



Industry 4.0 in Europe

Europe accounts for more than a third of global Industry 4.0 investments. Western and northern Europe are its main markets; especially Germany, where the term was originally coined, is a frontrunner. Both national and European initiatives are working to stimulate the rollout of Industry 4.0 and lower barriers. The shortage of skilled specialists creates additional opportunities for you to provide Industry 4.0 services to European companies.

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1 . Product description

What is Industry 4.0?

Industry 4.0 Internet of Things, is a part of the Internet of Things (IoT) that focuses on manufacturing. IoT refers to – even everyday – objects being connected to the internet. These “things” have electronics, sensors, software, actuators and network connectivity embedded in them.

This allows them to:

- sense / measure their environment to collect data
- perform computations on this data
- react autonomously to the collected data
- connect to other devices or systems to send and receive data.

There are various definitions, but we distinguish three types of IoT.

- consumer – devices designed to improve consumers’ daily lives

- industrial – non-consumer devices that companies use in the delivery of their services to improve operational efficiency
- manufacturing – Industry 4.0

This study focuses on Industry 4.0. You can read more about Consumer and Industrial IoT in [our study on the Internet of Things](#).

The term Industry 4.0 originates from Germany. The German government intends to maximise the competitiveness of the manufacturing sector by stimulating digitisation.

Industry 4.0 or Manufacturing IoT systems connect the components of a production process in a factory. Their purpose is to enable “smart manufacturing”. In smart factories, cyber-physical systems monitor physical processes and make decentralised decisions. Via their IoT connection, these cyber-physical systems can communicate and cooperate with each other and with humans in real time. Connected devices include manufacturing equipment and robots.

The main design principles of Industry 4.0 are the following:

Interoperability

Cyber-physical systems allow humans and smart factories to connect and communicate with each other.

Virtualisation

Linking sensor data from cyber-physical systems to virtual plant models and simulation models creates a virtual copy of the smart factory.

Decentralisation

Cyber-physical systems make autonomous decisions and produce locally.

Real-time capability

Data is collected, analysed and translated into insights immediately.

Service orientation

All services of cyber-physical systems and humans are available internally or even cross-company.

Modularity

Smart factories are flexible and can adapt to changing requirements by replacing or expanding individual modules.

Implementing Industry 4.0 systems can generate [considerable benefits for European companies](#) by monitoring operations, providing insights and suggesting methods of improvement. This allows companies to improve operational efficiency and machine uptime, while lowering maintenance cost.

In fact, [companies that use Industry 4.0 technology can perform 10 times better than their peers](#) by being 10 times more effective, efficient and/or faster. They use, for example, smart devices, connected objects and sensors, cloud and big data analytics. However, more than [41% of European small and medium-sized enterprises \(SMEs\) do not use these techniques yet](#). This is an opportunity for Industry 4.0 service providers.

What are Industry 4.0 services?

There are several types of Industry 4.0 services. The large volumes of data Industry 4.0 systems generate are especially suited for outsourcing. The cloud is ideal for managing Industry 4.0 data, which requires considerable scalable resources. Big data skills and solutions are needed to analyse, interpret and base predictions on Industrial 4.0 data.

This study focuses on development services of Industry 4.0 applications that allow integrated monitoring of production facilities, logistics equipment and robots.

Tip:

- For more information, see our studies on [big data](#) and [cloud computing](#).

2 . Why do European companies outsource Industry 4.0 services?

Cost reduction

[For 64% of executives, cost reduction is their main reason for outsourcing IT.](#) This confirms that cost reduction continues to be the main reason for European companies to outsource IT like Industry 4.0 services.

This can give you a clear advantage, as labour is relatively cheap in developing countries. To attract European buyers, your pricing should be competitive, clear and transparent.

Tips:

- Offer competitive pricing, but do not compromise on the quality of your services.
- Be transparent in your pricing: avoid hidden costs.

Expertise and flexibility

Industry 4.0 deals with highly specialised equipment that has to meet the highest of standards. It directly affects companies' core business. This means developing Industry 4.0 applications requires specialised and experienced professionals.

Another key advantage of outsourcing Industry 4.0 services is that European companies then will not need to hire in-house expertise. [A lack of expertise is the main concern among companies implementing Industry 4.0.](#) These services require excellent knowledge and technical skills, which most European companies do not have in-house. As an Industry 4.0 service provider, you can solve this problem for them.

Outsourcing Industry 4.0 services also gives European companies flexibility. Industry 4.0 projects often evolve from their original concept during the process. Service providers have access to the knowledge and skills required to successfully deal with such evolving demands. To benefit from this, you need to be flexible.

To make sure their operational needs are met, European companies may require a try-before-you-buy experience, for example a pilot project or demo.

Tips:

- To provide Industry 4.0 services to European companies, you need to be specialised and experienced in this technology.
- Emphasise your expertise, experience and flexibility in your marketing activities.
- Follow the latest technological developments to keep your knowledge and skills up to date.
- Be flexible and be prepared to adjust the scope of your project along the way.

- European companies often require proof of your technical skills. Provide references, testimonials and examples of recent work, preferably on your website.
- Offer potential buyers a pilot project or a demo to demonstrate transparency and capability. This also establishes trust.

3 . What are the challenges when it comes to outsourcing Industry 4.0 services?

Data security and intellectual property protection

Data security and intellectual property protection are of the utmost importance to European companies. This is especially relevant to outsourcing Industry 4.0 services. [Data security is among the main challenges](#) for companies implementing Industry 4.0, [especially when working with third-party providers](#).

Their major concerns are:

1. operational disruption due to cyber-security breaches
2. liability risks through data loss
3. unauthorised data extraction/modification within company-internal data flow
4. damage to company reputation and loss of trust due to data loss
5. misuse of data during exchange of information with partners
6. loss of intellectual property
7. violation of regulations and laws on data security or data privacy
8. endangerment of operators or users.

[More advanced manufacturers, in particular, are concerned about data ownership](#) when working with third-party providers. They have often discovered that data ownership as formulated in their current contracts is more limited than they thought.

These are important concerns, especially considering that [35% of companies in Europe, the Middle East and Africa \(EMEA\) do not trust the security of their connected devices](#).

European companies generally perceive offshore data security to be of inferior quality. [The European Union currently considers data appropriately protected in a select number of countries](#):

- the 28 countries of the European Union
- the three countries inside the European Economic Area – Iceland, Liechtenstein and Norway
- countries with “adequate” data protection laws – Andorra, Argentina, Canada, Faroe Islands, Israel, New Zealand, Switzerland and Uruguay, as well as the British Islands.

This makes it even more important for you to show potential European buyers that your Industry 4.0 services are secure.

Tips:

- Provide clear information about your company’s data security and privacy measures.
- Apply for standards like the [ISO 27000 series on information security](#) to support your commitment to data security.
- Make sure you comply with [European data protection frameworks](#). See the requirements section for more information.
- Also pay attention to data security within the software you develop. All software has bugs, which you need to handle appropriately.

- Address intellectual property and data ownership and make clear agreements on this with your buyer.
- Offer a Non-Disclosure Agreement.

Lack of knowledge about outsourcing

[Companies are often unsure about which Industry 4.0 services to outsource and who would be suitable providers.](#) They need to decide which services would benefit from a partnership with a third-party service provider and which should be handled in-house. If they are not familiar with the field of Industry 4.0 service providers, this further complicates their decision.

Tips:

- Clearly communicate which services you provide and what the benefits are of outsourcing these services to you.
- Read more on how to come into contact with buyers in our chapter on market channels.

Clear communication

Good communication between customer and service provider is essential to Industry 4.0 services. Poor communication may cause misunderstandings and disagreements, which can lead to disputes with your buyer.

Developing good Industry 4.0 products starts with defining what they should do. Ask your buyer such questions as the following.

- What process should the application innovate or disrupt?
- What are the key performance indicators to monitor?
- How should it interoperate with other connected products, cloud infrastructures and third-party services?

And of course:

- What is your budget?
- What are the deadlines of the project?

The extent of communication with your buyer a project requires depends on the type of contract, which include the following:

Fixed

With a fixed-price contract you agree on specifications, budget and deadlines in advance. During the application development you keep your buyer up to date, but you do not need to negotiate further. This type of contract is suitable for relatively simple and clearly defined projects.

Flexible

More flexible models are especially suitable for relatively complicated projects. This often applies to Industry 4.0 projects, where the scope may develop along the way. Especially interesting for Industry 4.0 development projects are co-investment and revenue sharing models, where you and your buyer share the risks and rewards of the project. These types of contracts require a high level of trust and communication with your buyer.

Tips:

- Listen carefully to your buyer's ideas, problems and wishes and thoroughly document them. Ask questions to better understand what your buyer wants.
- Regularly update your buyer on the progress you are making.
- Be prepared to communicate with your buyer during their office hours, even if they are in a different time zone.
- If you use a fixed-price contract, make clear agreements with your buyer on a structured plan and the expected timeline of the project.
- For more information on the different types of contracts, see Cleveroad's [Types of Contracts in Outsourcing: How to Make a Wise Decision](#).

4 . Which European markets offer opportunities for Industry 4.0 services?

European Industry 4.0 market is growing

[Europe is projected to account for more than a third of global Industry 4.0 investments](#) by 2020. The market is expected to grow at an impressive average annual growth rate of 22%. Reaching a value of €287 billion in 2020, [Industry 4.0 is Europe's largest IoT market](#).

European companies apply Industry 4.0 techniques in, for example:

- supply chain and warehouse management processes – real-time tracking of demand, order fulfilment, manufacturing flow, returns, etc.
- production lines – real-time control of performance, durability and safety of the products
- predictive maintenance – real-time monitoring of industrial manufacturing devices allows companies to predict when maintenance is required.

Many of these new Industry 4.0 technologies are rapidly becoming commodities in the way that such things as cloud computing did earlier. This means your window of opportunity in new technologies, business models and market segments is limited.

Tips:

- Provide examples of how your services have optimised operations for your clients. Include the concrete – financial – benefits this generated for them.
- To establish your position in this market you need to move fast, building your capabilities and experience in Industry 4.0 services.

Western and northern Europe are main Industry 4.0 markets

[The European manufacturing industry is responsible for 15% of GDP](#). Countries with an especially large manufacturing sector include Germany and Ireland, as well as various Eastern European countries.

However, for a market to be promising for Industry 4.0 services it also needs to be ready for these

techniques. This depends on, for example, production process maturity, degree of automation, degree of innovation, industry openness and internet use.

[Industry 4.0 readiness is considerably greater in western and northern Europe](#) than in other parts of Europe. As the founder of the movement, Germany scores particularly high. Combining readiness with the importance of the manufacturing sector reveals four types of European markets.

Promising market types are:

Frontrunners

These countries generally have a large manufacturing industry and modern, forward-looking business conditions and technologies. They are:

- Germany
- Ireland
- Sweden
- Austria.

Potentialists

The manufacturing industries of these countries are in decline. However, they possess a modern and innovative outlook that gives them the potential to implement Industry 4.0 techniques. This group consists of:

- Belgium
- Finland
- the Netherlands
- Denmark
- United Kingdom
- France.

Market types that are lagging behind are:

Traditionalists

These mainly Eastern European countries have a thriving manufacturing industry, which could make them promising Industry 4.0 markets. However, so far these markets continue to focus on traditional manufacturing and are not ready for digitisation. These countries are:

- Czech Republic
- Hungary
- Slovakia
- Slovenia
- Lithuania.

Hesitators

These countries do not have a particularly strong manufacturing industry. In addition, the sector is not ready for Industry 4.0 in these countries. This group consists of southern and Eastern European countries:

- Italy
 - Spain
 - Estonia
 - Portugal
 - Poland
 - Croatia
 - Bulgaria.
- 

Tips:

- Focus on companies in western and northern Europe, especially those in the Frontrunners and Potentialists categories.
- Keep track of developments in Traditionalist markets. These countries have interesting manufacturing industries with Industry 4.0 potential which, for example, future government initiatives could unlock.

European IT outsourcing market continues to grow

Some [41% of European companies plan to increase their IT outsourcing](#). Another 37% intends to continue outsourcing at their current rate, while 13% has not decided and a mere 9% plan to decrease their IT outsourcing activities. This indicates that the European IT outsourcing market continues to be a promising target market.

5 . Which trends offer opportunities on the European market for Industry 4.0 services?

Development of European standards

For a successful implementation of Industry 4.0 across Europe, standardisation is crucial. To allow devices/equipment to communicate regardless of manufacturer, operating system or other technological details, there should be standards for systems, platforms, protocols, connections and interfaces.

Currently, these standards are lacking. This is a considerable barrier for companies. In fact, [for 21% the need for standardisation is the main challenge](#) keeping them from implementing Industry 4.0 systems.

[The European Commission is now working on the development of European standards](#). These standards should make it easier for companies to connect their existing and new equipment, regardless of their service provider. Therefore, the publication of European standards is expected to drive the further rollout of Industry 4.0 in the coming years. Although such standards are voluntary, you should comply because they allow you to sell your products across Europe.

Tips:

- Keep up to date on the [development of European standards](#).
- When the standards are released, comply with them to ensure access to the European market. Clearly communicate your compliance to your potential European buyers.

National Industry 4.0 initiatives

Several European countries have launched or are launching national initiatives to stimulate Industry 4.0 implementation.

These initiatives include the following:

- France - [La Nouvelle France Industrielle](#)
- Germany - [Industrie 4.0](#)
- Italy - [Intelligent Factories](#)

- the Netherlands - [Smart Industry](#)
- Slovakia - [Smart Industry](#)

National initiatives like these can have a positive effect on the market for Industry 4.0 services in these countries. They often invite companies to participate and give input on important subjects to make the transition easier. They do so, for example, via [workshops with stakeholders](#), including scientists, associations, trade unions and federal ministries.

Tips:

- Check the European Commission's [map of national Industry 4.0 initiatives](#) for programmes in your target countries.
- Keep track of new initiatives, which can boost their national markets for Industry 4.0 services.

Skills shortage

As Industry 4.0 rolls out, there is an increasing need for specialised developers. However, there is a considerable lack of IT training, certification and experience in the European workforce. Due to the rapid technological innovations in IT, the skills of IT graduates do not match the needs of the market. The European Commission expects that [the shortage of IT-skilled staff could reach 825,000 by 2020](#).

Because of this, European companies need to outsource their Industry 4.0 services to providers with the required expertise. This offers you good opportunities.

Tips:

- Closely follow upcoming Industry 4.0 developments and build capacity in these technologies.
- Emphasise your professional skills in your marketing, as well as the lower cost you offer.
- Ensure your access to skilled professionals, for example by working with universities, setting up training courses or centres, systematically collecting and analysing CVs and developing a partner network of companies and individuals.

See our study about [trends on the European outsourcing market](#) for more information on general trends.

6 . With which requirements must Industry 4.0 services comply to be allowed on the European market?

What legal and non-legal requirements should you comply with?

European data protection legislation

The European Union protects the privacy of its citizens with the [Data Protection Directive](#) (95/46/EC), by regulating the:

- processing of personal data

- free movement of personal data.

For example:

- Personal data may only be processed with the consent of the subject.
- Personal data must be processed confidentially and securely.

The vast changes in technology since 1995 demand a stronger, more universal regulation. Therefore, in May 2016 the new [General Data Protection Regulation](#) (GDPR, EU 2016/680) and [Directive \(EU\) 2016/680](#) on data protection came into force. This GDPR is set to replace the original Data Protection Directive. All Member States have to implement it in national legislation by May 2018.

The main change you have to prepare for is that the GDPR makes you responsible for data protection. Under the old directive, any data by which an individual can be identified was the sole responsibility of the data controller (owner). However, under the GDPR any company or individual that processes data is also responsible for its protection. This includes parties from outside the European Union, like you. This means your data protection systems need to be in order.

Tip:

- Read more about the [protection of personal data](#) on the website of the European Commission. It also keeps you updated on the reforms of the European data protection legislation.

Copyright – Legal protection of computer programs

The European Union has established specific rules to protect computer programs by means of copyright. This [Directive on the legal protection of computer programs](#) (2009/24/EC) means that you have to make sure not to breach any copyright when placing your computer program on the market. However, it also protects your products against unauthorised reproduction.

Tip:

- Read more on the [legal protection of computer programs](#) on the website of the European Commission.

7 . Which additional requirements do buyers often have?

Voluntary data security ISO standards

Data security is one of the main challenges for service providers. This includes both data protection and recovery systems. Many European buyers expect you to have information security and management systems in place, especially in industries where security is essential, such as finance and banking or mobile applications. The [ISO 27000 series on information security](#) contains common standards for information security.

Tips:

- Make sure you have effective security processes and systems in place, from business continuity and disaster recovery to virus protection.

- Ask your buyer to what extent they require you to implement a security management system like the [ISO 27002 code of practice for information security](#).

See our study about [buyer requirements on the European outsourcing market](#) for more information.

8 . What competition will you be facing on the European Industry 4.0 services market?

Competition on the European Industry 4.0 services market does not differ significantly from the outsourcing market in general. See our study about [competition on the European outsourcing market](#) for an overview. Also refer to our [top 10 tips for doing business with European buyers](#).

Nearshoring more popular than offshoring

European companies prefer to outsource services to providers within the same country (onshoring). When outsourcing abroad they prefer nearshore locations because of proximity, language, cultural similarities and the little or no time difference. These are usually Eastern European countries, due to their relatively low wages, such as Poland, Bulgaria and Romania.

However, prices in nearshore countries are rising. This development makes service providers in these countries less competitive for offshore service providers. It makes European companies more open towards outsourcing to destinations further away. You can choose to form subcontracting partnerships with these nearshoring providers, or compete with them.

[Offshoring destinations with the strongest potential](#) are:

- India
- China
- Malaysia
- Brazil
- Indonesia.

Tips:

- Limit the possible disadvantages of being offshore. Provide excellent communication, availability in the required time zone and good security and privacy measures.
- Distinguish yourself from onshore and nearshore providers to remain competitive. Emphasise how you are different in your marketing message. Do not just compete on price, but also analyse what other advantages you can offer, such as access to skills, specialised industry expertise or around-the-clock operations (24/7).
- Research what your competitors are doing right and wrong. This can help you distinguish yourself from them.
- Partner with nearshore service providers, as Eastern European companies are looking for cheaper destinations. Many service providers in developing countries have not yet recognised this opportunity.

9 . Which channels can you use to put your Industry 4.0 services on

the European market?

Subcontracting by European service providers

Subcontracting by European service providers is your most realistic market entry channel. It entails European service providers subcontracting Industry 4.0 services to you that end-user companies have contracted to them.

Tips:

- Decide on a business model. Either develop your own Industry 4.0 solutions, or focus on development services for a European partner.
- Target service providers whose size is in line with your capacity.
- Focus on companies that serve the same industries as your company.
- Attend relevant industry events in your target country to meet potential partners. This also allows you to learn more about their business culture. Consider, for example, [AUTOMATICA](#), [Hannover Messe](#), [Industry of Things World](#), [Internet of Manufacturing](#) and [IT2Industry](#) in Germany and [Industry 4.0 Summit / Factories of the Future EXPO](#) and [The Manufacturer Smart Factory Expo](#) in the United Kingdom.
- Use industry associations to find potential customers in Europe, such as [Bitkom](#) in Germany, [Nederland ICT](#) in the Netherlands and [UKITA](#) in the United Kingdom.
- National outsourcing associations can also be interesting sources to find potential customers, including [Global Sourcing Association](#) in the United Kingdom, [Outsourcing Verband](#) in Germany and [Platform Outsourcing](#) in the Netherlands.
- Develop good promotional tools, such as a professional company website and a company leaflet. Also invest in Search Engine Marketing, so potential customers can easily find your company online.

Intermediary

You can approach European service providers and end users of Industry 4.0 services directly or through an intermediary. A local contact person is an advantage, especially if you are located in a lesser-known outsourcing destination. Intermediaries, such as a consultant/matchmaker or sales/marketing representative, can therefore be an important channel to establish contact with potential buyers.

See our study about [market channels and segments on the European outsourcing market](#) for more general information. Also refer to our study on [finding buyers in the European market](#).

10 . What are the end-market prices for Internet of Things services?

Price is the main reason for European companies to outsource Industry 4.0 services to developing countries. Staff salaries make up a large share of the costs of these services. This means outsourcing them to countries with lower wages can lead to considerable savings. For example, the average annual salary of a software developer in western Europe is between €36,000 and €50,000, while in offshore destinations this is usually significantly lower.

Tips:

- Research the average salaries in your European target country, for example via [Payscale](#), a

global database for salary profiles.

- Emphasise the potential salary savings in your marketing.

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