

Worksheets

from

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Connected Strategy

(HBR Press, 2019)

Firm Description

Background: MEC (Mining Equipment Company) designs, develops, engineers, manufactures, markets and sells machinery and equipment, and related parts to the mining sector. The company is based in the US and has over 30+ manufacturing facilities located in the Americas, Europe, the Middle East, and Asia Pacific with offices in 30+ different countries. The company uses a worldwide dealer network for most of its distribution, although certain large pieces of equipment are sold directly to customers through account representatives. The company also offers financing through its MEC Financing subsidiary. The industry is highly concentrated (especially in the high quality segment). In the last 30 years many players have entered the lower end of the market, putting pressure on incumbents like MEC to move upmarket.

Products: The product portfolio includes large track-type tractors, large mining trucks, underground mining equipment, rope shovels, draglines, hydraulic shovels, drills, wheel loaders, and articulated trucks. In addition to the original equipment, parts and attachments are also a significant revenue source, accounting for roughly one-third of sales. Most attachments are sold along with the original equipment at the time of sale but parts are sold over the life of the machine. Generally, profit margins are substantially higher for parts and attachments than for whole machines.

Distribution: MEC sells mostly through dealers, who are also responsible for providing direct and after-sales service. Even when the sale is made direct, it is mostly the dealer who provides the service. It is not uncommon for many machines to require service and parts equal to its initial cost. This wide dealer network is an asset for MEC but it also causes many inventory management challenges since MEC must maintain a high service level of part availability to customers across the globe.

Customer: The company is focused on supporting customers using machinery in mining and quarrying applications. Equipment purchase decisions are generally made by committees of high-level management and technical personnel in large mining companies. Key purchasing criteria include: manufacturer's quality reputation, machine performance, dealer capability, price, parts availability, and dealer proximity. State-owned enterprises are generally more price-sensitive than private mining companies and place more emphasis on price and all-inclusive costs in proposals.

Chapter 3

(Rewards of Connected Strategies)

Step 1: Diagnostic questions concerning your current connections with customers

How do we incentivize dealers to invest in better connecting us to end-customers??

Questions	Answers
How often do you currently connect to your customers?	<i>Connect directly with larger customers only every few years for large purchases of new machines. Dealers connect to customers more frequently to provide after-sale parts and services.</i>
What kind of information do you receive about your customers' needs?	<i>Receive orders for spare parts from dealers. Receive some aggregated feedback from dealers on customer feedback.</i>
How does information flow from the customer to you? For instance, does the information flow rely on the customer taking the initiative, or does the information flow happen in more a continuous and autonomous manner	<i>Information flows mostly from end customer to dealer. There is continuous flow with dealer partner but not with end customer. After-sale visibility into each individual customer is fairly low since dealers are the primary contact for all after-sale requests. We received aggregated requests from each dealer.</i>
How long does it take for a customer need to reach you?	<i>Customer typically can reach dealer instantly. However, dealer only communicates requests it cannot handle or aggregated feedback.</i>
How long does it take for you to react once you have a customer need?	<i>Dealers react very quickly (within 1-48hrs) to fulfil service or spare parts. For new machines varies widely but can take up to 8 months.</i>
What do you learn each time a customer connects to your firm? How are you integrating these episodic interactions into a single connected experience for your customers?	<i>Through ordering of products and feedback from dealers we make improvements and modifications to our existing line of products. Typically these changes are modest and have low risk - no major innovations occur.</i>

Step 2: Brainstorm the effects of a Connected Strategy could have for your organization

Imagine a world in which customers could instantaneously communicate their needs to you. You are by their side as they go through life, anytime and anywhere. How would this increase in connectivity allow you to improve how you serve your customers? More specifically:

Questions	Answers
How could you use this information to increase the willingness-to-pay of your customers?	<i>We could improve equipment life and lower downtime by advising best ways to operate and fix equipment.</i>
How could you use this information to decrease your fulfilment costs?	<i>Firm and dealers could lower inventory and supply chain costs required to meet spare part service levels with better visibility of demand. Also, required product iterations would be made more quickly to products in manufacturing lines.</i>

Next, imagine a world in which you know a customer need even before the customer knows this need itself.

Questions	Answers
How could you use this information to increase the willingness-to-pay of your customers?	<i>We could preemptively replace critical parts before they fail and reduce unscheduled maintenance events for our customers.</i>
How could you use this information to decrease your fulfilment costs?	<i>Much more predictable shipping and logistics of spare parts and more predictable scheduling of service technicians.</i>

Step 3: Start identifying drivers of willingness-to-pay

Willingness to Pay

Consumption Utility: How happy is the customer with the product or service?

Accessibility: How easy is it for the customer to get the product or service?

Cost of Ownership: How much does it cost for the customer to use and maintain the product?

Performance

- *Low downtime*
- *High durability*
- *Ease of operation*
- *High efficiency (e.g. dirt moved per weight of truck)*
- *High safety rating*

Fit

- *Ore mined (i.e. soft, medium, hard)*
- *Above ground /below ground*
- *Visibility*
- *Ramp grade*
- *Automation level*

Location

- *Spare parts and service technicians close to sites that are often remote*
- *Sales reps for purchase of new machines in every major city*

Timing

- *Delivering spare parts quickly is critical to avoid costly downtime*
- *Customers don't expect short lead times for new machines*

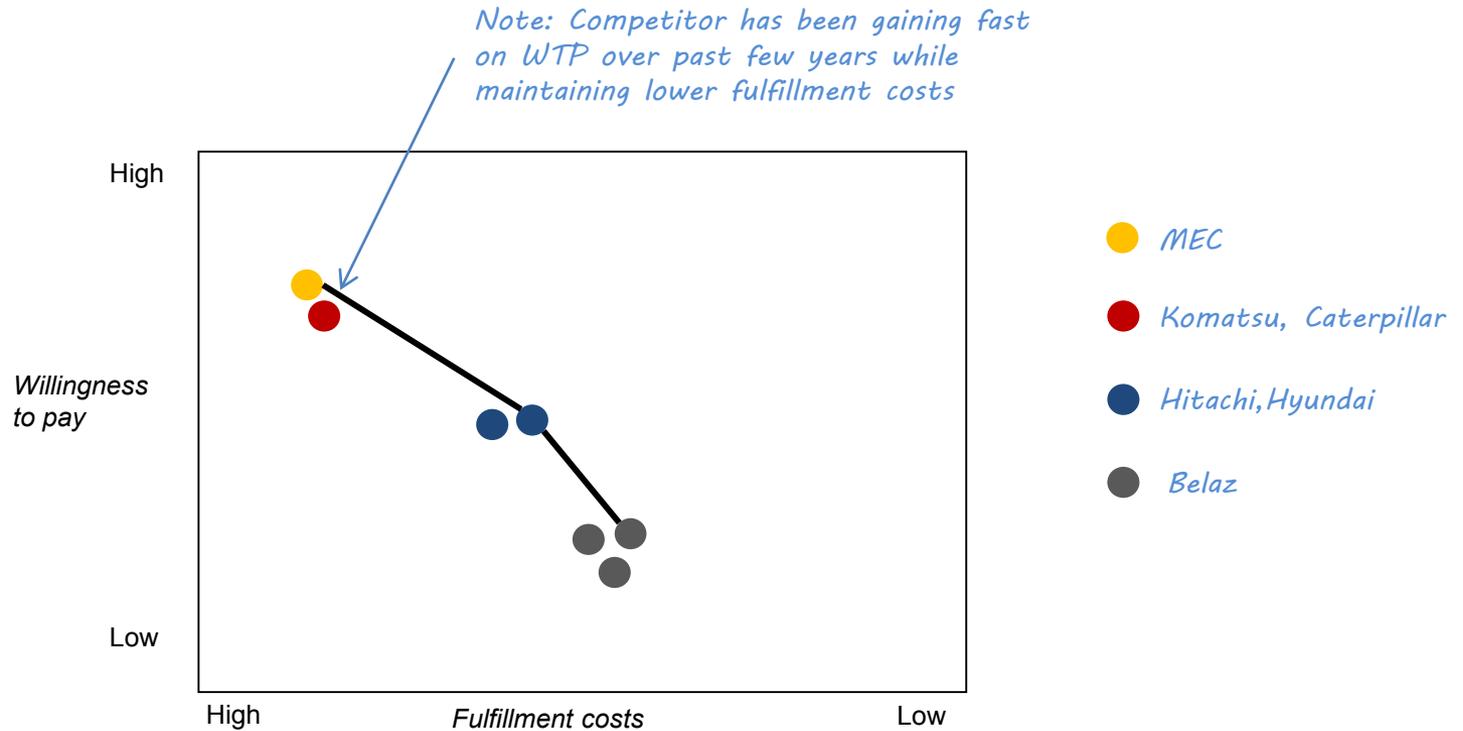
Usage cost over product life

- *Fuel*
- *Labor*
- *Lubricants*
- *Other consumables*

Maintenance cost over product life

- *Spare parts*
- *Technicians*
- *Non-productive time from scheduled and unscheduled maintenance*

Step 4a: Sketch the efficiency frontier for your industry that reflects the trade-off between willingness-to-pay and fulfillment costs



Step 4b: Follow-up questions after sketching the efficiency frontier

Questions	Answers
Where are you relative to the efficiency frontier?	<i>Yes, but one competitor is quickly approaching our WTP while maintaining a lower cost structure</i>
If you are not on the efficiency frontier, what efficiency improvements do you plan to pursue in order to reduce your fulfilment costs?	<i>Currently implementing a new inventory management system for all of our dealers.</i>
Assuming you are on the efficiency frontier, do you feel that you are in the right spot on the frontier?	<i>Yes, large dealer network is key to providing key high WTP features such as spare part availability and fast technician response. Our relationship with our dealers is difficult to replicate and a significant source of competitive advantage.</i>
What are the trends in your industry? Is there pressure on lowering costs or do you see your firm win over its rivals by providing products and services with a higher willingness-to-pay?	<i>Strong trends towards digitization of machines to optimize fleet management (utilization, dynamic scheduling, etc.) and move towards predictive maintenance through the use of data analytics. Very strong pressure to lower costs while maintaining higher WTP as competitors have gained on previous advantages.</i>
Are there new technologies that have allowed some of the firms already in the industry or potentially new entrants to push out the frontier? Do you see new business models breaking the trade-off between willingness-to-pay and fulfillment costs?	<i>Yes, better IoT sensors, data analytics, and augmented reality are becoming increasingly important for operators of mines. More sophisticated IoT sensors are allowing predictive maintenance to better reduce downtime (increase WTP) and reduce shipping costs of unplanned spare parts delivery and reduce inventory (lower fulfillment costs).</i>

Chapter 6

(Creating Connected Customer Relationships)

Step 1: Map the current customer journey of one customer experience

Customer Journey

Why does the customer engage in the interaction?

How does the customer go about identifying, ordering, and paying for the desired product?

What products and services are provided to the customer?

Latent need

Mining company needs tools to extract ore while minimizing operating costs

Awareness of need

- Bid for new project is won
- Expansion of existing site
- Replace machine or part

Search for options

- New project: RFP & sales rep visits
- Replacement or expansion: typically use the same provider

Decide on options

Decision made based on price, availability, dealer expertise, quality, dealer proximity. Committee or lead engineer on site makes decision

Order & pay

Customers pay dealers through account typically settled every month by procurement division

Receive

Takes months for new equipment to be delivered, hours for parts. Equipment is typically delivered to customer site.

Experience good/ Service

Training for customer's employees is required to operate machine. Customer employs mechanics with more advanced training on equipment.

Post-purchase experience

Customer requires technical and maintenance support, replacement parts, operating recommendations, & modifications

Step 2: Identify customer willingness-to-pay drivers and pain points

Willingness-to-Pay Drivers and Pain Points

Why does the customer engage in the interaction?

How does the customer go about identifying, ordering, and paying for the desired product?

What products and services are provided to the customer?

Latent need

Often doesn't foresee effects of changing environment (e.g. winter additive for engine oil)

Awareness of need

Not anticipating failure of critical part

Forget to order routine spare parts (air filters, lubricants, etc.)

Search for options

Composing a fleet of dozens of different types of machines to maximize utilization and optimize operations is complex and involves much uncertainty

Decide on options

Complex models used to help customer assess total cost of ownership

Govt. sourcing regulations favor lower upfront costs even if higher TCO

Order & pay

High value purchases must typically go through multiple levels of approval before settled, creating paperwork for us & customer

Receive

Long lead times requires much planning for customer and reduces ability to adapt to changing commodity prices, often requiring costly hedging

Experience good/ Service

- Downtime
- Idling
- Low flexibility
- Operator safety

Post-purchase experience

- Spare part and technician availability
- Salvage value

Step 3: Capture the information flows for this customer experience

Will be different from dealer perspective

Information Flows

Why does the customer engage in the interaction?

How does the customer go about identifying, ordering, and paying for the desired product?

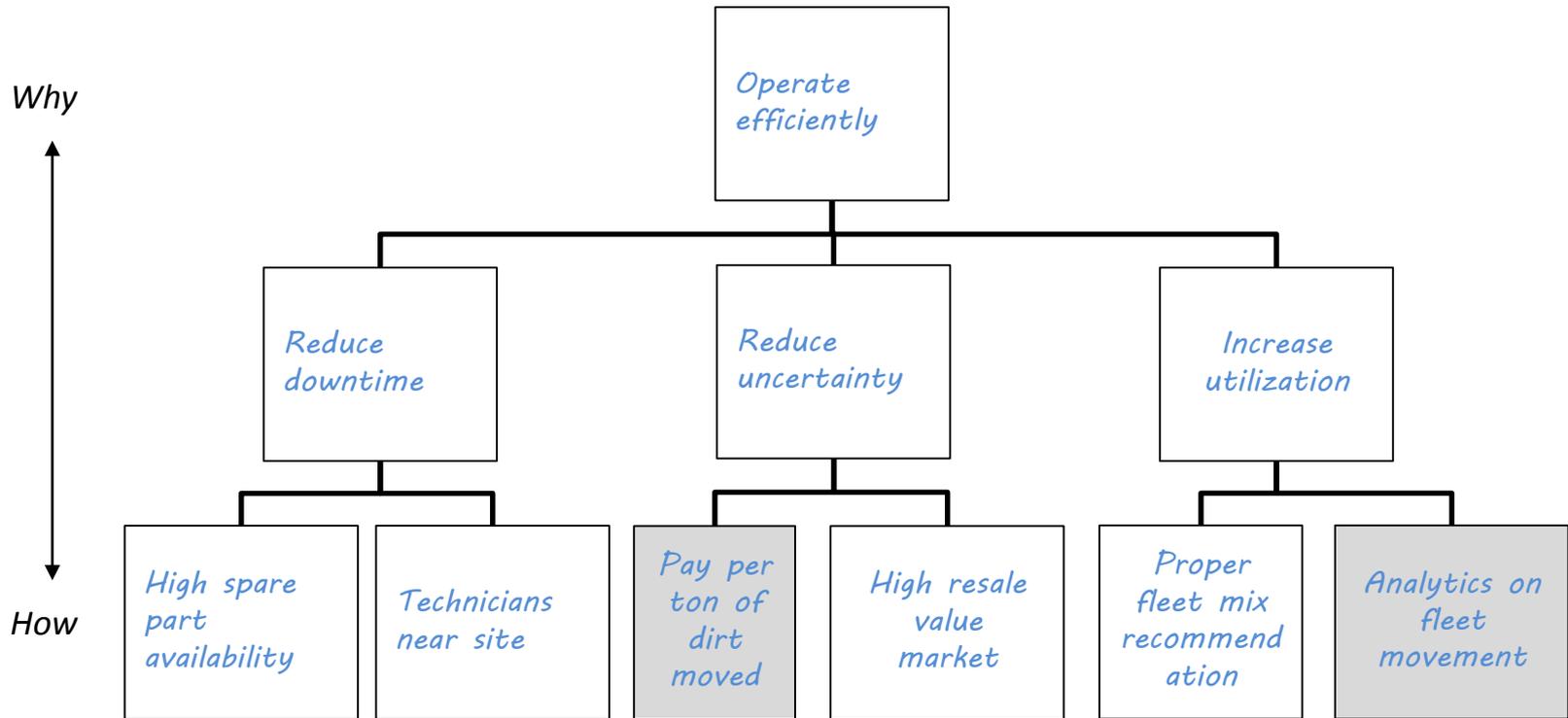
What products and services are provided to the customer?



	Latent need	Awareness of need	Search for options	Decide on options	Order & pay	Receive	Experience good/ service	Post-purchase experience
Description of Information	<i>Customer writes specifications for future purchases</i>	<i>Feasibility study and project planning</i>	<i>Requests for proposal</i>	<i>Submit proposal, sales visit, presentation etc.</i>	<i>Submit order</i>	<i>Delivery timeline and updates</i>	<i>O&M manual, training for operators</i>	<i>Requests for shipping spare parts, customer support,</i>
Trigger	<i>Customer</i>	<i>Customer</i>	<i>Customer</i>	<i>Us</i>	<i>Customer</i>	<i>Us</i>	<i>Us</i>	<i>Customer</i>
Frequency	<i>One batch</i>	<i>One batch</i>	<i>One batch</i>	<i>Continuous</i>	<i>One batch</i>	<i>Regular</i>	<i>One batch</i>	<i>One batch</i>
Richness	<i>Detailed</i>	<i>Detailed</i>	<i>Detailed</i>	<i>Detailed</i>	<i>Detailed</i>	<i>Limited</i>	<i>Detailed</i>	<i>Very Limited</i>
Customer effort	<i>High</i>	<i>High</i>	<i>High</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>High</i>	<i>High</i>
Action by	<i>Both*</i>	<i>Customer</i>	<i>Us</i>	<i>Both</i>	<i>Us</i>	<i>Us</i>	<i>Customer</i>	<i>Us</i>
Improvement Ideas	<i>Include IoT sensors in specifications</i>	<i>N/A</i>	<i>Provide guaranteed costs savings based on sensor readings</i>	<i>Gain permission to use sensor data to charge</i>	<i>Submit monthly statements based on hours used</i>	<i>Updates of location after drop-off through sensor</i>	<i>Worker login and electronic maintenance log</i>	<i>Tie each request to a specific machine, use record in resell</i>

Step 4: Identify the deeper needs of the customer

In the eyes of the customer, the purpose of the relationship with our firm is to...



Step 5: Understand the current relationship with your customer across separate (repeated) customer experiences

A) Identify the customer and retrieve data

Questions	Answers
How do you identify the customer and connect him or her to prior customer experiences?	<i>Through account number and information uploaded by dealers</i>
Is this identification requiring time and effort from the customer?	<i>No, due to high touch nature of the B2B business</i>
Is this identification costly to your firm?	<i>No, all order history is stored on CRM and relatively easy to track small number of customers</i>
What organizational incentives are in place (or what disincentives need to be removed) so that various parts of your organization share the information they have about a particular customer?	<i>Dealers are ultimately independent businesses and it is sometimes creates misaligned incentives</i>

B) Customization

Questions	Answers
How do we improve customization for a particular customer based on information that we have gathered about this customer?	<i>By providing emission reducing engines depending on company targets or removing superfluous parts for less intensive operations (e.g. soft rock)</i>
What feedback do we gather from the customer to understand whether a particular solution worked well?	<i>Receive aggregated, generalized feedback from dealer sales reps on customer satisfaction</i>
Can the customer make direct suggestions to us of how to improve our product or service?	<i>Yes, but typically will go to dealer sales representative first who will then relay information</i>

Step 5: Understand the current relationship with your customer across separate (repeated) customer experiences

C) Population-level insights

Questions	Answers
How do we currently use population (or market-segment) level data to improve our product assortment?	<i>Product assortment is fairly stable</i>
How do we currently use population (or market-segment) level data to refine features of existing products?	<i>Based on aggregated complaints for new products we make modifications for next batch of machines or parts</i>
How do we currently use population (or market-segment) level data to create entirely new products?	<i>Rarely do we create new products. Most innovation is low risk, minor modifications of existing products</i>

D) Why-How ladder questions

Questions	Answers
At what level in the Why-How ladder are most of our transactions currently taking place?	<i>Mostly taking place in the lower level</i>
What would be alternative value propositions to the customer that are either more focused (HOW) or broader (WHY)?	<i>Could implement a pay per ton of dirt moved or excavated to reduce uncertainty in planning or we can provide fleet mix recommendations based on tracking & analytics to increase utilization</i>

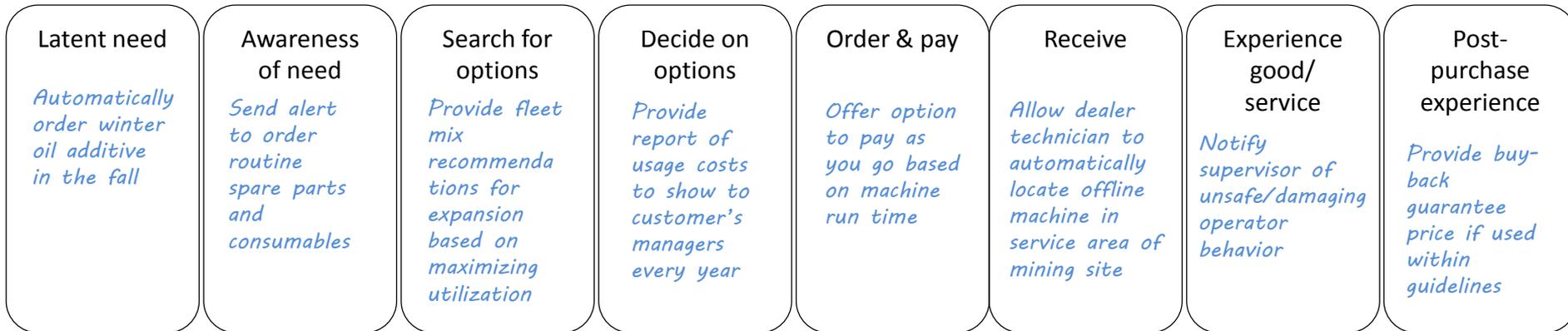
Step 6: Identify new opportunities associated with connected relationships

Automated Execution

Coach Behavior

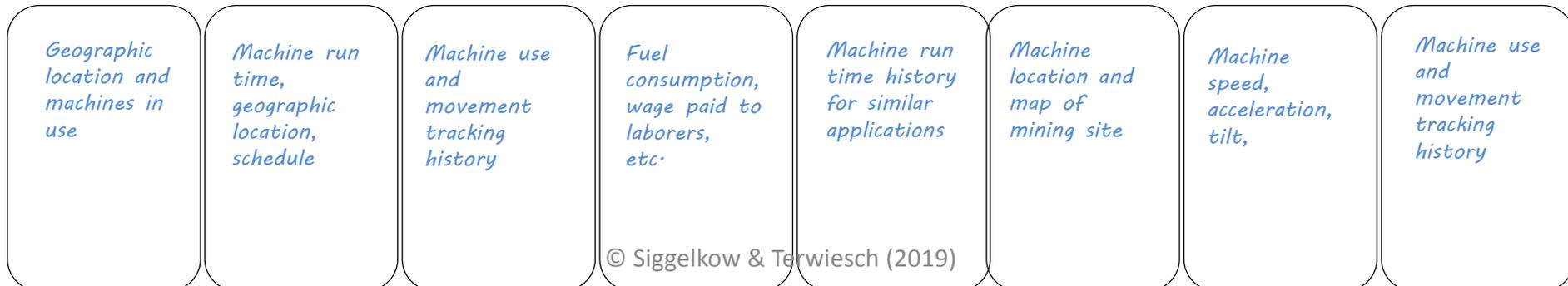
Curated Offering

Respond-to-Desire

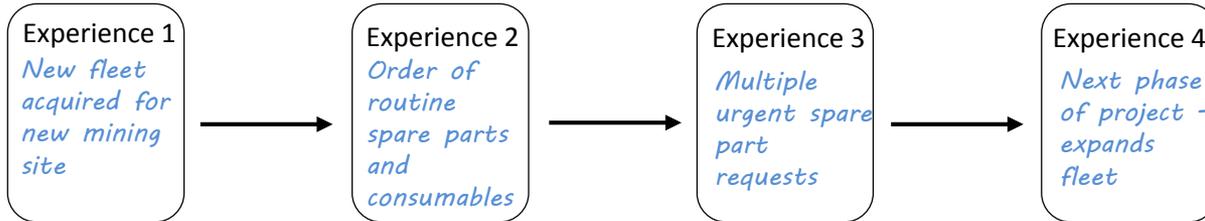


Responses to Pain Points

Required Information



Step 7: Find ways to utilize information gathered from repeated interactions to improve the Recognize-Request-Respond cycle



Customization Improvements

- *Adjust maintenance schedule to prevent another emergency part order*
- *Outfit expansion of fleet with more durable critical spare part*
- *Deliver additional spare parts previously urgently requested to near-by dealers*

Optimization of Product and Service Offering

- *Offer different grade consumables (o-rings, seals, etc.) based on rate of replacement*

Creation of New Products and Services

- *Create a more durable version of critical parts that failed*

Efficiency Improvements

- *Recommend right mix of equipment for expansion based on usage data of original fleet*
- *Automatically order low cost routine spare parts and consumables based on history*

Fulfillment of deeper customer needs

- *Reduce risk of downtime, reducing uncertainty*
- *Increases utilization*

Step 8: Assess your data-protection policies to maintain trust with your customers

Questions	Answers
What procedures do we have in place to stay informed about data protection and privacy regulations in all the geographies in which we are active?	<i>Currently have one centralized data protection and privacy team that US centric. Must hire or outsource regional experts as we expand our data gathering capabilities across the globe</i>
How do we keep up with how public opinion is changing with respect to these issues?	<i>Similar to above</i>
How do we currently obtain customer consent? How transparent is it to our customers what happens to their data?	<i>Through dealer sales rep. Must continue to provide training on how to communicate data gathering and use to end-customer.</i>
What do we do to keep the data current and accurate?	<i>Data gathering will be highly automatized through the use of sensors</i>
What are our activities to keep the data safe and under what conditions do we notify customers of any breaches?	<i>Data from each customer will be encrypted, anonymized whenever possible, and compartmentalized. In addition access to all servers containing data will require two-step verification.</i>

Chapter 10

(Creating Connected Delivery Models)

Step 1: Use the Connected Strategy Matrix to map your own activities and the activities of your competitors

	Connected Producer	Connected Retailer	Connected Market Maker	Crowd Orchestrator	P2P Network Creator
Respond-to-Desire	<i>MEC and direct competitors: Respond-to-desire requests for replacement, spare parts and service; Curated offering for new large projects</i>	<i>MECused.com sells MEC certified used equipment</i>	<i>Used equipment auctioneers (e.g. Ritchie Bros, IronPlanet)</i>	<i>Websites for used equipment dealers and non-dealers to sell or buy (e.g. machinerytrader.com)</i>	
Curated Offering					
Coach Behavior					
Automatic Execution					

Step 2: Use the empty cells in the Connected Strategy Matrix to create new ideas

	Connected Producer	Connected Retailer	Connected Market Maker	Crowd Orchestrator	P2P Network Creator
Respond-to-Desire					Platform for mining companies to sell equipment to each other
Curated Offering	Remote monitoring, asset management, predictive maintenance	Have order button on each machine 3 rd party oil, filters, o-rings, seals, etc.	Recommend partner repair shops based on capability of fixing certain machines, availability, feasibility in operations, etc.	Platform for on-call free lance technicians that speak language of operating crew and have specific knowledge of specific machine to help remotely through virtual reality	Recommend companies to trade machines with to reduce shipping, rebalancing costs
Coach Behavior		On machine display suggest ordering winter additive when temp. drops			Suggest preemptively sale of used machine to others based on high demand
Automatic Execution	Subscription service for MEC brand filters & lubricants	Automated drone delivery of critical spare parts at risk of failure. Sourced internally or from 3 rd party to increase efficiency		Automatic posting of consumables required for bidding (by 3 rd party on regular basis_	Automatically post machines near end of project for sale

Step 3: Understand your existing revenue model, identify its main limitations and consider alternatives for your current activities as well as for the ideas created above

Questions	Answers
What does the customer pay for?	<i>Initial purchase of machine, the after-market parts and service</i>
What are your different revenue streams?	<i>New fleets (i.e. green field), replacement of machines, attachments, parts, and service</i>
Who is paying?	<i>Mostly the user (with few contract exceptions)</i>
When does payment occur?	<i>Mostly once at time of purchase (exceptions for service contracts)</i>

Service rev. mostly captured by dealers

Questions	Answers
Next, look for inefficiencies in your revenue model. Do you use this revenue model because you believe it is the right one, or are you constrained by connectivity to the customer?	<i>Ideally we would charge based on performance and efficiency since we provide higher quality machines and exceptional service levels. Constrained by lack of visibility into individual use of machines in remote locations and approval process for payments</i>
Now that you understand the current revenue model, consider ways for considering these inefficiencies	<i>A bonus payment for low levels of downtime, pay per ton of dirt moved or hour that machine is used, different rates for different types of use (loaded, unloaded, idle, soft rock v. hard rock excavation, etc.)</i>

Step 4: Deconstruct your Connected Strategy into technological sub-functions and then catalogue currently used technological solutions for each sub-function

Note: Deconstruction for predictive maintenance (Connected Producer/Curated offering)

	Recognize	Request			Respond			Repeat	Connection Architecture	Revenue Model
	<i>Become aware of the need</i>	<i>Search and decide on option</i>	<i>Order</i>	<i>Pay</i>	<i>Receive</i>	<i>Experience</i>	<i>After sale</i>	<i>Learn and improve</i>	<i>Connect parties in ecosystem</i>	<i>Monetize customer relationship</i>
Sense	<i>Notice machine is not running normally</i>	<i>Receive part availability and price</i>	<i>Receive approval from supervisor</i>	<i>Confirm order placed</i>	<i>Detect part has arrived on location</i>	<i>Visually locate part to replace</i>	<i>Monitor machine performance</i>	<i>Monitor machine performance</i>	<i>Sense needs of other machines in region/site</i>	<i>Sense change in uptime</i>
Transmit	<i>Send performance metrics to database</i>	<i>Send info to diagnostics database</i>	<i>Send approval to ordered</i>	<i>Send costs to procurement database</i>	<i>Detect part has arrived on location</i>	<i>Send visual to database</i>	<i>Send from machine to diagnostics database</i>	<i>Send results to database</i>	<i>Pool together</i>	<i>Send report to database</i>
Analyze	<i>Identify cause of issue</i>	<i>Assess which can be delivered on time</i>	<i>Access seller API</i>	<i>Find appropriate cost center to bill</i>	<i>Locate machine part belongs to</i>	<i>Match visual information to O&M manual</i>	<i>Assess whether machine running normally</i>	<i>Analyze impact of part change</i>	<i>Take into account shipping needs of all parts</i>	<i>Adjust pricing based on uptime goals</i>
React	<i>Decide if part must be replaced ahead of schedule</i>	<i>Send cost-benefit analysis to supervisor</i>	<i>Send order to part seller</i>	<i>Send funds to part seller</i>	<i>Dispatch worker with part to machine</i>	<i>Replace part</i>	<i>Confirm fix and check other machines</i>	<i>Improve algorithm</i>	<i>Bundle parts for cheaper shipping</i>	<i>Charge client per use</i>

Step 5: Identify new technological solutions and how those might enable further innovations in your Connected Strategy not identified so far

Note: Tech solutions for predictive maintenance (Connected Producer/Curated offering)

	Recognize	Request			Respond			Repeat	Connection Architecture	Revenue Model
	<i>Become aware of the need</i>	<i>Search and decide on option</i>	<i>Order</i>	<i>Pay</i>	<i>Receive</i>	<i>Experience</i>	<i>After sale</i>	<i>Learn and improve</i>	<i>Connect parties in ecosystem</i>	<i>Monetize customer relationship</i>
Sense	<i>Cheap, advanced vibration sensors</i>	<i>Web scrapping of retailer inventory</i>		<i>Blockchain</i>	<i>geofencing</i>	<i>Augmented reality for technicians</i>	<i>Cheap, advanced vibration sensors</i>	<i>Cheap, advanced vibration sensors</i>	<i>Blockchain for trust and privacy</i>	<i>Cheap, advanced vibration sensors</i>
Transmit	<i>Low energy transmitter</i>						<i>Low energy transmitter</i>			
Analyze	<i>Analytics, AI, machine learning algorithms</i>	<i>Real time logistics visibility through part tracking</i>						<i>Machine learning</i>		
React	<i>Dynamic scheduling algorithm</i>	<i>Link downtime to commodity prices</i>								