HOW TO MAKE AI-BASED SOURCING AND SUPPLY-CHAIN-MANAGEMENT YOUR KEY TO SUCCESS

In this document you read:

- **What are the areas of application for Artificial Intelligence (AI) in procurement and supply chain management (SCM)?**
- **How far developed are AI-based sourcing and supply chain management?**
- **How to successfully use AI**
- **Which mistakes to avoid…**

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„AI is likely to be either the best or worst to happen to humanity.“ – *Stephen Hawking*.

Opinions differ on artificial intelligence. That's for sure. However, it is also certain that we will no longer be able to stop the use and continuous further development of AI. It is still too early to answer Stephen Hawking's question. What matters now is simply:

How can we use AI to our advantage?

In **Part I** below, we will first go into the use of **AI in the area of procurement / sourcing**. We show how AI-based procurement can play a key role in your company's competitive advantage. Read about the areas of application for AI and how far AI-based sourcing is currently developed.

In **Part II**, we then show how you can use **AI-based SCM to reduce your supply risks and costs and increase your sales**.

With our total of 14 tips at the end of both chapters, you can actually avoid the 14 biggest mistakes.

PART I: HOW TO GET AHEAD OF THE COMPETITION THROUGH AI-BASED SOURCING.

- Avoid typical mistakes and use our tips to reduce your risks and costs and increase your innovation rate through AI-based sourcing.-

According to the **Emarticon® Supply-Management Survey 2022**, more than 50% of managing directors in German medium-sized companies or CEOs in German corporations say they are planning to use AI in procurement in the future or are already doing so. The use of existing data plays an important role when using AI. In this context, the research company IDG has even determined that the profitability of companies develops significantly better and faster when data is used efficiently. According to the IDG study, companies that claim to use data efficiently increase earnings per share by 0.35 cents a year faster than the market average.

Regardless of how precisely this can actually be determined, these statements show: AI-based procurement can have a very significant share in a company's competitive advantage.

What are the areas of application for AI in procurement? How far is AI-based sourcing currently developed?

Essentially, the following five areas of AI application can be distinguished in sourcing/procurement:

1. **Supplier Market Research & Risk Management**
2. **Spend Analysis**
3. **Sourcing Event Optimization**
4. **Procurement Process Guidance**
5. **Requirement Matching**

1) SUPPLIER MARKET RESEARCH & RISK MANAGEMENT

Risk management is a classic area of application for AI for three main reasons:
First, risk management is based on empirical values and is therefore all the better the more well-founded these empirical values are, i.e. the larger the number of cases considered. This requires the analysis of large amounts of data, i.e. big data analysis.

Second, in risk management, assumptions can easily be translated into rules and these can be checked analytically. In market research, these rules relate to requirements. Rule-based support for decisions was an early research area of AI and has been expressed in so-called expert systems since the 1980s - for example through fuzzy logic. The methodology is now very well developed.

Third, risk management is always based on statistical methods that can be easily combined with big data analysis and rule-based expert systems using AI.
Companies such as **Risk Methods, Scout bee or Tealbook** have recognized the potential and already offer appropriate systems for decision support - not only for risk analysis but also for market research. These software systems analyze the risk of existing supplier portfolios and look for new suppliers as potential candidates.

The stroke through such systems can be very high. Yet, the market is in its early stages and is growing rapidly. It is to be expected that these solutions will be further developed rapidly and that other tool providers will follow. Properly trained and with sufficient analytical data, this area would even be a conceivable area of application for **ChatGPT** *in the future*.

2) SPEND ANALYSIS

Analyzing a company's costs is an important area of application for AI. However, almost every company struggles with **data quality**, which is the basis of effective analysis. A simple example in purchasing is the quality of names when designating suppliers. In large companies in particular, many names are used for the same supplier. This makes it analytically impossible to compare contracts, orders, invoices and payment transactions. Findings for cost reduction levers can then hardly be generated from this data.

In the first step, **data cleansing** is required in order to be able to work with this data at all. The adequate use of AI leads to significantly increased effectiveness and, above all, efficiency. The company **Sievo** offers special software systems that work with AI and have been well tested.

For companies with already high data quality, however, the hub through the use of AI in this area is small if the software only helps with data cleansing. Further developed AI is characterized in the area of spend analysis by the fact that, in addition to pure spend data, further, often publicly available, partly company-internal information is used for the analysis. This includes, for example, knowledge of company structures and contracts. This allows transactions with different subsidiaries of a parent company to be recognized and bundled. Especially in large companies, AI can play a significant part in reducing costs in the context of contract negotiations.

In the future, it will be important for AI to go even further in the area of spend analysis and also actively **propose cost reduction measures**.

3) SOURCING EVENT OPTIMIZATION

AI for the optimization of sourcing events, i.e. in particular tenders and purchase auctions, can be very useful if the goods and services are standardized to a high degree. The more company-specific (individual) the requirements are, the more complex the algorithms have to be in order to deliver good results.

Companies like **Keelvar or Archlet** offer successfully usable solutions for AI-controlled sourcing events. However, how efficient the application and how suitable these solutions are depends on the **individual case**. For example, the performance of these systems in the area of e-auctions can be completely different than in the case of tenders.

4) PROCUREMENT PROCESS GUIDANCE

The currently most used AI solutions in the field of procurement are applications that serve process management. However, this only applies to the private sector, with the **Amazon** portal being a prominent example. AI-based process management in companies, on the other hand, is still relatively uncommon today, because purchasing processes in companies follow strict and often **company-specific rules**. In addition, the group of users (employees who initiate orders) is often limited. **Tradeshift** or the **SAP/Ariba intelligent digital assistant** offer initial approaches. However, the goals pursued, such as adhering to compliance rules or reducing process throughput times, are also achieved sufficiently well by applications without AI. Advanced chatbots such as **ChatGPT** are expected to play a greater role in this area in the future.

5) REQUIREMENT MATCHING

Another very important area of application for AI in procurement is **requirement matching**, i.e. comparing your own requirements with the market. The special case of identical parts analysis is already often used in large companies in the area of **Product Life Cycle Management (PLM)**. **Dasault's subsidiary Exalead**, for example, offers a well-tested solution with **Onepart**.

Engineers can use it to find competitive products that can be used for a specific component from available catalogs and compare prices and data on this basis. AI-based algorithms help to find the right components and to understand how the requirements are met. Similar to AI-based sourcing event management, the following applies: The simpler the component and the less customer-specific the requirements, the greater the impact through AI and the

better the results. With the further development of AI, however, this rule will weaken in the future and eventually disappear.

WHAT IS IMPORTANT IN AI-BASED SOURCING? WHERE ARE THE PITFALLS?

On the one hand, the areas of application listed above show how great the possibilities are for gaining **competitive advantages today through AI-based sourcing**. On the other hand, we at Emarticon also see in our project practice that a poorly developed basic strategy or incorrectly planned implementation projects are often not only disappointing, but can actually be counterproductive in individual cases. **Processes then become less efficient and risks and costs increase**. We know typical mistakes from our consulting practice.

Our Tips

1. Take enough time to understand the **market and the possibilities** of AI-based software.
2. Ensure a good alignment of the AI project with the **overall company strategy**. In this way, the benefit can be clearly demonstrated, and in many cases even the return on investment of the project can be estimated.
3. Agree on the boundary conditions and procedure with **all stakeholders** in advance.
4. Concentrate on the essentials when customizing. Mapping customer-specific wishes in the tooling is important, but should typically not take longer than 2-3 weeks.

5. Make sure that both your business processes and your data quality are initially good enough to successfully use AI in procurement. Follow the motto: **"Think processes through to the end!"**

Questions that help define the right strategy for using AI-based sourcing:

- How far is your company in digitizing processes? How efficient is the process management?
- How good is your data management? How well suited is the state of this data for analysis?
- What are the challenges facing the company as a whole? What are the goals for profitability and innovation? In what way can improved sourcing / procurement support these goals? To what extent are the risks for the company in the procurement market and in the supply chain well known? How high are these risks and how well are they managed today?
- What influence do tenders and auctions have on your procurement? What proportion of the procurement volume do they account for? How often do they take place?
- How high is the complexity and to what extent is there a need for optimization in product life cycle management, e.g. with regard to identical parts, product replacements or component availability?

In many companies, these questions cannot be answered easily and immediately. However, the correct and sufficiently deep understanding of these topics is a prerequisite for successful and, above all, efficient AI-based sourcing.

In which steps does the implementation succeed in practice?

As the previous sections show: Every company has its own special situation. Nevertheless, regardless of the situation, clearly defined steps lead to the goal of achieving efficient AI-based sourcing. Essential are in particular:

1. Analyzing the possibilities to use AI more than before in procurement,
2. Checking or developing an AI strategy,
3. Development of the business case for corresponding investment decisions,
4. Finding suitable software manufacturers and IT development partners for implementation projects,
5. Negotiating project contracts to implement the AI strategy,
6. Working out necessary process changes and customizing, i.e. adapting the solution together with all stakeholders,
7. Rapid demonstration of performance through a well-managed implementation project.

It is important that these steps receive the right guidance and benefit from experience from comparable projects.

PART 2: AI-BASED SCM: REDUCE RISK & COSTS - INCREASE REVENUE

OVERVIEW

First, a look at the importance of supply chain management (SCM) for many companies and their customers at the moment.

Example Mechanical Engineering

As part of the **Emarticon® Supply Management Survey 2022**, over **66% of managing directors** in German mechanical engineering said that parts availability was **among the top 3 business risks**. Across all industries, availability of goods and services was within the top 3 business risks for over 50% of managers. **Supply failures lead to a loss of sales or have to be prevented at high cost**.

Example E-Commerce

Our 2022 survey has also shown that in e-commerce, over 20% of all sell-out cases, so-called "out-of-stock situations" (OOS), last for more than 3 days. According to studies, there is an OOS rate of **over 6% - 8% in retail in Germany**. That doesn't sound like much at first. However, it should be borne in mind that around 50% of customers then move on to the competition and do not wait until the situation is resolved. **Over time, OOS mainly results in long-term loss of customers and sales**.

How can AI help to solve such problems in supply chain management? What are the success factors?

AREAS FOR AI USE IN SUPPLY CHAIN MANAGEMENT

Essentially, the following four areas can be distinguished when using AI for supply chain management:

1. ***Predicitve Demand (incl. Predictive Maintenance)***
2. ***Supply Market Modelling (incl. Risk Analysis & Management)***
3. ***Stock Management – primarily through improved order decisions***
4. ***Enabling Technologies, this means***
    - Hardware for instance roboter or drones as well as
    - Software e.g. business-intelligence-tools, data-mining and big-data-analysis concepts

The basic approach in areas 1-3 is to use AI to **uncover patterns** that are undetected by classical approaches such as simple moving averages and therefore untapped in decision making. **Below you will find an overview and the success factors in the procedure, in the selection of providers and methodology as well as in the implementation**.

Area 4 is often a prerequisite for being able to use AI in the other areas. Without the appropriate hardware and big data analysis tools, for example, global inventories cannot be tracked and risks cannot be analyzed. First, however, it must be clarified which requirements result from the area of application, namely areas 1-3. *For this reason, and because of its scope and depth of detail, Section 4 will not be explored further here.*

APPROACH TO USE AI IN SCM SOLUTIONS

When building a supply chain that leverages AI, the key to success is doing the necessary steps in the right order. First, start by **defining the goal**. Is it about improved planning of customer demand? Is it about reducing risks in the procurement market? – to name just two possible goals.

The second step is to **analyze and understand the quality and availability of required data**. Only when these two steps have been completed is it worth thinking about the methodology and possible solution providers. In this third step, it is then important to understand to what extent the selection of the **methodology** has a direct influence on which **solution providers** come into question at all.

Many large ERP providers offer their own SCM solutions, in which the algorithms are either in a black box or at least the influence and especially consulting and support regarding optimization are limited. On the other hand, developing and maintaining proprietary solutions is expensive.

VENDORS

The following examples give a good overview of the different segments of possible technology partners.

Segment	Examples	Comment
ERP	SAP, Microsoft	The option of using plug-ins (e.g. Diskover), or alternatively, ERP in-house approaches (e.g. S/4HANA) must be distinguished.
All Purpose KI-SW	Google, Amazon, IBM	Some of these providers have powerful specialists as partners (e.g. Pluto7) or large in-house R&D (IBM Watson).
SCM Specialists	Throughput Inc. Intuendi s.r.l.	These providers specialize in SCM problems and often have extensive experience with medium-sized problems and corresponding implementation projects.
Proprietary Solution	Own Plug-in (e.g. via Python)	The recommendation for this option depends on the individual case. Above all, good documentation of the solution is important in order to be able to easily cope with employee changes.

METHODOLOGY

The core of every AI-based application in the supply chain is the **forecast methodology** - regardless of whether it is about demand or supply, i.e. fluctuations in demand or availability. The decision as to which methodology to choose is all the more difficult, the fewer systemic specifications there are. The question of the best method therefore arises in particular when using flexible plug-ins or proprietary solutions.

The following overview shows, in a highly simplified form, the main classic methods of forecasting requirements, including AI methods and the AI suitability of these methods depending on key parameters.

Prediction Methodology	Explanation	Prediction Accuracy			System Transparency	AI-readiness / applicabilty
		Large Order Volumen	Small Order Volume	Small Data Volume		
Multiple Regression	Correlation inbetween multiple factors	Medium	Low	Low	High	No
Poisson Regression	Multiple regression via Poisson-Distribution	Medium	High	Low	High	Yes
Dynamic State model	Continuous update of the system status, including trends and periodicity	High	Medium	High	High	Yes
Arima*	Regression based on averages	Medium	Low	Low	Low	No
Arimax*	Combination of Arima and multiple regression	High	Low	Low	High	Yes
Neural Network	Prediction via imitation of human brain	High	High	Medium	Close to Zero	Yes
Fuzzy Logic	Prediction based on fuzzy rules and logic	High	Medium	High	Depending on complexity	Yes
Case-based AI	Situation dependent AI-based selection of prediction methodology	High	High	High	Low	Yes

*Arima= “Autoregressive integrated moving averages”; Arimax= “Autoregressive integrated moving averages incl. explanatory variables”

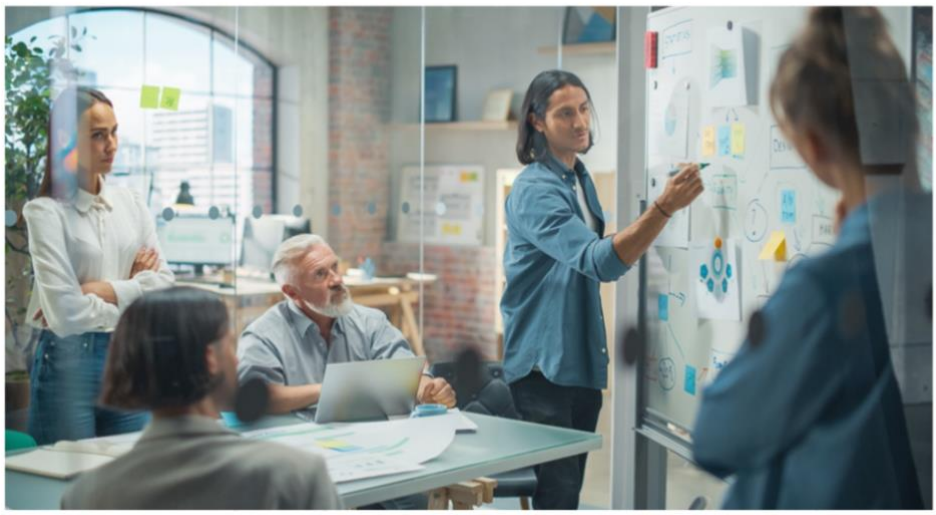
The summary shows that there is **no "one-size-fits-all" method**: The choice of the appropriate solution, i.e. the prediction method, depends on the boundary conditions. The table above only shows some of these boundary conditions. Other parameters such as **data quality or real-time availability** need to be added in reality.

Secondly, the overview shows that the use of AI does not make sense for every method (see the AI applicability column). **Finally, it becomes clear that AI supports very good predictions on the one hand. On the other hand, an understanding of the system is not necessarily made easier or can even be made impossible.**

WHAT IS IMPORTANT FOR AI-BASED SCM? WHERE ARE THE PITFALLS?

Key Success Factors

On the one hand, the areas of application listed above show how great the possibilities are for gaining competitive advantages today through AI-based SCM. On the other hand, we at Emarticon also see in our project practice that the challenges are similar to the use of AI in sourcing / procurement. The same applies to SCM: **A poorly developed basic strategy** or incorrectly planned **implementation projects** can often not only be disappointing, but actually **counterproductive in individual cases**. **Processes then become less efficient and risks and costs increase**. The reason for this is the complexity in the subject matter including the selection of methodologies and providers. We know typical mistakes from our consulting practice.



Our Tips

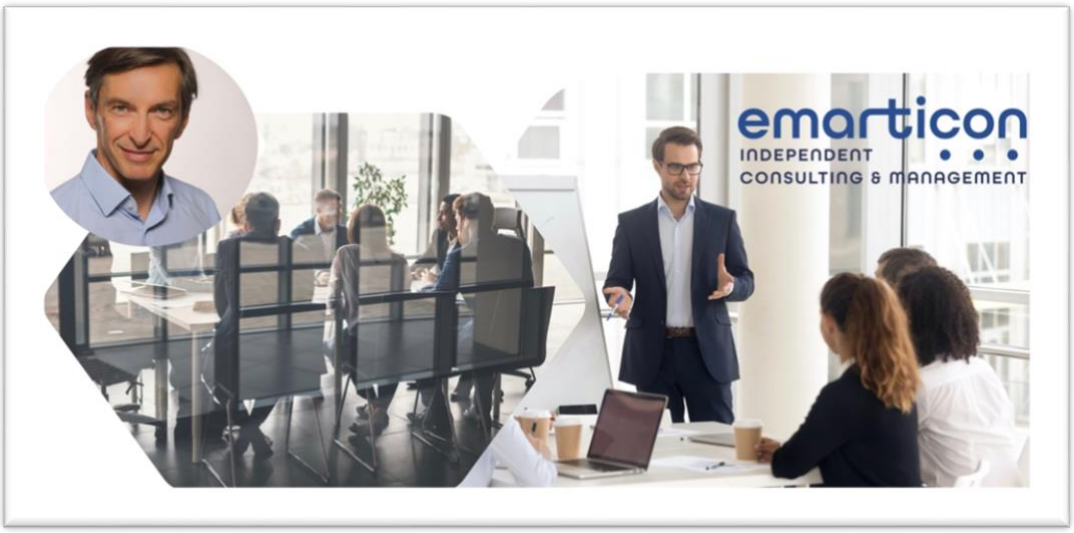
1. Ensure that the AI project is well aligned with the **overall corporate strategy**. In this way, the benefit can be clearly demonstrated, and in many cases even the return on investment of the project can be estimated.
2. **Choose "the right problem"**, i.e. the most suitable application area for AI for your company.
3. Take enough time to understand the market and the possibilities of AI-based software.
4. Agree the boundary conditions and procedure with **all stakeholders** in advance.
5. Make sure that both your business processes and your data quality are in good enough shape to successfully use AI in procurement. Follow the motto: **"Think processes through to the end!"**
6. **Not only ensure sufficient data quality, but also the corresponding data availability** in real time if possible. When data is not available in real-time, the speed of obtaining data of sufficient quality must be closely synchronized with software and decision points in the process.
7. Do not underestimate the hurdles in using **legacy systems** and the associated migration costs.
8. It is better to aim for quick results in several small steps than for one big step with a huge stroke that takes too long to be achieved.
9. Basically, assume that the system will change significantly over time. This includes not only changing goals, but also constantly new data sources and processing algorithms in a learning system.

In which steps does the implementation succeed in practice?

As the previous sections show: Every company has its own special situation. Nevertheless, regardless of the situation, clearly defined steps lead to the goal of achieving efficient AI-based supply chain management. Essential are in particular:

1. A good **understanding of the strengths and weaknesses** of current supply chain management
2. Selecting exactly those SCM problems where AI will provide significantly better results, taking into account data availability
3. Development of the **business case** for corresponding investment decisions
4. Finding suitable software manufacturers and IT development partners for implementation projects
5. **Negotiating project contracts** to implement the AI strategy
6. Developing a first draft of the **prediction methodology**, detailed enough to start with, but with enough potential for further development
7. Working out necessary process changes and **customizing** / adapting the solution **together with all relevant stakeholders**
8. **Rapid** demonstration of performance through **a well-managed implementation project**

It is important that these steps receive the right guidance and benefit from experience from comparable projects.



WE HAVE THE EXPERIENCE AND SUPPORT YOU

My offer for a free-of-charge strategy talk

Are you interested in an exchange of thoughts and ideas?

I would be happy to offer you the opportunity to discuss your specific situation with me as part of a strategy meeting. The aim of the discussion will be to determine together to what extent there is potential for you and your company to increase your competitiveness through AI-based sourcing or AI-based supply chain management.

Support services of Emarticon could be for instance:

- Analyzing the potentials of your organization through greater use of AI
- Working out levers for improvement
- Preparing and conducting tenders and negotiations with relevant providers
- **Taking on tasks in the project or in conducting negotiations with providers as an interim manager**

Let's start the conversation. We help to reduce risks and costs.

If you would like to know more about this topic and Emarticon's services in the area of strategic procurement and supply chain management**, please call me on +49-151-1083-7000 or write to me using clemens.rinnebach@emarticon.de.**

About us – Emarticon

Consulting and Interim Management specialized in
Strategic Procurement & Supply Chain Management

Emarticon GmbH is a consulting and interim management company specializing in strategic procurement and supply chain management. Emarticon has a pool of over 30 highly qualified consultants. We are characterized by the fact that all consultants have at least 10 years of consulting experience in their specialist area and also have many years of line experience.

Emarticon - Our passion is to get people and companies to work together efficiently.