around $308 million and expanded its 4G network across 29 more markets (Staff R. , T-Mobile buys wireless spectrum from U.S. Cellular for $308 million, 2013).

# 2.0 GOAL OF T-MOBILE

To bring innovation, speed, and value, T-Mobile wants to create the best 5G network in the world. At T-Mobile, they have a simple mission to be the best in the world at connecting customers to their world. It inspires us to use its network, scale, and resources to drive transformational improvements for customers, employees, society, and the planet. There was an extraordinary success in 2022 which enabled us to invest back in T-Mobile customers with a strategy to deliver the best network, best value, and best experiences (Sievert, 2020). They also upheld our promises to connect more people, to more places, than ever before. The other guys have overlooked and underserved America's small towns and rural areas for years, but the Un-carrier is different. They believe reliable and affordable wireless and internet service is a necessity for ALL in today's highly connected, digital world. When they deliver speed, choice, and value to people and businesses across the country, they improve access to essential services, enable more efficient commerce, expand education and employment opportunities, and empower innovation.

The future goal of T-Mobile is to manage its impact on the planet. They are committed to reaching net-zero emissions by 2040, souring 100% renewable electricity, improving energy efficiency, and investing in product circularity. The main features are,

**Market Expansion**: T-Mobile expects to DOUBLE its market share in the next five years to about 20 percent, with plenty of room to expand based on a strong 2020 performance (BELLEVUE, T‑Mobile Launches Canva Pro + Facebook Advertising on Us, 2022).

**Customer Acquisition and Retention**: It's important to grow your consumer base while keeping the ones you already have. This entails offering top-notch customer service, creative strategies, and equipment that meets a variety of consumer needs.

**Network Improvement**: Continually improving network speed, quality, and dependability to deliver an improved user experience. Infrastructure improvements, spectrum purchases, and technological advancements might all be part of this.

**Innovation and Technology**: To remain competitive in the rapidly changing telecommunications sector, companies are creating and introducing cutting-edge goods and services such as new smartphone capabilities, data plans, and value-added services (Cléliomiro de Sousa Lourenço, 2013).

**Corporate Social Responsibility**: Taking part in projects that benefit the community, education, and digital inclusion while also developing diversity and inclusion inside the business.

**2.1 Connecting what’s next, how they envision the 5G future:**

The advantages of 5G are to allow and accelerate innovation in nearly every area, driving a new generation of productivity and industrial growth that extends from urban centers to rural farms and factories across the country. Work-from-home and “road warrior” employees will have reliable high-speed connectivity so they can get more done, wherever their day takes them. Here are the below sectors where T-Mobile is focusing them envision the 5G future (Business, 2021),

**2.1.a Healthcare:** T-Mobile's 5G network will have a significant impact on healthcare. It can enable remote monitoring through wearables, aid traveling nurses, and enhance medical research with AI. This means quicker recovery, better in-home care, and advanced diagnostics for patients.

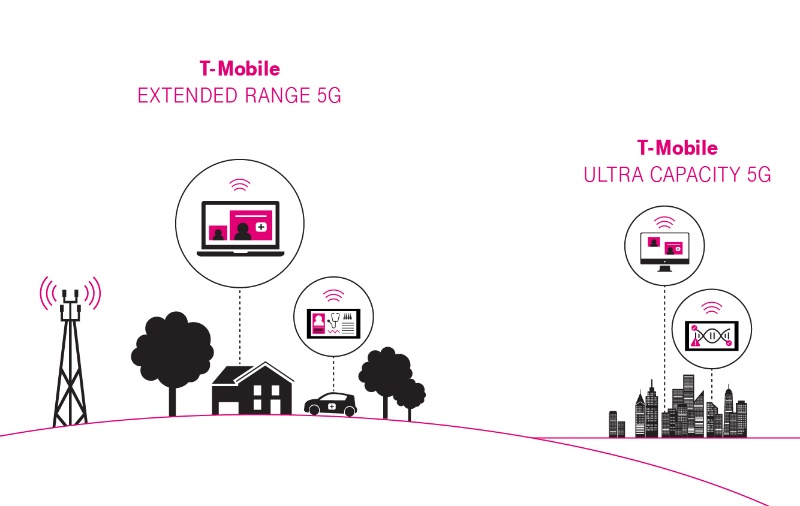


Figure 1: Focus of T-Mobile 5G on healthcare (Business, 2021).

**2.1.b Manufacturing and Warehouse management:** Shifting from 3G to 4G boosted manufacturing automation. 5G enables advanced remote or autonomous robots, enhancing safety and efficiency. Private networks support 5G in smart factories, while T-Mobile's 5G aids supply chain stages. This transforms operations and reduces costs.

A diagram of a mobile network

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Figure 2: T-Mobile Extended range 5G & Ultra capacity 5G (Business, 2021).

**2.1.c Agriculture:** Farming stands to gain greatly from 5G, using data for efficiency. 5G accelerates real-time crop and soil monitoring, benefiting small farms. T-Mobile's Extended Range 5G could enable cost-effective drone use for agriculture.

A tractor on a road

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Figure 3: Focus of T-Mobile 5G on Agriculture (Business, 2021).

# 3.0 T-MOBILE PRODUCTS AND SERVICES

The company offers phone, text, video, and data communications in addition to cellular telecom services and a wide range of other services. It caters to wholesale, postpaid, and prepaid clients. Under the brand names T-Mobile and Metro by T-Mobile, the business offers its goods and services. T-Mobile Offer different kinds of products and services. Such as,

1. Mobile Phone and data
2. Prepaid Mobile Phone and data.
3. Television and Streaming
4. Financial services

**3.a. Mobile Phone and Data**

**Go5G and Go5GPlus, plus Essentials**: T-Mobile Go5G offers reliable 5G connectivity with essential features, while Go5GPlus adds extra perks and faster speeds. Essentials provides budget-friendly access to T-Mobile's network. It guaranteed a two-year device payment plan for both new and existing customers and took the place of the Magenta Max as the most expensive plan. The cost was $90 per month and included everything Magenta Max offered, like Netflix and AppleTV+, as well as an extra 10GB of premium mobile hotspot data for a total of 50GB per month and 15GB of high-speed data in Canada and Mexico (Blumenthal, 2023), (Michaels, 2023).

**Magenta MAX**: T-Mobile Magenta MAX provides unlimited high-quality data, delivering a top tier 5G experience without any data limitations. It also includes extra benefits such as Netflix access and free international text messaging.

**Magenta & Magenta Plus**: T-Mobile Magenta provides unlimited data and select premium features, whereas Magenta Plus elevates the offering with added advantages such as enhanced international data speeds and high-definition streaming.

**Military, First Responder, and Unlimited 55+**: T-Mobile provides exclusive plans for Military and First Responder personnel, including discounts and premium features. Unlimited 55+ offers affordable, unlimited data choices tailored for older customers.

**T-Mobile ONE w/ ONE Plus Family**: T-Mobile ONE bundled with ONE Plus Family presents an all-inclusive family package, delivering limitless data and premium additions, guaranteeing a high-quality wireless experience for all members on the subscription. As of June 2, 2019, the T-Mobile ONE and ONE w/ ONE Plus Family plans have been retired and replaced by the new Magenta plans (Wagner, T-Mo renames T-Mobile One plan to Magenta, makes a couple of changes, 2019).

**T-Mobile ONE**: T-Mobile ONE provides unlimited data, calling, and texting with fundamental features, streamlining wireless plans for customers in search of a simple and cost-effective choice. The plan has been criticized by the Electronic Frontier Foundation and others for potentially violating net neutrality rules and making previously included features paid extras. The T-Mobile ONE and ONE w/ ONE Plus Family plans have been retired and replaced by the new Magenta plans (Wagner, T-Mo renames T-Mobile One plan to Magenta, makes a couple of changes, 2019).

**T-Mobile Essentials**: T-Mobile Essentials provides a straightforward wireless plan with unlimited data, text, and talk, designed for budget-conscious individuals seeking essential connectivity without high costs.

**Netflix On Us**: T-Mobile's "Netflix on Us" benefit offers free Netflix subscriptions with qualifying plans, providing added entertainment value without additional charges to their customers.

**Simple Choice**: T-Mobile Simple Choice was a customer-friendly plan that allowed personalization, provided unlimited talk and text, and offered adaptable data features, ensuring customers had easy and tailored mobile service decisions.

**Capping unlimited data users**: T-Mobile implemented data limits for unlimited data subscribers, reducing high-speed data access once a specific threshold was reached, impacting the experience and usage of those who consumed substantial amounts of data.

**InReach program**: T-Mobile's InReach initiative strives to narrow the digital gap by offering cost-effective internet access to marginalized areas, promoting connectivity and equal opportunities for everyone.

**3.b. Prepaid Mobile Phone and Data**

**Ultra Mobile**: Currently pending is T-Mobile's acquisition of Ultra Mobile, which was announced on March 15, 2023 (Bellevue, 2023).

**Mint Mobile**: Currently pending is T-Mobile’s acquisition of Mint Mobile, which was announced on March 15, 2023 (Bellevue, 2023).

**Metro by T-Mobile**: The former MetroPCS was taken over by T-Mobile in 2013, the new company formed T-Mobile US and currently continues to offer [prepaid](https://en.wikipedia.org/wiki/Prepaid_mobile_phone) wireless services under the Metro by T-Mobile brand.

**Assurance Wireless**: The T-Mobile network has carried [Assurance Wireless](https://en.wikipedia.org/wiki/Assurance_Wireless) since the 2020 Sprint merger. The service is subsidized by the federal [Lifeline Assistance program](https://en.wikipedia.org/wiki/Universal_Service_Fund#Low_income_(Lifeline)), a government benefit program supported by the federal [Universal Service Fund](https://en.wikipedia.org/wiki/Universal_Service_Fund). Low-income people who qualify for the services are provided a free phone, free monthly data and minutes, and unlimited texting (Bellevue, 2023).

**GoSmart Mobile**: GoSmart offered no-contract SIM wireless services. GoSmart Mobile was sold to consumers through dealers who worked as independent contractors under their own company name. Such sellers are known as "Authorized Dealers" with either physical or online stores (Wagner, 2016).

**3.c Television Streaming**

**TVision**: In December 2017, T-Mobile US revealed its intention to acquire Layer3 TV, an IPTV provider operating in Chicago and Washington, with plans to launch its subscription television service in 2018. This effort led to the rebranding of Layer3 TV as TVision Home in April 2019, aligning its offerings with traditional linear television services. In October 2020, T-Mobile introduced TVision, an over-the-top streaming service with packages like TVision Vibe (focused on entertainment channels), TVision Live (offering network television, basic cable, sports, and cloud DVR), and TVision Channels (providing standalone subscriptions for pay TV). Unfortunately, TVision Home ceased operations on December 30, 2020. Subsequently, on March 29, 2021, T-Mobile announced the discontinuation of TVision, opting instead to offer promotional bundles with third-party providers Philo and YouTube TV, signaling a shift in its television service strategy.

**3.d Financial Services**

**Banking cards**: On January 22, 2014, T-Mobile announced that it would expand its products into banking. T-Mobile would provide Visa cards with banking features and a smartphone money management application with reduced-fee or zero-cost services for T-Mobile wireless customers. In addition, customers would have access to over 42,000 ATMs with no fees. In early 2016, T-Mobile decided to discontinue the banking cards. They can no longer be purchased at T-Mobile (Staff R. , 2014).

**Online banking**: In early 2019, T-Mobile released an online banking option called "T-Mobile Money" (Farrington, 2023).

# 4.0 STRATEGY

T-Mobile has been carrying out an ambitious plan to maintain its position of dominance throughout the 5G era with expansion in wireless and other areas. To dominate customer choice and customer loyalty, the company aspires to provide an unparalleled network, the highest customer value, and the finest experiences. The goal of T-Mobile's strategy is to grow as quickly as possible while keeping the average income per subscriber steady. The corporation occasionally provides greater value to clients by making "Un-Carrier moves".

It has announced plans to use its superior resources and scale from the merger and the most recent C-Band auction, along with its plans to continue to lead the industry in growth by offering more value AND the best 5G network along with the best experiences to customers and businesses across the nation. The business is ahead of schedule with its merger constructive collaboration goals and anticipates that the total net present value of those synergies will exceed $70 billion, which is a significant increase over the initial merger forecast of $43 billion (BELLEVUE, 2021).

Only T-Mobile has the better resources, scale, financial situation, and customer-loving staff to steer this new 5G era over the next ten years, if not longer, according to T-Mobile CEO Mike Sievert. We are following that example and aiming higher. We have never undertaken ambitious growth goals and market expansion. Building the quickest, largest, and most accessible 5G network with the ideal spectrum mix is something we have already gotten well ahead of. For many more years, that will convert into a large and observable advantage.

T-Mobile's strategy was focused on upending the telecom sector and emphasizing customer-centric methods. However, remember that tactics can change with time. Here is a succinct breakdown of T-Mobile's approach at the time:

**Acquisitions and Mergers**: The most prominent merger that T-Mobile tried to increase its market share was with Sprint, which gave rise to more potent competition in the wireless sector.

**Expansion of the network**: To offer greater coverage, quicker speeds, and higher dependability, T-Mobile made significant investments in enhancing and expanding its network infrastructure.

**Market disruption**: By launching innovative plans, incentives, and business practices that tested its rivals and drew customers, T-Mobile sought to upend the existing quo.

**5G Leadership**: T-Mobile set out to take the lead in the deployment of 5G technology, concentrating on opening out 5G to more users across the nation.

**Innovation**: To diversify its sources of income, the corporation concentrated on launching novel products and services, like streaming packages and linked gadgets.

**The Un-Carrier Approach**: T-Mobile was the first to use the "Un-Carrier" strategy, which challenged established wireless norms by getting rid of contracts, overage charges, and implementing customer-friendly initiatives.

**Acquisitions and Mergers**: The most prominent merger that T-Mobile tried to increase its market share was with Sprint, which gave rise to more potent competition in the wireless sector.

# 5.0 COMPETITIVE ADVANTAGES OF T-MOBILE

One of the key factors that sets T-Mobile apart from its competitors is its innovative business model. T-Mobile has disrupted the traditional wireless industry by offering non-contract plans and eliminating hidden fees. This business model has been a hit with consumers who are tired of the high prices and confusing contracts offered by other wireless providers.

T-Mobile's innovative business model has helped the company to gain market share and grow rapidly. In 2020, T-Mobile had over 100 million customers, making it the second-largest wireless provider in the United States.

**Merger with Sprint**: T-Mobile has fortified its competitive edge through its recent merger with Sprint. This strategic consolidation has empowered T-Mobile to broaden its network reach and tap into previously untapped markets.

**Offering Better Value to customers**: T-Mobile periodically offers customers more value through what it calls "Un-Carrier moves." Those moves include things like unbundling smartphone devices from service plans, removing music and video streaming from data caps, switching to a single unlimited data plan, and including taxes and fees in its pricing (Fool, 2018).

**Strong Network Improvements**: T-Mobile Home Office Internet, which creates a home broadband network by connecting to the company's 4G and 5G cell service and then sharing it out with Wi-Fi.

**Financial Strength**: T-Mobile's competitive advantage is further bolstered by its robust financial prowess. The company boasts a sturdy financial foundation, characterized by a robust cash reserve and minimal debt burden. This fiscal resilience not only empowers T-Mobile to continuously enhance its network infrastructure but also positions it favorably for well-considered expansion endeavors and strategic procurements.

# 6.0 T-MOBILE'S MAIN COMPETITORS

T-Mobile is a prominent player in the telecommunications sector, offering a wide range of services to consumers and businesses. To maintain its market presence, it is crucial for T-Mobile to regularly analyze its main competitors and their strategies.

**Major Competitors:**

Verizon and AT&T are two major competitors of T-Mobile. Verizon is known for its extensive network coverage and has a large customer base, while AT&T offers a diverse range of services including mobile, internet, and TV. Both companies have established themselves as leaders in the industry and possess competitive advantages such as strong brand recognition and innovative offerings.

1. **AT&T**

AT&T Inc. was founded in Dallas, Texas, which is its headquarters. It is a holding company that provides digital communications and entertainment services worldwide. Some of the company's services and products include wireless communications, data/broadband and Internet services, local and long-distance telephone services, telecommunications equipment, managed networks, movies and television. In April 2022, an agreement was signed between AT&T and Discovery, Inc. The merger of Warner Media's operations with Discovery and the creation of a new independent media company has been completed. AT&T. "AT&T and Discovery Close Deal with Warner Media (DALLAS, 2022)." Another property owned and operated by the company is regional television sports networks. SBC Communications Inc. was the former name of AT&T.

1. **Verizon**

The corporate headquarters of Verizon Communications, formerly known as Bell Atlantic Corporation, are in New York, NY. Verizon is a holding corporation that works with both consumer and commercial segments to offer communications, information, and entertainment goods and services to people, businesses, and governments all over the world. In addition to selling wireless voice and data equipment, it also provides local and long-distance call services, broadband video, data center and cloud services, information security, and managed network services.

1. **Charter Communications**

In 1993, Charter Communications was established. Its main office is in Stamford, Connecticut. Charter Communications is a broadband and cable provider that offers both consumers and companies Wi-Fi, anti-virus and anti-spyware software, Internet, mobile, and phone services. Additionally, the business offers networks and regional marketers VOIP communications and advertising options. Regional sports and news networks are owned and operated by Charter Communications. More than 40 US states and more than 30 million people use it.

These companies compete through a combination of factors:

**Network Coverage and Quality**: The strength and reach of their wireless networks, especially in terms of reliability, speed, and coverage, are crucial factors. Customers want a network that works wherever they go.

**Pricing and Plans**: Competitive pricing and flexible plans attract and retain customers, especially in the age of unlimited data. Offering affordable programs with additional perks is a strategy to stand out.

**Innovation**: Being at the forefront of technology, like 5G deployment and IoT solutions, can give companies an edge. Early adopters often gain a reputation for innovation.

**Customer Experience**: Providing excellent customer service and addressing pain points, like hidden fees or complex billing, can set companies apart.

**Marketing and Branding**: Creating a distinct brand image and messaging that resonates with customers can help a company stand out in a crowded market.

# 7.0 T-MOBILE MARKET SHARE VALUE

Being a leading telecommunications company in the U.S, T-Mobile has recently increased its market share and established itself as a significant player in the industry. According to the latest reports by 2023, T-Mobile is the number one telecommunications company in the United States. It has a market cap of approximately $183.67 billion, making it the largest telecommunications company in the United States (CioIndex, 2023). T-Mobile has an impressive market share of around 20% in the US. This significant growth is due to T-Mobile's aggressive marketing strategies, customer-centric approach, and innovative offerings.

Measured by the number of subscribers, T-Mobile has an impressive customer base of over 113.6 million customers (Staff T.-M. , 2023). This significant number reflects the trust and loyalty of consumers to the services of T-Mobile. In addition, T-Mobile has attracted customers from other operators, reflected in its market share's continuous growth in recent years.

Another factor contributing to T-Mobile's market share growth is its commitment to providing exceptional network coverage and high-speed data services. The company's continued investments in network infrastructure expansion, including deploying 5G technology, have attracted customers seeking advanced connectivity.

In addition, T-Mobile's strategic acquisitions, such as its merger with Sprint in 2020, strengthened its market share and competitive position. Through consolidation, T-Mobile was able to tap into a broader customer base and use synergies to improve service and value. T-Mobile's commitment to customer satisfaction, innovation, and strategy is reflected in its impressive market share and subscriber growth. As the telecommunications industry continues to evolve, T-Mobile's strong market position puts it at the forefront of shaping the future of connectivity.

# 8.0 VALUE CHAIN ANALYSIS

There are five primary activities involved in Value chain analysis of T-Mobile. Such as.,

* 1. **INBOUND LOGISTICS**

Inbound logistics are all about moving raw materials, supplies, or finished goods into a supply chain. Through inbound logistics, a business secures its supply, that is, it obtains the products (or the materials to make the products) that it will eventually sell. The logistics processes that transport raw materials, inventory, or supplies from a supplier and into a business’s warehouse, distribution centre, fulfilment centre, or retail store are all considered inbound logistics (Hand, 2022).

It is important to develop strong relationships with suppliers as their support is necessary to receive, store, and distribute the product. Without analysing the inbound logistics, T-Mobile US Inc. can face various challenges in product development phases. Analysis of inbound logistics requires a company to focus on every aspect of transformation from raw material to finished product. Some examples of inbound logistics are retrieving raw materials, storing the inputs, and internally distributing the raw materials and components to start production (Byrne, 2018).

* 1. **OPERATIONS**

The well-known telecoms business T-Mobile engages in a variety of core activities throughout a dynamic and diversified value chain. "Operations" is one of its value chain's essential fundamental tasks. The distribution of T-Mobile's wireless communication services is facilitated by a variety of procedures and actions that make up this important aspect of the company's operations (TARVER, 2021). Operations entail the effective planning and carrying out of duties required to guarantee network dependability, great customer service, accurate billing, and network expansion, among other crucial tasks. For T-Mobile to maintain and grow its client base, satisfy regulatory standards, and preserve its place in the cutthroat telecommunications market, this core activity is crucial (TARVER, 2021).

* 1. **OUTBOUND LOGISTICS**

The processes used to deliver goods to customers after passing via many middlemen are referred to as outbound logistics. Material handling, warehousing, scheduling, processing orders, transporting, and delivering to the destination are some examples of outbound logistics activities. The outbound logistics can be analyzed and optimized by T-Mobile US Inc. to identify potential sources of competitive advantage and meet its goals for business expansion (Byrne, 2018). Because it maximizes customer satisfaction and expands the company's growth potential when outbound activities are managed on time, with the lowest possible costs, and with the least amount of negative impact on product quality. When the given products are perishable and need to be delivered to the end user quickly, T-Mobile US Inc. should give special attention to its outbound value chain activities (Byrne, 2018).

Managing transportation and logistics operations on a global scale has never been easy, but the job has become increasingly difficult over the last few years. The persistent labor shortage amplifies an already difficult problem. There are fewer workers behind the wheel, on the warehouse floor, and in the retail distribution center. As a result, many manual transportation and logistics systems are in dire need of optimization (Forster, 2023). Digital transformation can be daunting, but IDC's Maturity cape model is a great tool to help you plot a navigable course. Square one is to identify where your organization is now. Maturity levels range from the “resistant” organizations, whose logistics and transportation models are still mired in manual processes and paper, to ones with fully optimized operations. Between those two endpoints are the opportunistic, repeatable, and managed stages where companies are testing digital tools and putting some or all of them into service (Forster, 2023). The picture below illustrates more details of value chain.

Figure 4: Porter’s value chain with primary activities (Inchainge, 2023).

**A close-up of a chart

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* 1. **SALES & MARKETING**

T-Mobile US Inc will stress the benefits and difference factors of supplied products at this stage to persuade customers that its offering is superior to competitors. Only delivering a high-quality product at an affordable price with unique features may build value until T-Mobile US Inc invests in marketing and sales. Salespeople and marketers are crucial in this situation. T-Mobile US Inc's marketing and sales activities include sales force, advertising, promotional activities, pricing, channel selection, quoting, and relationship building with channel members. The marketing funnel strategy can be used to structure the company's marketing and sales activities. Depending on T-Mobile US Inc's corporate objectives, brand image, competitive dynamics, and existing market position, marketing tactics can be push or pull in nature (Byrne, 2018).

Effective and strategically integrated marketing operations can help T-Mobile US Inc build brand equity and differentiate itself from its competitors. T-Mobile US Inc, on the other hand, must avoid making misleading promises about product features that cannot be delivered by the production department. It emphasizes the importance of coordinating various value chain processes (Byrne, 2018).

* 1. **SERVICE**

Customer loyalty will be greatly influenced by the pre- and post-sale services provided by T-Mobile US Inc. Post-sale services are now regarded by customers as being equally significant to marketing and promotional efforts. In the modern, technologically enabled world, the influence of bad e-WOM resulting from subpar support services cannot be understated. To protect the reputation of its brand and instead use the positive word-of-mouth generated by rapid, timely, and effective support services, the company must examine its support efforts (Byrne, 2018).

To stay in touch with its clients, T-Mobile also offers after-sale services. Depending on each plan or device's particular terms and circumstances, T-Mobile offers various warranties on its goods and services. Depending on the exact product or service, customers can often return or exchange products within a predetermined time frame. Customers can often get help from T-Mobile customer support if they think their device or service is defective. You can accomplish this in several ways, including by calling customer service, stopping by a T-Mobile location, or communicating digitally via online chat or social media.

# 9.0 PROCESS MODELS

**9.1 VALUE CHAIN PROCESS (LEVEL 0)**

Diagram 0 illustrates the operational processes of T-Mobile. T-Mobile, a telecommunications company, procures essential components and services such as network infrastructure, equipment, and technology solutions from a variety of trusted suppliers. Additionally, T-Mobile secures funding from its shareholders, who invest in the company to support its ongoing operations and growth initiatives. These raw materials and financial resources are crucial elements in the initial stages of T-Mobile's operations.

Once the necessary resources are in place, T-Mobile enters the inbound logistics phase. During this stage, the company carefully manages the inflow of raw materials and financial assets to ensure the efficient functioning of its telecommunications infrastructure. Location strategies are developed to optimize the placement of network equipment and infrastructure, reducing operational costs while maintaining high-quality service delivery.

The core operation of T-Mobile involves processing these resources to create a robust and reliable telecommunications network. This operational phase is vital for maintaining network performance and expanding coverage. The development of efficient network configurations and infrastructure placement is pivotal in delivering seamless connectivity to customers.

T-Mobile's finished services, including voice and data connectivity, are then delivered to consumers through outbound logistics. This stage involves partnerships with various retailers and wholesalers who play a critical role in ensuring that consumers have access to T-Mobile's services. These partners, including authorized dealers and retail stores, facilitate the distribution of T-Mobile's services to end-users, ensuring a wide reach and accessibility.

To further enhance its market presence and customer engagement, T-Mobile's marketing department employs various strategies such as advertising, promotions, and leveraging social media platforms. These efforts are aimed at attracting new customers and retaining existing ones by showcasing the value and benefits of T-Mobile's telecommunications services. Revenue and profits are generated through increased sales, ultimately benefiting both the company and its shareholders through dividends.

Figure 5(Value chain Process- Diagram 0)

A diagram of a company

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T-Mobile also values customer satisfaction and offers comprehensive after-sales services. Customers can reach out to T-Mobile for support and troubleshooting, and faulty equipment can be returned for replacement or repair. Through these services, T-Mobile aims to maintain a high level of customer satisfaction, ensuring that customers continue to choose and rely on T-Mobile's telecommunications services. In summary, T-Mobile's operational processes can be visualized in Figure 6, which includes Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales, and Service. These interconnected stages form the backbone of T-Mobile's business model, enabling the company to provide reliable telecommunications services to its customers while delivering value to its shareholders.

**9.2 INBOUND LOGISTICS (LEVEL 1)**

T-Mobile's inbound logistics operations are typically represented in a Level 1 Data Flow Diagram (DFD), providing a high-level overview of the system and the option to further dissect processes if needed. At this level, we delve into the inputs and outputs of inbound logistics, starting with the process of finding and procuring raw materials from various sources, which involves vendor selection, agreement negotiation, and raw material delivery coordination.

Purchasing raw materials plays a pivotal role in ensuring a consistent supply for production, impacting both material quality and pricing. Next, the procedure for purchasing raw materials is responsible for managing orders, specifying quantity, quality, and delivery schedules, crucial for preventing production interruptions due to material shortages and optimizing inventory management.

Figure 6(Inbound Logistics – Level 1)

A diagram of a company

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The warehouse raw materials process focuses on efficient handling and storage, encompassing inventory tracking, organization, and accessibility assurance, thus minimizing damage and spoilage while facilitating inventory monitoring for planning and production.

Subsequently, the supply raw materials process oversees the distribution of raw materials from storage to production areas, managing logistics and timely deliveries, ensuring the smooth operation of production processes.

Lastly, the checking of raw materials involves inspection to ensure quality and safety compliance, including flaw detection, requirement verification, and necessary testing, safeguarding against the use of subpar or hazardous materials in production and upholding stringent quality standards throughout the manufacturing process.

**9.3 OPERATIONS (LEVEL 1)**

T-Mobile, a market leader in telecommunications, excels at providing first-rate mobile services as well as precisely managing every aspect of its value chain operations to guarantee customer satisfaction and superior products.

The meticulous and creative design of T-Mobile's products marks the start of its journey. The business develops product specifications that are in line with consumer needs and market demands by thorough market research, customer feedback analysis, and keeping a close watch on technology advancements. The Design Product process entails developing thorough design documentation, prototypes, and a vision for products that will stand out in a cutthroat market.

Figure 7 (Operations-Level 1)

A diagram of a product quality control

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T-Mobile's operations are built around quality. T-Mobile has an effective Quality Control mechanism in place to guarantee that its goods adhere to the highest industry standards. Quality requirements, inspection standards, and performance benchmarks are established through this procedure. To ensure that clients receive high-quality, dependable products and services, it plays a critical role in discovering and correcting any deviations from these standards.

T-Mobile keeps a well-oiled supply chain to back up its operations. A crucial part of this procedure is organizing the raw resources. The business carefully monitors its suppliers, considering demand projections, stock levels, and production schedules. T-Mobile does this to guarantee the prompt availability of all necessary parts and supplies for product assembly.

For smooth production, effective raw material procurement is essential. Communication with suppliers, starting purchase orders, and verifying delivery dates are all part of the Relay Raw Materials Order process. This guarantees that the supply chain remains unbroken, ensuring that the manufacturing operations go without a hitch.

The thorough inspection of finished goods is the last step in the value chain operations at T-Mobile. Here, things are put through in-depth testing and inspection using quality standards and specialist tools. Any flaws or problems found during the inspection are noted in reports, establishing a feedback loop that links back to the initial design stage. This input is crucial for enhancing the quality and design of products continuously.

**9.4 OUTBOUND LOGISTICS (LEVEL 1)**

The Inventory Final Products process at T-Mobile receives both finished products from Operations and defective goods from Service, generating Inventory reports that are forwarded to Schedule Shipping. Additionally, this process verifies all finished products and subsequently forwards them to the Package Final Products section for packaging and distribution.

Figure 8(Outbound Logistics-Level 1)

A diagram of a product

Description automatically generated

Schedule Shipping, in turn, transmits data including inventory reports to the Package Final Products team, shipment schedules to manage the Final Products Warehouse, and route maps to the Deliver Products process. Within the Package Final Products process, inventory reports received from Schedule Shipping for the finished products are used to package the products before sending them to the Manage Final Products Warehouse. The Manage Final Products Warehouse process then receives the packed products from Package Final Products and gathers all necessary data from the Schedule Shipment process, ensuring the finished products are ready for delivery to the Deliver Products process.

Finally, the Deliver Products process takes charge of the finished products and route maps, forwarding packaged products to the Sales & Marketing Team while assigning product deliveries to the Services Team.

**9.5 SALES AND MARKETING (LEVEL 1)**

Figure 9 represents the process of Sales and Marketing in T-Mobile. In Analyze Market Trends we start by gathering information through competitor analysis and surveys conducted with our customers. Competitor analysis helps us understand what our competitors are up to in the market, while customer surveys give us direct feedback from our customers. We then use this information to dig deep into current market trends. As a result, we produce two types of reports: Market Trend Reports, which give us insights into the larger market trends, and Product Trend Reports, which focus on trends related specifically to our products or services. This information is essential for making well-informed decisions regarding product development and marketing strategies.

Figure 9(Sales and Marketing-Level 1)

A diagram of a customer service

Description automatically generated

Price Product deals with setting the right price for our product. We take into consideration details about the packaging of our product and insights from Product Trend Reports. Packaging can impact how our product is perceived, which can, in turn, influence pricing. By examining the reports, we make decisions about the pricing structure and strategies. The result is a clear understanding of our pricing details, along with ensuring that our product is fully ready for sale as a finished product.

In Determine Selling Method we focus on choosing the most effective ways to sell our products or services. We consider data from our sales activities and factor in the cost of acquiring customers. Based on this information, we have decided on two primary selling methods: Telemarketing and E-commerce. Telemarketing involves reaching out to potential customers through phone calls or other communication channels, while E-commerce means selling our products online. The choice between these methods depends on factors like customer behavior and the cost-effectiveness of each approach.

Managing Advertisements revolves around effectively managing our advertising efforts. We take information from our Telemarketing activities and insights gathered from Market Trend Reports. Telemarketing data informs our advertising strategies, and knowledge of market trends helps us tailor our advertising content to match current consumer preferences. As a result, we create advertising campaigns and content that resonates with our target audience, ensuring our promotional efforts are both engaging and relevant.

Managing our customers is all about building and maintaining strong relationships while providing top-notch service. In this process, we take cues from the content used in our advertising efforts and the pricing details we've set. This process yields Customer Reviews, reflecting feedback and satisfaction levels from our customers. It also calculates the Customer Acquisition Cost (CAC), which helps us measure the cost associated with acquiring new customers. By closely monitoring these aspects, we can continually enhance our customer relations and evaluate the effectiveness of our customer acquisition strategies.

**9.6 SERVICE (LEVEL 1)**

The primary benefit of value chain operations for T-Mobile's service offerings can be summed up as follows in the context of a telecommunications service provider.

Maintain Final Products T-Mobile must maintain the final products, which include their advertisement, mobile devices, and privacy and security. This involves regular maintenance and updates to ensure the quality, reliability, and security of their services. Maintenance efforts are critical to delivering a seamless user experience.

Figure 10 (Service-Level 1)

A diagram of a company's process

Description automatically generated

Maintaining Customer Relationships For any service provider, it is crucial to develop and keep solid client relationships. T-Mobile works to build strong relationships with consumers through implementing reward programs, individualized communication, and account management. This includes providing timely and efficient customer service for questions and issues.

Customer Feedback Collecting A crucial activity is obtaining consumer feedback. Surveys, encounters with customer care agents, and social media are just a few of the ways T-Mobile gathers client input. Understanding client seeks and enhancing services can be accomplished with the use of this feedback.

Analyze Feedback While getting feedback, T-Mobile examines it to learn about consumer preferences, problems, and potential areas for progress. To improve its services, goods, and customer experiences, T-Mobile uses feedback evaluation to make data-driven decisions.

These core functions are intertwined and crucial for T-Mobile to succeed in the fiercely cutthroat telecom sector. T-Mobile can satisfy consumer expectations and continue to be a market leader by offering efficient technical assistance, upholding product quality, fostering customer connections, and using customer input for ongoing improvement.

# 10.0 DATA MODELS

**10.1 INBOUND LOGISTICS**

The "Raw Material" entity is a critical component of T-Mobile's inbound logistics process, enabling the monitoring and tracking of raw materials procured from various suppliers. Each raw material is uniquely identified by a "Raw Material ID," containing attributes like name, description, unit of measurement, supplier information, and cost. This entity establishes a connection with the "Supplier" entity through the "Supplier ID" attribute, facilitating the tracking of material origins and supplier relationships.

The "Inventory" entity is essential for managing and monitoring physical items received and stored in T-Mobile's logistics process. Each inventory item is identified by an "Item ID" and possesses attributes like its association with products or raw materials, quantity on hand, storage location, and expiration date if applicable. The "Inventory" entity connects to the "Raw Material" or "Product" entity through the "Raw Material ID" attribute, enabling precise inventory tracking.

Within T-Mobile's inbound logistics operations, the "Inventory Management" or "Inventory Transaction" entity plays a pivotal role in tracking inventory item movements. Each transaction is uniquely identified by a "Transaction ID," with associated properties providing valuable transaction details. Additional details such as specific items involved or responsible individuals can be captured through relationships with other entities, as depicted in the Entity-Relationship Diagram (ERD).

The "Delivery Request" entity is crucial in overseeing inbound logistics, ensuring timely deliveries of ordered supplies and materials to T-Mobile's facilities. Relationships with entities like "Suppliers," "Inventory Items," or "Quality Control" can be represented in the Object-Relationship Diagram (ORD) to capture additional information and dependencies. For instance, connections can link a delivery request to the suppliers responsible for fulfilling the order.

As part of T-Mobile's inbound logistics and procurement processes, the "Supplier" entity serves as a central repository for supplier information. Relationships with other entities in the Object-Relationship Diagram (ORD), such as "Delivery Requests," "Supply Chain Items," or "Quality Control," can capture additional details and dependencies. These connections help associate specific delivery requests with the suppliers tasked with fulfilling them.

Figure 11: ER-Diagram of Inbound Logistics

**A diagram of a computer

Description automatically generated**

Manufacturing involves transforming raw materials into finished products through multiple production steps. The manufacturing entity represents this production component within inbound logistics and includes attributes like Product ID, Product Name, Bill of Materials (BOM), Production Date, and Quantity Produced. The relationship between Raw Materials and Manufacturing signifies the utilization of raw materials during production, ensuring efficient tracking and management.

In conclusion, effective management of raw materials, inventory, and logistics entities, coupled with well-defined relationships, is integral to T-Mobile's supply chain operations. These entities facilitate tracking, transparency, and supplier collaboration. Ensuring precise control, timely deliveries, and efficient production processes is crucial for streamlining operations and meeting customer demands in the ever-evolving telecommunications industry.

**10.2 OPERATIONS**

T-Mobile's core operational components delve into five fundamental entities crucial to T-Mobile's success in the telecommunications industry: Customers, Order, Service Plans, Inventory, and Delivery. By examining the roles and attributes of these components, we gain a deeper understanding of how T-Mobile efficiently delivers communication services to a diverse clientele.

The Customer entity is fundamental to T-Mobile's operations, encompassing attributes such as Customer ID (Primary Key), Name, Address, Phone Number, Email, Account Status, Payment History, and Usage Data. Customer ID serves as the primary key, uniquely identifying each customer. This entity represents the core of T-Mobile's business, focusing on both individual and organizational customers. It is associated with various relationships, such as the one-to-many relationship with Orders (each customer can have multiple orders) and the one-to-one relationship with Delivery (each customer is associated with one delivery).

Figure 12: ER Diagram of Operations

A diagram of a data flow

Description automatically generated

The Orders entity is pivotal for managing the sequence of customer transactions. It includes attributes like Order ID (Primary Key), Customer ID (Foreign Key), Order Date, Order Amount, and Order Address. Order ID is the primary key, uniquely identifying each order, while Customer ID establishes a foreign key relationship with the Customer entity. This entity facilitates the tracking and management of customer orders, ensuring accurate deliveries and billing. It also has a one-to-many relationship with Inventory (one order can consist of multiple inventory items), allowing customers to order various products and services within a single transaction.

T-Mobile offers diverse service plans, and the Service Plan entity manages these offerings with attributes like Plan ID (Primary Key), Customer ID (Foreign Key), Plan Name, Monthly Cost, Data Allowance, Call Minutes, Text Messages, and Roaming Options. Plan ID serves as the primary key, while Customer ID establishes a foreign key relationship with the Customer entity. This entity caters to varied consumer needs by providing customizable service plans. It has a one-to-many relationship with Inventory (one service plan can include multiple items from the inventory), ensuring that customers can select different services and products.

Efficient inventory management is crucial for T-Mobile to meet consumer demands. The Inventory entity tracks attributes such as Product ID (Primary Key), Supplier ID (Foreign Key), Quantity, Price, and Location. Product ID is the primary key, and Supplier ID establishes a foreign key relationship with the Supplier entity. Inventory management ensures the availability of smartphones, tablets, accessories, and SIM cards. It also has a one-to-many relationship with Delivery (one delivery can consist of multiple items from the inventory), facilitating the tracking of product deliveries.

The Delivery entity handles distribution and logistics processes. It includes attributes such as Delivery ID (Primary Key), Sales ID (Foreign Key), Delivery Address, Delivery Date, and Delivery Status. Delivery ID is the primary key, and Sales ID establishes a foreign key relationship with the Sales entity. Timely and secure deliveries of devices and accessories to customers who make online orders are crucial for enhancing customer satisfaction. This entity plays a pivotal role in ensuring that deliveries are made efficiently, with a one-to-one relationship with Customer (each customer can have one delivery associated with their order) and a one-to-many relationship with Inventory (one delivery can consist of multiple items from the inventory).

In summary, T-Mobile's success hinges on its customer-centric approach, offering a wide range of telecommunications services. Through a structured system encompassing customer data, Order, service plans, inventory management, and efficient delivery processes, the company ensures a seamless experience for its clientele. T-Mobile's strategic use of data attributes and relationships within its operations demonstrates a commitment to meeting diverse customer needs while maintaining operational excellence. This approach positions T-Mobile as a standout player in the telecommunications industry, dedicated to delivering quality services and products that align precisely with customer expectations.

* 1. **OUTBOUND LOGISTICS**

The provided ER diagram offers a comprehensive representation of T-Mobile's database schema, showcasing the intricate relationships among customers, services, sales, inventory, and delivery requests. This schema plays a vital role in efficiently managing T-Mobile's operations and data. The primary entities in this schema are Customers, Inventory, Invoice, Delivery, and Stores. Each entity holds essential attributes that capture crucial information. For instance, Customers include data such as Name, Delivery ID, Address, and Email, while Inventory encompasses details like Invoice ID, inventory size, raw materials, and inventory price. Understanding the entities and their attributes is key to comprehending how the database operates.

One of the central aspects of this ER diagram is the relationships between these entities. Several one-to-many relationships are established, enabling a robust connection between the entities. Customers, for instance, are linked to both invoices and deliveries in a one-to-many fashion. This means that every customer can have multiple invoices and deliveries associated with them. Similarly, Inventory and Invoice exhibit a one-to-many relationship, where each inventory item can be linked to multiple invoices. These relationships serve as the backbone of the database, facilitating data retrieval and ensuring that related information is appropriately organized.

Furthermore, the diagram highlights many-to-one relationships. One such relationship exists between Shipment and Order, signifying that each shipment can be associated with multiple orders and deliveries. This versatile arrangement is crucial for tracking complex logistics and managing customer orders effectively. Additionally, there's a one-to-many relationship between Customers and Delivery, implying that each delivery can involve multiple customers. This feature is particularly valuable for T-Mobile in cases where several customers receive deliveries in a single shipment.

Figure 13: ER Diagram of Outbound Logistics

A diagram of a data flow

Description automatically generated

The role of Stores in this schema is paramount for managing the inventory. Stores are responsible for overseeing inventory items, and each inventory item is tied to a specific store. This one-to-many relationship ensures that inventory is efficiently managed at the store level. Stores are defined by attributes such as Store ID, Store name, store address, inventory ID, and Phone number, which offer comprehensive information for inventory management and tracking.

In summary, this ER diagram provides T-Mobile with a structured and organized framework for handling its services, sales, inventory, customers, and delivery requests. The relationships between entities, whether one-to-many or many-to-one, create a web of connections that streamlines operations and ensures data accuracy. This database schema is a critical tool in the day-to-day functioning of T-Mobile, allowing for efficient data retrieval, analysis, and decision-making, ultimately benefiting both the company and its customers.

* 1. **SALES & MARKETING**

The provided Entity-Relationship (ER) diagram offers a comprehensive database schema that encapsulates various aspects of T-Mobile's operations in the realm of Sales & Marketing. This ER diagram encompasses entities such as Customer, Sales, Invoice, Advertisement, and Stores. Each entity plays a distinct role in the functioning of T-Mobile's business operations. The Customer entity represents the individuals who utilize T-Mobile services, storing pertinent information like customer ID, name, email, and address. Moreover, the diagram showcases how Customer is associated with Invoice, establishing a crucial link between billing and customer data.

Sales, another pivotal entity in this diagram, meticulously records sales transactions occurring across different store branches. It encompasses vital information, including sale ID, invoice number, product list, and store name. The Sales entity's interconnection with Invoice and Advertisement highlights its significance in the context of T-Mobile's marketing and sales strategy, serving as a bridge between these two crucial aspects of the business.

Figure 14: ER Diagram of Sales and Marketing

A diagram of a data flow

Description automatically generated

Invoices, as the central repository for billing details, play an essential role in financial management. It contains data such as the invoice number, customer ID, customer name, and coupon code. The relationship between Invoice and Customer reveals the one-to-many nature of their association, where a single customer can have multiple invoices, emphasizing the importance of accurate billing and record-keeping for T-Mobile's customers.

Advertisement, as a distinct entity, houses a collection of advertisements created by T-Mobile. Its attributes include coupon codes, advertisement names, product lists, and budget information. The diagram illustrates the relationships between Advertisement, Sales, and Invoice, showcasing how these three entities are interconnected. This underscores the significance of advertisements in driving sales and revenue for T-Mobile.

Lastly, the diagram includes the Stores entity, which contains crucial information about T-Mobile's store locations, such as store ID, store name, store address, and phone number. The relationship between Stores and Customer further underscores the integration of T-Mobile's physical retail presence with its customer database. This ER diagram provides a structured and comprehensive representation of the intricate relationships between customers, services, sales, invoices, and advertisements within T-Mobile's database system, facilitating efficient tracking and management of T-Mobile's marketing and sales efforts.

In summary, this ER diagram presents a structured representation of the interrelationships between customers, services, sales, invoices, and advertisements within the T-Mobile database system. These relationships enable T-Mobile to efficiently track and manage its marketing and sales activities, ensuring a comprehensive understanding of customer transactions and the impact of marketing campaigns on the bottom line.

* 1. **SERVICE**

T-Mobile, a prominent player in the telecommunications industry, boasts an intricate and multifaceted service ecosystem. Within this dynamic framework, five core entities—Customer, Service, Sales, and Delivery Request—form the backbone of T-Mobile's operations. This introduction provides a concise overview of these interconnected entities, which collectively enable T-Mobile to deliver seamless, customer-focused services and efficiently manage its extensive service portfolio. Let's explore how these entities contribute to T-Mobile's success in providing top-tier telecommunications solutions.

Firstly, the "Customer" entity serves as the cornerstone, representing T-Mobile's diverse customer base. It stores crucial customer details, including their unique identification, personal information, contact details, and addresses. This entity allows T-Mobile to manage and track its customer interactions efficiently. Moreover, it establishes a Many-to-One relationship with the "Sales" and "Delivery Request" entities, enabling a seamless connection between customers and their sales transactions and delivery requests.

The "Service" entity, another pivotal component, catalogues the range of services offered by T-Mobile. It encompasses attributes such as service ID, name, description, and dates, providing comprehensive information about each service. This entity forms a crucial connection between various parts of the database, as services can have multiple sales, inventory items, and delivery requests associated with them. This relationship allows T-Mobile to monitor the performance and utilization of its services effectively.

Figure 15: ER Diagram of Service

A diagram of a software company

Description automatically generated with medium confidence

The "Sales" entity is pivotal in recording customer transactions. It captures sale-specific data, such as sale ID, customer ID, service ID, date, and total amount. Each sale is intricately linked to a specific customer and a specific service, facilitating accurate tracking and reporting of sales activities. This entity is crucial for financial and sales analysis, enabling T-Mobile to understand customer preferences and revenue generation.

On the other hand, the "Delivery Request" entity is responsible for managing customer requests for service deliveries. It encompasses essential details such as request ID, customer ID, service ID, request date, status, and delivery address. This entity establishes a Many-to-One relationship with both customers and services, allowing T-Mobile to efficiently manage and monitor delivery requests while ensuring that customer preferences are met promptly.

In summary, the ER diagram for T-Mobile's database schema reflects a comprehensive approach to managing services, sales, inventory, customers, and delivery requests. The entities and relationships established within the schema provide a solid foundation for T-Mobile to optimize its operations, enhance customer service, and make informed business decisions based on data analysis and customer insights. This structured approach ensures efficient data management and enables T-Mobile to thrive in a competitive telecommunications industry.

# CRUD MATRIX

*11.1 INBOUND LOGISTICS*

In the context of T-Mobile's inbound logistics, the management of data within Manufacturing Data, Inventory Data, and Supplier Data categories. The "Source Raw Materials" process involves creating and accessing data, including manufacturing processes, inventory management, supplier details, and delivery requests. In the "Inspect Raw Materials" process, data is read and updated in these data stores, allowing for adjustments and enhancements based on inspection findings. When it comes to "Order Raw Materials," interactions primarily focus on Inventory Data and Supplier Data, enabling the manipulation of inventory levels and supplier relationships for efficient inbound logistics. "Warehouse Raw Materials" revolves around updating data within these categories, ensuring adjustments in manufacturing processes, inventory levels, supplier relationships, and inventory management protocols. "Distribute Raw Materials" entails updating Manufacturing Data, Inventory Data, Inventory Management Data, Supplier Data, and Delivery Request Data based on raw materials inspections, enhancing T-Mobile's inbound logistics through effective data management within the Manufacturing, Inventory, and Supplier categories, ultimately contributing to a well-optimized supply chain.

Figure 16: CRUD of Inbound Logistics

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*11.2 OPERATIONS*

Operations at T-Mobile involve managing the day-to-day activities of the company's network and services. This includes tasks like network maintenance, capacity planning, and resolving technical issues to ensure a reliable and seamless mobile service experience. It has one main data center as Product Data. The CRUD matrix in the operations framework outlines critical data interactions between level 1 processes and entities. "Manage Quality Control" requires both reading and updating access to "Service Plan," ensuring quality standards align with service offerings. Similarly, "Inspect Final Product" necessitates reading and updating the service plan to maintain product quality. "Organize Raw Materials" and "Inventory" have an updated relationship, ensuring accurate management of available raw materials. "Relay Raw Material Order" and "Order" are linked in a creation process, initiating material procurement for operations. Lastly, "Design Products" involves creating entries in the "Service Plan" to offer newly designed products, thus enabling customers to access and benefit from these innovations. These interactions emphasize the importance of seamless data flow and coordination in the operations process.

Figure 17: CRUD of Operations

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*11.3 OUTBOUND LOGISTICS*

Outbound logistics is basically the process of delivering the product ordered by the customer from the store and it has two main data centers as: Product Data and Store Data. In this process the customer reads the inventory final products and orders the product, inventory is read from inventory final products. Invoice will be created when the Shipping is scheduled and updates the manage final product warehouse regarding the inventory. The stores read and update the scheduled shipping and read the package final products before the delivery process. Delivery is created when the delivery products process begins and updates when the shipping is scheduled, in delivery the package final products process has been read to verify the customer information and address. While the delivery is in process the customer reads the packaged product and then the inventory is updated in manage final product warehouse process.

Figure 18: CRUD of Outbound Logistics

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*11.4 SALES & MARKETING*

The following CRUD matrix for sales and marketing of T-Mobile defines and manages the basic operations performed on the data. This CRUD matrix is obtained by evaluating the process and the entities of T-Mobile sales and marketing. The manage customers process creates the customers entity and reads the stores and advertisements entities to manage the customers like getting new customers. The determined selling method process reads the invoice entity and creates the stores entity because it basically determines the selling method, so it creates the stores entity and also creates and updates the sales entity. Managing advertisements process is used to create and update the advertisement entity. Analyze market trends process analyzes the trends in the market by reading the Advertisement and sales entities. Price products process reads the invoice and customer entities, updates the invoice and stores entities. Based on the relationship between the entities these entities are grouped into two data stores namely store data and sales data. The store data has grouped by invoice, customers, and stores, where sales data has grouped by advertisements and sales entities. In summary, this CRUD matrix establishes clear guidelines for managing sales and marketing operations. It ensures that users or roles have appropriate permissions to perform their tasks effectively while maintaining data security and integrity. The flexibility of permissions allows for adaptability in a dynamic sales and marketing environment, contributing to better decision-making and customer management.

Figure 19: CRUD of Sales & Marketing

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*11.5 SERVICE*

T-Mobile, as a company, excels in offering customer support services post-purchase. Echoing the sentiments mentioned earlier in this paper, T-Mobile's commitment to post-sale support is a pivotal way of maintaining an ongoing relationship with its clients. During various stages of customer interaction, it becomes imperative for T-Mobile to gather and create specific data: information related to customer service inquiries and resolutions is essential to gather feedback from clients regarding any issues or concerns post-purchase. It is essential to read and handle this data. This makes it possible for T-Mobile to effectively track and monitor both resolved and pending service requests. For example, T-Mobile needs to handle consumer reports of service or product problems to efficiently monitor the resolution process. After the problem is fixed, whether by replacement, service adjustment, or some other method, it is crucial to review and update this data to verify that the operation was completed.

Analyzing customer satisfaction also hinges heavily on the ability to interpret this data. T-Mobile must read and analyze social media interactions and data from other online services to accurately gauge customer sentiments. This process often involves not just reading but also updating the service data. Updating and maintaining this data ensures its accuracy and relevance, aiding in cleaning and refining the dataset. This meticulous approach to managing "after-sales service" data reflects T-Mobile's dedication to enhancing customer experience and support.

The CRUD matrix presents the interactions between various service processes and data entities. For instance, the "Analyze feedback" process involves reading from numerous data entities such as Delivery Request, Order, Invoice, Service Plan, Deliveries, Customer, Stores, Advertisement, and Sales. Similarly, when providing technical support, the system reads information from the Delivery Request, Service Plan, Delivery, and Customer while ng the Customer data entity. The "Maintain customer relationship" process reads from Order and Customer and has the capability to both read and update the Customer entity. In contrast, "Maintain final products" only reads from the Stores entity. Lastly, "Collecting customer feedback" reads from Delivery Request and Customer and can read from as well as update the Customer and Sales entities. This matrix is a crucial tool in system design and database planning. It ensures that every process can seamlessly access the requisite data, thereby upholding data integrity throughout the system.

The connection between various service activities and certain data entities is depicted in the CRUD matrix. "Analyze feedback" retrieves information from nine data entities, whereas "Provide tech support" retrieves information from four and modifies one. These matrices are essential for designing databases and systems because they guarantee that each operation can access the correct data and maintain data integrity.

Figure 20: CRUD of Service

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# DFD with DATA STORES

*12.0 LEVEL 0*

T-Mobile, a renowned telecommunications entity, relies on an intricate yet efficient system to manage its operations, as depicted by its Level 0 Data Flow Diagram. This essay delves deep into the diagram's portrayal of T-Mobile's processes, illuminating the interactions between activities, data storage, and external entities.

At the outset, T-Mobile's supply chain is anchored by its Suppliers, who furnish essential raw materials for the company's multifaceted operations. These Suppliers forward invoices to T-Mobile's Inbound Logistics process, a hub that governs the reception and management of these raw materials. In reciprocation, Suppliers receive their due payments and occasionally specific delivery requests to streamline material provision.

Inbound Logistics' chief responsibility lies in the regulation of raw material inflow. It harnesses shipment information to monitor material deliveries meticulously. From there, these raw materials are channeled to the Operations process, the heart of T-Mobile's manufacturing and processing endeavors. Within Operations, there's a symbiotic relationship with the Product Data store. This data store is updated with initial design specifications and is later consulted for the final design details. Furthermore, Operations overseas stringent quality control checks, ensuring products that proceed to the Sales & Marketing sector are of the highest caliber.

In the realm of distribution, Outbound Logistics emerges as the key player. This segment is charged with ensuring products reach their destined locations efficiently. It meticulously updates the Product Data store with shipment specifics and identifies any defective products. Such defective products are subsequently directed to the Service division for rectification or replacement.

Sales & Marketing stands as the company's front line, interfacing directly with the market and the consumers. This segment receives products prepped for sales from Operations and formulates robust marketing stratagems, including persuasive advertisement campaigns. Their target audience, the Customers, responds to these campaigns, often culminating in new orders. The relationship between Sales & Marketing and the Stores Data store is noteworthy. The former leans on the data store for invaluable marketing insights while simultaneously updating it with profit metrics.

Post-sale, T-Mobile's dedication to its customer base is epitomized by its Service division. This segment is the focal point for warranty claims and addressing issues with defective goods. It works meticulously to ensure products requiring updates are directed appropriately to the store inventory.

Supplementing these processes are two vital data stores: the Product Data and the Stores Data. While the former acts as the repository for design and shipment nuances, the latter retains a record of finished products, marketing analytics, and store-generated profits.

Lastly, the Store Inventory, presumably an external system, plays a pivotal role by receiving delivery updates from Outbound Logistics. Its function is likely imperative in sustaining an updated record of product stocks and streamlining logistics.

Figure 21: Level-0 DFD with Data Stores

*A diagram of a diagram

Description automatically generated*

In conclusion, the Level 0 Data Flow Diagram provides an exhaustive representation of T-Mobile's operational ecosystem. The orchestrated interactions between activities, data repositories, and external stakeholders underscore T-Mobile's commitment to operational efficiency, market responsiveness, and unyielding customer dedication.

*12.1 INBOUND LOGISTICS*

At the heart of this framework are three essential data stores: the Manufacturing, Inventory, and Supplier Data Stores, each contributing uniquely to the operational prowess of T-Mobile.

The Manufacturing Data Store serves as a crucial bridge between raw material procurement and inspection. It meticulously captures and processes vital data points, such as supplier information and raw material inspection results. The store's output, mainly the Production Defect Data, offers insights into the production process's potential inefficiencies. By leveraging this data, T-Mobile can swiftly rectify operational hitches, ensuring product quality remains uncompromised.

Adjacent to this, the Inventory Data Store sits at the intersection of order placement and warehouse management. It acts as a sentinel, monitoring the flow of raw materials and other inventory items. By processing inputs like purchase orders, it generates real-time Inventory Updates. This real-time feedback mechanism ensures T-Mobile maintains optimal stock levels, aligning with market demands and ensuring product availability.

Figure 22: DFD with Data Stores of Inbound Logistics of T-Mobile

*A diagram of a company

Description automatically generated*

Lastly, the Supplier Data Store is T-Mobile's reservoir for all supplier-related data. This store strengthens T-Mobile's relationships with suppliers by ensuring seamless coordination and communication. It amalgamates varied data, from supplier performance metrics to multi-team feedback, offering a comprehensive overview of supplier interactions. An integral output from this store is shipment notifications, ensuring timely processing of materials, solidifying the store's importance in operations. In summary, T-Mobile's robust inbound logistics framework is powered by its trio of data stores. Each store, with its unique role, ensures operations run smoothly, positioning T-Mobile as a leader in the telecommunications domain. Their strategic approach to data management underscores their commitment to operational efficiency and customer satisfaction. In a nutshell, these data stores exemplify T-Mobile's dedication to excellence in the fast-paced world of telecommunications.

*12.2 OPERATIONS*

T-Mobile, a market leader in telecommunications, excels at providing first-rate mobile services as well as precisely managing every aspect of its value chain operations to guarantee customer satisfaction and superior products. The meticulous and creative design of T-Mobile's products marks the start of its journey. The business develops product specifications that are in line with consumer needs and market demands by thorough market research, customer feedback analysis, and keeping a close watch on technology advancements. The Design Product process entails developing thorough design documentation, prototypes, and a vision for products that will stand out in a cutthroat market.

Figure 23: DFD with Data Stores of Operations of T-Mobile

*A diagram of a product quality control

Description automatically generated*

T-Mobile's operations are built around quality. T-Mobile has an effective Quality Control mechanism in place to guarantee that its goods adhere to the highest industry standards. Quality requirements, inspection standards, and performance benchmarks are established through this procedure. To ensure that clients receive high-quality, dependable products and services, it plays a critical role in discovering and correcting any deviations from these standards.

T-Mobile keeps a well-oiled supply chain to back up its operations. A crucial part of this procedure is organizing the raw resources. The business carefully monitors its suppliers, considering demand projections, stock levels, and production schedules. T-Mobile does this to guarantee the prompt availability of all necessary parts and supplies for product assembly.

For smooth production, effective raw material procurement is essential. Communication with suppliers, starting purchase orders, and verifying delivery dates are all part of the Relay Raw Materials Order process. This guarantees that the supply chain remains unbroken, ensuring that the manufacturing operations go without a hitch.

The thorough inspection of finished goods is the last step in the value chain operations at T-Mobile. Here, things are put through in-depth testing and inspection using quality standards and specialist tools. Any flaws or problems found during the inspection are noted in reports, establishing a feedback loop that links back to the initial design stage. This input is crucial for enhancing the quality and design of products continuously. To encapsulate, this manufacturing journey, as portrayed in the diagram, is a harmonious ballet of various processes. From design to quality assurance, each step, interconnected and interdependent, ensures that the final product stands as a paragon of quality and efficiency.

*12.3 OUTBOUND LOGISTICS*

The Inventory Final Products process at T-Mobile receives both finished products from Operations and defective goods from Service, generating Inventory reports that are forwarded to Schedule Shipping. Additionally, this process verifies all finished products and subsequently forwards them to the Package Final Products section for packaging and distribution.

Figure 24: DFD with Data Stores of Outbound logistics of T-Mobile

A diagram of a product

Description automatically generated

Schedule Shipping, in turn, transmits data including inventory reports to the Package Final Products team, shipment schedules to manage the Final Products Warehouse, and route maps to the Deliver Products process. Within the Package Final Products process, inventory reports received from Schedule Shipping for the finished products are used to package the products before sending them to the Manage Final Products Warehouse.

The Manage Final Products Warehouse process then receives the packed products from Package Final Products and gathers all necessary data from the Schedule Shipment process, ensuring the finished products are ready for delivery to the Deliver Products process.

Finally, the Deliver Products process takes charge of the finished products and route maps, forwarding packaged products to the Sales & Marketing Team while assigning product deliveries to the Services Team.

*12.4 SALES & MARKETING*

The provided operations data flow diagram offers an in-depth insight into T-Mobile’s Sales & Marketing procedures. Strategically divided into several interconnected processes, the diagram showcases the systematic flow of operations to optimize sales and maintain strong customer relationships.

Commencing with 'Sales', it sets the stage for subsequent processes. An integral component here is the 'Analyze Market Trends', which processes data from sales to assess prevailing market trends, feeding this analysis through 'Market Trend Reports'. By staying abreast of current market dynamics, T-Mobile ensures its offerings remain relevant and competitive.

Furthering the analytical approach, the ‘Product Sales Trend Reports' and 'Customer Surveys' contribute valuable data to the 'Price Product' segment. Here, pricing decisions are meticulously crafted, balancing market demands, production costs, and competitive landscapes. Updates on pricing strategies are relayed through 'Price Updates' ensuring transparency and uniformity across all channels.

Adjacent to this is the 'Manage Advertisements' node. It is here that the company’s marketing strategies are brought to life, leveraging 'Advertise Content' and 'Promotional Data' to craft compelling campaigns. This module collaborates seamlessly with other processes, receiving market insights and sending out updated packages for sales integration.

A pivotal process depicted is the 'Manage Customers' node. Interfacing with 'Price Details', 'Customer Account Data', and 'Warranty', it embodies T-Mobile's commitment to customer satisfaction. By understanding customer acquisition costs and managing account data efficiently, T-Mobile ensures a seamless customer experience, fostering loyalty and driving repeat business.

Lastly, the 'Determine Selling Method' phase is a testament to T-Mobile’s adaptive sales strategies. Whether it’s through direct sales, tele-marketing, or other avenues, the method is chosen based on 'Sales Strategy Information' and is relayed through 'Advertisement', ensuring a cohesive sales and marketing strategy.

In summary, this diagram exemplifies T-Mobile's integrated Sales & Marketing approach, spotlighting its analytical mindset, customer-centric operations, and agile marketing strategies, all harmonizing to propel the company to new heights in a dynamic market landscape.

Figure 25: DFD with Data Stores of Sales & Marketing of T-Mobile

*A diagram of a company

Description automatically generated*

*12.5 SERVICE*

Data Flow Diagrams (DFDs) with data stores pertaining to the "service" aspect of T-Mobile. This is organized into multiple interconnected processes, emphasizing the interplay and flow of information between various elements. The central process "Provide tech support" is linked to the "Management" data store. This process receives "Support tickets" and "Issue resolution" as its two inflows. The outflows from this process are directed towards "Service Request Intake" and "Communication Logs”. Adjacent to this, there's another process titled "Maintain final products". This process emphasizes the company's commitment to product quality and updating. The inflows for this process are "Continuous Improvement" and "Product updates", while its outflows connect to "Delivery of the products" and "Privacy and Security".

The process of "Maintaining customer relationships" revolves around keeping customers engaged and satisfied. The inflows into this process include the "Warranty" and "Advertisement", while the outflows are focused on "Customer Engagement" and "User communication". The diagram also features an "Analyze feedback" process, underlining the importance of customer feedback. The inflows for this segment are "Issues Identification" and "Feedback", leading to the outflows of "Prioritization" and "Reports". A notable addition to the diagram is the "Manage support requests" process. This newly introduced process has two inflows: "Support tickets" and "User support requests". The corresponding outflows from this process are aimed at "Issue resolution" and "Service Request Intake". This process suggests an organized way to handle and resolve support inquiries from users. "Collecting customer feedback" is a process that highlights the significance of understanding customer needs and preferences. This process takes in "Privacy and Security" and "Final Product" as inflows, producing "Feedback" and "Customer Engagement" as its outflows. The DFDs present a comprehensive view of T-Mobile's service-oriented processes, demonstrating the intricate interconnections between various steps and emphasizing the company's commitment to technical support, product maintenance, customer relationship management, feedback analysis, and support request management.

Figure 26: DFD with Data Stores of Service of T-Mobile

*A diagram of a company

Description automatically generated*

# REENGINEERING

*13.1NBOUND LOGISTICS*

T-Mobile's incorporation of the "Invoice Suppliers" process into its inbound logistics system signifies a transformative approach towards payment management and supplier relationship fortification. This strategic move underlines the importance of financial transparency in today's rapidly changing business environment. Upon confirmation of raw material orders, an automated invoicing procedure is triggered, reflecting the agreed-upon terms concerning the quantity and quality of materials procured. The automated system not only reduces manual errors but also strengthens trust between T-Mobile and its suppliers, ensuring accuracy in billing.

Several compelling reasons drive this innovative addition. First, automated invoicing reduces discrepancies, fostering a more seamless and trustworthy supplier-buyer relationship. By centralizing the invoicing process, T-Mobile ensures punctual payments, eliminating the risk of late fees, and thereby achieving significant operational cost savings. Moreover, regularized invoicing underscores T-Mobile's commitment to its partners. Suppliers, assured of timely and accurate payments, are more likely to offer priority services and potentially more favorable business terms in future engagements.

The impact of this integration extends across multiple facets of T-Mobile's operations. Administratively, it eases the burden, allowing for a more efficient allocation of resources. Data-wise, the consistent flow of invoice information into key data repositories facilitates easier reconciliations, ensuring every transaction is traceable. This simplifies audits and financial checks. Financially, predictable invoicing cycles enable better cash flow management and strategic financial planning. In essence, the "Invoice Suppliers" process not only streamlines T-Mobile's logistical functions but also amplifies its commitment to transparency, efficiency, and relationship-building, setting the company distinctly ahead in the competitive landscape.

Figure 27: Reengineering of Inbound Logistics of T-Mobile

*A diagram of a company

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*13.2 OPERATIONS*

T-Mobile's inclusion of the "Receive Raw Materials" process into its operational strategy marks a notable enhancement in its supply chain dynamics. At its core, T-Mobile has always prioritized product design, quality assurance, and end-product scrutiny. However, this new process positions the company to better manage and streamline its material intake, a critical step in the broader product development lifecycle. This addition represents more than just a procedural update; it symbolizes T-Mobile's commitment to precision and quality from the very beginning of its production chain. By setting up a system that meticulously monitors the inflow of raw materials, the company can ensure that every batch aligns with its stringent quality metrics, laying the foundation for consistent product output.

Several benefits arise from this integration. First, it introduces a structured protocol for material reception, minimizing errors and ensuring that every material unit is accounted for. This systematic approach aids in identifying discrepancies between ordered and received batches early on, reducing potential hold-ups in subsequent operational phases. Additionally, real-time inventory updates become more accurate, essential for T-Mobile's resource planning and allocation. Furthermore, this dedicated process fosters enhanced transparency with suppliers. With an accurate log of material inflow, both T-Mobile and its suppliers benefit from clearer accountability, ensuring smoother collaborations.

Figure 28: Reengineering of Operations of T-Mobile

*A diagram of materials and materials

Description automatically generated*

In essence, while the "Receive Raw Materials" process might appear as a basic operational addition, its implications are vast. By ensuring precision at the initial stages, T-Mobile sets the stage for operational excellence, reinforcing its reputation for quality and efficiency. This strategic move not only optimizes the present but also positions T-Mobile for future scalability and growth.

*13.3 OUTBOUND LOGISTICS*

The integration of the "Track Shipment" process into its outbound logistics, demonstrates T-Mobile's commitment to elevating both the customer experience and operational efficiency. The "Track Shipment" feature provides customers with real-time insights into their product's journey, allowing for accurate delivery predictions and fostering trust. From T-Mobile's perspective, this real-time oversight enables swift identification and resolution of any supply chain interruptions. Proactive communication in the event of delays ensures consistent reliability and service excellence.

Furthermore, the tracking mechanism offers T-Mobile data-driven insights, enabling continuous refinement of its delivery processes. By understanding routes and delays, T-Mobile can optimize operations for better speed and cost-effectiveness. In essence, the "Track Shipment" process positions T-Mobile as a pioneering brand, harmoniously merging operational efficacy with an enhanced customer experience. Through such innovations, T-Mobile solidifies its reputation as a customer-focused entity in a dynamic digital age.

Figure 29: Reengineering of Outbound logistics of T-Mobile

*A diagram of a process

Description automatically generated*

*13.4 SALES & MARKETING*

With the introduction of the "Manage Social Marketing" process, the recognizing of T-Mobile the increasing influence of digital platforms on consumer behavior, this integration epitomizes T-Mobile's commitment to staying relevant and engaging in today's fast-paced digital marketplace.

Social media has transcended from being just another communication channel to a pivotal marketing tool. It offers businesses like T-Mobile an unparalleled opportunity to not only showcase their products and services but also engage directly with consumers, gathering feedback and gauging sentiment in real-time. The newly incorporated "Manage Social Marketing" process emphasizes T-Mobile's intent to harness this powerful medium fully.

However, it's crucial to note that this new process isn't about sheer volume or constant promotional bombardment. Instead, T-Mobile focuses on creating meaningful, authentic connections with its audience. By analyzing customer feedback, monitoring online trends, and assessing consumer responses, T-Mobile can tailor its social media campaigns to ensure maximum resonance and engagement.

Moreover, the integration of this process with established modules like "Analyze Market Trends" ensures that T-Mobile's social media strategy aligns with its broader marketing goals. Consistency in messaging across various channels solidifies the brand's image and ensures a cohesive customer experience. Furthermore, the two-way communication facilitated by the "Manage Social Marketing" process allows T-Mobile to remain adaptive, adjusting its strategies based on real-time consumer feedback.

In conclusion, T-Mobile's strategic inclusion of the "Manage Social Marketing" process into its Sales & Marketing framework underscores its vision of embracing change, enhancing customer engagement, and ensuring sustained growth in an increasingly digital world.

Figure 30: Reengineering of Sales & Marketing of T-Mobile

*A diagram of a company's process

Description automatically generated*

*13.5 SERVICE*

The integration of the "Manage support requests" process in T-Mobile’s service workflow signifies their focus on streamlining customer support and addressing issues effectively. The flow begins with users submitting their support tickets, which are managed under the newly implemented "Manage support requests" procedure. This ensures a systematic intake of queries and concerns. A pivotal interaction takes place at the "Provide tech support" juncture, where technicians receive and act on service requests. Here, the real-time issue resolution, coupled with continuous improvement initiatives, becomes evident. This continuous process ensures T-Mobile's services remain at the forefront of customer satisfaction.

Figure 31: Reengineering of Service of T-Mobile

*A diagram of a company's process

Description automatically generated*

Furthermore, communication logs provide a record of all interactions, facilitating transparency and fostering trust. Concurrently, the "Maintain customer relationship" process emphasizes long-term rapport. By offering timely product updates and upholding privacy and security standards, T-Mobile guarantees that customers feel valued and protected. Feedback is an essential component. It's not just collected, but meticulously analyzed to identify prevalent issues and drive improvements. This integrated approach, where feedback directly influences product and service enhancements, establishes T-Mobile as a customer-centric entity. By blending the traditional elements of service with the new "Manage support requests" process, T-Mobile exhibits its unwavering commitment to excellence, ensuring its services remain reliable and top-notch in an ever-evolving digital landscape.

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