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# Engineering Services: Unpacking Value Exchange

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## 1 Value Exchange Among Engineering Services

Many commentators discuss value in manufacturing. The aim of this chapter is to unpack the concept of value, exploring what it means in a practical setting of engineering services using the service staircase. At one level, one can consider value in terms of the product being provided—does the product meet the customer's requirements and hence create value for the customer? However, customers use products to achieve outcomes. So value can also be thought of in terms of the efficiency and

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effectiveness with which the product enables customers to achieve the outcomes they want—does the machine create the most value throughout its lifetime? Another perspective on value is to consider the two-way flow. Manufacturers **create value for customers**, and customers in turn **create value for manufacturers**, by, for example, continuing to use a manufacturer's services to support the products through life. In this case the customer creates economic value for the manufacturer. Additionally by feeding back data on operations of the product during its working life, the customer allows the manufacturer to improve future generations of the product (Fig. 1).

The creation of value for the customer through services brings the customer and the firm into closer proximity. More feedback is given by the customer to the machine manufacturer throughout the lifetime of the machine, which also enables the manufacturer to understand the business model of its customer better. Furthermore, the option is created for the manufacturer to interact directly with the machine and, hence, obtain data and insights into its use. When the customer brings a machine in for service or sees the manufacturer as the place to obtain spare parts, there are automatically more exchanges between the customer and the firm. This brings several opportunities of engagement, not only for gaining an in-depth understanding of how machines are used, and for additional sales opportunities through timely information on the status of machines and the customer's market situation, but there are also options for the extension of interaction through additional services to integrate the manufacturer into the customer's business model. When thinking about the level of service provision to the customer by a machine manufacturer, there are different levels that can be referred to as the service staircase.

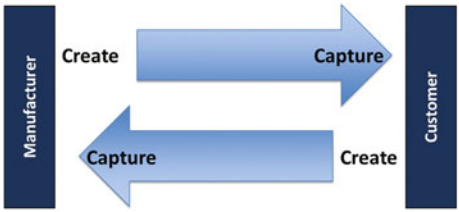


**Fig. 1** The creation and capture of value

Figure 2 shows five service provision levels that firms have already implemented for their customers. The different levels of service offered to customers are usually interdependent; for example, without a working spare parts' business the offering of solutions will be problematic. This journey is often referred to as servitisation (Vandermerwe and Rada 1988). The next section will look at the value creation and capture of the manufacturer taking the structure of the service staircase. The following section will then focus on value creation and capture with a focus on the customer. Before offering some conclusions, details will be provided about asset management and how it can act as an integrator between the customer and the manufacturing company.

Even the simple examples above illustrate the complexity of defining value in manufacturing services—it is multidimensional and involves mutual exchange. In the rest of this chapter we will unpack the concept of value more fully, exploring it from the perspective of both a manufacturer and a customer. This chapter consists of two main sections. In the first section we will explore how manufacturers are able to create value through services. The second section will create an insight into how manufacturers' customers can create value through services created for them. Both parts will be structured based on the service staircase shown


**Fig. 2** The service staircase. (adapted from Turunen (2012))

in Fig. 2, in other words the offering of simple services, which increase in complexity. Finally, a summary of the value delivery will be offered.

## 2 The Manufacturer's View: Unpacking Value Through Services

The importance behind offering services is usually driven by the opportunity to create new revenue streams for the manufacturing firm. However, offering services also provides the opportunity to influence the design and manufacturing process through additional feedback from the customer and the gathering of information about the machines' use, as well as the customer's business model. Because the firm is moving closer to the customer and understanding the use of the machines more, there is a good opportunity to aggregate feedback and information and feed them into the design process. This is in addition to the opportunity to design new services enabling the growth of the manufacturing firm through servitisation. This section will view the value captured and created

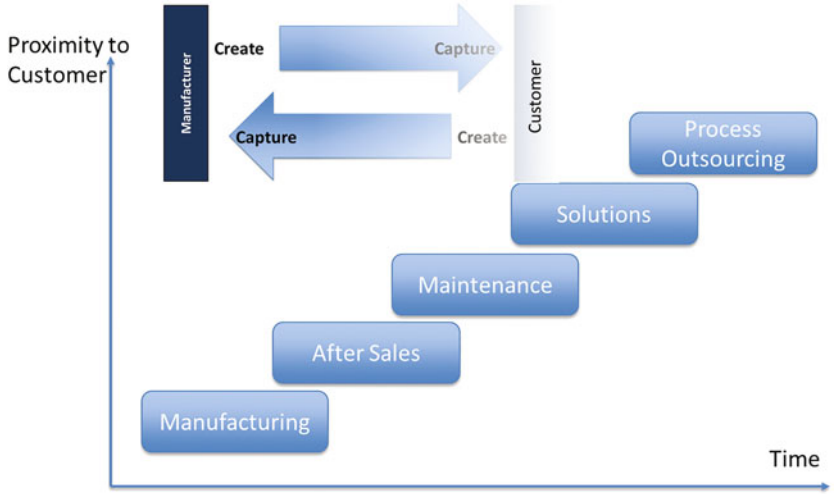


**Fig. 3** The service staircase, focusing on value for the manufacturer

throughout the different parts of the service staircase, starting with spare parts' services and concluding with process outsourcing (Fig. 3).

## 2.1 The Importance of Spare Parts

When thinking about the second level, the sale of spare parts and what the manufacturer can create and capture in value for itself, additional revenue may be one of the main drivers. It may, however, also be that there is the intention to produce other services, which will not be implementable if there is no spare parts' distribution in place. In any case, the manufacturer will create value if a spare parts' business is in place. When interviewed, some heavy machine manufacturers indicated that there is market potential for more revenue created by selling spare parts for a machine throughout its lifetime. There will be a dependency on the type of product manufactured and its need for spare parts; however, it deserves consideration.

Having spare parts' offerings means that the manufacturing company needs to produce them and have storage, as well as distribution, channels in place. All this with the goal of allowing timely delivery of the spare part to the end-customer when necessary. In other words, when for example a machine broke down and needs a spare part to function again.

With many manufactured spare parts' products there is a grey market, where other manufacturers produce spare parts under their own brand name for products manufactured by others. This can be seen as value slippage, as there is a lost sales opportunity for the manufacturer. However, there are other risks associated with grey-market spare parts. If the quality of the spare part produced by a third party is lower than required, there is a potential impact on the machine's lifetime or other knock-on effects on the uptime of the machine.

Cases were observed whereby the manufacturer purchased a grey-market spare parts' supplier to buy in the capability and the companies' market share in the spare parts' market. In the case described, the manufacturer even kept the acquired supplier under its existing brand name to keep it separate. This allowed instant access to the existing spare parts' market and its value creation, as well as the existing distribution

channels. However, it also allowed tight control to be maintained over the spare parts' quality of a large share of the market, thus also protecting the manufacturers' credibility. The above example shows that there are manufacturers that create value for their firm from spare parts.

## 2.2 Maintaining the Customer's Assets

Through the offering of maintenance the supplier has the option to give further support to the customer. This is the classic repair and warranty fulfilment approach of, for example, a car garage. Hence, the starting point is that the retailer, the dealer and the focal firm have the option to receive spare parts for the machine manufacturer through a distribution system and can offer the repair and maintenance of machines. It always represents high value for the customer to have access to the timely and efficient repair or maintenance of machines, and therefore, the process should be focused around the customer's needs (see later in this chapter). The creativity of offerings can be endless. One example is a heavy machinery manufacturer offering refactoring of a machine, whereby an old machine is delivered to the workshop and will be made not only operational again but also close to new. This means exchanging all parts that are worn out. The process is less expensive than purchasing a new machine, and hence, machine owners have an interest in the process. The acceptance of these offerings by the customer may differ depending on the economic situation. Higher uptake of such offerings is expected when there are higher economic risks, or market volatilities. So a decision to refactor as a form of maintenance may receive more uptake in economically uncertain times or with economically strained customers. Interestingly, insights have been obtained throughout the offering of refactoring maintenance. A significant effect was that even that the machine was technically similar to new, the machine operator was not particularly impressed by the performance of the machine and complained to the owner. When the basic package included the full renewal of the operator cabin, these complaints stopped. Two things can be learned from this. First, there is a need to review and enhance offerings constantly, and second, the look and feel of a machine is important.

It has recently emerged that there are ways to obtain information from a machine through, for example, sensors, but also through contact with the customer. The data received from a machine can easily be translated into information, helping to implement advanced asset management systems including, for example, the prediction of failure, or more. This can only be achieved when sensors have been included in the design and production of the machine. All of the above are ways in which the manufacturer can capture value through maintenance.

## 2.3 Offering Solutions as a Manufacturer

The next stage in the service staircase is to offer solutions for customers. A solution has in the past also been described as a full service contract. The idea is that "a comprehensive bundle of products and/or services fully satisfies the needs and wants of a customer related to a specific event or problem" (Stremersch et al. 2001). In general, a higher intensity in service contracts for manufacturers is evident in studies. This is based on maintaining competitiveness in the advent of commoditisation, declining growth and falling profitability in core product markets. Related services are sold through dedicated service divisions, which are designed to take advantage of the commercial opportunities of servicing an installed equipment base rather than just one machine. Additionally, the implementation of integrated solutions offerings is used to increase the competitiveness of core product offerings under industry conditions (Salonen 2011).

Examples for solutions offerings are twofold. One example is to guarantee uptime for one or more machines, and another is to adopt a more consultative approach, helping the produced machine to work better within the environment.

The first option for the manufacturer is to guarantee uptime by being paid by outcome. The process is relatively simple and can be taken to the extent that the manufacturing company takes over the risk by offering compensation for machine failure. The basis for this is that, instead of selling a machine to a customer, the outcome value of the machine is sold. This means, for example, for a gas engine producer, that instead of

selling the gas engine to the customer, electrical energy and heat are sold. Electrical energy is produced by the gas engine's rotation, and heat is produced as a by-product of the engine combustion process. This can be of great interest to the customer (see next section). However, a manufacturer with good processes in place, and who understands the risks, has the opportunity to gain greater monetary value over time and a continuous flow of revenue instead of a one-off sale. In addition, as the machine maintenance and servicing are included in such a solution offering, there is a risk of lowering costs or losing the customer to other service providers and/or the customer purchasing parts from grey-market parts' providers. Hence, the value chain is covered and creates value for the manufacturer.

The second example is to help the customer to obtain more value from ownership of the machine and to offer this as a service. Indeed, there are machine manufacturers who offer this support. One simple example is to check the oil of large machines in a laboratory on a regular basis. The oil is tested to give an indication of not only lubrication—in other words whether the oil needs changing—but also metal and aluminium content, which is an indication of increased wear and tear of the engine. A more complex example is a wind turbine manufacturer who supports its customer in getting the most from its investment. It supports by continuously optimising the wind power plant, including the use of software and solutions that increase the production and profitability of the wind power plant. The best time to stop wind turbines for maintenance is either when there is no wind or when the electricity they produce is at its lowest cost. Weather prediction models and public data, as well as past data on wind and weather patterns, are used to anticipate any changes.

In conclusion, this level of the service staircase represents the highest complexity to reach without the prior level functioning. Without working maintenance and parts' businesses it is more complex for a manufacturer to offer solutions. There are parts of a solution that can be outsourced to other companies, for example, the transport of machines; however, the manufacturer can maintain a network of reliable partners who can be included for either specialist repairs or specific locations. These networks of partners are often referred to as ecosystems. The next

section will discuss process outsourcing, which requires that such an ecosystem is understood and partners are used for collaboration.

## 2.4 Process Outsourcing to Create and Capture Value

The final level of the service staircase concerns the outsourcing of entire processes, and the types of process are endless. However, this level continues to show that offering services provides the manufacturer with the opportunity to move close to the customer's business and to create value for its operations by fully integrating itself into the customer's operations. This enables the machine manufacturer to move into a space where the outcome of a process is guaranteed, instead of simply providing part of a process. An example of such an outcome is the excavation of material in a quarry. In this case, the machine manufacturer is in charge of the process of excavation and placing the material in a stone crusher. This includes taking the material up, transporting it in the quarry and loading the crusher with the material. Therefore, the manufacturer, instead of supplying single machines or guaranteeing their uptime, supplies all the machines involved in the supply chain and monitors, optimises and manages them. Payment in this case can be structured by charging for material loaded into the crusher. These processes can be structured and optimised using extensive integration of technology. This not only increases the income of the manufacturer by providing the services of taking over the process and risk and spare parts for all the machines, but it also enables the manufacturer to test new machinery and technology. When interviewed, a machine operator stated that technology, like self-driving dump trucks, can be implemented when the process is owned by the manufacturer.

In greater detail, the value addition for the manufacturer is manifold, but the influencers need to be understood. The manufacturer takes over the risk of the operation and, hence, needs to understand this risk in detail. This includes all influencers that may have an impact on shaping the process, and the outcome is therefore different to what is expected. The market needs to be understood, including its seasons, cycles and volatilities.

The first section of this chapter argues that in order to deliver a service, the end value must be understood. This is what the customer wants to sell in the first place and also how, when and who the customer will be. For the quarry business, for example, this may mean there is the potential to increase the amount of ore in the rock that is excavated; there is a good chance that this will increase the value of the operation and, hence, the income of the manufacturer. On the contrary, if the amount of ore in the rock is not monitored, then the operation may become more costly. The logical question is therefore whether it can be predicted if the market is volatile, and the customer will need to move with the market and cover peak demands; it is also important to know and respond to this. As a machine manufacturer this could be a good time either to maintain or even to exchange machinery with other businesses with higher demands. It is evident that there are many opportunities for manufacturers created by supplying processes to the customer. Most importantly, however, this helps them to move closer to the customer, to understand the customer's business model and business better and to be embedded in the same.

The next section will look at the other side—how the customer thinks about value creation—and will use examples to provide a better understanding of the issue.

## 3 The Customer's View: Unpacking Value for the Company

How the company or owners obtain the most value out of the ownership of a machine is relatively simple: getting it to do as much as possible of what it was purchased for, whether it was moving earth, creating energy or moving people from one point to another. This value and how it is created or captured depends to a large extent on the business owner and its business model. One example is a building company owning a digger. For the owner of the building company the amount of earth moved does not matter as much as, for example, for a quarry. The owner of a building company is more interested that the hole in the ground created by the digger and its operator is of a specific diameter, so that it will fit the

foundations of the house accurately. When interviewed, building company owners confirmed that they don't mind which brand of digger their company owns. Besides the need for the machine to be well priced and maintainable, the operator of the digger needs to be able to work well with the machine and to produce the right-sized hole in the ground for the foundations of the house. If the size of the foundations is not accurate, the building project will encounter problems. Most diggers on the market support all their needs.

When interviewing the operators, it becomes evident that their value focus shifts again and they want to work with a machine with which they can feel what they are digging. A digger operator wants to be able to say when he or she is digging into changing materials. For example, a digger operator for a building site will be able to feel that he or she is digging into a drain or a cable and should be able to stop in time to reduce the damage. Another example is a large stone in a quarry being dug into. The operator lifts the shovel from the digger to go above the stone and get the large stone with the next load (Fig. 4).

Another influencer is economic impacts from the market. If the market demand for what is produced is reduced, the value of the machine

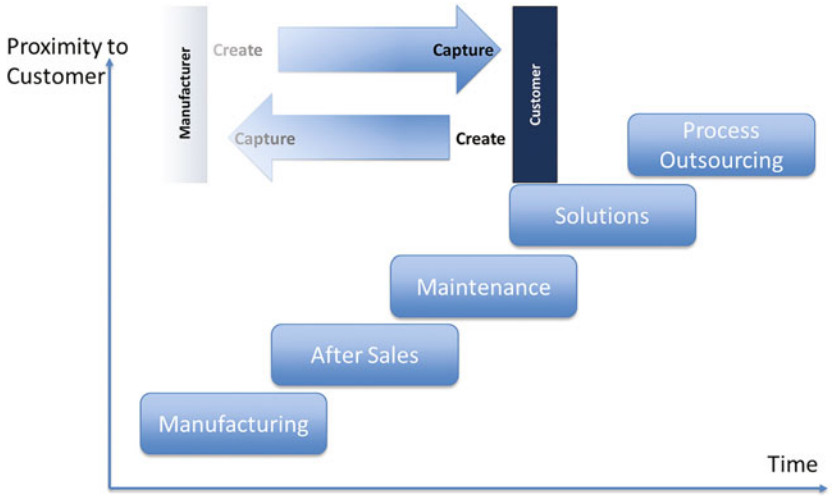


**Fig. 4** The service staircase, focusing on value for the customer

is also reduced. The value propositions for the aforementioned machine are extremely diverse, depending on the actor. Therefore, the value propositions for the machine throughout its lifetime are very different. This value proposition throughout the lifetime of the machine becomes clearer when thinking about a harvester used only in harvesting season. The value proposition of ownership of the machine changes instantly when the harvesting season begins. When the machine breaks down during harvest, losses are extremely high, as the harvest will not progress.

Knowing the priorities of the use of the machine enables the supplier to create value for the machine owner. Hence, when a machine breaks down, the value proposition for the owner of the machine changes, as well as when maintenance needs to be done. The next part of this section will look at the change in value, first, of parts' sales in detail, then at maintenance and, finally, repair.

## 3.1 The Value of Buying Parts to the Machine Customer

Parts' availability should be seen as a baseline for successful service operation for a manufacturing company. Hence, if the parts are not available for the machine owner or the wider ecosystem within a reasonable timeframe and at a reasonable price, the value of ownership decreases. Value as a concept here can be very diverse. Taking the example of a harvesting machine during harvesting season, the acceptable timeline for the supply of a spare part needed to repair the machine will be considerably shorter than outside harvesting season. In conclusion, the customer will see parts' supply in different ways, depending on how and when the value of the machine is created.

One example comes from the European market and a heavy-equipment manufacturer. The customer in question said to its country representative that the machine would be moved over a European border for a large building contract. The dealership of the manufacturer said this would not be a problem and that they could still supply parts. However, when one of the machines failed and needed a spare part, it was not possible for the dealership to delver to the other

country as it was the territory of another dealership. The customer was asked to cross the border again to pick up the part. The customer was not satisfied.

When seeing the supply of spare parts as a business model, the distribution channels and also operations can be defined very clearly. For example, the fastest delivery can be offered by an external direct courier, or the delivery route of a delivery truck can be prioritised, depending on the urgency or even importance level of the customer based on turnover.

In conclusion, a working spare parts' business can be seen as the baseline of not only a working service business but also to create value for the customer, allowing the customer to obtain more value from the machine and to capture value for the company by providing additional revenue.

## 3.2 Gaining Value from Maintenance

Maintenance brings additional value to the lifetime of the machine, whereby a good maintenance schedule for a machine reduces breakdowns and, hence, risk for the owner. Maintenance carried out well enables the machine manufacturer to create value for itself in the form of additional income and regular contact with the customer. This includes the manufacturer supplying its own spare parts to the customer. However, there can also be a regular conversation with the machine owner about the status of the machine, if the machine needs to be upgraded or is still the right fit for use by the customer. Both sides are open to the opportunity of value creation. Next to a repair situation, for example, the customer is in a calmer state, whereby a conversation is potentially more fruitful.

A well-structured customer relationship management system for a machine manufacturer provides the opportunity to support the customer in its decision-making and to create value for both sides. Taking the example for the harvester above, calling the customer prior to the harvesting season and offering machine maintenance will be well received. This is capturing value for the manufacturer, but also creating value for the customer, as it will reduce the risk of breakdown during the harvesting season. The result will be a more satisfied customer.

When considering management of the maintenance schedule for a machine fleet, an asset management system (AMS) is an important tool for value creation by the customer. Asset management can be defined as a tool supporting the implementation of asset management policies, for specific, measurable, achievable, realistic and time-bound asset management objectives, and clear plans to achieve those objectives (IAM 2012). The AMS will help to define not only the maintenance schedule on the basis of use but also how much value the firm is realising from ownership of the machine. The latter is also a risk-based decision. The definition of when the machine has served its purpose and should be exchanged is when the risk of breakdown of the machine and higher maintenance or repair costs become too high. In interviews, companies stated that this goal is movable, depending on the economy of the market and the financial ability of the owner company. One example was that during the financial crisis fleet owners had to make the decision that taking higher risks with assets would be better than making new purchases, meaning costs in the books. There may also be the need to decide which machines to retire earlier or to use less to reduce risk. If the economy is down and production has to be reduced, a decision must be made about machine use and retirement. If the AMS is defined in the right way, it can provide an overview of its use based on data from the machine or recorded throughout its lifetime. The information gathered about the machine will facilitate an informed decision by the management about which machine to retire or which to increase the usage of. One example of this is the stockpile management of arms. Every country has a certain amount of arms, which are kept for defence purposes. Taking a complex missile, the manufacturer guarantees the use of the arms for 10 years. After its storage lifetime it will be destroyed. The 10 years are calculated based on specific environmental conditions, meaning that a change in these conditions will have an impact on the lifetime of the missile. When it has been stored in a deep storage bunker for 10 years and not moved, its lifetime can often be extended for 5 years. However, generally the problem is the provenance of the missiles over their lifetime. Therefore, the recording of environmental data and the tracing of movements become more important. Specifically in the defence industry, this is problematic, as most of the movements are not traceable. On the other hand, the

recording of data in an AMS has the potential to save large sums of money and, hence, create significant value for the customer if the lifetime of the missile can be extended.

The literature states that it is important to see AMS as a flexible system, since the practical or strategic realities of modern-day asset management need to be addressed. The issue is that requirements are changing quickly and the system therefore needs to be flexible. This is also due to the changing economic environment described above. One way to understand the flexibility of the AMS is to do scenario analysis to ascertain whether the AMS supplies the right information for the scenario and enables the right decisions to be made for the scenario. Hence, a list of test scenarios must be defined and the AMS then needs to be evaluated. Another option is case-based reasoning, whereby past data are used to understand failure frequency and/or failure pattern recognition (Dinges et al. 2015). This enables an understanding of the machines themselves based on the available data.

When looking into the near future, predictive analytics, remote communications for machines and dashboards, enabling the visualisation of KPIs in AMSs, are seen as the favourable option for service technologies. These technologies support maintenance work, reducing unscheduled repairs, and are enabled through the availability of data from the machines (Dinges et al. 2015).

The value proposition for the customer changes most dramatically when the machine breaks down and needs to be repaired. This is a situation whereby the value capture through ownership of a machine stops abruptly through a breakdown. While ownership of the machine usually brings a general risk, and breakdown is part of the risk of machine ownership, there is still the need to manage the risk and enable the machine to create value for the machine owner again, meaning repair and spare parts' availability. However, this also depends on the business model of the machine owner. If the machine owner is a builder, who works with a digger infrequently, and the machine breaks down on the last day of a building project, the machine may not be used for some time or can easily be exchanged and the repair may not be an important priority. On the contrary, if a harvester breaks down during harvesting season this is likely to be the highest repair priority for the customer. In

other words, if the harvester can be repaired, even if the repair is not of a high quality but it enables the machine to work for two more days of the harvesting season, then any larger repairs can be carried out easily, and money, as well as time, does not play an important role. The examples above show that priorities regarding repairs for the customer are different and when the value to the owner, in addition to the cycles of the season and situation, are understood, priorities for repair can be set. When a harvester is broken and needs repair, the worst message that can be given is that the harvester needs to be transported to a workshop, as it cannot be repaired on-site and a larger repair needs to be conducted. Only by understanding the situation (e.g. season, workload or exchangeability) and the business model of the machine owner can an understanding of the way the repair can be conducted, and therefore the highest value for both customer and manufacturer, be gained.

On the contrary, offering good repair business models usually varies across organisations, countries and locations. Hence, the ability to capture real value from repairs cannot often be observed. The problem may be that the repair workshop is often not centrally organised and, hence, the quality of the repair and the extra miles to deliver to the customer are often dependent on the people working in the repair shop. The authors found that communications are considered extremely important by the customer. The quality of the repair and the work to be done are also important aspects; however, communications are ranked highly. This is considered important, as a firm can have many great processes and do better work than its competition, but if it does not communicate what has been done and why, and what the outcome was, then the process is potentially seen as another item on the bill. One example is where a heavy-building machine manufacturer does a general inspection of the status of the machine after its arrival at the repair shop. This includes cleaning the machine and a complete review of it by an expert before work begins. The outcome is an understanding of the status of the machine and whether there are any other aspects of the asset that require attention during the time in the workshop. This process creates value for the customer, as it shows that the manufacturer takes the work seriously. After all, what would be more disturbing if the machine went back to the site after repair and broke down again soon after? Without

communication from the repair workshop, however, the customer cannot capture value. A short phone call to the owner of the machine stating that the review has been carried out and that the machine's status is good, or, on the contrary, any information about problems will enable the machine's owner to capture information. The result in the case of negative news will potentially be the offering of additional repairs, which will need to be addressed soon in order for the machine to function fully and reliably. The outcome of such an inspection might also be that there is a major crack in the frame of a digger, or similar, and a repair is wasted money. The decision about an additional repair purchase is then left to the machine owner.

As stated, the speed of delivering repairs as a service can be most important for the customer. At least delivering a decision or a risk assessment will help the customer to make decisions for its business. Information about the time it will take to perform the repair results in decisions such as needing to hire an exchange machine, and so on. One strategic option for a machine manufacturer to enable the customer to capture the maximum value in repairs is to build a service network, which can even be defined as a wider ecosystem. This includes the manufacturers' service organisation, direct certified partners, indirect partners of a lesser certification, competitors and influencers. When the wider ecosystem is well understood and strategically well used, configured and governed, the network can function to the satisfaction of all. When thinking about the value delivery through ecosystem partners, and also how to see competitors as contributors, the value delivery can be maximised for the good of the customer. The complexity of involvement and the number of links to external companies increase. Therefore, the value added needs to be carefully planned and structured.

When combining the ability of the customer and machine manufacturer to conduct good asset management using data from the machines, enabling high-quality maintenance and an understanding of the customer's business models, greater collaboration to create value between the machine manufacturer and owner is possible. Additionally, the machine manufacturer is able to build and sell solutions rather than products. The next section of this chapter will look at the offering of solutions and how the customer can create value for itself by taking on solutions.

## 3.3 Creating Value from Solutions as a Machine Owner

The first section of this chapter argues that in order to deliver a service, the end value needs to be understood. This is the first step to moving closer to the customer and understanding the customer's business model and business better. This provides the opportunity to move closer to the customer's business and to create value by fully understanding the use and optimisation of the customer's equipment. This enables the machine manufacturer to move into a space where, in combination with the machinery, additional services are sold, such as monitoring the equipment, for example, on fuel efficiency, but also predicting failures. The next step for the manufacturer is to sell uptime of the equipment or to sell the entire value generation and guarantee it. The customer has the option to outsource parts or whole processes to the manufacturer and to increase its productivity in doing so. For example, increasing the capability of predictive analytics in an asset management solution for a manufacturer is much easier, as the scale can be reached and the cost shared with multiple customers. This also means that the management interfaces between the manufacturer and the customer need to be well defined in order to work seamlessly.

Another option for the customer to make the most of the solutions is by no longer owning the assets, but rather paying for the outcome. It is then up to the machine manufacturer or the solution provider to optimise the use of the assets and to ensure that they work to their maximum capacity. One example is that the introduction of autonomous trucks in quarries may be complex for the quarry owner but less complicated for the machine manufacturer. If payment is by outcome, rather than by time and effort of the implementation, the risk stays with the manufacturer and the outcome can be leaner processes and higher value for the customer.

In the case above the trucks are longer paid for by the customer, but they remain in the ownership of the manufacturer. The costs for the machine are therefore not on the books of the customer, but there is a clearer cash flow, which can be linked to the outcome of the production.

In conclusion, the customer of services can easily capture value from service offerings at all levels. The focus should be to create high value throughout the lifetime of the machine and enable the manufacturer to create this value. This will take a common understanding of the situation, as well as an ability and interest in innovating in the space of services.

## 3.4 Thinking About Outsourcing a Process

When the customer outsources a process to another company there are initial questions to be asked. These include: What is the expected gain from process outsourcing? Which process is not core enough to the company's business model to be outsourced, and which process can be outsourced and gain the most in productivity? The latter indeed asks the question about who can be a partner for the process outsourcing in the first place.

The information presented above emphasises the importance of choosing wisely the process that is outsourced. So what are the aspects for consideration? The outsourced process should enable the company to capture more value through what is offered by the outsourcing company than what the company itself can create internally. This is one area where the customer of the outsourcing company can gain from the proffered expertise. The larger the value increase through outsourcing of the process, the better. However, there are also strategic factors to be considered. On the one hand, outsourcing the process should enable the company to follow and focus on its core business. This means choosing a process for outsourcing that is not too close to the core capability of the company. On the other hand, the core process should be reasonably sized, value can be created and, hence, a process can be taken over by the outsourcing company. It is strategically simple to take an outsourcing company or manufacturer who has a strategic advantage, for example, a strong technology base.

One aforementioned example for process outsourcing is for the machine manufacturer to create value by taking the transport and excavation out of the process of a mine and giving it to a machine

manufacturer. The above would facilitate the sale of the fleet to the machine manufacturer, and the machine manufacturer could then implement the operation from the start. One advantage for the machine manufacturer is that they are able to use more advanced technologies and should normally have the knowledge to implement them. Therefore, the value creation is a fixed price for the excavation of material and, hence, stability in pricing, but at the same time the creation of value by enabling a focus on the core business while others look at the technology.

The final section of this chapter has focused on value creation and capture for the customer; from the examples and arguments presented it has become clear that it is particularly important to think about value creation and capture when looking at services and to clarify expectations and strategy in getting the most out of the asset's lifetime.

## 4 Summary

Industrial firms are servitising, hence shifting their product-oriented strategies to services with the principal aim of expanding their growth and market portfolios. Throughout different service offerings the value creation for manufacturers can be increased; however, services also allow the manufacturer to capture more value. This is based on increased revenues, but also on capturing more of the market share and details on the use of the produced machines. The latter information is important for the machine manufacturer to be able to offer advanced services and solutions. Solutions include the movement of the manufacturer into the production cycle of its customer and participating within that cycle in the form of process outsourcing. One example is taking over the process of the excavation of stone in a quarry and transporting the material to the stone crusher. For the manufacturer to do this, it is important to fully understand the customer's market in order to fully assess the risks.

For the customer it can be advantageous to take on advanced services from the machine manufacturer, which will reduce the risk and costs of optimisation projects. The outcome would be for the customer to focus on its core business, for example, trading stones rather than focusing on the operations of excavation or running a service workshop.

The baseline of working together is acting as network partners instead of suppliers and building relationships instead of transactions. The customer then buys outcomes and solutions rather than products and outputs. This also means the exchange of information about the value creation process, for example, the sharing of information from machines or market expectations. This allows the manufacturer, as well as other partners, to create value.

Overall, both customer and manufacturer are able to create and capture value through service offerings. The focus should be on innovating and reducing value slippage on both sides. Hence, one side creates value and the other captures it, without loss on either side.

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