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MANAGEMENT CONSULTANTS

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**IMPRINT**

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# CAPITAL EXPENDITURES: WAYS TO OPTIMIZE

**L**ong-term investments, or CapEx, are an essential part of entrepreneurial activity. However, the framework conditions for investment decisions have rarely been as challenging as they are today:

On one hand, companies are grappling with significant changes that lead to high investment expenditures. These include technological upheavals, managing the energy transition, shorter product life cycles, demographic change, and the reorganization of global networks. On the other hand, rising interest rates and weak economic prospects have massively increased the cost of refinancing, making it more difficult to access necessary capital for upcoming investments.

Against this backdrop, companies need to scrutinize where, how, and when it makes the most sense to invest. This is complicated by the fact that predictability for companies has decreased dramatically due to global crises and unclear political conditions. This poses an additional challenge for potential CapEx expenditures, because, unlike operational expenditure (OpEx), CapEx cannot "breathe" with the markets. Their potential for flexibility and the ability to adapt to short-term fluctuations is limited. CapEx ties up a lot of capital in the long term and can lead to immense burdens for the company if market forecasts do not materialize.

The question of how CapEx can be optimized is therefore becoming critically relevant. The good news is that companies have many options to significantly optimize the use of existing capital goods, reduce or avoid investment requirements and, in many cases, even free up the capital tied up in CapEx.

In this issue of our magazine, we present different perspectives on long-term investments and outline smart and efficient strategies for the sustainable optimization of CapEx.

We wish you an insightful read.

**Sebastian Diers**  
 Member of the Management Board of  
 ROI-EFESO Management Consulting AG

**CAPEX-  
OPTIMIZATION  
IS NOT  
ENOUGH -**

**ABOVE  
ALL,  
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HAS TO  
HAPPEN  
QUICKLY**

## INTERVIEW WITH JOST KAMENIK, CEO, TSETINIS-EFESO AND THOMAS PLASA, PARTNER, TSETINIS-EFESO



**M**r. Kamenik, the financial framework conditions and the investment environment for companies have deteriorated significantly in recent years. How serious are these changes?

**JK:** What we are seeing in the industry is a massive tightening of the interest rate situation and the cost of refinancing. For a long time, money was so cheap that even large debts were easy to finance. This situation has changed dramatically, and interest rates have risen exorbitantly. At the same time, the cooling of the markets has often led to a shortage of liquidity. Frequently, companies' credit ratings have fallen, in some cases, to levels at which institutional investors are no longer allowed to invest money. This in turn leads to further increases in the cost of loans. This development comes at a time of stagnating or shrinking markets and transformative upheaval. A lot of money is therefore needed for interest payments and restructuring measures as well as for investments in new technologies. This is why CapEx optimization is rapidly gaining in importance. It is the lever to free up liquidity, stabilize credit ratings and reduce upcoming expenses very quickly. Conventional CapEx approaches, which often have a horizon of 18 months, are not enough to get the situation under control. Many companies no longer have this time.

**Have companies not hedged against interest rate fluctuations in the past, Mr. Plasa?**

**TP:** Of course, there are different types of financing and different maturities. But the era of cheap money came to an end in a kind of perfect storm: very abrupt and unexpected in its intensity. In the past, people had allowed themselves a certain vulnerability based on the idea that things cannot change from one moment to the next. The speed and extent of the change were surprising and have rendered the industry's planning principles obsolete. Action must now be taken very quickly. This is not easy within existing structures. Typically, existing plants cannot simply be wound up; the restructuring costs would be almost impossible to bear. At the same time, strategically important markets and technologies require further investment. However, investments made today will not pay for themselves for several years. Decisions are scrutinized intensively because every euro can only be spent once. In other words: You take time that is not actually there.

**How can action be taken quickly and effectively under these conditions?**

**TP:** You must significantly reduce the time required for the analysis, bundle all relevant competencies in the projects and ensure a high degree of flexibility. The example of e-mobility is a good illustration of this: In this segment, there are manufacturers who are focusing on converting entire plants to e-mobility. Others remain open and leave the decision to their customers. You have to be able to find the right optimization approaches for both strategies and precisely identify the potential investment requirements for new construction and conversion over long periods of time – with regard to operator concepts, personnel deployment, energy and space requirements, conveyor technology, production technologies or IT.

A central task is to analyze and streamline the portfolio and clarify the question of where the future core business lies. The selection of appropriate operating scenarios and the integration of different partners into an operating model – the distribution of CapEx – also play an important role. There are also opportunities to achieve CapEx flexibilization by using digital technologies. The analysis of the environment is of particular importance. It is critical to understand exactly in which regions certain tax incentives and subsidy opportunities exist and how these can affect product and investment costs. In addition, companies often have no transparency about the optimization potential in their CapEx portfolio, resulting in huge amounts being lost.

**Is this task becoming increasingly demanding?**

**TP:** Yes. We have to assume that the process and manufacturing technology will change significantly in the future during the amortization period of a plant. Or, to take the example of "electromobility" again, that there will be several generational changes in batteries, including the design of the battery itself or the cell modules.

You therefore have to weigh up the opportunities and risks very carefully in order to draw up an investment and expansion plan, find the right balance between CapEx and OpEx and set the right course in order to be able to react to market conditions at short notice.

**JK:** There are more and more significant technology changes, which leads to significantly lower volumes. This requires greater flexibility regarding investment and operating costs, which need to be more closely integrated into the business case. Added to this is the pricing of CO<sub>2</sub> emissions as a new determinant in investment planning. Decisions can no longer be made almost exclusively based on long-term product costs, as in the past.

This complex interplay of low volumes, rapid technology changes, the consideration of investment and operating costs and sustainability costs as a new dimension is pushing many companies to their limits. This is dangerous because inadequate consideration of CO<sub>2</sub> pricing alone could cause business cases to collapse in the future. It is therefore about decisions that affect CapEx, but also have an enormous strategic scope, about a balance between today's stability and a sustainable future perspective.

# AN INVESTMENT IN MODERN TECHNOLOGIES

## IS ALWAYS AN INVESTMENT IN SYSTEMS, DIGITALIZATION, PEOPLE, AND ORGANIZATIONAL STRUCTURES

### **W** What is the difference between CapEx optimization and traditional cost reduction?

In my opinion, it is too short-sighted to consider CapEx only in terms of cost reduction. Investments in the CapEx environment can take effect in several ways: Firstly, costs can be shifted – from variable to fixed costs – with the aim of reducing the total production costs per unit. At the same time, however, this reduces flexibility in the face of volume fluctuations. This means that although highly efficient production lines are

very cost-effective, they have to operate at 100 percent capacity over a long period of time. In addition, investments in a higher degree of automation enable savings to be made on currently scarce personnel and thus increase the attractiveness of Europe as a business location. And finally, investments in the CapEx environment can help to reduce the costs for the operation of machines and systems. For companies in Europe, this is currently particularly relevant in light of the high energy costs.

**What levers are there to optimize CapEx-related investments within this logic?**

Looking at the expansion of your own production capacities, e.g., by purchasing new machines or building a factory, there are various starting points for optimizing the associated investment costs. On the one hand, intelligent factory planning, high-capacity utilization and OEE (Overall Equipment Effectiveness) and better throughput, the machine requirements – and thus the CapEx requirements – can be reduced directly. On the other hand, the complexity of the machinery offers levers for CapEx reduction, e.g., along questions such as: How high should the degree of automation be? How flexible and modular should the systems be? It is important for companies to find the right balance between capital expenditure and the subsequent operating costs during ongoing processes. And finally, the cost of procuring the machines can be optimized by choosing the right suppliers.

**How far does the CapEx approach extend? Is it just about planning and procurement, or does it go further?**

It would be far too short-sighted to consider only the acquisition costs of the machines and systems. Rather, the investment must also consider the opportunity costs that are incurred until a line or system is actually up and running. This includes the costs for the commissioning itself, especially in highly regulated environments. At the same time, the time from the purchase of the machine to actual production is synonymous with lost sales. The faster the 100 percent

ramp-up is achieved, the lower the lost contribution margins. In most companies, there is still enormous untapped potential in optimizing this ramp-up phase.

**What influence do process innovations have on investment decisions in the CapEx environment?**

Process quality in the production environment is often a decisive competitive factor, especially for mass-produced products. From a CapEx perspective, the associated investment decisions regarding new production processes are of great significance, as the processes in which investments are made are generally used for many years. Companies should, therefore, optimize innovation cycles. They must keep an eye on the leaps in new manufacturing processes and carefully weigh up when to invest in the relevant technologies.

**To what extent do such technological leaps result in new investment requirements?**

One question is: When do I invest in a new production technology? The other question is: What do I need to be able to use this technology effectively? This is because new technologies generally require different skills that need to be invested in. For example, if you want to operate a highly automated system, you need appropriate maintenance personnel who must be set up and trained. These systems produce data with which something must be done, otherwise the investment will not be used. This in turn requires new functions and structures in the organization. In other words, future investment

in modern technologies will not just be an investment in a system. It will also be an investment in systems, digitalization, people, and organizational structures.

**Do these costs also count as CapEx?**

Perhaps not in purely accounting terms. But in terms of the idea, it is an investment in the future. At this point, it may be useful to take a broader view of the term CapEx to clarify that it involves more than just purchasing a system. There is a whole range of other issues related to this hardware that also need consideration, which may not be visible or tangible at the time of investment.



**INTERVIEW**  
**WITH DR. ELMAR HUBNER,**  
**MANAGING DIRECTOR,**  
**ROI-EFESO VIENNA**

**REQUIRES**

**TRUE CAPEX OPTIMIZATION**

**A FOCUS ON LIFE CYCLE COSTS, CO<sub>2</sub> EMISSIONS AND SPEED**

**The perspective on CapEx has changed significantly in recent years. What developments do we need to keep an eye on in the future?**

The planning and management of long-term investments has become considerably more challenging in recent years, and this trend will continue. Companies, therefore, need a very well synchronized model to manage CapEx properly. The first step is to develop a general strategy and link it to the company's business plan. Based on this, it is important to make well-informed decisions – regarding the avoidance and reduction, but also the timing of CapEx. There are a number of levers to analyze here. In the strategic area, for example, these are the technology and product strategy, the financial framework, the ecosystem, or fundamental alternatives to CapEx purchasing.

**What is the reason for this increase in complexity?**

Global conditions, the sluggish economy, the situation in the financial markets, the acceleration of cycles and more frequent technology changes are undoubtedly important causes. The decarbonization of the economy and the accompanying regulatory requirements are particularly relevant. CapEx projects, therefore, have to consider many factors that are difficult to calculate and forecast today. Decision models are needed to handle fundamental uncertainties. Dealing with CO<sub>2</sub> emissions is a good example of this: is it more efficient in the medium term to reduce the carbon footprint through CapEx, or through other process-oriented approaches? To answer such questions, you have to be able to compare and evaluate very different solutions and include many uncertainties in the calculations. This is enormously complex.

**Which indicators must be taken into account to build a sustainably successful CapEx management?**

There are three central KPIs that need to be addressed in an integrated manner to gain a holistic perspective. The initial focus is on the costs of CapEx expenditure over the entire life cycle. The second aspect is the medium-term optimization of the CO<sub>2</sub> balance. And finally, it is about the time until CapEx becomes effective, be it the investment in a factory network or in a production line. These three KPIs need to be combined in one platform. In addition, there is the digital perspective, which must be added to this system in the future. These factors must be considered on two levels.

**Which levels are involved?**

The strategy and operating model is the first level, while the actual implementation of the projects is the second. Very often, the second level, i.e., the design and procurement of CapEx, is very much in the focus. However, this means that not all three of the mentioned KPIs can be focused on.

This can also be illustrated using the CO<sub>2</sub> example: companies, that deal intensively with sustainability issues and specifically with their carbon footprint, state that they have to manage their capital expenditure differently than before. A more holistic approach is needed, new stakeholders must be involved, and the KPIs must be developed further.

**Why are the KPIs used so far insufficient?**

In the long term, CO<sub>2</sub> is about broader targets than just savings. If you focus on financial criteria, you will not be able to create a viable business case that pays off. A comprehensive renewal of the machinery in order to reduce the CO<sub>2</sub> footprint will only pay off very slowly from this perspective – if at all. It is, therefore, necessary to change the governance, processes, and criteria by which long-term investments are evaluated.

There are a few critical issues that need to be addressed at a strategic level. These naturally also require corresponding changes at project level like in the context of design-to-value considerations and other product development methodologies. This also goes hand in hand with process development, the development of technologies – and therefore CapEx. Here, again, the triad “Cost – Carbon – Time” must be addressed.

**How can this diversity of topics be brought together and made transparent?**

Today, even companies that invest 200 or 300 million euros a year in the long term often lack transparency about what happens in these projects from planning to execution. There is a lack of data, structures, and dashboards to effectively manage CapEx portfolios. This is where digital approaches can bring significant added value. For example, by integrating CapEx projects into central AI-supported platforms or by introducing a CapEx Control Tower, a solution that has already proven itself in other areas.



**INTERVIEW WITH  
ANDREA MONTERMINI,  
VICE PRESIDENT &  
MANAGING DIRECTOR  
WESTERN EUROPE,  
EFESO**

**CAPEX  
OPTIMIZATION  
IS A  
STRATEGIC  
IMPERATIVE**



**The optimization of long-term investments has become a critical topic on the management agenda. What are the reasons for this development?**

Today, various forces are influencing companies' investment processes. On the one hand, there is the difficult political and economic framework and the relocation decisions that companies are faced with. At the same time, the energy transformation must be mastered. And last but not least, new approaches are emerging to fundamentally improve industrial value creation – through new production processes, automation, and digitalization. All of this requires massive investment. The urgent need for investment is growing immensely, but there is not enough money – or time. This is a paradigm shift that cannot be managed with conventional instruments and perspectives.

**What new perspective is needed?**

On the one hand, it's a matter of dealing with CapEx as a manageable dimension in the first place and not just focusing on operating costs and operational processes, which has often been the case in recent years. On the other hand, it's not just about costs; it's also about time. Time is becoming an increasingly critical dimension in investments, a resource that is just as scarce as money. There is – especially in transformation phases – fierce competition for delivery capability and time-to-market. For many companies, CapEx is not primarily about costs. The focus is increasingly on the question of how quickly CapEx begins to take effect, as this can have a major impact on success and competitiveness.

**This is very challenging – because complex investment projects are very often characterized by the fact, that they massively miss their time and budget targets.**

Yes, but this situation is not God-given. We can no longer afford such projects in the future. CapEx optimization is a strategic imperative. Long-term investments are urgently needed today to meet rapidly growing demand, manage transformation processes, and secure a strong position in new markets. CapEx projects must, therefore, be reliable, predictable, and highly efficient in the future. This is achieved through short ramp-up phases and avoiding failures, interruptions, or bad investments. Companies are often unaware of the extent to which CapEx can be influenced. Delays in completion, cost explosions, delayed commissioning and operational interruptions are often considered invariants. They are not. There are very effective approaches to optimize CapEx, and not only the project management around it, because you are only scratching the surface.



**INTERVIEW  
WITH LUCA LECCHI,  
CO-CEO, EFESO**

**What are the most common mistakes and the most important levers?**

The example of automation initiatives is a good illustration of this. In some cases, robots are used in areas where they do not really add any value. Or the company lacks the knowledge and capacity to maintain them professionally and proactively, to organize effective networking or to plan smooth spare parts logistics. There is a lack of comparative values and models for calculating the appropriate level of

automation for specific industries, regions, or products. It is also necessary to consider which regulations need to be observed and the quantities of resources and energy required.

These are questions that require comprehensive experience and extensive know-how in the field; this cannot be replaced by higher-level frameworks. In addition to this technical and procedural dimension, it is also important to build a bridge to the company's business plan and strategy and to develop valid scenarios: Which markets are to be supplied? What is the overall cost perspective? What volumes can be produced over the life cycle of the product? What kind of flexibility and modularity must be guaranteed in manufacturing?

The challenge often lies in integrating these two dimensions and in mastering the complexity and long-term nature of CapEx projects. You have to go all the way to the point where the investments are running – at the right cost, in the right quality, at the right speed and with a clear view to free up scarce liquidity. This is the approach that EFESO takes with CapEx projects.

# A CROSS-LOCATION PERSPECTIVE REVEALS CONSIDERABLE POTENTIAL FOR CAPEX REDUCTION

**S**ustainable cost reduction focuses on both operating costs and long-term investment costs. What are the main differences in the approaches?

A significant proportion of CapEx goes into buildings and systems, which requires a different approach to traditional process issues. Because once the investment has been made, you must deal with the circumstances – and focus on better utilization. CapEx initially arises when new investments are made. For example, several gigafactories are currently being built around the world, which also entails investments in associated infrastructure, development centers and much more. However, the necessary replacement and improvement investments are also important, often in connection with rationalization. This applies, for example, to machines that could still be used to produce – but not as well or as quickly as with new systems.

**What approaches can be used to avoid long-term investments?**

A key lever is the consideration of capacity. CapEx is often driven by an assumed capacity requirement, such as new machines. An important question is, therefore, whether the existing range of systems is being used efficiently. The first thing to look at here is Total Effective Equipment Performance (TEEP). This is because existing capacities often stand idle for a long time, are poorly maintained, are set up for a long time, or defective products are created that do not need to be created at all. The same approach also applies to productivity per unit area. Of course, too much consolidation and an intensive workload can also lead to a breakdown and ineffectiveness. An appropriate balance is important here. Another interesting aspect is the differentiated view of automation. The trend in the industry has been towards high automation for many years. This also included products for which this is not necessary, especially if production was outsourced to best-cost countries at the same time. Today, more and more companies are questioning this trend. New approaches are emerging here, such as flex lines, which can be staffed with additional employees if needed. Those lines require much less investment.

**What is the significance of outsourcing in the CapEx context?**

Outsourcing is an important instrument because not every investment is right and necessary in the long term. From a business perspective, it can certainly be worthwhile to fully utilize your own facilities and cushion the peaks with external manufacturing partners. In some cases, the costs of constructing buildings can also be outsourced. In certain situations, it can therefore make sense not to have to make the investment yourself.

**Does the perspective on CapEx change when the entire network is considered?**

A cross-location perspective reveals considerable untapped potential in some cases. Companies that operate several development or production sites often have over-capacities globally. This raises the question of whether capacities can be managed correctly worldwide, or at least regionally, and whether requirements can be distributed within the manufacturing or development footprint. A high level of transparency regarding all relevant facts and indicators is crucial for this. Digitalization also plays a decisive role. However, the "fluctuation" of capacities in the network has certain limits. For example, if a company has a new plant in Eastern Europe and benefits from considerable labor cost advantages, it will not automatically shift production towards capacities that are available in principle at a high-wage location. It is crucial to take a very detailed look at the actual current expenses, e.g., for manufacturing product and development costs, but also for coordination, the supply chain, transportation, taxes, and fees as well as potential risk costs.

**What role does product design play in CapEx considerations?**

The motto here is "Design for Smart Manufacturing", so that cost-effective production is possible later on. A second important point is "Design to Line". This means designing new products in such a way that they can be manufactured on existing systems. This is not always the case. Completely new systems are often acquired with each product generation, and existing systems are relegated to a shadowy existence for a few spare parts. This is due to the lack of networking between production, engineering, and R&D.

**Is it possible to go too far in reducing and limiting CapEx?**

A certain amount of excess capacity is important to remain flexible and agile. Because inflexibility can be detrimental to business. For example, if a downturn in demand has a temporary nature, the ability to deliver must be maintained. Otherwise, you lose market share when the engine starts up again. Another factor is the avoidance of single sourcing and deliberate risk diversification. The importance of this strategy has been made very clear to us in recent years during the pandemic and other global crises.



**INTERVIEW**  
**WITH DR. THOMAS TROLL,**  
**SENIOR VICE PRESIDENT, ROI-EFESO**

# IN GERMANY, THE IDEA OF

**T**he call for a reduction in CapEx seems to be common sense right now. What are the arguments against it?

There are two main reasons why a one-sided focus on reducing CapEx is problematic in the medium to long term: firstly, because CapEx cannot be viewed in isolation. It always interacts with other target variables, such as sustainability and total cost of ownership, leading to inevitable trade-offs. In this respect, a focus on CapEx alone from a cost perspective is flawed if these conflicting objectives exist. Secondly, the reduction of CapEx can become problematic if the ability to operate modular and reusable machines as well as systems for different products, customers and applications is lost as a result. This is because any machine that exceeds the optimal, cost-effective configuration for its application automatically incurs higher investment costs, resulting in more CapEx than necessary.

**Conversely, one could argue that an investment in equipment is always also an investment in certain structures and capabilities, through which one builds up additional barriers to market access and immunizes oneself against competition ...**

**Yes, but only as long as the orders arrive or are called off,** on the assumption of which a new line or machine was planned, purchased and configured. This is often not the case, especially in industries with strong dependencies between suppliers and manufacturers, such as the automotive industry, despite corresponding promises and contracts. If it's not possible to design systems flexibly for different applications, this can lead to a low-cost, CapEx-optimized line coming to a standstill – because it cannot be used elsewhere due to its specifications.

**What conclusion can be drawn from this?**

The conclusion is not to attempt to avoid generating CapEx entirely. Rather, it is about finding the optimum balance between minimal CapEx and the greatest possible flexibility and

## INTERVIEW WITH ANDRÉS HERNÁNDEZ, VICE PRESIDENT & INDUSTRY LEAD AUTOMOTIVE, ROI-EFESO



HAVING  
TO OWN  
THINGS  
IS STILL  
VERY  
FIRMLY  
ANCHORED

reusability of the systems. It is not about buying a machine that can do everything, but about creating a setup that allows the invested lines and systems to be used in different contexts, such as within a plant network, if needed. This approach may require bearing more CapEx to achieve this flexibility and multiple uses. The key question is: who bears these additional costs? While such an investment may be beneficial for the company, it could be a financial disadvantage for an individual plant, especially if that plant does not benefit from the machine's multiple uses. This creates a conflict between the local and global optimum.

**What could a solution look like?**

In the future, more companies will adopt models where they do not own certain systems or system types but use them through rental or operator models. In this model, individual stations within the company's production are outsourced to service providers who handle specific production steps under defined conditions and quality requirements, billing per part or per hour. As with contract logistics, companies do not incur any CapEx costs; instead, the services are treated as operating costs.

**Doesn't the flexibility of not having to operate your own systems lead to new dependencies?**

Of course, but the crucial question is: where do you buy in these dependencies? There will always be core service areas that are so differentiating and value-creating that you don't want to give them up. As a result, you will continue to own the associated machines and production technologies. However, there will likely be parts of production where it makes sense to outsource to someone who can better manage, balance, or make the manufacturing service more flexible for various reasons.

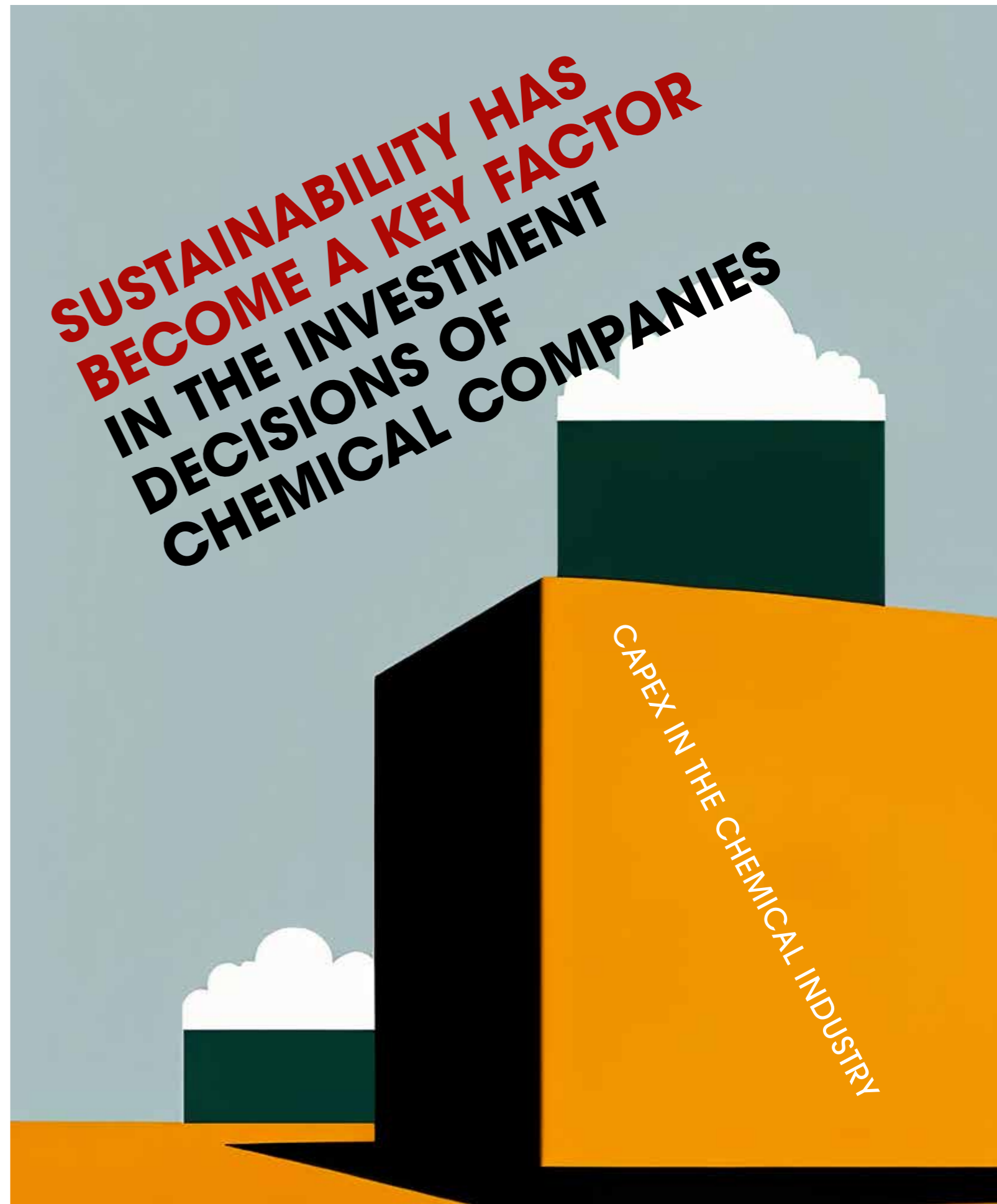
**In other words, a kind of contract manufacturing for certain parts of production. Is the German industry ready for this type of model?**

This is certainly viewed critically in many cases. In Germany, the idea of having to own things is still very firmly anchored. Not only in industry, but also in society. The situation is very different in other regions of the world, as can be seen from the examples of Apple and Foxconn. In this respect, the current focus on CapEx reduction in this country is probably also due to the fact, that for years people have not looked at an optimal CapEx balance. Instead of this, each plant invested in its own lines instead of planning flexibly across the entire production network. Here we should start as well, when talking about the possibilities for optimizing CapEx.

**Reducing CapEx will free up capital, but does this make sense given the current high inflation rates worldwide?**

The problem we see now is that there isn't enough money available for important transformation projects. Every euro that is freed up by a CapEx reduction, even if it is only worth 0.96 euros afterwards, can be used for measures that would otherwise not have been possible. Even if only to increase profits.

What's more: in some areas today, you're lucky if you get any machines at all. In the case of machines for battery factories, there is currently not enough supply on the market to meet demand. In addition to raw materials and materials, machines are also in short supply. Companies are prepared to spend more money to secure scarce resources, even if it means higher investment costs. Therefore, it is worth taking a more nuanced view of CapEx beyond just reduction.



## How important is the topic of CapEx optimization for chemical companies?

Investment decisions in the chemical industry tend to be long-term in nature. This is due, on the one hand, to the complexity and long planning and realization times for the construction of systems and, on the other hand, to the high investment costs involved. Companies, therefore, often focus more on the total cost of ownership (TCO), which also includes environmental factors such as industrial policy incentives, long-term energy cost expectations or available skillsets at the planned location. Simultaneously, chemical companies often operate in very different market environments each requiring a different focus and balance between OpEx and CapEx.

### What basic strategies can be observed?

Of course, every company will strive to optimize and use CapEx funds as effectively as possible. In our experience, three basic patterns can be distinguished in terms of focus, each of which is characterized by a different market logic. First, the more stable and predictable in the long term, e.g., a market, the lower the initial investment costs compared to the ongoing costs for the profitability of the business area. Therefore, companies operating in such market environments will be more willing to accept higher investment costs in favor of better maintainability and lower maintenance costs for their systems. Second, companies in more uncertain or cost-sensitive market environments will try to reduce CapEx in order to invest in new systems or processes, even if this sometimes means higher maintenance costs. And finally, there are areas in which the speed with which a company can bring a product to market and thus secure market share is decisive – rather than the level of initial investment costs. We have seen examples of such an agility-driven market environment during the coronavirus crisis, where speed was the order of the day.

### Apart from these “winner-takes-all” markets, the main issue is therefore the trade-off between initial investment in engineering and the costs of operating the systems. Which factors should be considered in terms of a comprehensive TCO analysis?

In the past, a very close eye was usually kept on the key financial figures. Today, a much more comprehensive approach is taken. In addition to the actual running costs for maintenance or operability, this increasingly includes sustainability aspects such as energy efficiency or the CO<sub>2</sub> emissions of systems, which are included in the evaluation of investment costs in the form of sustainability coefficients or scoring.

## INTERVIEW WITH FERNANDO CRUZADO, VICE PRESIDENT & INDUSTRY LEAD CHEMICALS, ROI-EFESO



This means that by quantifying these environmental factors, which have been given less consideration in the past or were not calculable at all, a certain compensation can now be created to justify higher CapEx for investments in more sustainable structures. In other words: sustainability has become a key factor in the investment decisions of chemical companies. In some companies, access to CapEx funds is strictly linked to contributions to sustainability goals.

### What levers can companies in the chemical industry use to directly influence costs in the CapEx environment?

There are various starting points for reducing CapEx when building new plants or expanding existing ones. It is crucial for effective optimization that the engineering teams are prepared to question things actively. Typically, this is done in cost-down workshops in which, based on the specifications, a minimum solution is examined to determine what is functional, sensible and necessary. This concerns both the correct dimensioning of the systems and the specification of the requirements. Further starting points typically arise wherever “external” requirements are introduced into the engineering process – for example, in safety. There can be no compromises when it comes to safety-critical elements. At the same time, a pragmatic translation of the safety requirements into system design is mandatory – with the aim of designing safe and operable systems. In addition, there is potential in the actual execution as well as in cost engineering, i.e., the detailed scrutiny and benchmarking of cost structures. The latter is less pronounced in the chemical industry compared to other sectors, as the focus is on delivering functioning systems on time.

### What role does digitalization play in this?

Digital technologies can safeguard investments by digitally simulating the effects of certain measures before investing in physical infrastructure or adapting a chemical process. On the one hand, this relates to process engineering, where a digital twin can be used to simulate the effects of certain parameter changes, such as pressure or temperature, on the chemical reaction. On the other hand, 3D models can be used as part of plant planning to involve not only process technicians and plant engineers but also representatives of the shop floor in the planning process at an early stage. This makes it possible to identify planning errors instead of having to correct them later with high CapEx input.



**INTERVIEW**  
**WITH DR. CHRISTIAN KÖNIG, PRINCIPAL, ROI-EFESO**

**CAPEX POTENTIAL CAN ONLY BE LEVERAGED IF YOU CONSISTENTLY BREAK AWAY FROM THE OLD**

**Sustainable cost reduction focuses on both operating costs and long-term investment costs. What are the main differences in the approaches?**

A significant proportion of CapEx goes into buildings and systems, which requires a different approach to traditional process issues. Because once the investment has been made, you must deal with the circumstances – and focus on better utilization. CapEx initially arises when new investments are made. For example, several gigafactories are currently being built around the world, which also entails investments in associated infrastructure, development centers and much more. However, the necessary replacement and improvement investments are also important, often in connection with rationalization. This applies, for example, to machines that could still be used to produce – but not as well or as quickly as with new systems.

**What approaches can be used to avoid long-term investments?**

A key lever is the consideration of capacity. CapEx is often driven by an assumed capacity requirement, such as new machines. An important question is, therefore, whether the existing range of systems is being used efficiently. The first thing to look at here is Total Effective Equipment Performance (TEEP). This is because existing capacities often stand idle for a long time, are poorly maintained, are set up for a long time, or defective products are created that do not need to be created at all. The same approach also applies to productivity per unit area. Of course, too much consolidation and an intensive workload can also lead to a breakdown and ineffectiveness. An appropriate balance is important here. Another interesting aspect is the differentiated view of automation. The trend in the industry has been towards high automation for many years. This also included products for which this is not necessary, especially if production was outsourced to best-cost countries at the same time. Today, more and more companies are questioning this trend. New approaches are emerging here, such as flex lines, which can be staffed with additional employees if needed. Those lines require much less investment.

**What is the significance of outsourcing in the CapEx context?**

Outsourcing is an important instrument because not

every investment is right and necessary in the long term. From a business perspective, it can certainly be worthwhile to fully utilize your own facilities and cushion the peaks with external manufacturing partners. In some cases, the costs of constructing buildings can also be outsourced. In certain situations, it can therefore make sense not to have to make the investment yourself.

**Does the perspective on CapEx change when the entire network is considered?**

A cross-location perspective reveals considerable untapped potential in some cases. Companies that operate several development or production sites often have over-capacities globally. This raises the question of whether capacities can be managed correctly worldwide, or at least regionally, and whether requirements can be distributed within the manufacturing or development footprint. A high level of transparency regarding all relevant facts and indicators is crucial for this. Digitalization also plays a decisive role. However, the "fluctuation" of capacities in the network has certain limits. For example, if a company has a new plant in Eastern Europe and benefits from considerable labor cost advantages, it will not automatically shift production towards capacities that are available in principle at a high-wage location. It is crucial to take a very detailed look at the actual current expenses, e.g., for manufacturing product and develop-

ment costs, but also for coordination, the supply chain, transportation, taxes, and fees as well as potential risk costs.

**What role does product design play in CapEx considerations?**

The motto here is "Design for Smart Manufacturing", so that cost-effective production is possible later on. A second important point is "Design to Line". This means designing new products in such a way that they can be manufactured on existing systems. This is not always the case. Completely new systems are often acquired with each product generation, and existing systems are relegated to a shadowy existence for a few spare parts. This is due to the lack of networking between production, engineering, and R&D.

**Is it possible to go too far in reducing and limiting CapEx?**

A certain amount of excess capacity is important to remain flexible and agile. Because inflexibility can be detrimental to business. For example, if a downturn in demand has a temporary nature, the ability to deliver must be maintained. Otherwise, you lose market share when the engine starts up again. Another factor is the avoidance of single sourcing and deliberate risk diversification. The importance of this strategy has been made very clear to us in recent years during the pandemic and other global crises.

# THE DECISIVE FACTORS THE BUSINESS BENEFIT

## AND NOT THE USER'S WISHES

### Which software investments can be attributed to CapEx?

Software CapEx relates to all investments directly attributable to the solution as an asset to be developed. This framework can be interpreted differently, depending on the financial strategy and the local accounting capitalization options. These can be newly implemented systems, including implementation costs, but also replacement investments, for example, in the case of very large upgrades and version changes.

### What significance does the use of AI technologies have in this context?

With AI, companies can create CapEx-relevant assets by developing and training AI in specific contexts, such as building company-specific Large Language Models (LLMs) that can be capitalized and assigned to CapEx.

### Which optimization approaches for software CapEx have proven successful?

The first point is platform strategy. Two opposing strategies can generally be described here, which can be useful depending on the context and initial situation. Do you opt for a best-of-breed or a one-platform approach? The one-platform approach reduces CapEx. Complexity and cost risks are reduced, and the negotiating position vis-à-vis the provider becomes stronger. But there is also another side to this. For example, working with providers who offer a complete solution is often cost-intensive and cannot always map certain growth models efficiently.

This applies, for instance, to acquisitions of smaller business units, scalability, or the support of smaller units. From this perspective, best-of-breed approaches can also be useful for certain fields of application or business units. Caution is advised when combining these two approaches. It is not trivial and often leads to greater complexity in parts of the overall landscape and, therefore, higher costs and technical challenges.

### What other aspects play a role in addition to the platform strategy?

Technology developments in the market, innovation potential, and the roadmaps of major system providers should be closely monitored and analyzed. This includes areas such as cloud, edge, and IIoT, where opportunities should be identified and exploited. This is the second pillar regarding the management of software CapEx. The third pillar is governance. The aim is to make not only the process owners but also the business responsible for results and costs. The fourth aspect is demand management. The focus should be on business benefits and not on user wishes.

Currently, IT is often driven by user demands instead of business strategy needs. IT often lacks an understanding of the requirements of the specialist departments and a deep understanding of the business processes. You have to concentrate on the strategically relevant requirements. And finally, IT Supply Management should be considered. Building

up your own resources can reduce CapEx. It makes sense to combine the core competencies in process and IT alignment in a separate core team that can act globally in the strategic area of IT. However, success depends on understanding critical organizational and personnel factors, such as the distinct roles of a solution manager and a solution architect.

### What software world trends are having an impact on these approaches?

The first is IIoT platforms. There are more and more specialist providers and innovative solutions on the market. We are moving into a world of apps and container systems, which is creating a new ecosystem on the market. This is not just about apps on a platform but also about orchestration and synchronization of data and applications in the process context. The providers themselves refer to these as composite applications. They emphasize the interoperability of their platform and its container-based logic and allow third-party applications on their platforms. You can take advantage of this, and design modular solutions based on technology platforms in areas such as ERP and MES. This makes it easier to manage requirements and achieve a reduction in CapEx.

### What significance does the convergence of IT and OT, as well as the IoT, have in this context?

The core problem in many digitalization projects is often the IT-OT divergence. The corporate IT of a group coexists with the OT world in the globally distributed plants. In this local world, technologies have been developed and operated for years on and around the shop floor, around the machine. However, in the Future Factory, integrating OT and IT solutions with end-to-end logic becomes critical.

A cooperation and governance model is necessary for effective global scaling and integration of these two domains. It's essential to understand why and how OT has developed its own solutions and how to design their interaction both technologically and organizationally. For instance, addressing security requirements is challenging with the often outdated systems of the OT world. Without concrete details, projects risk remaining on an abstract meta-level.

### INTERVIEW WITH GERNOT SCHÄFER, VICE PRESIDENT, ROI-EFESO



# INTERVIEW PARTNER



## Luca Lecchi has led more than 300 progression initiatives

in reengineering, supply chain, global performance and cost reduction projects in the most important global industrial and services companies.

**Luca Lecchi, Co-CEO, EFESO**



## Already successfully implemented more than 300 projects

in restructuring, turnaround management, supply chain optimization, performance management and cost reduction with international companies. He develops innovative solutions for product, process and structural adjustments with his clients, particularly in the context of the automotive industry's transformation.

**Thomas Plasa, Partner, TSETINIS-EFESO**

## For over 30 years Gernot Schäfer has been supporting companies with their strategic orientation in the areas of "Operational Excellence" and "digitization".

In the process industry as well as in discrete manufacturing, he brings new information technologies into a highly effective application.

**Gernot Schäfer, Vice President, ROI-EFESO**



## Christian König supports companies in their digital transformation.

Together with his clients from the manufacturing industry, he focuses on process and IT harmonization. He also prepares companies for the future with Industry 4.0 assessments and efficient supply chain management.

**Dr. Christian König, Principal, ROI-EFESO**



**Fernando Cruzado**



**Andrés Hernández**



## A thought leader in performance excellence

Jost Kamenik is a thought leader in performance excellence, including OPEX, CapEx and CO<sub>2</sub> / sustainability optimization. Throughout the last 25 years, he has supported many of the most complex programs for global players in the fields of automotive, aerospace & defense, industrial engineering, and finance across the EMEA and the US.

**Jost Kamenik, CEO, TSETINIS-EFESO**



**More than 25 years** of experience as management consultant. His main competencies are in business planning and management, industrial strategy, operational improvement across the end-to-end value chain, product & CapEx management, and commercial & contractual management.

**Andrés Hernández, Vice President & Industry Lead Automotive, ROI-EFESO**

Andrés Hernández has more than 23 years of experience in international management positions at various management consultancies. His consulting focus is on strategy and digitalization projects in the areas of transformation, sustainability / circular economy, product compliance, engineering effectiveness and crisis management.

**Andrés Hernández, Vice President & Industry Lead Automotive, ROI-EFESO**

In more than 20 years of consulting experience, Fernando Cruzado has led numerous transformation programs in sectors such as the chemical and process industries. He has extensive experience in setting up and managing global OPEX programs. He also focuses on organizational development and the design and implementation of industrial footprint networks.

**Fernando Cruzado, Vice President & Industry Lead Chemicals, ROI-EFESO**

## Implements organizational changes for clients

in several corporate functions that strengthens their competitiveness. This includes, for example, transformation programs and cost optimization initiatives in indirect functions. Since 2001, more than 60 companies have improved their Operational Excellence with him.

**Dr. Elmar Hubner, Managing Director, ROI-EFESO Vienna**

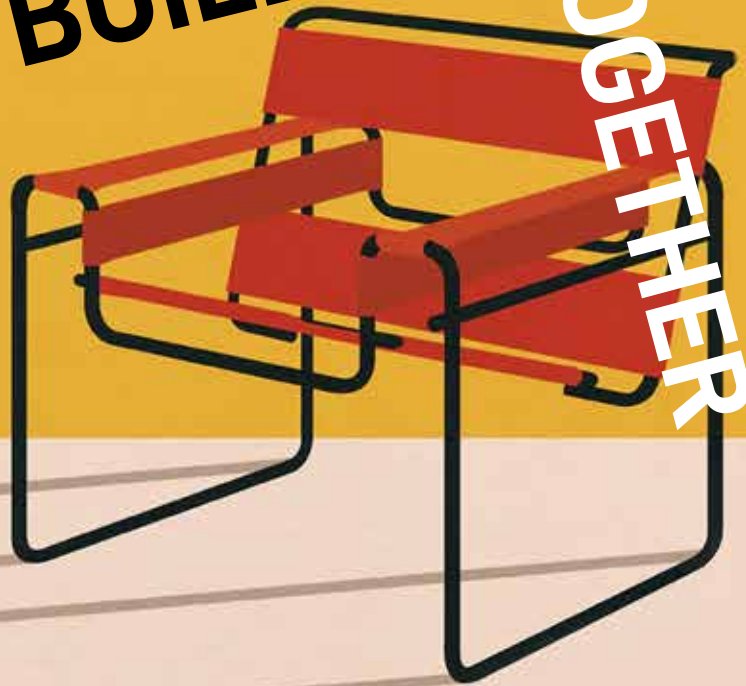


## More than 150 international locations

of industrial companies have shaped their transformation course towards excellence and sustainability with Thomas Troll. He develops results-oriented solutions with his clients, particularly when it comes to redesigning global value creation networks and digitalization.

**Dr. Thomas Troll, Senior Vice President, ROI-EFESO**

# BUILDING FUTURE TOGETHER INDUSTRIAL



**ROI-EFESO Management Consulting is the leading international operations consultancy.**

In our cooperation with industrial companies, we set global standards for result- and future-oriented operations design. Through the integrated optimization and further development of technologies, processes, systems, and supply chains, we create the basis for manufacturing industries to maintain their impact, enhance their resilience and to grow sustainably, even in complex environments.

Working together with the people who manage this change – from within the boardroom to on the shop floor – we realize end-to-end solutions for smart factories and global value networks. We implement new and improved operating and business models, leverage the potential of data-driven approaches to master complexity, align organizations in a networked and customer-oriented way, and enable their successful entry into the circular economy.

As part of the internationally active EFESO Group, we are present in more than 30 locations worldwide and employ around 900 consultants, a highly experienced network that we are continuously expanding.

ROI-EFESO's work is regularly recognized for its quality of results, efficiency and degree of innovation and achieves top positions in important industry rankings such as "Best of Consulting", "Hidden Champions", "Beste Unternehmensberater" (Best Management Consultants) and many more. Since 2023, we have also supported the German Sustainability Award as jury members in 13 sectors.

Since 2013, ROI-EFESO has been awarding the best practical solutions in industrial digitalization with the INDUSTRIE 4.0 AWARD, which is one of the most prestigious international industry awards.



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