What it Takes to Scale Value-based Industrial Solutions

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Creating a first value-based industrial solution can be done ad-hoc, but scaling is complex and requires strong capabilities and a structured process

By Johan Frishammar and Vinit Parida

Introduction

Many industrial equipment manufacturers (IEMs) face a perfect storm as two major trends converge. First, they face intense competition from low-cost players as their advanced physical products alone no longer confer competitive advantage. Second, many IEMs' traditional product offerings-many of which are resource-intensive and environmentally harmful-are being undercut by stronger environmental requirements. As these two trends converge, opportunities for growth and profitability shrink, so IEMs are increasingly looking to new business models — but the capability to execute them at scale has been elusive.

To improve their customer value propositions and their profit margins, IEMs across industries create *value-based industrial solutions*.[1] We define value-based industrial solutions as customized and integrated combinations of product, service, and digital technology that allow companies to achieve profitability and sustainability simultaneously by providing value in use. In some industries, like construction and mining equipment, solutions such as fleet optimization and equipment-as-a-service already account for the majority of total revenues.[2]

Value-based industrial solutions imply that IEMs shift from selling products to solving complex customer needs – that is, to a value-in-use business logic where the value created is shared between manufacturer and customer.[3] Such solutions have three distinctive but interrelated characteristics. “Customized” means that the solution is not off-the-shelf but rather tailored to the unique operational needs of a specific customer.[4] “Integrated combinations” denotes the combination of product, service, and digital modules enabling the solution a total value that surpasses the value of its individual modules.[5] Finally, “dual goals” implies the pursuit of profitability and sustainability outcomes for both IEMs and their customers. Profitability may manifest as productivity improvements and reduced operating costs, while sustainability can be achieved by lowering the CO_2 footprint of operations and enhancing product utilization.[6] Industrial examples of such solutions include Scania’s fleet management system, Volvo Construction Equipment’s site optimization solutions, ABB’s motor-as-a-service, Caterpillar’s autonomous solutions, GE Aerospace’s TrueChoice flight hours, and John Deere’s TimberCare service offering.

The Scaling Challenge

Our research shows that it is relatively easy for an IEM to create an initial (or one-off) value-based industrial solution. It implies limited financial commitments and an assurance that one key customer is on board. Here, the value created does not center on immediate revenue flows. Rather, the initial solution is about proving technical feasibility and operational capabilities while strengthening the brand image of both the IEM and its

customer. However, scaling these solutions is much more challenging. Moving from pilot initiatives to offering these solutions across a large and diverse customer base requires a repeatable structured process and strong entrenched capabilities.

When scaling, the expectation is for higher profits, but these expectations often fail to materialize. Instead, many firms find that their investments into value-based industrial solutions result in rising costs and enhanced organizational complexity, without improving profitability.[7] IEMs often struggle with managing scaling in practice, and their customers frequently complain that value-based industrial solutions are not financially viable.[8]

We studied 19 companies across eight industry sectors to gain insight into where the scaling process falls apart, and we found that many IEMs misconceive of value, i.e. thinking that their value proposition is much stronger than what their customers think. To properly configure solutions and aligning with partners was also challenging across the cases. Many IEMs also fall short on implementing new revenue models and building strong capabilities to deliver promised value, especially when involving third-party services.

There are numerous reasons why these challenges prevail. Many IEMs have a deeply rooted culture that prizes the development and improvement of physical products and limits the ability to deliver new forms of customer value beyond the products themselves, such as value-based solutions.[9] Second, many IEMs are organized for a transaction-based customer interaction and lack the organizational readiness for solution delivery and

implementation.[10] Third, creating a profitable revenue model may be particularly complex as it requires alignment and agreement with third-party service providers and other ecosystem partners over whom a focal IEM has limited control -- in addition to requiring contributions from customers, which magnifies complexity.[11]

The Capabilities Required for a Scaleable Solution

Our analysis shows that organizations capable of scaling value-based industrial solutions have established a set of prerequisite capabilities in the initial phase of designing and piloting these offerings. In a second phase they have gone on to develop additional capabilities required to repeatedly execute and scale such solutions.

In the framework we have developed from our research, we have defined three core capabilities for each of the two phases, and briefly described the key practices for each. (See, "Framework Figure Title TK.") These practices outline what an IEM needs to do to successfully scale their value-based industrial solutions. Our research shows that the chain is only as strong as its weakest link, and deficiencies in any single scaling practice can stall the overall scaling process. As we look more closely at the framework below, we'll identify particular areas of challenge.

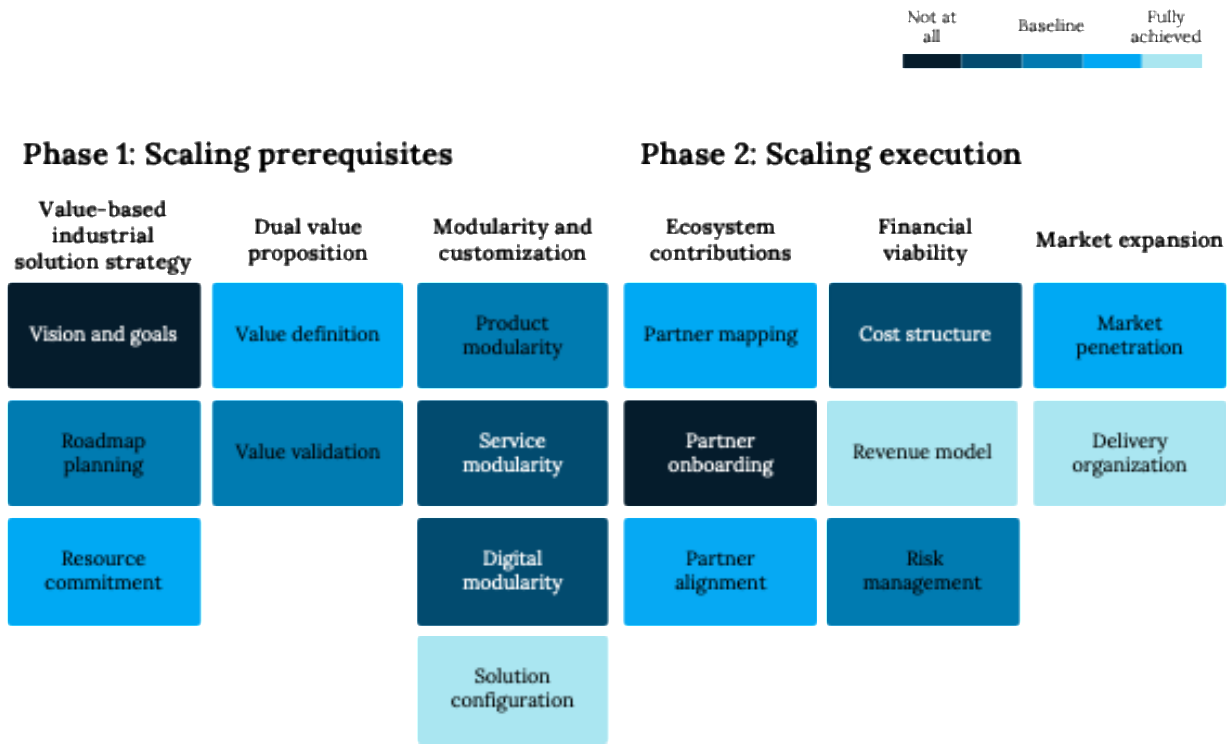

Figure: What it takes to scale value-based industrial solutions

Getting the scaling prerequisites right

The strategy work that kicks off the process of developing a value-based industrial solution was not, in our analysis, a particular roadblock. Managers recognize that this represents a profound shift: as one told us, “For most of our product lines, we no longer sell just products – we deliver comprehensive solution projects tailored to our customers’ operational needs.” That said, it's important to articulate a clear vision with a rationale for the shift, and to establish a set of clearly defined goals. Without this, top management will struggle to win the commitment of the rest of the company. Second, leaders must design a roadmap, using a structured planning process to outline key activities, milestones, and timelines that operationalize the vision and goals into practical, actionable steps. Finally, a

credible resource commitment is needed – leaders must dedicate specific people, a defined budget, technology, and other assets to execute the roadmap.

Where companies have typically struggled in this initial phase is in defining the dual value proposition. A value-based industrial solution must ideally create both business value (profit, growth, competitive advantage) and environmental value (resource efficiency, carbon reduction, waste elimination) simultaneously. Successful companies use environmental value to create business value — and it must do so. Not a single company we studied was willing or able to afford “unprofitable sustainability”, i.e. pursuing sustainability without a clear business case.

An ecosystem partner to an IEM we studied told us, “Profitable sustainability is front and center. Adopting advanced electric machines is not just about reducing emissions – it's about achieving tangible financial gains. These solutions must lead to measurable reductions in operating costs, ensuring that the total cost of ownership is justified from both a financial and environmental perspective.”

However, high perceived costs of such solutions can make customers hesitant. A supplier of construction solutions invested heavily in developing electric construction machines, thereby eliminating local emissions while simultaneously reducing noise. Despite the environmental superiority of the solution, customer uptake was much slower than expected due to the more costly investment. Further, in some markets, the impact of low

fossil fuel prices, or policy incentives favoring fossil-based solutions, meant that savings were insufficient to offset the higher cost.

Creating a dual value proposition requires both defining and validating the promised value. Value definition should result in a clear articulation of how the solution will deliver both business value and environmental value and was, in some cases, fairly straightforward. An IEM active in the heavy trucks industry did this well: “For long-haul operations, digital services enable our customers to reduce CO_2 emissions by cutting fuel consumption through real-time route and driving optimization.” However, few IEMs correctly defined the business value of their solutions and hence failed at getting perceived customer value right. All too often, marketing, sales, and R&D functions conceived of business value differently – even years after a solution was first launched. IEMs also commonly held inflated perceptions of the business value of their solutions, which customers did not find credible.

That is why value validation — confirming and measuring the dual value created via customer feedback and real data — is so critical, and so challenging. Digital maturity helps with this, as exemplified by an ecosystem actor catering to the mining industry. This company's digital mining intelligence service provides data on asset and operational performance, which enables it to produce a customized dashboard with visibility into actual operational efficiency, environmental impact, and safety outcomes.

However, many other actors were much less sophisticated, and it was not uncommon to attempt to validate value via word of mouth or ad-hoc customer interactions. One IEM developed what they believed to be a groundbreaking solution for industry automation: a suite of semi-automated, electrified machines designed to improve both efficiency and sustainability. From the IEM's perspective, the business value seemed obvious. A senior product manager told us: "*With these systems, operators can cut emissions while reducing downtime. We were confident the total cost of ownership would be compelling"*. However, the customer saw it quite differently and was not convinced that the economics of the solutions were competitive and realistic — nor that the IEM's solution reflected their operational realities.

Another important scaling prerequisite for delivering solutions that are customized to a particular operating context is capability in modularity across products, digital assets, and services. For products, this means developing key components such as motors, pumps, and transmissions that they can be used across a variety of customer solutions. Similarly, digital modularity means designing software, data analytics, and communication interfaces to work across diverse solutions. Developing service modules to work across solutions – such as proactive maintenance contracts, upgrading, and refurbishment — enables efficient and flexible delivery and is key to make a value-based industrial solution deliver on its promises.

One IEM providing construction equipment developed standardized products, services, and digital modules, along with internal processes to configure them efficiently. This enabled flexibility in designing solutions and was cost-effective for their customers. In contrast, an IEM that focused excessively on customizability and limited standardization ultimately found this to be an operationally inefficient approach that lacked financial viability.

The most challenging among the practices involving modularity and customization was solution configuration. Seamlessly bringing together product, service, and digital modules was a headache across the cases we studied. Each of the three types of modules has a different value logic. Physical products are judged on reliability and quality, services are assessed more on responsiveness and customization, and digital assets are evaluated on connectivity and usability. Because the value logics are orthogonal, solution configuration becomes a problem of aligning performance regimes that are partially incompatible. For example, service customization can sometimes undercut product reliability. Second, each type typically emerges from different units or departments within an IEM, which in our cases caused silo thinking and hence additional integration problems. Finally, the effectiveness of digital modules depended on customer data, which some customers were reluctant to share with their IEMs for fear of lock-in and loss of control — but without customer data, the IEM couldn't unlock the full value of the product and service modules. Yet another problem centered on customers having different procurement routines for

products, services, and digital assets, which complicated their acquisition of value-based solutions.

An IEM catering to the mining and steel industries shows how to configure solutions well. This firm followed an agile and collaborative process where customers were involved in co-designing advanced solutions and supported the configuration process. This process brought together delivery experts, product owners, and R&D early to define both module integration and performance outcomes. Structured guidelines enabled solution sales and delivery teams to rapidly assemble and adapt solutions using standard modules with minor adjustments – thereby making the solution both efficient and responsive to individual customer needs. In this process, a particularly pressing point was procurement and financial cycles related to different modules of the solution. Industrial products typically had an estimated 30+-year life span and were acquired through significant CAPEX investments. In contrast, services were budgeted on shorter 3–5-year cycles, while digital features required recurring OPEX payments. By involving customers early in the co-design, the IEM was able to align these cycles and negotiate a hybrid model: equipment was sold on a discounted CAPEX basis, while services and digital modules were bundled into a three-year OPEX contract with the option for successive three-year extensions if predefined performance outcomes were met. This alignment reduced friction in procurement and built confidence that both operational and financial goals could be achieved simultaneously.

What's needed to successfully scale VBIS

The second phase of work, scaling execution, centers on the capabilities needed to deliver value-based industrial solutions repeatedly and across a variety of customer engagements while ensuring that financial objectives are met.

Here, developing and orchestrating a partner ecosystem is essential, as even large IEMs cannot scale VBIS on their own: We did not see a single IEM that was horizontally and vertically integrated to the extent that it had all capabilities in product, service, and digital modules in-house. Some IEMs added needed competencies via partnerships, via acquisitions, or both: An IEM active in process equipment and industry automation filled competency gaps in its design and delivery structures via a combination of acquisitions and contracts with complementary partners.

Building out an ecosystem requires both mapping out complementary partners and onboarding them, which worked relatively well across the cases we studied. However, aligning with partners on who does what and who is situated where proved much more challenging. Partners' interests and goals tended to diverge from IEMs', particularly when a VBIS was novel and the relationship between partner and IEM was recent, leaving partners hesitant to commit to uncertain future pathways. Such situations required active orchestration and engagement by the IEM. Yet another complication was that alignment

normally required the sharing of data and intellectual property, which caused concerns about opportunistic behavior and knowledge leakage.

A diversified global IEM in industry automation had an innovative approach to partner mapping, onboarding, and alignment. The company sponsored an accelerator program for over 100 startups and SMEs, with a focus on co-developing solutions that integrated directly with the IEM's existing product lines. This collaborative approach allowed the IEM to tap into the capabilities of a diverse partner network and subsequently onboard and align with a subset of these firms to scale innovative solutions. Another IEM partnered with a global digital platform provider and innovative digital start-ups to put together a complete VBIS. After the onboarding phase, the partners worked tirelessly on clarifying responsibilities and mutual expectations, and on data-sharing protocols, to prevent overlap and friction. As trust and experience accumulated, the partners successfully developed a scalable solution that spanned the full solution lifecycle—from design and operation to performance monitoring and end-of-life recovery.

Needless to say, financial viability will eventually make or break a solution. It implies that the IEM must cover its costs, recoup its investments into value-based industrial solutions, and generate profits — while maintaining an attractive customer value proposition. Managing this requires a detailed understanding of cost structure, which is fairly

straightforward, as well as having the right revenue model and managing risk, which were more challenging for the IEMs we studied.

VBIS normally bring about a new type of revenue model that shifts from up-front product sales revenue streams to monthly licensing fees as the IEM normally retains ownership of the solutions they provide. This puts the need for rigorous risk management front and center. IEMs in our study experienced instances of adverse customer behavior, for example instances where solutions were misused and additional repair and maintenance costs imposed on the IEM. Some IEMs also took on unanticipated costs stemming from complexity in service delivery, and others faced new financial risks such as working capital being stressed when revenues from conventional product sales diminished. All these risks will effectively undercut the revenue model if not proactively dealt with.

One IEM, which provided process equipment to mining companies, pursued outcome-based cost-per-ton contracts successfully. One executive told us: “This is a high-risk revenue model in which we earn in proportion to customers operational success materializing. While this model tightly aligns incentives – monetizing value through shared productivity gains – it also places significant pressure on us to continuously deliver measurable outcomes.” Many of the IEMs we studied alluded to challenges in meeting performance guarantees, due largely to limited insights into customer operations. This was particularly prevalent in early attempts at scaling, before learning effects had accumulated. Another IEM eventually abandoned its attempts at performance-based

contracts after years of pilot tests due to risk management and cost structure concerns. Capability gaps in delivering contracts on-site could not be closed, and the risk of consistently failing to meet promised performance outcomes was deemed too high.

Implicit in scaling is the need to reach a larger addressable market. And given the specificity of VBIS, this implies building capability to expand internationally where customer requirements can differ significantly across countries, regions or segments. IEMs must identify additional customer segments that are good prospects for VBIS and/or penetrate existing segments more deeply. Here, understanding customer readiness, regulatory pressure, policy incentives, and infrastructure support is key. For example, in scaling its site electrification solutions, an IEM active in construction equipment learned that not all customers or markets were equally prepared. In some cases, customer maturity was too low; in others, limited local sales and delivery capacity effectively hindered implementation at scale. To address this, the IEM conducted in-depth market analyses to identify high-potential segments and regions where both customer readiness and organizational reach were aligned – thereby ensuring more focused and effective market penetration.

Addressing a larger market requires defining and clarifying the roles, responsibilities, and structure of the IEMs' firm-internal or partner-based delivery organization responsible for getting the solutions implemented in practice. Some IEMs also used a hybrid version, that is, a firm-internal set-up in some markets and a partner-based in others. Even a firm-

internal delivery organization caused major challenges but with a partner-based one complexity grew further and capability deficiencies was a major issue. The delivery organization needed to make the solution work at each customer's site, and even with standardized modules the customer context and specific requirements were seldom identical. This implies that a standardized process for solution delivery was often unfeasible, and performance of the solutions therefore varied, for example regarding equipment uptime. We also observed a few cases where partners disagreed on who was best positioned to exert influence over solution architecture in practice: an IEM from its domestic headquarters or third-party service actors in a specific country.

An IEM catering to the forest industry created a delivery organization equipped to implement complex solutions and deliver operational performance over time. This company adopted a forward-leaning and proactive delivery model, where service delivery teams not only responded to customer issues but also actively managed to ensure that its solutions delivered guaranteed results. Building this capability involved combining technical expertise, field support, and monitoring routines into an organizational structure and process to support scaling and long-term customer success. An executive from a construction equipment IEM further underscored how instrumental the delivery organization was for customer satisfaction: "…solutions require a completely different mindset. Our delivery teams now need to collaborate closely with customers over time, monitor performance, and ensure outcomes are achieved. That demands new skills, new

incentives [...] unless we invest in these capabilities, the delivery organization will drift back to its transactional delivery model".

Managerial implications: Using the framework in practice

Splitting the scaling process of IEMs into two phases, six core scaling capabilities and 17 scaling practices allow IEMs and their partners to systematically identify strengths and weaknesses in scaling. This sets the stage for building better scaling capabilities to bridge the company-specific weaknesses identified. These weaknesses can span strategy, technology, organizational, financial and market issues, so doing the analysis is complex. For this reason, we advise managers to use the VBIS scaling tool with a set of diagnostic question for each scaling practice [Link to tool here]. The following managerial implications pertain.

1. Value-based industrial solutions are complex, customized, and ecosystem dependent. For this reason, take a systematic and holistic approach to scaling them. Roll-out via ad hoc actions or uncoordinated initiatives will not work.
2. Scaling success is contingent on reaching sufficient maturity in all scaling practices because a chain is only as strong as its weakest link. That said, getting the dual value proposition, solution configuration, partner alignment, revenue model and delivery organization right seems particularly challenging and managers at IEMs are encouraged to pay specific attention to these.

3. Misalignment or poor timing – such as engaging global partners before a clear internal strategy is established, or attempting wider replication before solution-market fit is achieved – is likely to create bottlenecks, resource misallocations, and scaling fatigue. Therefore, make sure that scaling practices are not only conducted, but conducted in the appropriate order.

Creating one value-based industrial solution to demonstrate proof of concept can be done ad hoc. Getting from pilot cases to a structured process for scaling such solutions, and strong capabilities to execute on that process, is a totally different matter. Addressing scaling weaknesses and improving scaling capabilities can be achieved by following the advice outlined here.

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About the research

The authors' research into the development and scaling of value-based industrial solutions began in 2008 and is still ongoing.

- Companies studied included IEMs active in global markets like Sandvik, Epiroc, ABB, Metso Outotec, Volvo Construction Equipment, Scania, Komatsu Forest, Kongsberg and Siemens, some of their customers like Skanska, Stena Recycling, BillerudKorsnäs, Smurfit Kappa, SCA, LKAB, and Boliden. The research also covered ecosystem partners such as Ragn-Sells, Mobilaris, Swecon, IBM, Amazon Web Services, Telia, and Ericsson (case examples have been anonymized in text).

- Sectors covered include process equipment for pulp and paper, steel production, mining, construction equipment, heavy trucks for long- and short-haul transportation, forestry machinery, industry automation, and maritime industries.
- The authors conducted 157 interviews with senior managers, middle managers, and engineers in R&D, innovation, marketing, procurement, service and sales, and legal and compliance. In addition, they held over 20 workshops with managers and studied internal company materials, including strategy and policy documents.

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