

Bridging the Strategy Gap: Redefining Engineering Services for Product-Centric Firms

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Abstract

Engineering service providers and product-centric firms have the bond that is very much necessary to make both industries successful. However, due to the nature of their operation, they differ in their business strategy and approach to relationships, creating a gap in strategic alignment. This paper addresses the critical areas of misalignment and how these organizations can create mutual value with alignment. It also emphasizes how emerging technologies like artificial intelligence (AI) and data-driven solutions address these strategic gaps. By analyzing these strategic gaps, this paper proposes how digital transformation can help enhance collaboration, improve efficiency, and drive innovation across engineering and product development. The paper also proposes a framework that highlights the important components to be considered while creating a relationship between EPS and a product-centric company to build trust, effective collaboration, and mutual value.

Keywords: Engineering services providers (EPS), Product-centric Firms, Business Strategy, Strategic Alignment, Digital Transformation, Artificial Intelligence (AI), Value Creation

I. INTRODUCTION

With the advance in digital technology post-1996, service-based industries became vital to product-centric firms. As technology advanced and the market size of the service industry grew, service organization changed their operating structure to cater to a different industry and explored different business models. This change in business model changed how they support product-based companies that potentially have customers. These engineering service providers (ESPs) offer technical support to product-oriented firms that are ready to outsource engineering tasks. These engineering tasks can vary from product development, testing, or R&D. Product-centric companies often focus on consumer needs, market share, and rapid innovation, while ESPs focus on account management and operational efficiency. This misalignment limits the value delivered and increases the missed opportunities to create economic value in the industry.

By focusing on identifying and analyzing these strategic gaps, there is a need to understand the core business model misalignment between these organizations to move beyond technical collaboration. These gaps could hinder the ability to collaborate, co-innovate, and create mutual value. This paper focuses on understanding the strategic dimension of these relationships and inter-firm collaborations in product development and innovation. This could help understand how the realignment of their strategies could create synergistic partnerships in the digital era. This paper also highlights how digital transformation, including emerging technologies like artificial intelligence (AI) can be used as strategic enablers to bridge these gaps.

II. LITERATURE REVIEW

The relationship between the ESPs and the product-centric firms has been a center of research in outsourcing and collaborative innovation for decades. However, some research focuses on the operational priorities and technical aspects of collaboration, ignoring the need for organizations to align strategically and develop a co-

compatible business model for collaboration.

Most product-centric manufacturing companies increasingly rely on external service providers for various aspects of their operations, including consulting, R&D, and product development. While this trend highlights the growing importance of engineering service providers, it also increases the challenges and underlying strategic misalignment [1].

In the realm of collaborative innovation, it is important to have open innovation practices where firms leverage external knowledge and capabilities [2]. This concept is particularly relevant to the ESP-product firm relationship, yet it also raises questions about effectively managing knowledge flows and intellectual property in such collaborations [3]. Further exploring the tensions in cooperative relationships can provide insights into the complex dynamics between ESPs and their clients.

Digital technologies can help reshape business models and value-creation processes. However, there is a gap in the literature regarding how these digital transformations specifically impact the strategic alignment between ESPs and product-centric firms.

Muller and Zenker [4] examine the role of knowledge-intensive business services (KIBS) in innovation systems, a category that includes many ESPs. Their work highlights the importance of knowledge transfer and absorption in these relationships but does not fully address the strategic implications of these processes. There is extensive literature on how digital transformation can be used in engineering services and product-centric firms; however, it offers insights into the technical possibilities and often overlooks the strategic challenges of implementing non-ownership collaborative environments of ESPs and product-centric firms.

A. Understanding ESP industry

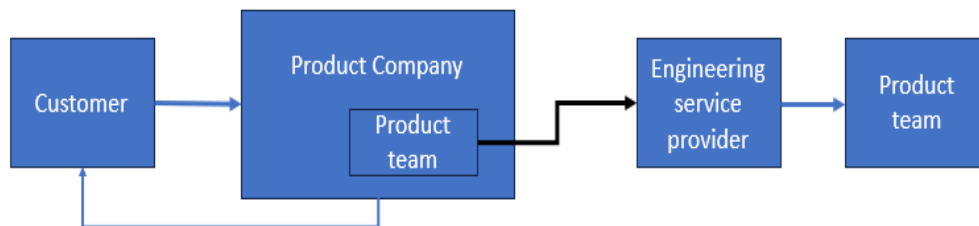


Figure 1: Economic value chain

The Engineering service industry, or ESP, focuses on delivering intangible value with specialized engineering solutions. Their business model focuses on the engineering activities in the product development lifecycle, such as R&D, Manufacturing, testing, and project management, making them B2B companies. The common forms of business models are time-and-material, where the product-centric company pays for the time of the engineers supporting their project or product and provides the material needed, including licenses, etc. Fixed-cost projects are where the servicing company is responsible for all the costs, and the product-centric company pays an estimated cost. This project-based approach limits the time the ESPs are engaged with a client.

Strategically, ESPs prioritize managing accounts, building long-term relationships, on-time delivery, and operating excellence. In these companies, the cost-to-profit ratio depends on the time the engineers spend on a project. Hence, operational efficiency is critical to their success. As utilization of the global delivery model increases, the ESP emphasizes scalability and distribution of work across low-cost regions like India.

This approach allows product-centric companies to outsource routine work, limiting ESPs' evolution. With agile practices and product innovation taking over the industry, ESPs face the challenge of transforming from service providers to collaborative partnerships.

B. Understanding Product industry

Product-centric companies focus on consumer needs and customer pain points by developing, marketing, and selling innovative products. The business model revolves around the value creation through differentiation,

innovation, and customer experience. These are market-driven and continuously seek to improve their products or develop new ones.

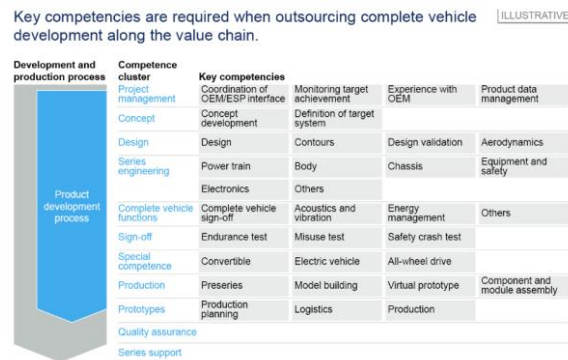


Figure 2: Key competencies of vehicle development [5]

The core elements of the business model include R&D and product innovation, customer-centric problem-solving, and revenue generation models. These companies prioritize market share, brand positioning, and competitive advantage over R&D for sustainability but understand that product innovation is necessary for long-term success. With digital transformation driving these companies towards data analytics and global operations, time-to-market and management of talent becomes a key factor for success. This drives the need for collaborative partners who can accelerate the routine work of R&D, such as testing, engineering drawing, etc. These companies often work with more than one ESP to complete a product launch.

The strategic challenge is to understand the three main questions. Which competencies are required to be outsourced? Who is the correct ESP for the project? What are the critical factors for collaboration success?[5]. Figure 2 shows typical vehicle development along the value chain and highlights the challenges faced by Product-centric companies to outsource work.

III. STRATEGIC GAPS AND DIGITAL SOLUTIONS

The strategic gaps and misalignment between product-centric organizations and engineering service providers can be categorized into several areas.

A. Organizational Culture and Mindset

One of the most significant strategic gaps lies in the differing organizational culture and leadership mindsets in engineering service providers and product-centric companies, where ESPs prioritize flexibility and project-based thinking. In contrast, product-centric companies concentrate on product-cycle, market positioning, and customer satisfaction. ESPs struggle to connect their project's short-term goals with product companies' long-term vision, while product companies ignore the need to align the brand value and customer expectations with ESPs due to the short engagement timeframe. This gap could lead to misunderstanding, conflict of priorities, and inefficient collaboration.

One such example is the Boeing 787 Dreamliner development project. In the early 2000s, Boeing outsourced the aircraft's design to various engineering service providers worldwide. However, the cultural differences between the companies led to several delays, quality issues, and cost overruns. ESPs are more accustomed to specific requirements and detailed specifications for designing, often misinterpreted Boeing's requirements or made design decisions that do not align with the overall product vision, resulting in designs that do not fit together and causing integration failure.

In the new Digital era, digital collaboration platforms and data visualization tools can help bridge the culture gap. Facilitating real-time communication and project tracking, providing insights into cross-functional dependencies and their overall impact on product goals, and aligning short-term project goals with long-term product goals while enabling data-driven decision-making on comparative advantage could be beneficial by creating a virtual space for cultural exchange and shared learning. For example, an overall digital product

management tool and the team could have helped Boeing and its partners to provide project tracking and understand the design changes while flagging any inconsistencies across other ESPs.

B. Risk Control and Innovation

ESPs often operate within a short time frame for project execution, while product-centric companies concentrate on long-term product innovation; this could lead to misaligned risk perception and mitigating strategies. ESPs often prioritize short-term project completion over long-term product sustainability, resulting in short-term success that fails to integrate into the long-term product innovation pipeline. ESPs often struggle to keep pace with the evolving technological landscape, while product companies lack specialized expertise to fully leverage emerging technologies.

One example is the Ford Pinto development. This highlights the misalignment in risk approach, which led to car safety issues that killed many customers. The reduction in the time for development caused the need to overlook safety tests and to concentrate on short delivery time. ESPs prioritizing these short-term goals over the long-term goal caused Ford its reputation and numerous lawsuits.

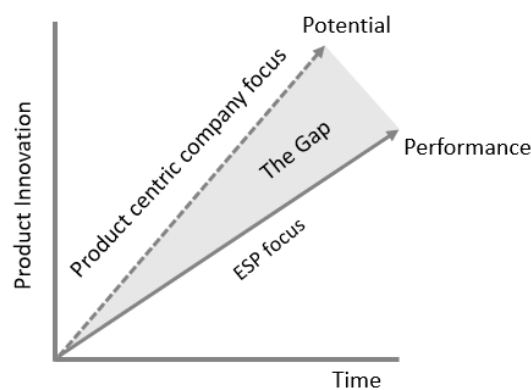


Figure 3: Value proposition expectations and focus

Even though digital technology was not dominant during the 1960s, such a situation could be addressed with the help of digital transformation in today's world. Many simulation software are available for engineering and non-engineering risks that could impact engineering decision-making on product performance and market reception. ESPs and product-centric companies can collaborate in utilizing such software to understand the impact of the decisions made, thereby reducing and aligning on the risks involved in product innovation.

C. Business Model and Value proposition

The traditional business model, in which ESPs focus on billable hours rather than long-term product success, may not align with value-based product companies. This creates a misalignment in incentives and undervalues engineering service providers' importance. This misalignment creates a transactional relationship between the two firms rather than a true collaboration and partnership, limiting innovation. ESPs are incentivized to prolong projects and avoid risks, while product companies focus on time-to-market and view ESPs as a cost reduction rather than a source of comparative advantage. ESPs should innovate in how they allocate time to collaborate with nonbillable hours to establish trust and understand customer value propositions.

One such example is the automotive industry. The automotive industry viewed ESPs and other part suppliers as interchangeable vendors rather than partners and focused on cost reduction. This led to quality issues, limiting innovation and missing collaboration opportunities in value creation. GMs faced quality issues, and their suppliers reduced investment in R&D to compete in cost rather than differentiation.

The capabilities of new digital technologies, such as AI, could drive value assessment platforms where both product-centric and ESPs could see the long-term impact of R&D and component quality on brand reputation.

D. Knowledge Ownership and concerns

Another misalignment is with knowledge and intellectual property (IP) management. ESPs work with multiple

clients in the same industry and accumulate valuable knowledge and expertise, which is the center of their value proposition. However, product-centric companies often seek to protect their IP and are not interested in sharing critical knowledge. This limits the collaboration and prevents both parties from leveraging their capabilities to their full potential.

A clear framework for IP and data governance can reduce the conflict and increase trust between product-centric companies and ESPs. Joint ownership models, transparent data-sharing policies, and IP agreements could ensure alignment on incentives. These models and policies should involve dispute resolution mechanisms and penalty structures. Treating ESPs as innovation partners and allocating royalties for shared innovation could push ESPs to innovate in their business model, creating higher value for product-centric companies in terms of product innovation.

E. Market Orientation

Product-centric organizations have a deeper understanding and insights into end-user needs and market trends, while ESPs do not typically have such insights due to their focus on billable hours. This market-related information often needs extensive research and extensive investment in efforts and time without the expectation of valuable outcomes and purely for knowledge purposes. If ESPs can prove to acquire this knowledge or are willing to invest time with product-centric companies for collaborative interests, it will help build trust, greater value, and a better reputation in the industry.

One classic example is that the big consulting companies and even engineering technology service providers are not segmenting their business into different industries; where these segments invest a significant amount of time and effort to understand and build industry-specific knowledge and address customers with solutions rather than waiting for the customers to provide them a detailed solution to implement or test. This move has taken the relationship in the consulting industry to the next level by building a platform that could be used as a solutions. Similarly, L&T technology services started its interest in providing solutions rather than just service, investing in pushing engineers to build product-oriented mindsets and creating innovation hubs, which have proven to contribute to their success.

IV.FRAMEWORK

The framework below is proposed to systematically address these strategic gaps between Engineering Service Providers (ESPs) and Product-centric firms and foster more effective collaboration than just services. This framework helps make decisions and add effective components to the engagement contracts to foresee and set the framework to avoid conflicts, build trust, and improve collaboration.

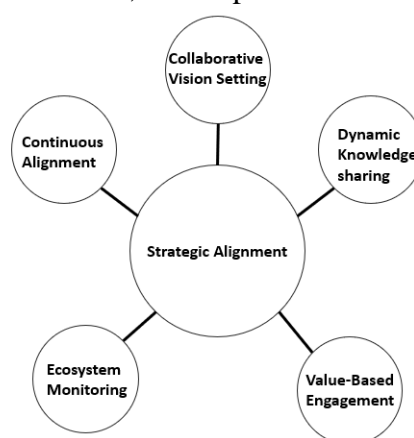


Figure 4: Framework for enagement

Collaborative Vision setting: Utilize the digital tools to structure the collaborative teams that are focused on a collective vision rather than focusing on individual organizational vision. Setting this collaborative vision as a blend of both organizational priorities is necessary.

Dynamic Knowledge Sharing: Implement a policy or contract to secure open knowledge sharing between organizations. A technology-driven knowledge management platform to share controlled information and data such as IP, trade secrets, etc.

Value-Based Engagement Models: This step is used to diversify risks and value outputs based on innovation. Future collaborations between the ESPs and product-centric companies should focus on pricing and engagement models that are more valuable for both organizations than billable hours. Models like shared profit or royalty could help ESPs to succeed in the industry without being seen as competitors.

Ecosystem Monitoring: As the digital footprint of technological evolutions continues, it is necessary for product-based companies to treat the engineering service providers as extended teams and involve them in their transformation journey. A strategic partnership is key to building and monitoring innovation, collaboration, and value creation process.

Continuous Alignment: Companies often change strategies, visions, and even their tactics with changes in leadership, business environment, or with a changing economy. It is necessary to set an agile and robust process to understand these changes and continuously align on partnership and value creation with each other. By implementing this framework and utilizing new digital technologies, both product-centric companies and ESPs can create a synergistic relationship that drives innovation and creates mutual economic value.

V.CONCLUSION

The strategic gaps between engineering service providers and product-centric firms represent significant barriers to effective collaboration and value creation in today's rapidly evolving technological landscape. Identifying and addressing these strategic misalignments could help both organizations to collaborate effectively within the time frame of the engagement and create mutual value. Understanding each other's business models, strategies, concerns, and value propositions. ESPs exploring new business models like the shared revenue model or royalty model could help product companies see the value created by ESPs.

Utilizing new digital technologies and platforms for collaborations enforcing frameworks, policies, and contracts around sensitivity data, information, and IPs helps build trust. Additionally, building a collaborative vision instead of the requirement for a project could help the partnership succeed. This ability to align strategically could be crucial for competitive advantage for ESPs and an important value-creation factor for product companies to create more resilient, innovative, and mutually beneficial relationships that can drive success in the digital era.

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