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Sustainability Through Business Architecture, Part II:

Circular Economy Transition Via Business Model Transformation

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In Part I of this *Executive Update* series, we discussed leveraging business architecture to achieve sustainability via the circular economy. We introduced two circular economy domains that serve as "hooks" to connect circular economy perspectives with business architecture: value cycle and value carrier. Here in Part II, we detail business architecture's role in transitioning to the circular economy while concurrently delivering related business strategies that include opening up new markets and new revenue streams. To highlight the approach, the *Update* centers on business model optimization and business model innovation for an automotive manufacturing company seeking to maximize its traditional manufacturing business while concurrently opening up new customer segments, services, and revenue streams within the digital economy. Existing business model optimization and new business model innovation enable organizations to transition to the circular economy while concurrently delivering bottom-line benefits. Business model optimization and innovation each leverage business architecture in unique ways to achieve business objectives.

Circular Economy Transition Via Business Model Optimization

Regardless of whether a vehicle is owned, leased, shared, or rented, real-time data capture and analytics can expedite research into new ways to extend vehicle life; improve safety, tracking, and recovery of key parts/materials at the product end of life; and fine-tune the overall production model. In other words, optimized business models deliver bottom-line business value while concurrently transitioning an organization to the circular economy. The focus on business model optimization targets investments in traditional manufacturing models, with an emphasis on reuse, recycle, and remanufacturing of materials and products.

Business Model Optimization

Traditional manufacturing business models offer multiple opportunities for organizations to engage in the circular economy. The automotive industry business model shown in Figure 1, as viewed through the Business Model Canvas, represents a traditional manufacturing firm, where the company designs, builds, and sells vehicles to individuals through a dealer network and to companies and government agencies in the case of fleet sales.

The manufacturing business model shown in Figure 1 focuses on a traditional automotive industry model, where the company builds vehicles and distributes them through a dealer network. The customers in this model are viewed as the individuals who purchase vehicles via a dealer as well as companies and government agencies that acquire multiple vehicles for their fleets. Rapid automotive industry transformations are forcing companies to be more competitive, reuse more materials, increase vehicle longevity, and increase customer satisfaction through an enhanced customer experience.

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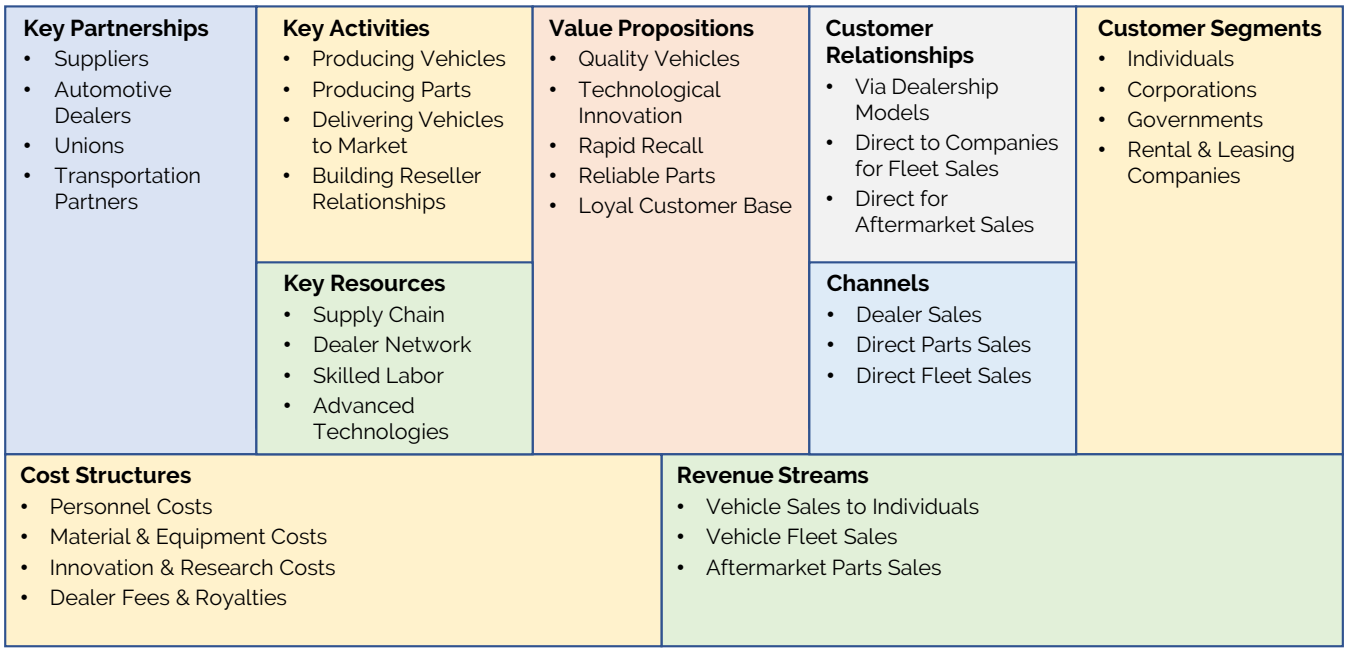

Figure 1 — Traditional automotive industry manufacturing business model.

Optimizing existing or traditional business models can achieve aspects of sustainability envisioned by the circular economy. For example, improved fuel economies, a shift toward electric vehicles, reduction and reuse of waste, and end-of-life buy-back programs all align to the overall goals of the circular economy. However, it may take the introduction of new, innovative business models to augment and accelerate steps toward sustainability. While the longstanding business model shown in Figure 1 will continue to be refined based on continuous innovation, new business models can emerge, opening up new avenues of opportunity and sustainability.

Role of Business Architecture in Business Model Optimization

Business model optimization plays an important role in transitioning to the circular economy. Business architecture enables this transition while concurrently enabling organizations to streamline costs, increase revenues, and achieve related strategic objectives. Consider the traditional automotive manufacturing business model shown in Figure 1, which focuses on designing products, retooling

production lines, optimizing material utilization, manufacturing products, and selling and delivering those products. Viewing this automotive manufacturing company through the lens of business architecture provides an actionable perspective on the business ecosystem, which in this scenario includes, among other things, the dealer network through which manufacturers engage the end customer.

Figure 2 highlights six value streams relevant to optimizing traditional automotive manufacturing business models. In this traditional view, the "product" includes the vehicle itself, add-on options, warranties, and post-delivery services. The six value streams in Figure 2 focus on optimizing material inventories, setting up and running assembly lines and other operations, designing and developing new products, creating and deploying the final product, enabling customers to acquire those products, and maintaining the vehicle.

The business architecture value streams shown in Figure 2 deliver the value propositions shown to the right for the triggering stakeholder shown to the left. In some situations, the triggering stakeholder seeking the value proposition is the end customer, but in other cases it may be an inventory manager, product manager, or shift supervisor. For example, Figure 2 depicts *Optimize Material*

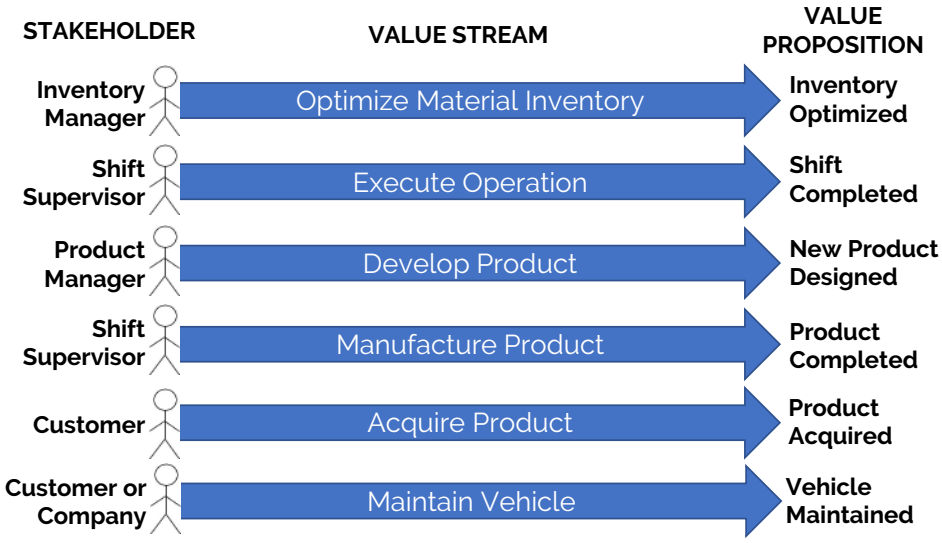

Figure 2 — Value streams targeted to achieve business model optimization.

Inventory to ensure that the right material is available just in time. *Execute Operation*, on the other hand, sets up and runs manufacturing shifts, assembly lines, and other operations. *Develop Product* produces a final product design, while *Manufacture Product* delivers a ready-to-sell or ready-to-deliver product. In this traditional manufacturing business model, the *Acquire Product* value stream delivers the vehicle to individual customers and fleet customers. In keeping with the holistic ecosystem-wide perspective, the *Maintain Vehicle* value stream represents a customer obtaining vehicle maintenance, which would typically be through the dealer network for individuals.

Value streams form the basis for targeting business objectives, related initiatives, and corresponding investments required to optimize this traditional manufacturing business model.

Value streams form the basis for targeting business objectives, related initiatives, and corresponding investments required to optimize this traditional manufacturing business model. These investments target capabilities that collectively enable one or more of the value streams shown in Figure 2. Planning teams specifically target capabilities to address performance gaps, with priority given to underperforming, customer-impacting capabilities. Each initiative seeks to improve the behavior of selected capabilities, driven by business objectives that concurrently improve the company's financial position, improve the customer experience, and transition to the circular economy. A sampling of high-profile, high-level capabilities that enable the aforementioned value streams includes the following:

- **Facility Management** — tracks, maintains, and configures factories, warehouses, office buildings, and other company-owned, company-leased, and partner-related structures
- **Asset Management** — tracks, configures, and maintains equipment, tools, hardware, software, and other properties used in a business
- **Operation Management** — sets up, designs, and synchronizes an orchestration of work that includes, for example, factory shifts, shipping centers, assembly lines, service centers, and dealer work shifts
- **Material Management** — identifies, tracks, and transforms matter used in the manufacture of products and includes, for example, raw material, parts, subassemblies, chemicals, fuel, and waste

- **Customer Management** — identifies, tracks, and engages individuals and organizations that receive or benefit from the organization's products and services, by agreement or other means
- **Partner Management** — engages third parties that collaborate with the manufacturer to further its mission and goals and includes, for example, suppliers, dealers, and transportation companies
- **Product Management** — configures and embodies vehicles and related entitlements, such as warranties, as well as aftermarket products that include parts and interactive, in-vehicle services

These capabilities form the basis for delivering end-to-end value as framed by the value streams shown in Figure 2. When an automotive manufacturer seeks to optimize its traditional operating model, the value streams shown in Figure 2, along with corresponding capabilities, information concepts, and stakeholders, form important investment focal points. For example, an overall strategy to transition toward a circular economy would focus on the previously listed value streams and capabilities engaged in:

- Reusing and recycling material during the acquisition, optimization, transformation, and use of those materials, including optimizing the use of byproducts from the manufacturing process
- Optimizing operations, facility configurations, asset utilization, and partner engagement via improved automation, training, or other means
- Streamlining vehicle delivery, transportation routes, and means of fulfillment

An example of changes induced by business model optimization is the introduction of remanufacturing; for example: "Caterpillar no longer specifies if a new engine is new or remanufactured, as the technical specifications, sales price and warranty are the same." In this example, trackers and other conveyors that reach end of life reenter the manufacturing cycle as an alternative source of parts, to be refurbished and reintroduced into the supply chain. As a result, a new sourcing channel is added, while no disruptive changes are required on the overall manufacturer's business model.

Besides obvious updates to the capabilities involved in the *Manufacture Product* value stream, a *Decommission Vehicle* value stream is required to represent the extraction of materials of interest, such as engines, from vehicles at end of life. These materials are subsequently delivered to the manufacturing plant through reverse logistics. The entry point in the decommissioning value stream happens locally, where vehicles are sold or traded, mirroring the point-of-sale concept for new vehicles. Figure 3 depicts the point-of-sale (POS) dealer, which is part of the automotive company's business ecosystem, triggering the *Decommission Vehicle* value stream.

Decommission Vehicle value stream stages are enabled by existing Material Management and a wealth of other capabilities. The value stream may require improving existing capabilities or adding new capabilities to manage vehicle condition, criteria matching, vehicle disassembly, component reuse, product refurbishment, and related scenarios. These capability improvements may additionally surface the need for modifications to information concepts focused on the vehicle and other business objects.

From the manufacturer's point of view, its traditional focus relates to production and go-to-market stages of the value cycle. For the sake of recycling effectiveness, optimization or expansion of the business model would ideally supply information needed by partner capabilities enabling the *Decommission Vehicle* value stream. Capability dependency analysis highlights information required from the manufacturer that maximizes the effectiveness of partner-delivered capabilities. Identifying these capabilities, in turn, helps identify the digital technologies required to deliver on key strategies. For example, capabilities that collect remote vehicle telemetry and related conditional data must be made available to enable partner-delivered capabilities needed to evaluate a vehicle prior to its decommissioning.

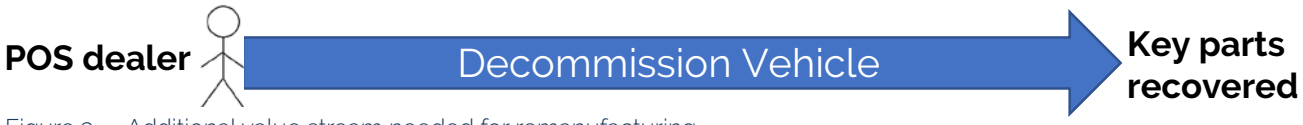

Figure 3 — Additional value stream needed for remanufacturing.

The holistic mapping of value streams, capabilities, information concepts, stakeholders, and business units across the business ecosystem enables coordinated execution among dealers, the manufacturing company, and other business entities. From an overall perspective, strategic planning can extend across a coordinated view of the development, manufacture, and decommissioning of the vehicle as well as the optimization of material inventories and operations.

Circular Economy Transition Via Business Model Innovation

While business model optimization can incrementally transition an organization toward the circular economy through reuse, recycle, remanufacture, and other techniques, customer, economic, and competitive demands are forcing organizations to reinvent themselves in new and unique ways.

While business model optimization can incrementally transition an organization toward the circular economy through reuse, recycle, remanufacture, and other techniques, customer, economic, and competitive demands are forcing organizations to reinvent themselves in new and unique ways. Reinvention requires innovation, which often leads to the need to deploy new business models that materially differ from existing business models. Note that any given organization can have multiple business models, oftentimes deployed across different business units and regions. This is neither a conflict nor an exception, but rather opens up new market segments, increases customer value propositions, and expands revenue opportunities.

Business Model Innovation

Figure 4 depicts a second automotive industry business model, one that encapsulates innovations being pursued by many companies within the automotive industry. This new business model focuses almost entirely on the aftermarket customer experience, where the focal point is on direct customer engagement of vehicle owners,

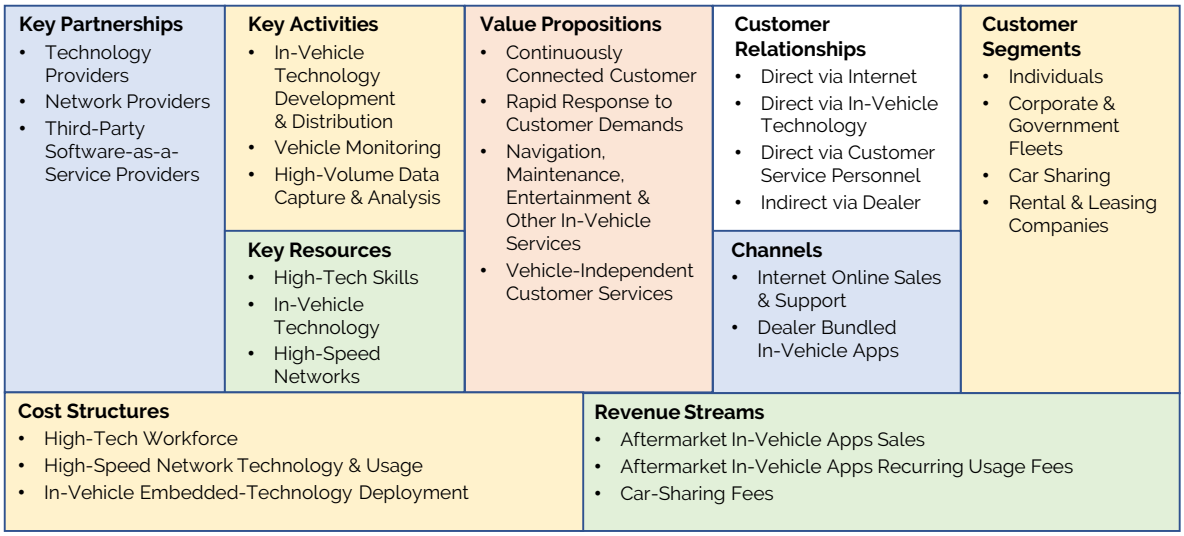

Figure 4 — Digitally connected customer automotive industry business model.

lessees, drivers, and passengers. Different companies assign varying names to this business model, but for purposes of this *Update*, we'll call it the "digitally connected customer" business model.

The digitally connected customer business model describes a path that many automotive manufacturers have long eyed, yet in many ways contrasts with the previously shown traditional business model. The digitally connected customer business model seeks to engage customers directly, improve customer experience at point of use, create an aftermarket revenue stream, and extend the life of the customer relationship and the life of the vehicle. Engaging directly with the customer when they take a trip or require assistance establishes a bond between the automotive manufacturer and the customer that may not exist under existing business models. Strategically, companies in multiple industries are seeking to establish or improve direct relationships with the end customer, where revenue and long-term growth opportunities can expand dramatically.

The digitally connected customer business model differs in many ways from traditional business models. For example, a company deploys aftermarket products in the form of in-vehicle technologies; performs vehicle monitoring and real-time data capture; directly engages vehicle owners, drivers, and passengers; enables real-time

assistance; and establishes partnerships with key technology providers. This new, innovative business model requires high-speed, continuous channel access, which, along with a high-tech workforce, represents an additional cost structure. Revenue under this business model is aftermarket-based, where in-vehicle product and service fees are charged on a recurring or per-usage basis.

From the perspective of the circular economy, the digitally connected customer business model seeks to concurrently improve the customer experience and increase aftermarket revenue, while opening up more strategic sustainability opportunities.

From the perspective of the circular economy, the digitally connected customer business model seeks to concurrently improve the customer experience and increase aftermarket revenue, while opening up more strategic sustainability opportunities. For example, proactive maintenance activities and real-time customer assistance can lengthen the life of the vehicle and ensure that the manufacturer is engaged in every aspect of the vehicle lifecycle, through use, maintenance, incident management, refurbishment, reuse, recycle, and ultimately disposal, covering the value cycles inherent in the circular economy. One extended perspective of this business model involves car sharing. Viewing the digitally connected customer business model holistically allows an organization to incorporate vehicle sharing, whether it be via a car-sharing subsidiary or via one or more partner organizations.

Role of Business Architecture in Business Model Innovation

Business model innovation differs from business model optimization insofar as innovation implies the transition or addition to a new business model, while optimization implies the ongoing improvement of an existing business model. For example, the digitally connected customer business model, shown in Figure 4, represents innovations that focus on direct customer engagement, digital products, and the aftermarket customer experience. This new business model envisions dramatic improvements to the customer experience and new revenue sources, while concurrently opening up opportunities to improve sustainability.

When a new, innovative business model differs materially from existing business models, transitions can be haphazard or even fail. One automotive company, for example, had the right vision, hired the right talent, and even reenvisioned the product management role to focus on aftermarket offerings. A second company focused on the technology but lacked the business perspectives required to target and leverage those technologies. In both cases, these companies lacked clear investment focal points. The results were predictable; projects did not align, requirements were off target, and investments were not coordinated.

When a new, innovative business model differs materially from existing business models, transitions can be haphazard or even fail.

These companies lacked a clear business ecosystem perspective required to plan and execute a transition to the digitally connected customer business model. This focal point is provided by business architecture, specifically well-articulated value streams, capabilities, information concepts, and stakeholders, to aid in visualizing the business ecosystem to enable strategy execution.

One example of business model innovation addressed by the business model in Figure 4 is car sharing as a service. A car-as-a-service business is a reuse cycle, where the car represents the value carrier. It delivers value for the users as well as for the rental company, and it is returned all the time, running the loop many times until disposal.

Figure 5 depicts five essential value streams that serve as the focal point for deploying the digitally connected customer business model. In the car-as-a-service value cycle, two value streams are fundamental: *Take a Trip*, representing the customer's value perspective, and *Maintain Vehicle*, representing the company's perspective of asset value maintenance that allows value cycles to be repeated.

The value streams shown in Figure 5 focus on direct aftermarket customer engagement, including situations where a customer takes a trip; obtains or upgrades in-vehicle products; recovers from an incident; has vehicle maintenance; and captures, analyzes, and disseminates vehicle, trip, customer, incident, and other information. These value streams form the focal point for driving investments to

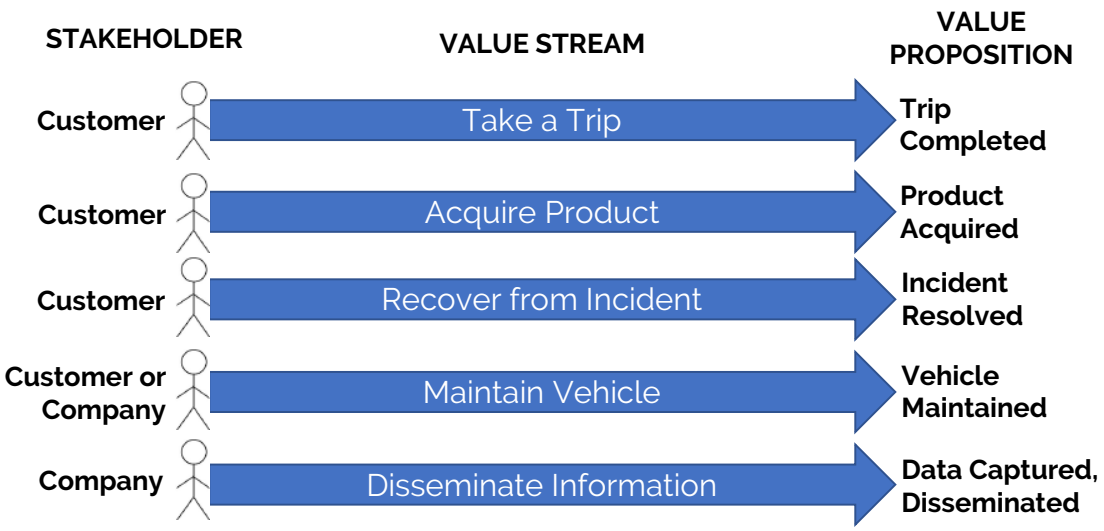

Figure 5 — Value stream focus for digitally connected customer automotive industry business model.

improve the customer experience, expand revenue streams, maximize asset utilization, and achieve new levels of sustainability in the circular economy.

For example, the *Take a Trip* value stream engages customers directly over the life of a "trip." Independent devices and in-vehicle products provide navigation, routing, entertainment, and other services; alert the driver to maintenance needs or incidents; and upload real-time data on the trip, vehicle, product usage, and incidents. The *Recover from Incident* value stream initiates when a vehicle failure or customer-reported incident occurs. Customers receive real-time assistance such as dispatching help or even emergency services.

The *Acquire Product* value stream deploys and activates in-vehicle products and related upgrades in the form of downloadable apps. These products provide navigation, entertainment, shopping, incident recovery, and other services. Product acquisitions can be completed in-vehicle or offline with the customer's choice of timing and device.

The *Maintain Vehicle* value stream is triggered when a customer determines, either independently or at the prompting of the manufacturer, that vehicle service is required. While this value stream exists in traditional manufacturing business models, interactive

messaging to the customer provides greater insights into specific timing and maintenance requirements.

Finally, the *Disseminate Information* value stream captures, transforms, and assimilates data captured on the vehicle, trips, routes, incidents, network utilization, and customers. This data is used for a wide variety of purposes, including improving vehicle design, resource utilization, navigation, network utilization, incident response, and other purposes. No personal customer data is ever used or compromised.

An annotated perspective of *Take a Trip* highlights how value streams are used in business model innovation and strategy execution. Figure 6 depicts an annotated view of the *Take a Trip* value stream, highlighting various stages and corresponding enabling capabilities, information concepts, stakeholders, and products used in context of a given stage. Value stream stages serve as the fundamental means of ensuring that capability- and information-related investments are value-oriented and consider the stakeholders engaged at each stage that delivers value for the stakeholder that initiates or "triggers" that value stream. For example, the customer, typically the driver, triggers the *Take a Trip* value stream while the

Take a Trip

	Plan Trip	Prepare for Trip	Depart Location	Arrive Destination	Terminate Trip
Key Enabling Capabilities	Plan Management, Trip Management, Location Management, Network Management, Material Management, Route Management, Geographic Space Management	Trip Management, Route Management, Location Management, Vehicle Management, Network Management, Material Management, Geographic Space Management	Trip Management, Route Management, Location Management, Vehicle Management, Network Management, Material Management, Geographic Space Management	Trip Management, Route Management, Location Management, Vehicle Management, Network Management, Material Management, Geographic Space Management	Trip Management, Route Management, Location Management, Vehicle Management, Network Management, Material Management, Geographic Space Management
Key Information Concepts	Plan, Trip, Location, Route, Network, Device, Material, Agreement, Customer, Product, Geographic Space	Plan, Trip, Location, Route, Network, Vehicle, Agreement, Customer, Material, Product, Geographic Space	Plan, Trip, Location, Route, Network, Vehicle, Agreement, Customer, Material, Product, Geographic Space	Plan, Trip, Location, Route, Network, Vehicle, Agreement, Customer, Material, Product, Geographic Space	Plan, Trip, Location, Route, Network, Vehicle, Agreement, Customer, Material, Product, Geographic Space
Key Stakeholders	Customer (Driver)	Customer (Driver, Passenger), Help Personnel	Customer (Driver, Passenger), Help Personnel	Customer (Driver, Passenger), Help Personnel	Customer (Driver), Help Personnel
Products	Mapping Tool	Mapping Tool, Gas Buddy	Navigation Tool, Gas Buddy, Mapping Tool, Entertainment Tool	Navigation Tool, Gas Buddy, Mapping Tool, Entertainment Tool	Navigation Tool, Mapping Tool

Figure 6 — *Take a Trip* value stream mapped to capabilities, information concepts, stakeholders, and products.

driver and passengers, both of which are considered customers, participate in the value stream.

Figure 6 highlights a sampling of relevant enabling capabilities that collectively further value delivery at each stage. Capabilities in the traditional automotive manufacturing business model are well understood and continue to play a role in the new, digitally connected business model. This new business model, however, requires that additional, new capabilities be introduced to successfully deploy the digitally connected customer business model. Trip Management, for example, is a new capability that would not exist in a traditional manufacturing business model. Essential capabilities enabling the *Take a Trip* value stream include:

- **Trip Management.** Establishes and tracks initiation and termination of a journey, which may be associated with a combination of routes and locations, and includes the collection of journey-related statistics. Each trip is associated with the customers, vehicle, routes, locations, and other concepts for statistical analysis.
- **Vehicle Management.** Identifies and tracks the car, truck, or other conveyor associated with a customer, trip, incident, or other scenario, including the capture and provisioning of vehicle data, which may be used to recommend maintenance, assess resale or salvage value, or generally provide insights into sustainability initiatives long term. A vehicle in this scenario may be owned, leased, or shared via a car-sharing service.
- **Network Management.** Ensures network access is available to enable all communication, navigation, information exchange, entertainment, and other in-vehicle entitlements.
- **Route Management.** Establishes and plots various courses or avenues, from location to location, that may be associated with a vehicle, trip, or segment of a trip.
- **Location Management.** Identifies and interprets specific latitudinal and longitudinal points used to associate the whereabouts of a vehicle, customer, or points of interest associated with a given route or trip.

- **Incident Management**. Identifies and quantifies unplanned issues that may arise and be associated with a vehicle, route, customer, or trip.
- **Material Management.** Identifies and tracks availability and levels of fuel, oil, and related materials relevant to vehicle operation, including parts if repair services are warranted during a trip.
- **Geographic Space Management.** Maps areas such as countries, states, or provinces, as well as borders being crossed, for insights into passport, declaration, legal, or other factors relevant to the customer.

Capabilities decompose into increasingly more granular capabilities, allowing planning teams to target investments with significant clarity of corresponding outcomes.

Capabilities decompose into increasingly more granular capabilities, allowing planning teams to target investments with significant clarity of corresponding outcomes. For example, Material Management decomposes into Material Solidification, Liquefaction, Deformation, Blending, and Combustion, among many other capabilities. If any one of these granular capabilities are underperforming for any type of material, which includes waste, an investment would ideally improve those capabilities from an ecosystem-wide perspective where appropriate.

Figure 6 highlights important information concepts required by these and other capabilities. The role of information concepts extends beyond providing information to capabilities over the life of a trip. Real-time data, captured over the life of the trip, serves as the basis for ongoing analytical assessment used to improve the customer experience, resource utilization, mileage, vehicle performance, maintenance scheduling, and other sustainability improvements. These information concepts, which for purposes of automation would need to be formalized in an automotive company's data model, are essential to the effective deployment of the aforementioned capabilities.

Figure 6 also depicts the products that customers may leverage at each stage of a trip. For example, a driver would leverage mapping, navigation, and fuel access products, while passengers would leverage entertainment products. Consider an example where a question or issue arises while the customer is preparing for a trip or is

in transit. In-vehicle technology provides help, connects to an automated or human advisor, and requests emergency services.

A well-defined business model lays the groundwork for business model optimization and innovation, but a clearly defined strategy, broken down into well-articulated business objectives and courses of action, is essential to execution.

By framing a formal, holistic view of how value is delivered to customers and other stakeholders, along with enabling capabilities, corresponding information concepts, engaged stakeholders, and key products, business architecture creates the basis for envisioning and executing business model innovation and strategy execution. A well-defined business model lays the groundwork for business model optimization and innovation, but a clearly defined strategy, broken down into well-articulated business objectives and courses of action, is essential to execution. Most important is that business architecture enables a set of coordinated investment targets to improve the customer experience, drive revenue creation, and optimize asset and resource utilization. These overall goals may be augmented and synchronized when transitioning to the circular economy. Goals may include:

1. Optimizing vehicle and fuel utilization through trip and route optimization
2. Extending vehicle life through proactive maintenance, dealer and customer incentives, and other means
3. Improving vehicle design based on statistical analysis of an aggregation of trip, vehicle, route, and other data
4. Enabling a car-sharing service, where *Take a Trip* frames a customer accessing a vehicle via a car-sharing agreement, completing a journey, and relinquishing the vehicle at a given destination
5. Preventing, eliminating, or reusing waste, by optimizing vehicle afterlife through material reuse and ultimate disposal

Consider the third goal, for example, which initially focuses on two value streams, *Take a Trip* and *Disseminate Information*. Objectives targeting the first value stream, which is called *Take a Trip*, would involve real-time data capture while the vehicle is in use, where that data covers every aspect of a trip, route, customer, network access, material utilization, the vehicle itself, and product usage. Drilling

down on a stage-by-stage basis, the manufacturing company would leverage information concepts as a basis for specifying a new data model that supports the capability-specified software services and microservices needed to meet ongoing business objectives.

The automotive industry example demonstrates how an organization can leverage business architecture to optimize existing business models and deploy new innovative business models to improve the customer experience, drive revenue requirements, optimize resource utilization, and achieve sustainability goals associated with the circular economy.

While data capture is important, assimilating that data and developing analytical analysis is required as input to future vehicle design. The *Disseminate Information* value stream becomes the target for a second set of objectives, courses of action, and corresponding investments. In other words, a formal strategy to improve and optimize future vehicle design for purposes of improved sustainability and customer satisfaction requires focusing on the *Take a Trip* and *Disseminate Information* value streams as well as the shared capabilities and information concepts used across those values streams.

The automotive industry example demonstrates how an organization can leverage business architecture to optimize existing business models and deploy new innovative business models to improve the customer experience, drive revenue requirements, optimize resource utilization, and achieve sustainability goals associated with the circular economy. One important consideration is that there is one integrated business architecture that represents a business ecosystem and enables multiple existing and new business models. A robust, persistent business architecture serves in an ongoing role as the basis for coordinating ecosystem-wide planning and execution, ensuring that organizations improve and expedite program and project delivery while optimizing corresponding investments.

The car-sharing point in the fourth goal above highlights the widely adaptable nature of business architecture across a business model. Value streams and capabilities play multiple roles whether a customer owns, leases, rents, or accesses the vehicle under a car-sharing agreement. All other benefits accrue, including vehicle usage tracking, data analytics capture, and tracking of maintenance requirements. The most notable aspect of leveraging business architecture to realize business model innovation is that the same perspective may be used for strategic planning and execution for a car-sharing service regardless of that service being a subsidiary or a third-party partner.

Summarizing the Circular Economy and Business Architecture Alignment

Business architecture and the circular economy each have extended perspectives (note: the details of each have not been discussed in this *Update)*. The important takeaway is having clarity and formality as to where the disciplines intersect to deliver corresponding benefits — in particular, which aspects of business architecture can the circular economy leverage to expedite and smooth the overall transition. Formality is typically conveyed in models.

Figure 7 summarizes the relationships between the previously highlighted business architecture domains and the circular economy domains: value cycle and value carrier. Business architecture domains are typically represented using defined color schemes. For example, capability and capability outcome are shown in blue, while value stream, value stream stage, value proposition, and value item are all shown in orange.

Figure 7 highlights the role of the business object, which serves as the basis for defining capabilities, information concepts, and value carriers. Establishing these domain relationships in a formal knowledgebase provides ecosystem-wide perspectives that may be used by any business unit engaged in business model optimization and innovation. This knowledgebase base is an ongoing reference to ensure that relevant stakeholders and business units remain synchronized in delivering initiatives to concurrently transition to the circular economy while delivering bottom-line customer value and financial benefits to the organization as a whole.

The essential takeaway from the Figure 7 model is that the circular economy aligns very effectively to business architecture and that business architecture, when viewed through the full set of domains, provides the means for a formal, robust transitioning approach to the circular economy. For example, business architecture provides a much more robust view of stakeholder value delivery and

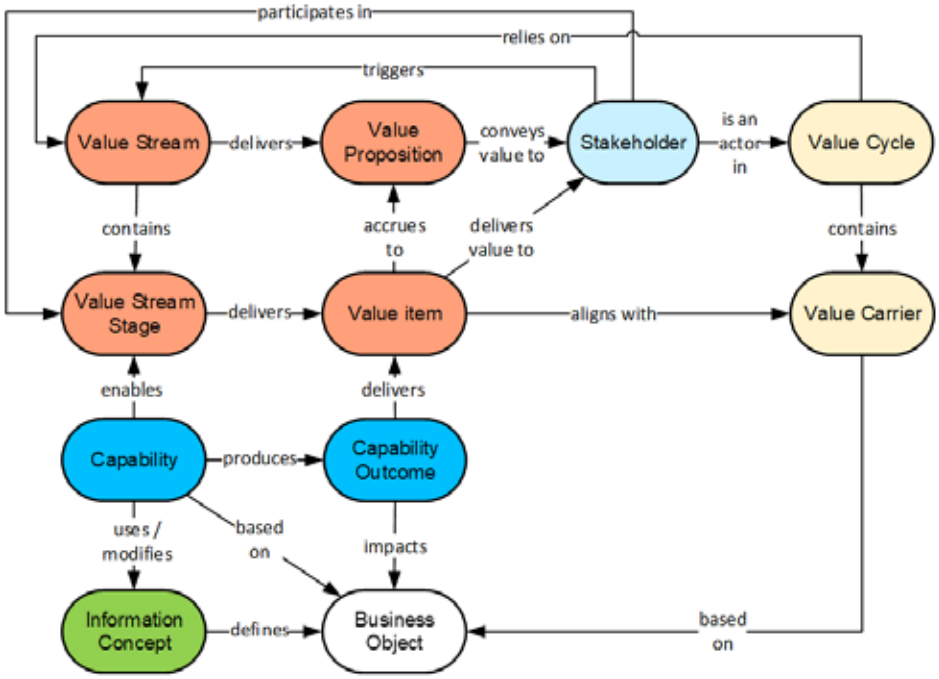

Figure 7 — Summary of business architecture and circular economy domain relationships.

contribution, the underlying capabilities that deliver value, and the information required by those capabilities for them to work effectively.

The model in Figure 7 is easily expanded to include other business architecture domains, including strategy, policy, organization, product, and initiative, ensuring that the business ecosystem is represented holistically in the business architecture knowledgebase. Organizations may further extend business architecture mappings to represent associations to corresponding data and application architectures and software designs. Expanding the knowledgebase to incorporate these IT architecture domains ensures that any transformation strategy incorporates formal business and IT architecture domains.

Call to Action

Organizations seeking to invest in the circular economy and lacking a roadmap or motivation should leverage the strategy execution pathway introduced in Part I to align and synchronize strategic objectives through highly coordinated business design efforts, rationalized initiatives, related investments, and coordinated data and software architecture deployments. The starting point depends on what an organization has adopted to date but involves several factors as summarized below:

- Identifying circular strategy's role and value proposition for the organization
- Evaluating how that strategy aligns to near- and long-term goals and objectives.
- Establishing a baseline business architecture, leveraging industry reference models.
- Leveraging the strategy execution path to deliver a coordinated set of goals and objectives based on a long-term evolutionary view of the transition to a circular economy.

There are many places to begin the journey toward a circular economy, as long as all the right pieces are in place as organizations recognize that they can deliver financial, customer, social, and sustainable business value as a coordinated, synchronized collection of initiatives.

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Cutter Consortium helps clients address the spectrum of challenges technology change brings — from disruption of business models and the sustainable innovation, change management, and leadership a new order demands, to the creation, implementation, and optimization of software and systems that power newly holistic enterprise and business unit strategies.

Cutter Consortium pushes the thinking in the field by fostering debate and collaboration among its global community of thought leaders. Coupled with its famously objective "no ties to vendors" policy, Cutter Consortium's Access to the Experts approach delivers cutting-edge, objective information and innovative solutions to its clients worldwide.

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